State Of South Carolina Coastal Management Program and Final Environmental Impact Statement

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UNITED STATES

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

PROPOSED

COASTAL MANAGEMENT PROGRAM

FOR

THE STATE OF SOUTH CAROLINA

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MAR 25 1997

State of South Carolina

RICHARD W. RILEY
GOVERNOR

OFFICE OF THE GOVERNOR
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COLUMBIA 29211

June 19, 1979

Mr. Robert M. Knecht
Office of Coastal Zone Management
National Oceanic and Atmospheric Administration
3300 Whitehaven Avenue, N. W.
Page Building #1
Washington, DC 20235

Dear Mr. Knecht:

It is my pleasure to submit to you the South Carolina Coastal Program for final approval pursuant to the Federal Coastal Zone Management Act as amended (P.L. 92-583, 94-370). This program meets both the requirements of 15 CFR part 923 (Federal Register, March 1, 1978) and those of the South Carolina Coastal Management Act of 1977 (Act 123).

The South Carolina Coastal Program, developed and to be implemented by the South Carolina Coastal Council, was approved by myself and the General Assembly on February 14, 1979 (Ratification No.19). This approval attests to our belief that the State has the necessary organization and authority to implement this management program.

We in South Carolina believe this comprehensive program will provide a sound guide in the future for preservation and wise development of valuable, irreplaceable natural resources of our coastal zone.

Very truly yours,

Richard W. Riley

RWR/jkw

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NOTE TO READERS

The National Environmental Policy Act of 1969 (NEPA) requires that an environmental impact statement be prepared as part of the review and approval process of major actions by Federal agencies which significantly affect the quality of the human environment. The action contemplated here is approval of the South Carolina Coastal Program under Section 306 of the Federal Coastal Zone Management Act of 1972, as amended.

Approval qualifies South Carolina for Federal matching funds for use in implementing and administering the coastal management program. In addition, the Coastal Zone Management Act stipulates that Federal activities affecting the coastal zone shall be consistent, to the maximum extent practicable, with the approved coastal management program.

It is the general policy of the Office of Coastal Zone Management (OCZM) to issue a combined final environmental impact statement (FEIS) and coastal management program document. Part I of this FEIS was prepared by OCZM and includes a summary of South Carolina's coastal management program, as well as a summary of all comments received on the DEIS and responses to those comments. Part II of the FEIS is a detailed description of the state's program, and was prepared by the South Carolina Coastal Council as were the appendices and attachments. Part II also fulfills, in part, the NEPA requirement for a description of the proposed action. Part III addresses the remainder of the NEPA requirements for a FEIS and was prepared jointly by OCZM and the South Carolina Coastal Council.

For purposes of reviewing the proposed action, the important Federal concerns are:

- whether the South Carolina program is consistent with the objectives and policies of the national legislation,
- whether the award of Federal funds under Section 306 of the CZMA will help South Carolina meet those objectives,
- whether the State's management authorities are adequate to implement the South Carolina Coastal Program, and
- whether there will be a net environmental benefit as a result of program approval and implementation.

OCZM has made a preliminary assessment that the answers to these questions are affirmative. OCZM wants the widest possible circulation of this document to all interested agencies and parties in order to receive the fullest expression of opinion on these questions, and wishes to thank those participating in the review of the South Carolina program and this final environmental impact statement.

( ) Draft Environmental Impact Statement

(x) Final Environmental Impact Statement

This document was prepared by the Department of Commerce, National Oceanic and Atmospheric Administration, Office of Coastal Zone Management. For additional information about the proposed action or this document, contact:

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Regional Manager
South Atlantic Region

Marion Cox
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South Atlantic REgion

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Washington, D.C. 20235
Phone: (202) 254-7494

Written comments should be addressed to: John Phillips at the above address.

1. TYPE OF ACTION

Proposed Federal approval of the South Carolina Coastal Program

(x) Administrative ( ) Legislative

2. BRIEF DESCRIPTION OF THE ACTION

It is proposed that the Assistant Administrator approve the Coastal Management Program application of the State of South Carolina pursuant to P.L.92-583. Approval would permit implementation grants to be awarded to the State, and require that Federal actions be consistent with the program.

3. SUMMARY OF ENVIRONMENTAL IMPACTS AND ADVERSE ENVIRONMENTAL EFFECTS

Approval and implementation of the program will enhance governance of the State's coastal land and water areas and uses according to coastal policies and standards implemented by existing State and local authority. The effect of these policies and standards is to condition, restrict or prohibit some uses in parts of the coastal zone, while encouraging development and other uses in other parts. This program will improve decision-making processes for determining appropriate coastal land and water uses in light of resource considerations and will increase predictability of public and private coastal decisions. The program will result in some short-term economic impacts on coastal users but will lead to increased long-term protection of and benefit from the State's coastal resources.

4. ALTERNATIVES CONSIDERED

I. The Assistant Administrator could delay or deny program approval if the policies of the program are not specific enough to ensure a sufficient degree of predictability in decision-making.

II. The Assistant Administrator could delay or deny program approval if the definition of Uses of Regional Benefit (URB's) is not sufficiently broad to meet the requirements and intent of the CZMA as amended.

III. The Assistant Administrator could delay or deny program approval if the State has not clearly defined its §307 Federal Consistency procedures.

5. DISTRIBUTION*

Comments have been requested from the following Federal, State, and local agencies and other parties:

Federal Agencies

Advisory Council on Historic Preservaation
Department of Agriculture
Department of Commerce
Department of Defense
Department of Energy
Department of Health, Education & Welfare
Department of Housing & Urban Development
Department of the Interior
Department of Justice
Department of Labor
Department of Transportation
Environmental Protection Agency
Federal Energy Regulatory Commission
General Services Administration
Marine Mammal Commission
Nuclear Regulatory Commission
U.S. Coast Guard

*Upon request, copies were sent to all individuals and other interested parties not listed as receiving copies of the DEIS.

National Interest Groups

A.M.E.R.I.C.A.N.
AFL-CIO
American Association
of Port Authorities
American Bar Association
American Bureau of Shipping
American Farm Bureau Federation
American Fisheries Society
American Forest Institute
American Gas Association
American Hotel and Motel Association
American Industrial Development Council
American Institute of Architects
American Institute of Merchant Shipping
American Institute of Planners
American Littoral Society
American Mining Congress
American Oceanic Organization
American Petroleum Institute
American Shore and Beach Preservation Association
American Society of Civil Engineers
American Society of Landscape Architects, Inc.
American Society of Planning Officials
American Water Resources Association
American Waterways Operators
Amoco Production Company
Ashland Oil, Inc.
Associated General Contractors of America
Association of Oil Pipe Lines
Atlantic Richfield Company
Atlantic States Marine Fisheries Commission
Atomic Industrial Forum
Barrier Islands Coalition
Boating Industry Association
Center for Law and Social Policy
Center for Natural Areas
Center for Urban Affairs
Center for Urban & Regional Resources
Chamber of Commerce of the United States
Chevron U.S.A., Inc.
Cities Service Company
City Service Oil Company
Coastal States Organization
Conservation Foundation
Continental Oil Company
Council of State Governments
Council of State Planning Agencies
The Cousteau Society
Earth Metabolic Design Laboratories, Inc.
Edison Electric Institute
El Paso Natural Gas Co.
Environmental Policy Center

Environmental Defense Fund, Inc.
Environmental Law Institute
EXXON Company, U.S.A
Friends of the Earth
Getty Oil Company
Great Lakes Basin Commission
Gulf Energy and Minerals, U.S.
Gulf Oil Company
Gulf Refining Company
Gulf South Atlantic Fisheries Development Foundation
Independent Petroleum Association of America
Industrial Union of Marine & Shipbuilding Workers of America
Institute for the Human Environment
Institute for Marine Studies
Interstate Natural Gas Association of America
Izaak Walton League
Lake Michigan Federation
League of Conservation Voters
League of Women Voters Education Fund
Marathon Oil Company
Marine Technology Society
Mobil Oil Coporation
Mobil Exploration & Producing, Inc.
Murphy Oil Company
National Academy of Engineering
National Association of Conservation Districts
National Association of Counties
National Association of Dredging Contractors
National Association of Electric Companies
National Association of Engine & Boat Manufacturers
National Association of Home Builders
National Association of Realtors
National Association of Regional Councils
National Association of State Boating Law Administrators
National Association of State Park Directors
National Audubon Society
National Boating Federation
National Canners Association
National Coalition for Marine Conservation, Inc.
National Commission on Marine Policy
National Conference of State Legislators
National Environmental Development Association
National Farmers Union
National Federation of Fisherman
National Fisheries Institute
National Forest Products Association
National Governor's Associaation
National League of Cities
National Ocean Industries Association
National Parks and Conservation Association

National Petroleum Council
National Petroleum Refineries Association
National Realty Committee
National Recreation and Park Association
National Research Council
National Science Foundation
National Science Teachers Association
National Shrimp Congress
National Society of Professional Engineers
National Wildlife Federation
National Waterways Conference
Natural Gas Pipeline Company of America
Natural Resources Defense Council
The Nature Conservancy
Nautilus Press
New England River Basin Commission
North Atlantic Ports Association
Outboard Marine Corporation
Resources for the Future
Rice University Center for Community Design
and Development
Shell Oil Company
Shellfish Institute of North America
Shipbuilders Council of America
Sierra Club
Skelly Oil Company
Society of Industrial Realtors
Society of Real Estate Appraisers
Soil Conservation Society of America
Southern California Gas Company
Sport Fishing Institute
Standard Oil Company of Ohio
Sun Company, Inc.
Tenneco Oil Company
Texaco, Inc.
Texas A & M University
United Brotherhood of Carpenters & Joiners
of America
Union Oil Company of California
Urban Reseach and Development Association, Inc.
U.S. Conference of Mayors
U.S. Power Squadrons
Virginia Marine Resources Commission
Water Pollution Control Federation
Water Transportation Association
Western Oil and Gas Association
Wildlife Management Institute
The Wildlife Society
World Dredging Association

State Distribution

Governor
Attorney General
Archeology Institute
Patriots Point Development Authority
South Carolina Department of Archives and History
South Carolina Department of Health and Environmental Control
South Carolina Department of Highways and Public Transportation
South Carolina Department of Parks, Recreation, and Tourism
South Carolina Forestry Commission
South Carolina Land Resources Conservation Commission
South Carolina Public Railways Commission
South Carolina Public Service Authority
South Carolina Public Service Commission
South Carolina State Budget & Control Board
South Carolina State Development Board
South Carolina State Ports Authority
South Carolina Water Resources Commission
South Carolina Wildlife & Marine Resources Department

Local Distribution

Beaufort County
Beaufort County Development Commission
Beafort County Joint Planning Commission
County Administrator
Mayor, Port Royal

Berkeley County
County Administrator, Hanahan
County Supervisor
Development Board, Moncks Corner
Mayor, Goose Creek

Charleston County
Charleston County Mosquito Abatement Program
Charleston County Parks, Recreation & Tourism
Charleston County Planning Board
Charleston County Public Works Department
City Administrator, Folly Beach
City Administrator, Isle of Palms
City Hall, Isle of Palms
City Manager, Mt. Pleasant
Clerk, Ravenel
Clerk, Sullivans Island
Manager, Charleston County
Mayor, McClellanville
Mayor, North Charleston

Colleton
County Supervisor
Mayor, Edisto Beach
Walterboro-Colleton Recreation Commission

Dorchester
County Administrator
Mayor, St. George
Mayor, Summerville

Georgetown
Administrative Assistant, Georgetown
Georgetown County Health Department

Horry
Administrative Assistant, North Myrtle Beach
Horry County Planning Commission
Mayor, Myrtle Beach
Mayor, Surfside Beach
Planner, City of Myrtle Beach
Planning Zoning Commission, Surfside Beach

Jasper
Jasper County Council
Jasper County Joint Planning Commission
Mayor, Hardeeville
Town Administrator, Ridgeland

Regional Councils of Government
B-C-D Regional Planning Commission
Lowcounty Council of Governments
Waccamaw Regional Planning Council

South Carolina Special Interest Groups
Cooper River Water Users Association
Historic Charleston Association
The Jean-Michel Cousteau Institute
Junior League of Charleston
League of Women Voters
League of Women Voters, Local Chapters
Myrtle Beach Board of Realtors
Myrtle Beach Environmental Association, Inc.
National Audubon Society, Local Chapters
North Myrtle Beach Citizens Association, Inc.
Osceola
South Carolina Bankers Association
South Carolina Chamber of Commerce
South Carolina Environmental Coalition
South Carolina Petroleum Council
South Carolina Wildlife Federation
Save the Wando Association, Inc.
Savings and Loan Association of South Carolina

6. The appendices to the Draft EIS have not been reprinted in the Final EIS. Copies may be obtained from either OCZM or the South Carolina Coastal Council.

[illegible] written comments received on the proposed South Carolina [illegible]ogram. The full text of all written comments received has been prepared as an attachment to this Final Environmental Impact Statement and will be sent to all those commenting on the South Carolina Coastal Management Program DEIS. Additional copies of the attachment can be obtained from the Office of Coastal Zone Management.

The Office of Coastal Zone Management, in consultation with the State of South Carolina, has responded to the comments listed in this Part. The responses appear directly following each summarized comment. Strictly editorial comments have been forwarded directly to the State for inclusion in the FEIS and do not appear in the synopses which follow.

The Citadel
William Bruce Ezell, Jr.
May 17, 1979

Comments

1. Under Section VIII, Dredging (pages III-55 to III-59), the authors of this section failed to note the most important (albeit a negative one) ecological impact of the disposal of dredged material. . .namely the production of mosquito larvae within fissured, dried dredged material. In the South Carolina Coastal Zone dredged material disposal sites in the State's harbours and along the Atlantic Intra-Coastal Waterway (AIWW) are known sources of important mosquito species such as Aedes taeniorhynchus and Aedes sollicitans. The impact of these two arthropods upon the health and well-being of residents of South Carolina is well known and should have been cited in the EIS.

Under Dredging, Disposal Policies (pages III-57 to III-58) the report fails to cite the need for well-planned and ecologically sound policies for mosquito control efforts within dredged material disposal sites, regardless of the local sponsor or nature of the project.

No mention is made of the need to manage dredged material disposal sites in such a manner that mosquito breeding is suppressed or eliminated,(page III-57). I feel that the policies relating to the disposal of dredged material should allow for water management techniques that allow for mechanisms that restore tidal flushing action to the disposal site. In this manner the introduction of a variety of marine life (such as predatory fish) would tend to decrease mosquito production.

Response

1. The South Carolina Coastal Council recognizes the effect of certain activities in the coastal zone on mosquito populations--most especially the activities of dredged material disposal and creation of impoundments. The Council agrees that the coastal management program should address the problems of mosquito production and control because of the significant adverse impacts that certain mosquito species can have on the human population.

Dredge policies now indicate that mosquito control must be considered by SCCC in permit decisions regarding disposal of dredged material. The Mosquito (Vector) Control Division of DHEC is notified and responds to all permit applications from the SCCC. The SCCC relies heavily on these recommendations in making its permit decisions based on the technical expertise of this Division.

Please see changes to the management program document on pages III-54 policy #1(d) and III-57 policy #1(d).

Comment

2. The Waterways Experiment Station of the U.S. Army Corps of Engineers recently completed a massive research effort on the ecology and management of dredged material under the Dredged Material Research Program (DMRP). Some of these studies include:

A study of the locations and mosquito potential of all dredged material disposal sites in the Charleston Corps of Engineers District in South Carolina;

A study of the ecological impact of dredging on marshland that was based in South Carolina. The report fails to note the importance of the introduced plant Phragnites communis (common reed), and also fails to note the historical association of freshwater mosquitos within diked estuarine ponds.

The Coastal Council takes note of the several studies and reports brought to its attention by these comments, and would point out that its bibliography was not intended to be all-inclusive. The Council appreciates having these studies and reports identified for future reference.

Various discussions of plant species which appear throughout the program document are not intended to be academic, all-inclusive treatments of the subject. The Coastal Council is aware of the potential importance of Phragmites communis and appreciates its being cited in the comment. Also, in response to the comment on freshwater mosquitos, please see Response No. 1.

Comment

3. In Volume II, under Areas of Particular Concern (pages F-2 to F-4), the report fails to cite the importance of Drum Island in Charleston Harbour as a Bird Rookery. Drum Island is also a major source of salt marsh mosquitoes for downtown Charleston. The occurrance of large numbers of birds and mosquitoes within the same proximity suggests a potential for the transmission of the encephalitide viruses to man. The public health aspect of this phenomenon was not addressed in the EIS.

Response

Federal regulations contain certain criteria which sites or areas must meet in order to be designated as Geographic Areas of Particular Concern. To date, Drum Island does not meet these criteria. As sites, other than those listed in the Appendices, come to meet these criteria, they will automatically become GAPCs. The Council welcomes nominations from all interested parties for future GAPCs.

Max Askey
May 18, 1979

Comments

1. The Charleston County Mosquito Abatement Program endorses the statement made by the South Carolina Department of Health and Environmental Control, Division of Vector Control, and recommends that it be incorporated into the Impact Statement.

The State of South Carolina Coastal Management Program and Draft Environmental Impact Statement is insufficient in its statements concerning mosquitoes.

Response

Please refer to response No. 1 to The Citadel and response No. 1 to the South Carolina Department of Health and Environmental Control.

Comments

1. In a number of instances, a good, sound management policy is reduced by insertion of such words as "should not," "discouraged," "to the extent possible," or "unless no feasible alternative exists. . .". Following are only some of the specific policy areas with which there is concern with the terminology.

a. Guidelines for Evaluation of all Projects (page III-14.8) ". . .no feasible alternative" and "any substantial environmental impact" is minimal. In this statement how can substantial environmental impact be minimal. Also, if "no feasible alternative" must remain in this statement, then no action must be considered as a viable alternative.

b. Page III-15.II.1) "The extent to which the activity requires a waterfront location or is economically enhanced by its proximity to the water." Perhaps the underlined portion of this statement should be deleted because it opens the door for approval of almost any residential development. It is a known fact that proximity to water enhances almost any residential lot value.

c. Page III-16.1(b) "Residential development which would require filling or other permanent alteration of salt, brackish or freshwater wetlands will be prohibited, unless no feasible alternatives exist . . .". Again, the decisiveness of this policy statement is weakened by the phrase "unless no feasible alternatives exist." The phrase should either be omitted or no action considered as a feasible alternative.

Responses

a. Please note editorial changes to guidelines which reflect your concerns. Also please note revised definition of "feasibility," which allows for a "no action" alternative.

b. This guideline must be viewed in the context that it is a general consideration for evaluation of all projects in the critical areas, and other specific rules and regulations will also be employed in the review and evaluation of individual permit applications. The economic consideration is not an overriding one. The language explicitly tracks Section 15(A) of the South Carolina Coastal Management Act of 1977.

c. See Response a., above. In addition, it should be noted that some Council certifications have already been denied for the filling of freshwater wetlands for residential development when it was thought that feasible alternatives existed. It should be noted that the thrust of this statement is consistent with EPA's §404(b)(1) guidelines [230.5(b)(8)], i.e., that other site or construction alternatives are not practicable.

Comment

2. Page III-20. This section concerning port facilities should also include a requirement for considering intensified use of existing facilities for expansion such as highrise container storage, etc.

Response

Resource Policies (1) and (3) p. III-19-20 read in conjunction address the concern expressed in this comment. (In addition, Recommended Policy (2) specifically covers this point.)

3. Page III-22.1. The policy on roads and highways should include a provision requiring bridge construction techniques which avoid dredging or filling, thus preserving the marsh below the bridge.

Response

Resource Policies (1)(a) and (2)(a) and (b), p. III-22 address the concern expressed in this comment. Feasibility in the case of bridging wetlands refers to engineering capabilities and extremes in cost differential.

Comment

4. Page III-31. Where temporary access roads through wetlands are required to reach a land parcel to be logged, a performance bond should be required of the applicant in an amount adequate to have the temporary fill removed and marsh restored after the logging activity is complete, should the applicant fail to remove the material himself.

Response

Requiring a performance bond would be unnecessary duplication since any applicant must observe the requirements or conditions of a permit in order to continue an activity legally or face punitive enforcement action. This applies to removal of temporary roads or other structures if such a request is made a stipulation of permit issuance.

Comment

5. Page III-55.1(d). "Dredging for establishment of new canals which involves permanent alteration of valuable wetland habitats, especially for the purposes of creating waterfront lots from inland property or for creating dead-end canals, will be prohibited unless the Council finds there will be no significant environmental impacts." This is a highly inconsistent statement. You cannot permanently alter valuable wetlands and replace them with a dead-end canal development and still have ". . .no significant environmental impacts." Unfortunately, it is in reality quite possible for a politically influenced Council to conclude that there will be no significant environmental impact from such a development. Therefore, we suggest that portion of the statement which reads ". . .unless the Council finds there will be no significant environmental impacts" be deleted.

Response

Please note the change in language on page III-55, Policy 1(d). The State agrees that the permanent alteration of wetlands almost always has significant environmental impacts. Changes in policy language are intended to strengthen the Council's ability to prohibit such activities unless an overwhelming public interest exists. Also this revised policy language is intended to extend the application of this policy to upland areas as well (non-wetland areas).

Comment

6. Page V-5 and V-23. Table 1 on page V-5 lists the NPDES program and air emissions permits as items under DHEC's responsibility, while on page V-23, EPA is responsible for these programs. Since the EPA has delegated these programs to DHEC, it seems the State would direct the applicant to determine consistency. In any case, the EPA is not entirely clear on the consistency procedures within this plan and suggests additional discussions prior to the FEIS.

correction on page V-23, which has deleted from the list subject to consistency review those permit activities which have been delegated to DHEC.

Comment

7. The Draft EIS portion of the CZM plan recognizes the importance of wetlands and points to the unlikeliness of their being filled. However, the policies preceding the DEIS contain too many stipulations (often the same word or phrase) which could allow approval of an environmentally destructive project. As stated earlier, most of the time the stipulation involves the word "feasible" which is defined in the glossary section of the document. However, even with this definition, terminology involving the word feasible is ultimately discretionary and can lead to arbitrary decisions. For this reason, a number of the policy statements are weakened in their effectiveness when they contain this terminology.

Response

Please refer to Response No. 7, NRDC comments. Also please note that editorial changes have been made to policies which eliminate unnecessary qualifiers.

Comment

8. It appears that some areas containing high quality wetland habitat have been excluded from the "critical area" category and are not delineated on the maps depicting "areas of unique natural resource value." Most of these excluded areas are positioned upstream on various major rivers such as the Waccamaw and Cooper, as well as their tributaries. If this is indeed the case, it seems arbitrary to exclude them.

Response

"Critical area" is defined by a geographical boundary which generally includes salt and brackish wetlands and is defined for the purpose of the direct permit issued by the Council. "Areas of unique natural resource value" is a designation which only applies to GAPCs. Designation as a critical area does not necessarily imply designation as an area of unique natural resource value.

It would be impossible to single out and map every area of high quality wetland habitat as an area of unique natural resource value. However, the Coastal Council has adequate jurisdiction over all quality wetlands through review and certification of State permits, direct Council permits, and Federal consistency of Corps of Engineer and other Federal permits.

The SCCC recognizes that other high quality wetland habitat areas do exist in the coastal zone and would welcome working with EPA in considering additional areas for nomination as GAPCs.

In addition, please note Audubon Response No. 11 and NRDC Response No. 1(c).

Comment

1. The SCCMP should discuss the certification requirements and legal authorities on hydroelectric projects under FERC's licensing jurisdiction which are located outside of the coastal zone but may significantly affect the coastal zone.

Response

The State agrees that a clearer discussion should be included regarding consistency not only for Federally licensed projects outside of the coastal zone which may directly affect the coastal zone but also for direct Federal activities and development projects, Federal assistance, and OCS activities. Therefore, please note the changes in the document which include under operational guidelines for each category the consistency of these development projects and activities outside of the coastal zone. The changes are found on page V-17, page 23, and page 32. Also, please note the addition of projects under FERC's licensing jurisdiction.

Comment

2. Future alternatives for power supply in South Carolina are discussed on page IV-36. We would like to point out that the President's National Energy Plan includes installation of small hydroelectric generating facilities at existing dam sites. There are a great number of retired small hydroelectric powerplants in South Carolina, which could be reactivated or redeveloped to provide electric energy needs. We believe that the development of small hydroelectric power at existing dams should be considered as an alternative power supply for South Carolina.

Response

The State agrees, and the inclusion of the possible development of small hydroelectric generating facilities at existing dams has been added on page IV-36, 7th paragraph under Future Alternatives.

Comment

Liquified Natural Gas (LNG) Policies

3. There is concern about the wording used in the State's LNG policies, as presented on page IV-48. The expression "areas of significant population" is not sufficiently clear to permit a reasonable determination of available LNG sites. Also, we are opposed to the inclusion of areas that are "likely to become significantly populated. . ." in the State's prohibition. If a facility were located in a sparsely populated area, it is likely that economic and aesthetic factors would automatically limit any future population increases.

Policy V on page IV-48 is inappropriate. The State's intention appears to be to minimize truck transportation of LNG throughout South Carolina. However, the State's recommendation that LNG be moved by pipeline is technically infeasible. More likely, the LNG would first be regasified at the import terminal before being transported by pipeline as a gas. The proposal that safeguards for LNG truck transportation be as strenuous as those for LNG tankers is unacceptable. LNG tanker transportation is regulated in a variety of ways by the Coast Guard. If the State wishes to develop standards for LNG truck transportation it should do so in cooperation with the Department of Transportation. However, South Carolina should avoid singling out LNG transportation for stringent regulation when many volatile and potentially more dangerous liquid fuel transportation situations are being overlooked.

Note the change on page IV-43 which strikes "likely to become significantly populated." The State agrees that future population patterns are difficult to predict. Areas of significant population are any areas other than rural areas.

Also please note the language change on page IV-49 which clarified that the State's intention is to encourage regasification of LNG to be moved through pipelines unless no feasible alternatives exist.

The State does intend to minimize truck transportation of LNG through urban areas. Rather than developing standards for LNG truck transportation now which may never be needed, the intention of the State is to go on record that those standards might need to be developed in conjunction with any specific facility planning to locate in the coastal zone.

Comment

4. Uses of Regional Benefit

As acknowledged by OCZM, South Carolina presents a very restrictive list of proposed uses of regional benefit. From the State's general definition many more facilities would qualify under uses of regional benefit. The list of uses of regional benefit should be expanded to include all energy producing and transportation facilities.

Response

The CZMA (See §923.12 OCZM Rules and Regulations) allows states the flexibility to determine what uses they consider to be land and water uses of regional benefit. The State's determination that parks and transportation facilities are their only URBs is directly related to the rural character of the coastal counties and results in an acceptable approach to defining URBs. The SCCMP has determined that energy production and transmission facilities are in the national interest but are not uses of regional benefit.

Carlyle Blakeney
May 9, 1979

Comment

The State's proposed program, while infinitely better than no program at all, needs to be amended in several respects in order to meet all the requirements of the Federal Coastal Zone Management Act. The National Audubon Society therefore recommends that NOAA approve the program conditionally, subject to strengthening amendments to remedy the following shortcomings.

1. The DEIS notes that the State's "critical areas" will receive "more intensive attention through the direct permitting system, while the remainder of the coastal zone will be managed through cooperation with other State agencies and their adherence to coastal program policies."

We believe that the entire coastal zone must be covered by the permit system if the letter and the spirit of the Federal Coastal Zone Management Act are to be met. "Cooperation" by and "memoranda of agreement" with other State agencies cannot take the place of a permit system covering all of the coastal zone and administered by a single agency, the Coastal Council.

Response

The State of South Carolina has two levels of management concern within its identified coastal zone. As noted in your comments, the identified "critical areas" will be more intensively managed through direct regulation by the South Carolina Coastal Council than the remainder of the coastal zone. The State's approach for management of all remaining areas within the eight coastal counties relies upon a "networking" approach which our regulations specify as an acceptable method of land and water use planning and regulation (see §923.43 Rules and Regulations). Additionally, OCZM believes that South Carolina's "networking" approach is highlighted and strengthened by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act. In particular, §8(B)(11) provides the Council with a veto power over proposed State agency actions that would contravene the State's approved coastal management program. In this respect, we believe that South Carolina's "networking" approach in areas of the coastal zone outside of the "critical areas" is much stronger than simple "cooperation" and coordination.

Comment

2. The State Program's use of "considerations" and "policies" is somewhat confusing and could lead to unnecessary confusion, misunderstanding and conflict. We recommend that "considerations" and "policies" be combined into a single set of guidelines, policies or standards that clearly set forth what is required and what is recommended under the program.

Response

The discussion on pages (III-12) - (III-15) shows the difference between the enforceable policies (on which the Council bases its final decisions both on activities which it directly permits as well as those which it reviews for compliance or noncompliance with the management program) and the guidelines or considerations which assist the Council in making an evaluation of activities but not a final decision. Page III-15 also explains that there is also a category of recommended policies which the Council cannot enforce but can encourage applicants to follow.

As indicated, the considerations listed on p.III-14 and 15 are general guidelines for evaluation of all projects. In addition to this general review, individual projects are reviewed and evaluated based on the Resource Policies for the specific type of activity. The difference between policies for the critical areas, for the coastal zone, and recommended (or enhancement) policies is explained on p. III-15. All guidelines and policies are required (or enforceable) except those specifically labelled as recommended.

General program guidelines (p. III-14) as contained in the program document are enforcable guidelines upon which the SCCC wil base permit decisions in the critical areas, review and certification in the coastal zone, and Federal consistency determination in the coastal zone.

[illegible] provide adequate guidance for the further orderly development" of South Carolina's barrier islands. If that is indeed so, then we suggest that the program violates the letter and the spirit of the Federal and State coastal zone management laws. "Development" of barrier islands has long been one of the major problems in South Carolina and other coastal States, has caused the degradation of many barrier islands and has adversely affected people, wildlife and marine resources, and the environment. We recommend that the program be amended to make it clear that it is not intended to "develop" any of the State's now undeveloped barrier islands.

Response

The Federal CZMA does not require that States prohibit the further development of barrier islands. However, the State of South Carolina has taken a strong position on the future development of undeveloped barrier islands along its coast. Policy #1(h)(p. III-22 of the DEIS) indicates the State's intention to severely restrict, if not prohibit, the use of public funds for the construction of roads or bridges to undeveloped barrier islands. This type of public investment policy will have a major impact on the development potential for these islands. While this and similar policies do not prohibit island development, they severely restrict development because of the enormous expense involved in road and bridge construction to the private developer. The above referenced policy represents a strong commitment to protect the integrity of the fragile barrier island system.

Comment

4. On page II-3, the DEIS says that State legislation "has authorized the Council or any person adversely affected by any violation of the Act to bring suit in the circuit court of the county where the violation occurs." We hope that the definition of "any person adversely affected" includes any individual or organization concerned about the wise conservation and use of natural resources and not just any person adversely affected personally and/or economically. If the proposed program does not already do so, we recommend that it be amended to make this clear.

Response

The definition of "person" (Section 3(K) of the South Carolina CZM Act) is an all-inclusive one. The meaning of "any person adversely affected" (Section 18 of the South Carolina CZM Act) is intended to include any individual or organization concerned about the wise conservation and use of natural resources. The Natural Resources Defense Council has used this right by serving as an intervenor in an appeals process.

Comment

5. On page 13 of Part III, the DEIS says that "decisions made according to the rules and regulations enable a predictability which is economically beneficial and essential for environmental pro'ection." What may be "economically beneficial" may not necessarily be "essential for environmental protection." We recommend that the discussion be clarified.

Response

Please see change in the wording on page 13 of Part III. In addition, please note Response No. 2, EPA. These changes note and clarify that both economic and environmental considerations are a part of SCCC permit decisions.

6. On pages 14-15 of Part III, the DEIS says: "If the project would have a significant negative impact on a priority use, it would be discouraged or disallowed." We believe that language leaves far too much discretion to the Coastal Council, which will implement the program. If the program is indeed designed to "protect the primary purpose or use of the area," then any project that would have a significant negative impact on a priority use" should be "disallowed," not merely "discouraged."

Response

See change on p. 14 and 15 of Part III and on p. IV-2 (Implementation, line 5) of Part III (Program Document).

If a project would significantly permanently impact the priority of use it would be prohibited. Lesser impacts would require a heavily conditioned permit to mitigate those anticipated impacts.

Comment

7. The definition of "feasibility" on page V-45 cites many factors but fails to provide clear guidelines for the impartial and objective determination of "feasibility."

"Feasibility" must be defined more clearly and the areas in which "feasibility" will be a determining factor must be reduced to a bare minimum if the State's proposed program is to meet the requirements of Federal law.

Response

Please see Response No. 7 Natural Resources Defense Council, which fully discusses changes to both the definition of "feasibility" and specific policy changes which have been made to the program document.

Comment

8. On page 28 of Part III, the DEIS says that the SCCC has changed "should" to "shall" in many policies in its program in response to NOAA's request. Nevertheless, the word "should" still remains in too many of the policies. That, once again, gives the SCCC much more discretion in implementing the program than the Federal Coastal Zone Management Act allows. We recommend that the word "should" in all policies be changed to "shall" or "must" wherever necessary to meet the requirements of Federal law.

Response

Please see Response No. 7 Natural Resources Defense Council, which fully discusses changes to both the definition of "feasibility" and specific policy changes which have been made to the program document.

Comment

9. We agree with NOAA's finding, on page 34 of Part III of the DEIS, that the State's consistency procedures "do not appear to be specific enough." We recommend that approval of the program be conditioned upon further clarification of the consistency requirements.

Response

Please note changes made to the Federal Consistency Section of the FEIS. If you have further concerns about the clarity or specificity of the "operational guidelines" for Federal Consistency, your specific comments would be helpful to both our staff and the State's staff.

are 'beyond the purview' of the SCCC under the proposed program.

. We recommend that this part of the proposed program be amended to require more complete review and regulation of small projects that could, cumulatively have a significant effect upon coastal resources.

Response

As a point of clarification, Part III of the DEIS is a part of OCZM's and the State's assessment of the environmental impact of Federal approval of South Carolina's coastal management program. The statement referenced in your comment is not intended to be a part of the State's proposed program, rather an objective review of some of the impacts associated with approval of the program. We believe that the State's program as defined fully meets the requirements of the Federal Act. While the State's ability to regulate small projects, such as single family residential development, is limited, we believe they will be able to adequately address the issue of cumulative impacts in part through their Guidelines for Evaluation of All Projects (DEIS, Part II, p. III-14). Specifically guideline #7 addresses the issue of cumulative impacts. Where a State permit is required: "The possible long-range cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area" must be considered.

Comment

11. Finally, we want to comment upon an issue that the State's proposed program and the DEIS do not address. Federal regulations require a State to "designate geographic areas that are of particular concern, on a generic or site-specific basis or both," in its coastal zone management program. South Carolina's law requires the State's Coastal Council to "inventory and designate areas of critical State concern within the coastal zone, such as port areas, significant natural and environmental, industrial and recreational areas." On page IV-1, the DEIS says that the "areas of critical State concern" parallel the "geographic area of particular concern" requirements mandated by the Federal legislation.

The State's proposed program defines "geographic areas of particular concern" as including "areas of unique natural resource value" and "those offering substantial recreational value" and "those of vital importance in protecting and maintaining coastal resources." (Page IV-1) The State's proposed program includes in the criteria for designating a natural resource area as a geographic area of particular concern the following (page IV-4): "The area is unusually large or undisturbed in comparison to others of a similar kind, thus affording a unique opportunity for scientific observations or recreation." "The area represents superior habitat for species which while not endangered or threatened, are of vital importance as commercial or sports-oriented coastal resources;" and "the area affords maximum recreational opportunities in the coastal zone because of access to. . .waterfront. . .and/or wide range of active and passive recreation opportunities in a natural setting."

Despite those clear mandates in Federal and State law, the State's proposed coastal zone management program fails to include, in its inventory and designation of areas of critical State concern, some of the areas of most critical concern in the State's coastal zone--especially St. Helena Sound and Port Royal Sound.

The South Carolina Water Resources Commission's "Port Royal Sound Environmental Study" noted a few years ago:

> "Most of Port Royal Sound and the associated St. Helena Sound constitute a large part of South Carolina's remaining coastal area.
>
> "The cleanliness of these areas--in a time when pollution is rampant--should be regarded as a natural resource for the nation.

"Port Royal Sound and adjoining waters supported a wide variety of marine fish which included several species of sport and commercial value. A total of 47 species was recorded in the collections.

"The most productive of the 20 foot trawl sampling stations in the Port Royal estuary in terms of overall numbers and biomass was the Colleton River location near Victoria Bluff. . . This river system is of considerable significance to marine fishery resources. . .The Port Royal estuary. . .is of prime importance as a habitat for white shrimp, blue crab and commercially important fin-fish species.

"At all stations Port Royal Sound is apparently an unstressed ecosystem at the moment." (Page 219.)

The facts seem clear enough: Port Royal Sound, according to the State agency study and according to supportive studies by Federal agencies, is clearly an area of "particular concern" under the Federal law and an area of "critical State concern" under South Carolina law.

Until and unless coastal areas, such as Port Royal Sound, are inventoried and designated as areas of particular concern, and until and unless other changes are made in the proposed program to enable it to meet all the requirements of Federal law, we respectfully suggest that Federal law prevents NOAA from unconditionally approving the State's proposed program.

As we noted earlier, we commend the State for its efforts to date to improve its management of the coastal zone. We look forward to working with the State as it strives to bring its program into full compliance with Federal law.

Response

Port Royal Sound and St. Helena Sound have not been designated as Geographic Areas of Particular Concern (GAPCs) at this point for several reasons. First, the State management authority which presently exists in these areas is thought to be adequate to ensure reasonable protection of the coastal resources. All of Port Royal and St. Helena Sounds are within the direct jurisdiction of the Coastal Council for "critical areas." Any activity or alteration proposed for the waters or wetlands in these areas must first obtain a Council permit, with review and evaluation of such application based on the Rules and Regulations, plus input from Federal, State and local agencies as well as interested citizens and groups.

Designation as a GAPC carries with it the requirement (§923.21, Federal Regulations) that priorities of use be developed for the area. Because of the extensive size, diversity of natural characteristics and competing uses of Port Royal Sound, drafting one set of priorities for the entire area would be a difficult if not impossible task. The resulting priorities might not be in the best interest of responsible resource management throughout the sound.

The Coastal Council and its staff would, however, welcome the opportunity to talk directly with and work with the Audubon Society in consideration of formal nomination of these and other areas as GAPCs, now and in the future.

Comment

12. On page IV-19, the DEIS lists facilities owned and managed by the State Ports Authority as designated areas of particular concern. However, not included is the State Ports Authority's property on the Colleton River in the Victoria Bluff area. We respectfully request an explanation for this omission.

Response

The State Ports authority's property on the Colleton River was not listed on page IV-19 because of the fact that no port facilities exist on this site. The Council's list was intended to include only active port sites.

A portion of property is currently being transferred to the S.C. Wildlife and Marine Resources Department. Once it becomes a part of either the Heritage Trust Program or a Gam or Wildlife Management Area it will be included as a GAPC.

Comments

1. Statutory Limitations

The Natural Resources Defense Council finds that the major weaknesses in the South Carolin Coastal Management Plan flow from weaknesses in the enabling legislation. Specifically, the critical areas over which the Coastal Council has direct permitting authority do not include sand dunes beyond the first row of dunes adjacent to the ocean, freshwater wetlands, or barrier islands.

a. Regarding sand dunes, some special protection is afforded to areas beyond the first landward dune by erosion control policy and by the designation of these dune areas as areas of special resource significance. However, policies affecting construction and development in these dune areas state only that proposals for such activity "should demonstrate reasonable precautions" to prevent negative impact on adjacent critical areas.

b. Freshwater marshes are also designated as special resource areas and activity below the highwater mark in freshwater marshes must be permitted by the State Budget and Control Board and thus reviewed by the Coastal Council. Policy provides that filling or other significant alteration of a productive freshwater marsh "will not be approved where feasible alternatives exist." The effectiveness of this policy and the strictness of its application is questionable.

c. Barrier islands, also designated as special resource areas, are protected by policies which call for "an overwhelming public interest" to be demonstrated before public funds are expended to provide access to previously undeveloped islands and for a comprehensive approach considering the natural "carrying capacity" of an island to accompany any proposals for the extension of public services. However, these policies would not affect private development on a smaller scale, which is more likely to occur on islands which are not purchased by the State.

Response

1. a. Sand dunes other than the first primary ocean-front dune (within the critical area) are afforded protection through the authority of the Council to review and certify all permits of other State agencies (see Policies p. III-71). In addition, much residential development which might not otherwise come under State permit jurisdiction, will be subject to Federal consistency review by the Council when application is made for FHA financing (notification through the A-95 process). The policies affecting these dunes in the section "areas of special resource significance" have been revised, please note change in program document. Absolute prohibition or restriction of development in these areas is not felt to be necessary to protect the resource. Precautions to avoid significant disruption of the dune formations and especially to eliminate impacts on the crucial primary dune are the main focus of the Council in managing these areas.

b. As noted by the commentor, the State does have management authority over freshwater wetlands below mean high water. Outside the critical areas but within the coastal zone, the Coastal Council must certify each application before the S.C. Budget and Control Board may issue the permit. Since adoption of the S.C. program by the General Assembly, the Council has already denied such certification in freshwater wetlands on several occasions, specifically for residential lot purposes. In addition, the Council will have Federal consistency review over Army Corps of Engineers permits in these areas.

Policy language in many instances affecting freshwater wetlands has been revised, and the definition of feasibility has also been modified. Please note response to Comment No. 7 and see changes to program document.

c. South Carolina's State level management of already developed barrier islands is accomplished primarily through the direct permitting authority of the SCCC over identified "critical areas" which include: coastal waters, beaches, primary ocean-front sand dunes, and tidelands. In addition to this control, the SCCC has certification (and veto power) authority for State-level activities occurring on barrier islands. This certification authority assures that no activites can occur on the barrier islands that would contravene the State's approved coastal management program and all policies contained therein.

...protection for currently undeveloped barrier islands is the policy you cite (policy 1-(n) p. III-22). While this policy does not promote any further development of undeveloped barrier islands, it indicates that the State will not support (financially) new construction of roads and/or bridges to undeveloped barrier islands. OCZM believes that this policy will significantly affect the kind and level of future development on the affected islands. Where private development on a smaller scale does occur, we believe that the State management over "critical areas" coupled by the State's review and certification authority over other State actions will provide adequate protection of the resource. We believe that this type of State-level public investment policy is an important management tool and are very supportive of the State's use of such a policy to further protect their coastal barrier islands.

Comment

2. It is not clear that an applicant must specifically demonstrate that substantive environmental considerations have been made or that alternative methods of carrying out a project have been examined before a proposal is submitted to the Council or to another regulatory agency.

Response

The permit applicant must in all cases provide the basic information required in the application and by the Rules and Regulations for Permitting. This list is shown on p. V-6 of the program document. This data is generally adequate for Council staff to evaluate environmental considerations and possible alternatives. Please note #8 of the list on p. V-7 which reserves the right of the Council to request additional information when necessary. It is Council policy to encourage pre-application conferences with applicants; and in practice on major or controversial permit decisions there are usually several meetings with the applicant to discuss just such matters as environmental considerations and options. The Council makes the determination of conformance with the rules and regulations and of feasibility of alternatives, not the applicant. The Council plans to write a "Developer's Handbook" in the near future which will help applicants better understand the need for coastal resource management and identify reasonable, more environmentally acceptable alternatives.

Comment

3. The term "no feasible alternative" should be replaced by a broader standard. The burden should be on the permit applicant to show before any permit is issued for activity in a critical area:

a. No significant resource deterioration will take place.

b. There is a clear public benefit connected with the activity.

c. There is no feasible alternative.

Response

Please refer to the State's revised definition of "no feasible alternative" which appears in the program "glossary." While the State has determined that an applicant does not have to meet all three standards identified here by NRDC, changes have been made to the document which require the applicant to show that:

a. Any substantial environmental impacts can be minimized; and

b. An overriding public interest can be demonstrated; or

c. No feasible alternative exists.

Also please refer to NRDC Comment and Response No. 7.

Coastal Management Plan. Some uses which could have significant coastal impacts may not be affected by the management plan. Specifically, small residential projects and roads or other access ways which are privately funded could conceivably escape regulation by the Council or any other State regulatory agency.

Response

While local government regulations outside the "critical areas" are not subject to State regulation, Section 10(B) of the South Carolina Coastal Management Act requires any city or county exercising zoning authority to submit regulations and ordinances affecting "critical areas" for Council review (for conformance to the management program) and adoption. The State's proposed management program has not identified small-scale residential development, etc., occurring outside of the "critical areas" to be of State-level management concern. Therefore, it is not subject to direct State regulation. However, it should be noted again that the SCCC has review and certification (including veto power) authority over State actions occurring within the State's eight-county coastal zone. Any activity occurring outside the "critical areas" that is subject to State regulation is therefore subject to conformance with coastal program policies.

Comment

5. The SCCMA does not require a determination of State or private ownership before a permitting decision affecting property whose ownership may be questionable is made.

Response

While nothing in the S.C. Coastal Act of 1977 or the Rules and Regulations requires a determination of ownership before permitting decisions are made, the Council has stipulated that in instances where ownership of tidelands is questionable, the applicant will be required to provide a statement from the Attorney General as to whether or not there is a dispute with the State regarding ownership before the SCCC will consider the application as completed. If the Attorney General fails to respond within 60 days, the application will be processed.

Section 15(c) of the Act requires the Council to act upon permit applications within 90 days, so the Council could in no way withhold its decisions until such lengthy legal issues are resolved. Section 22 of the Act specifies that the Council has no authority with regard to the right, title or interest of individuals or the State in such tidelands, so the Council can in no way be involved in settlement of such disputes. However, in terms of its mandate to protect navigation and public access, the Council feels it appropriate to provide appropriate State agencies the opportunity to institute action. Please note addition to program document (p. V-7).

Comment

6. The Attorney General is not empowered by the Coastal Management Act or by any other South Carolina legislation to bring an action on behalf of public interest in access to or use of land. Where development is anticipated on beach property or other areas that have been previously used for recreation by the general public, important public rights can be lost without some means of determining whether the public rights have been acquired.

Response

Public access is discussed in the Beach and Shoreline Access Section of the program document (IV-61). That section defines "existing public access," which constitutes a basis of every Coastal Council permitting decision which requires consideration of public access. This definition, which includes availability of transportation and actual use by the general public with reasonable frequency, is not limited to dedicated access ways. Thus, private individuals may appeal permit decisions which fail to comply with the mandate that existing public access be considered. Also, the Attorney General does have authority to protect the public interest in access to or use of land independently of the Coastal Management Act.

Comment

7. Policies which combine non-mandatory language with specific protective options have been carefully scrutinized. Since the "protective measures" option in itself affords the permitting authority a great deal of flexibility and discretion, the use of the word "should" instead of "shall" or "must" brings enforceability into serious question.

The section in the statement on "General Policy Impacts" assumes that policies regarding the filling of wetlands will be narrowly interpreted, that the Program requires adequate consideration of alternative plans for erosion control, sedimentation and water quality, and that the "feasibility" definition will prevent activities which would be harmful to the environment. All of these assumptions again are clearly subject to attack. For example, the South Carolina Coastal Council has permitted a section of Charleston Harbor to be filled for parking places. The Plan does not require a clear showing that water quality, sedimentation, and erosion control alternatives have been examined and the best measures employed but only that alternatives be considered. The "feasibility" definition is pregnant with possibilities for discretion which can allow development at the cost of damage to environmental resources.

Natural Resources Defense Council finds that the enabling legislation in South Carolina should be amended to cure the defects cited here and that the Management Program should be changed to reflect those amendments and to require the application of policies which allow for much less discretion in the protection of unique and valuable coastal resources.

Response

Allowance for flexibility has been a consideration throughout development of the program policies. Because of the geographic extent of the coastal zone and its variety of natural characteristics and development pressures, a flexible performance standard approach was selected as the only practical framework for effective resource management. Policies too narrow in their definition or scope could result in types of projects or specific circumstances not being covered. Absolute prohibitions or restrictions generally were not possible in the policy language because of the taking issue, which is specifically mentioned in Section 2(c) of the Act.

The S.C. Coastal Council does retain some discretion in permitting decisions in the critical areas, review and certification throughout the coastal zone, and Federal consistency determinations. Because of the comprehensive scope of a coastal management program there will often be trade-offs inherent in the review, evaluation and decision-making regarding project proposals. A certain amount of discretion will be present in any permit decisions, especially those which involve a variety of considerations (natural resource protection, national interest considerations, uses of regional benefit, shoreline access, etc.).

The Council was created for the purpose of dealing with these trade-off situations, in South Carolina, to achieve a balance between coastal resource protection and the economic growth which is badly needed in coastal areas of South Carolina (see p. I-30, Coastal Economy). Rather than being made by administrative staff, the permit and certification decisions on significant or controversial projects are discussed and debated openly at public meetings of the Council. The membership of the Council is representative of both the coastal areas and inland parts of the State. In addition, a complete appeals procedure is available to the applicant and any affected parties.

The Council must be guided by the policy language of the S.C. Coastal Management Act of 1977, the program Goals and Objectives and the general guidelines for evaluation of all projects. It must also enforce the Resource Policies, including the Rules and Regulations for Permitting. While they do allow some flexibility, these policies are specific enough to ensure that the Council does not act in a manner which would constitute an abuse of its discretion.

To strengthen the level of predictability in response to this comment and other commentors, the following modifications have been made in the program document.

(1) The definition of "feasibility" has been clarified. Specifically, the no action alternative has been mentioned as a part of the feasibility concept. (The glossary has been shifted to a more prominent location in the program document, p. v, following the Table of Contents.)

[illegible] necessary [illegible] see changes to program document. Those policies [illegible] areas extracted from the Rules and Regulations for Permitting have not been re-drafted at this time.

Comments

We find that process well developed, structured and described. The integration of the South Carolina Coastal Council (SCCC) into the State's overall facility approval process through the mechanism of SCCC participation in the PSC process for facilities sited in the coastal region should provide effective communication and balance in decision-making.

1. The prohibition against siting nuclear power plants in areas of significant population (policy) may be a permissible restriction to include in a coastal zone management program if premised on considerations within the reach of the Coastal Zone Management Act, i.e., the impact on the land and water uses of the coastal zone from siting nuclear power plants in areas of significant population. If, however, the prohibition is premised on considerations of radiological health and safety in areas of significant population, the prohibition may be inconsistent with NRC's preemptive authority under the Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974. We also presume that the reference to "overall safety and environmental impacts" of the plans for waste disposal (policy) is directed to non-radiological safety and environmental impacts affecting the land and water uses in the coastal zone.

Response

Your assumption is correct. South Carolina's prohibition against siting nuclear power plants in areas of significant population is based upon the impact on the land and water uses of the coastal zone. Additionally your presumption that the reference to "overall safety and environmental impacts" is directed to non-radiological safety and environmental impacts affecting land and water uses of the coastal zone is correct.

Comment

1. The Division of Vector Control, SCDHEC, is interested in activities in the coastal zone primarily as they relate to mosquito production and control. Although many coastal activities affect mosquito populations, the two which constitute the greatest problem are spoil disposal areas for hydraulically dredged material and impoundments in the marsh which, in South Carolina, are managed primarily for waterfowl foods.

We recognize the need to perform hydraulic dredging operations to maintain desired channel depth, create boat slips, etc. We, however, do not approve of the creation of new disposal areas. Whenever possible we would like to see existing disposal areas used in preference to creating new ones.

In regard to waterfowl impoundments, it has been our experience that, in most cases, management for duck foods need not be incompatible with water management for mosquito control. Since this is the case, we do not, in principle, oppose waterfowl impoundments. However, many such impoundments in South Carolina are permitted to produce mosquitoes far in excess of acceptable levels. Since the Council policy is that management plans are a condition of permitting and are enforceable, we would like to see more detail about management plans in public notices to which we might make specific recommendations.

We would like to see more overt concern for this problem than one vague reference to "adverse impacts on public health and welfare. . ." on page III-57 relative to placement of spoil disposal areas.

We would like to assert at this point that mosquitoes are most efficiently controlled by rendering their breeding sites unsuitable by water management. Tidal flushing of certain kinds of breeding places is an excellent mosquito control technique. Often this can be accomplished by minimal marsh ditching to allow the tide in. While this undesirably results in temporary disruption of some marsh areas the overall net change in marsh productivity is increased by creating additional low marsh areas subject to daily tides.

We are strongly in favor of this practice and wish to go on record as supporting such projects. In addition, the Charleston County Mosquito Abatement Program has offered to provide orientation training for Council staff members to assist them in considering mosquito control as a factor in evaluating permit applications. We would like to recommend that this be done.

Response

1. The South Carolina Coastal Council recognizes the effect of certain activities in the coastal zone on mosquito populations--most especially the activities of dredged material disposal and creation of impoundments. The Council agrees that the coastal management program should address the problems of mosquito production and control because of the significant adverse impacts that certain mosquito species can have on the human population.

Dredge policies now indicate that mosquito control must be considered by SCCC in permit decisions regarding disposal of dredged material. The Mosquito (Vector) Control Division of DHEC is notified and responds to all permit applications from the SCCC. The SCCC relies heavily on these recommendations in making their permits decisions based on the technical expertise of this Division.

Please see changes to the management program document on pages III-54 Policy #1(d) and III-57 Policy #1(d).

We believe that the South Carolina Coastal Council has closely approached the intent of the Federal and State statutes.

Our general acceptance is based upon the following achievements of the South Carolina Coastal Management Plan.

- o The Program is well organized and clearly presented in understandable terms with a minimum of superfluous verbage.
- o With rare exception, it closely adheres to statutory authority and Federal requirements.
- o The Program is quite strong in its protection of coastal resources, but affords the reasonable degree of balance and predictability essential for a capital-intense industry such as ours to exist.
- o The national interest in oil, gas, and other energy resources is recognized.
- o The structure and organization for implementing the Program appears to be a system which will work.

For the purpose of this hearing, we would like to reiterate several suggestions we have made to the South Carolina Coastal Council, which were apparently rejected, which we feel will improve the Program.

Comment

1. "The extent to which a proposed use is in the national interest" should be added to the list of considerations which guide the Council's action on a permit application for a project in a critical area. (Page III-15.)

Response

The requested addition cannot be made on page III-15 because the section is quoted from the South Carolina Coastal Management Act. However, the consideration of national interest is required in Section 8(B)(6) of the South Carolina Act and throughout the National Interest Section Chapter II,c,1 of the Program Document.

Comment

2. There still appears to be inadequate authority for State override of local land and water use regulations which could exclude uses of regional benefit. Activities considered by the Program to be of regional benefit are extremely narrow and should be enlarged to include those uses of national interest. (See attached comments dated October 1978, relating to the South Carolina Management Program Discussion Draft, pages 5, 6, and 7.)

The authority for URB implementation is based on the eminent domain powers of the State, and in no way relies on review of or control over local ordinances or regulations. (See also the response to U. S. Department of Interior comment No. 12.) Local governments may not "unreasonably" exclude any uses within their jurisdiction since they cannot act in an arbitrary and capricious manner, as pursuant to local zoning enabling legislation. (Section 6-7-710, S. C. Code of Laws, 1976, as amended.)

The list of URBs is limited and the justification for this is explained in the program document under "Findings", p. III-8. Under NOAA's Approval Regulations, states have the option of defining uses in which there may be a national interest involved in planning for and siting facilities as uses of regional benefit, however, this is discretionary with the state.

Comment

3. The glossary section of Chapter V should be moved to a separate chapter with a clear notation that the terms defined apply to all chapters of the Program.

The Program developers are to be commended for their conscientious effort on a difficult job. We trust the implementation phase of the Program will obtain broad acceptance and achieve the desired objectives.

Response

Please note that the Glossary now appears in Part II, page v, immediately following the Table of Contents.

South Carolina State Commission of Forestry
Walter T. Ahearn
May 29, 1979

Comment

1. In the listing of concerns identified to be in the national interest under Part 3, Coastal Resources on page 9 and on page III-5, it is suggested that prime agricultural and forest lands be included in the listings. Such lands have been recognized as being of national interest and concern for the production of food and fiber to meet future needs of our growing population. A writeup on Prime Agricultural and Forest Lands should be added on page III-7.

Response

While prime agricultural lands and forest lands are acknowledged to be of national importance in South Carolina and the nation as a whole, OCZM regulations allow States to define the "national interest," in concert with State and Federal agencies, according to their own identified criteria. The resource policies contained within the State's proposed program are designed so as to protect the integrity of this valuable resource in South Carolina's coastal zone.

Comment

2. Part II, page I-51 and I-52, tables F-3 and F-5. Considering the substantial economic value contributed by agriculture and forestry it would seem most inappropriate to classify these areas as UNDEVELOPED LAND, including a category called "Vacant." It is suggested that the land use tables for Berkeley, F-3, and Dorchester, F-5, be given the same breakdown as for Charleston, F-4, changing Undeveloped Land to Resource Production and showing breakdowns for agriculture, water, forests, etc.

Response

See Response No. 1 under the U. S. Department of Agriculture, which submitted essentially the same comment.

Comment

3. Part III, page 6, fourth paragraph reads "approximately 25% of the county is marsh or wetland and almost 50% vacant, undeveloped (includes forested areas)." Here again, the economic value of forest lands hardly merits the classification "undeveloped," and it is suggested this section be rewritten to reflect resource production and its varied values.

Response

The language in this paragraph has been modified to reflect the Council's recognition of the value of agricultural and forest areas. Also see Response No. 1 under the U. S. Department of Agriculture which explains the source of the data used in this and other sections.

Comment

4. Part II, page III-31, Section B. The second paragraph indicates that timber harvesting can have severe impact on coastal ecosystems. Research in this area conducted by the Southeastern Forest Experiment Station, Forest Service, U.S. Department of Agriculture at Charleston does not show any significant adverse impact on water quantity or quality in the Coastal Zone, and the South Carolina 208 Nonpoint Source Silvicultural Advisory Committee could find no data to show "severe impacts."

Response

See reference on p. III-31, Section B. New language describes the environmental impacts of improper timber practices and cites sources for those findings.

Comment

5. Page III-43. We would question Policy (1)(b) noting that parks and open spaces are preferr uses in wetland areas, flood prone areas, etc. Recreational use is only one of the uses for such ar However, production of high quality forest products (including swamp hardwood species) is the major use of many wetland and flood prone areas, providing employment, income and raw materials for forest industries in coastal zone counties.

Response

The Council recognizes that needs occur for important uses other than that of parks and open spaces in wetland areas, flood prone areas, etc. The uses of parks and open spaces have been identified as preferred uses because they have less potential for adverse environmental impacts than do other uses.

Comment

6. Page III-33. In addition to the five types of industrial manufacturing listed, consider adding a sixth: Industries that depend directly on the non-marine environment for raw materials. (This would include sawmills, veneer and plywood mills and other forest-based industries.) Also, there are a number of "cottage" industries that depend on the non-marine environment of the coastal areas (ex. the making of straw baskets, cypress cuttings and cypress knee materials, etc.). (According to figures on page I-32 the 1975 delivered value of forest products in the coastal zone was $52.1 million, compared to the 1976 value of the fisheries catch cited as $14 million, page I-32.)

Response

The list on page III-33 is a quotation from Coastal Ecosystem Management by J. Clark. The list refers only to major types of industrial manufacturing and is not intended to be all-inclusive. Industries that depend directly on the non-marine environment for raw materials are considered to be included in #3 of the list.

Hugh G. Robinson
May 16, 1979

Comment

1. The following should be listed as "national interests" in the South Carolina Coastal Management Program:

a. Maintenance of navigation.
b. Interstate commerce.
c. Flood control.
d. Disaster relief measures.
e. Wetlands and floodplains.

Response

Note the change in the Program Document on p. III - 5, where maintenance of navigation and wetlands have been included as concerns of national interest.

Interstate commerce, flood control, and flood plains are already important concerns which the Council presently considers.

Disaster Relief Measures have not been added. Under the South Carolina Coastal Management Act in Section 13(D)(6), the Permitting Rules and Regulations in Section 30-5-A(6), and the Federal Regulations in Section 930.32(b), the Council would waive permit and certification requirements in disaster and emergency situations, thereby facilitating national interests in this area.

Comment

2. The South Carolina Coastal Program does not contain specific procedures to assure that national interests will be handled differently from local interests. The program merely states that national interests will be "considered" by the Council during its usual review, certification and permitting procedures. No special steps are outlined to prevent a national interest from being relegated to a priority even lower than local concerns.

Response

The South Carolina program describes the national interest in planning for and siting of facilities. (See page III-5.) It details the sources relied upon for this description. The program also delineates how and where the national interest is reflected in the substance of the management program. The final requirement under NOAA's Approval Regulations is that the State establish a process for continued consideration of the national interest, including procedures and decision points. This requirement contemplates that this continuing consideration occur as part of a State permit procedure. The South Carolina Coastal Council considers the national interest in facilities during its direct permitting and its review and certification process. §306(c)(8) of the Federal Statute requires that the national interest be considered, not that it be given priority accommodation or otherwise treated apart from other considerations.

Comment

3. The Charleston District provided the Council with a list of the disposal areas used and controlled by the Corps for exclusion from the South Carolina Coastal Zone. The purpose of seeking their exclusion was to prevent Corps activities within the disposal areas (but not significantly affecting adjacent areas) from being subject to the 90-day consistency process. Often, these activities must be carried out or modified quickly due to changing weather conditions, equipment availability, schedules, etc. To date, the Council has neither included these areas nor responded to the Corps giving reasons why they should not be included. This matter should be settled before the program is approved in order to comply with Sections 306 and 307 of the CZMA.

[illegible] for the area to be designated a federally excluded land. The SCCMP recognizes that Corps of Engineers activities carried out in these disposal areas are continual. The program does not require separate notification and certification of individual and on-going activities which are reviewed as part of the project as a whole.

Please note Response No. 4 below also.

Comment

4. Sections dealing with the nature of activities to be managed or reviewed by the Council are extremely vague. For example, on page III-12 under the heading "Definition: Activities with a 'Direct and Significant Impact'," any action merely located in a critical area satisfies the definition. Similarly, the phrases "detrimental environmental impact" and "adverse effects" can be widely construed to include even the smallest, almost imperceptible effects. It appears that little effort has been made to establish true criteria for determining which activities have significant effects and should be reviewed or managed by the Council.

Response

Critical areas are defined in the South Carolina Coastal Management Act and are so designated because they are fragile areas which are directly linked to the coastal waters. Impacts of all activities in the critical areas are not adverse but should be reviewed and managed to determine the nature and degree of the impact and to minimize or eliminate any adverse impacts. Federal activities which are considered to have a direct impact on the critical area are specifically identified. Page V-17 lists the Corps of Engineers activities which are evaluated for consistency. Also note the changes in language on page V-17 which more clearly specify the activities to be included for review.

The definition of Direct and Significant Impact on p. III-12 was developed as criteria to support the listing of activities subject to management (a requirement of the Federal regulations, §923.11). While all activities in critical areas would not necessarily result in substantial or significant environmental impact, they should have careful management attention to ensure that no such impact would result. Any alteration in a critical area requires a permit from the Council because of the fragile nature of the resources in these areas. This part of the definition is clearly mandated by the South Carolina Coastal Management Act of 1977.

The phrase "detrimental environmental impact" is applied only with reference to impact on the critical areas. While it does leave room for some interpretation, the intent is to consider only discernible or measurable and substantial type impacts. The same basic interpretation is applied to the phrase "adverse effects," and the Council can be expected to be reasonable in its use of this language. See also response to Westvaco, Comment No. 2.

In practical application, projects outside the critical areas will be subject to management when the permit of another State agency is required (and, therefore, review and certification is in effect). This will generally be major projects.

In response to the specific area of concern of the Corps, Federal activities considered to have a direct effect on the coastal zone are identified in Chapter V of the program document. Page V-17 lists those Corps of Engineer activities which will be evaluated for consistency. Also note the language changes on this list which more clearly indicate that the activities to be included for consistency review take into account on-going or maintenance type projects which are reviewed as a whole. See also response to Comment No. 3.

Comment

5. Chapter 30-10 of the Rules and Regulations denotes that the Coastal Council will exert permitting jurisdiction seaward of U.S. 17 in Georgetown and Horry Counties and the Budget and Control Board landward of this line. This split in jurisdiction has a serious effect on the Corps of Engineers' permitting program as a major portion of the AIWW in Georgetown and Horry Counties lies landward of U.S. 17, thereby out of the Council's critical zone. In addition, the split of jurisdictional authority in this area raises the question as to which State agency, the Council or the Board, will serve as the local sponsor for easement grants in those areas located outside the critical zone in the coastal area.

Response

The Coastal Council will review the consistency determinations for Federal activities whether they occur within the permitting jurisdiction of the Council or elsewhere in the coastal zone. Likewise, the Coastal Council is the local sponsor of all dredge material easement grants throughout the coastal zone.

Comment

6. Various policies in the program document refer to control of public funds. Additionally, "Funding Policies" have been listed for the erosion control program on page IV-55 "Public Funds," as used in the program, must be defined. There is an implication that Federal funds are included (DEIS, page 8). Since Federal agency funds are appropriated by Congress under existing law, they should not be included. Inclusion of Federal funds would also be in conflict with Section 930.32 of the consistency regulations.

Response

Under provisions contained in §307 of the CZMA, Federal Assistance projects are subject to the policies contained in an approved State Coastal Management Program. This means that where the State has developed policy which is binding on State-level actions, relevant Federal actions are also bound to these same policies. The funding policies referenced on page IV-56 of the DEIS are clearly intended to be binding on both State-level actions and Federal agencies which are required to be consistent with these funding policies.

Comment

7. DEIS, Part III, Page 16. The second paragraph states that because much residential development is outside the Coastal Council's jurisdiction, the policy will not generally affect residential shoreline development. Does this mean that residential development will have priority over water dependent activities?

Response

No, residential development will not have an assumed priority over water-dependent activities.

Small scale residential development will generally not be regulated by the South Carolina Coastal Program in cases where such development is adjacent to the shore but outside a critical area and meets all environmental standards and does not require water access. It is not anticipated that residential development will have an adverse effect on the availability of sites for water-dependent activities as there are ample shorefront sites available to accommodate a wide range of development activities which are consistent with the goals and policies of the SCCMP.

[illegible] section appears curiously out of place in a chapter otherwise devoted to management areas and management practices, and appears more suited to Chapter I. If it remains in the Program, this section should be revised to provide support for the many unqualified and sweeping statements made, particularly in the parts which discuss the impacts of transportation and shoreline modification.

Response

Pages IV-77 through IV-144 have been completely rewritten since the public hearing draft reviewed by the Corps. However, the Council would welcome future communication with the Corps on this section of the document.

Comment

9. Page III-51. Policy (1)(a). The terms "significant negative impact" and "overriding socio-economic considerations" should be defined in order to provide sufficient predictability.

Response

The term "significant negative impact" is not defined in the program document because determination of significant negative impacts is felt by the Council to be a decision which must be made on a case-by-case basis taking into consideration the relative value of the resource or resources in question (i.e., the relative productivity of an already severely impacted marsh area when compared with a pristine one). See also Response No. 4 to Westvaco.

The term "overriding socio-economic considerations" also is not defined in the program document because of the difficult if not impossible task of formulating such a definition. Moreover, this determination is also felt by the Council to be one which should be made on a case-by-case basis taking into consideration all relevant policies as well as its overall goal of balancing economic development with protection of the environment.

Comment

10. Page III-56. Policy (2)(h). "A specialized form of dredging activity" should be more clearly defined.

Response

The words "a specialized form of dredging activity" are intended to refer to the dredging of navigational channels and access canals to create waterfront lots as opposed to dredging performed for the purpose of maintaining already existing navigation channels. This policy is a direct quotation from the Council's rules and regulations which were previously adopted by the State General Assembly and thus are law. The wording of these policies cannot be changed without consent of the General Assembly.

Comments

11. Page III-56, 2.a. The phrase "and there are no feasible alternatives" should be deleted or modified to show that in some cases there are feasible alternatives to dredging in wetland areas, but that these feasible alternatives might be more disruptive or otherwise less acceptable.

Response

Please refer to the definition of feasible (feasibility) in the Glossary on page v (after the Table of Contents). This definition along with all of the policies for protection of coastal resources show that a feasible alternative would be one that must be less disruptive and thus more acceptable than the original proposal.

Comment

1. Page I-51, page I-52, and page III-29, paragraph 2. In each of these three instances, there is a reference to agricultural land as being "undeveloped." We believe it is incorrect to so classify this land. Current agricultural practices require a high investment in developmental activities to achieve optimal production. A distinction may be drawn between agricultural development and urban development.

Response

The land cover categories used in tables on p. I-51 and 52 were defined in land use data received from the Regional Planning Councils in the coastal zone. Regarding p. III-29, paragraph 2, please note change to the program document. This change recognizes the investment in and economic importance of agricultural land in the South Carolina coastal zone.

Comment

2. Page III-31, Item B, Policy 1. This statement is not clear. A permit is not required for the activities described within this policy. We have referred this concern to the South Carolina State Forester.

Response

Outside the critical areas but within the coastal zone, permits from the South Carolina Budget and Control Board may be required for these forestry activities if they are proposed for areas below mean high or ordinary high water. In review and certification of such permit applications, the Council would base its review on the policies on p. III-31.

Comment

3. Page III-5, Paragraph 5, Item 3 - Suggest adding - g) Prime forest lands; and a narrative describing their values on page III-7. This suggested narrative is:

> Prime forest land includes much of the land base presently classified as commercial forest land, as well as large acreages now in other uses such as cropland and pasture land. Land, upon which there are irreversible uses such as urban areas or large impoundments, is not included under this definition.
>
> USDA's prime lands program identifies prime lands so they may be considered when planning for other uses. The prime forest lands program includes several phases, i.e., timber, wildlife, recreation.

Response

See Response No. 1 to the S. C. State Commission of Forestry.

Comment

1. Page V-1, Permitting Authority - Direct Federal activities/development projects are not subject to the Council's permit process, and thus should be added to the listing of exempted activities.

Response

The reference on page V-1 under "Permitting Authority" tracks the language of Section 13 of the S.C. Coastal Management Act of 1977. This section of the Act specifically lists those activities exempted from the State permit requirements in the critical areas, and since this appears directly in the Council's enabling legislation, other exemptions cannot be added to the list. The Council has reached a specific working agreement with the Charleston District of the U.S. Army Corps of Engineers that harbor and navigation maintenance in South Carolina will not be subject to State permit requirements, provided that the Council has opportunity to review and comment on these projects. This arrangement is expected to continue under the Federal consistency process. The Council would welcome discussion with other branches of the Department of Defense to work towards similar, individual agreements for direct Federal activities/development projects which take place outside Federally excluded lands.

Comment

2. Page V-16, Department of Defense, Item 7 - We recommend that this item be rewritten as follows:

"Construction or major modifications to sewage or drainage ditches or canals."

We do not feel that routine maintenance of existing drainage ditches and similar facilities will significantly affect the coastal zone, and thus will not require a consistency determination.

Response

The Council agrees that certain types of routine maintenance would not have direct affects the coastal zone. The State's concern is only for construction and maintenance of sewer and drainage facilities located in coastal waters and wetlands which unarguably would have direct effects. The wording of item 7, p. V-17 has been rewritten to reflect this intent.

Comment

3. Page V-16, Department of Defense, Item 9 - We feel that this item is unnecessary and should be deleted in order to avoid confusion. An action which has a ". . .potential negative impact on coastal lands and waters" would be considered as ". . .significantly affecting the coastal zone," and thus would require a consistency determination.

Response

Since it is agreed that activities with potential impacts on coastal lands and water would require a consistency determination, the Council does not believe that inclusion of item 9, p. V-17 is confusing. It simply reiterates that these types of actions would be considered to have direct effect on the coastal zone. Please note that the word "negative" has been deleted in item 9, in response to a request by the Charleston District, Army Corps of Engineers.

U.S. Department of Energy
Robert J. Kalter
May 9, 1979

Comments

The Department of Energy has reviewed the South Carolina Management Program and Draft Environmental Impact Statement. We concur in your proposed administrative action to grant approval of the proposed program.

We find that policies for implementation of this administrative system give adequate consideration to energy interests.

Response

Comments accepted.

The proposed SCCMP appears to be a well-balanced program. The South [illegible]na Coastal Management Act of 1977 clearly provides the necessary authority and framework for [illegible]e program. Adoption of the program by both the General Assembly and the Governor constitutes a strong State commitment to coastal resource management. The program is to be commended for its general recognition of the overall ecological values to the coastal zone.

Comment

1. Many SCCMP policies covering activities undertaken within the State's critical areas are ambiguous. We feel that many of the SCCMP policies, particularly critical area policies, fail to provide this predictability and are so indefinite that their enforceability is questionable. Since the means of resolving conflicts is by judicial review or appeal, we consider the questions of clarity and enforceability to be extremely important, especially in light of our Department's responsibility to be consistent with the program, once approved.

Response

The Rules and Regulations for Permitting in the critical areas were adopted by the Coastal Council and were subsequently ratified by the State General Assembly. Thus, they were made law and are subject to change only by the General Assembly.

The Council anticipates the revision of a number of its rules and regulations during its first year of program implementation. Among the categories of policies to be studied for change are: residential development, parking facilities, mineral extraction, manufacturing, impoundments, and agriculture.

In its review of policies, the Council will give careful study and consideration to the comments and suggestions of the U.S. Fish and Wildlife Service received in November 1978 as a part of the Department of the Interior's comments on the program Discussion Draft. DOI is encouraged to work with the SCCC staff during program implementation to ensure that relevant changes are considered for review and change.

Comment

2. The Department is concerned about the relationship of local governments to the SCCMP, and the involvement of local governments continues to be essentially voluntary, despite the provisions of the State Coastal Management Act. We would like to see the SCCMP discuss more completely whether the Coastal Council intends to require that local governments abide by and enforce program policies, and how the Council will insure that local governments do not unreasonably restrict uses of regional benefit and/or facilities of national interest.

Response

SCCMP is based on direct State control (Technique B) and therefore does not require that local governments abide by and enforce program policies. The State's program is based upon State-level control over identified "critical areas" and Council certification of State agency actions occurring throughout the coastal zone. The Council staff has already begun a far-reaching effort of meeting with all local governments in the critical areas and offering considerable assistance to bring all local government ordinances in line with the SCCMP. Chapter III, C, 1 and 2 discuss the procedures which the State will use to protect uses of regional benefit and concerns of national interest.

3. We request that the program acknowledge the continuing interest of Federal agencies in geographic areas of particular concern (GAPCs) by providing the opportunity to nominate additional potential sites or categories. In this regard, we think the Council should consider five additional or supplementary types of GAPC's: spawning habitats for anadromous fish, shore- and wading bird rookeries, certain sites eligible for inclusion in the National Register of Historic Places, potential mineral sites, and earthquake hazard areas.

Response

Note program change on page IV-2 which corrects the inadvertant omission of providing for Federal agencies to nominate future GAPCs. We think the suggestions for additional GAPCs merits serious consideration. The Coastal Council staff looks forward to the opportunity of discussing with regional D.O.I. staff both the supplementary types of GAPCs identified by D.O.I. and specific GAPC sites for possible future nomination.

Comment

4. We are unable to determine specifically how the SCCMP addresses the requirements of the Federal Act regarding areas for preservation or restoration. We request that the final document provide a separate discussion of the means by which the State proposes to meet this requirement and of the specific criteria and procedures by which areas can be designated for preservation or restoration.

Response

The Areas of Unique Natural Resource Value (pages IV-3 through 17) and Areas of Special Historic, Archeological or Cultural Significance (pages IV-22 through 28) in conjunction with the procedures for considering GAPCs and the designated priority of uses address the requirements of the Federal Act regarding APRs. Please note changes (p. IV-3) to program document which more clearly reference APRs.

Comment

5. We believe the State's Federal consistency procedures are based upon an incorrect reading of the appropriate Federal regulations in at least two instances: development projects on excluded Federal lands and negative determinations. The Department believes that to automatically require a consistency determination for all development projects undertaken on excluded Federal lands is contrary to the intent of the Federal Consistency Regulations and could place an unreasonable burden on a Federal agency (specific comments regarding the activities of the U.S. Fish and Wildlife Service on refuges are included in the attachment). We also believe that the SCCMP's statements concerning negative declarations are too broad and should be modified to reflect those limited circumstances where the Federal Regulations indicate that such determinations should be made.

Response

The State notes its inaccurate interpretation of the Federal Consistency Regulations on page V-17. Please see correction. Note change on page V-20 of SCCMP which, along with the four criteria contained in the note on page V-17, more clearly specifies the instances where a consistency determination for a Federal activity is not required.

6. It is not clear that Federal agencies will have an opportunity to review the comprehensive ports management plan which, upon completion, is to be incorporated into the SCCMP. We request the opportunity to review this plan either prior to SCCMP approval or as an amendment to the approved program.

Response

A draft Ports Management Plan is currently under review. The Coastal Council has taken no action on the Ports Plan pending the comments being received. Federal agencies and interested parties can review this study at the current time by requesting a copy from the South Carolina Ports Authority. In addition, the Council intends to circulate the draft Ports Plan, with refinements, for comment by all State, Federal and local agencies and interest groups before any Council action is taken.

Comment

7. While the map in the Appendix and the regulations in Appendix F depict and define the areas, there is no simple preliminary definition of terms such as "tidelands," "beaches," and "coastal waters," which can be referred to when reading the program document. Moreover, the concept of "tidelands" is complicated by the differentiation in the program between saltwater and freshwater wetlands. In order to avoid confusion over what areas are subject to the direct permitting authority of the Council, we suggest that the Boundaries Section of the document (pp. III-3 and III-4) contain a concise explanation of each term, perhaps supplemented with a simple schematic diagram.

Response

The terms referred to are all defined in Section 3 of the South Carolina Coastal Management Act (Appendix B, Vol. II). In addition, revisions have been made to the Glossary which include a further definition of "tidelands." This addition to the Glossary is referenced on page III-3.

Comment

8. One of the considerations (#7, p. III-14) in the Council's review and certification of permit applications in the coastal zone will be ". . .the possible long-range, cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area." The Council's adoption of this policy will help assure that primary, secondary and cumulative impacts of an activity will be considered in the review process.

However, in regard to activities which occur within the State's critical areas, it is not specifically stated on page III-15 that the Coastal Council will apply the same consideration in their approval or denial of a permit application. The program should clearly and specifically indicate what the Council's "critical areas" policy is in this regard.

Response

The Council recognizes that adequate, comprehensive evaluation of all permit applications must include the cumulative effects of each project. When the program is viewed as a whole, it can be seen more readily that the cumulative effects of projects will be factors considered by the Council in the granting or denying of permits. Section 2(B)(1) of the State's Coastal Management Act makes the balance of coastal development with environmental protection one of the specific policies which the Council must follow.

Please refer to the discussion which has been added to Chapter V(B), Project Evaluation Procedure, for further information on this point. The requested consideration is not specifically added on the list on page III-15 because the guidelines for evaluation of all projects in critical areas are a direct quote from the South Carolina Coastal Management Act.

Also please refer to Audubon Comment No. 9.

... most concerned about the frequent use of the word "should" in the resource policies. When "should" is used in the context of a policy, the policy can be considered a recommendation of an unenforceable nature. Consequently, nearly all of the policies governing activities within the critical areas could be no more than recommendations. In fact, even the policies which describe what factors will be considered by the Council in their decisionmaking role are stated in this manner. Members of the Council are therefore provided a tremendous amount of flexibility as to how the policies are interpreted and the program implemented, and other decisionmakers are not given adequate direction.

Response

Please note change to policies in the FEIS. Many policies have been revised to eliminate unnecessary qualifiers and in some instances "should" has been changed to "shall" or "must." Also please refer to Response No. 7 - NRDC comments and associated changes to the document.

Comment

10. We feel that terms or phrases used in the policies are subject to varying interpretations and should, therefore, be defined so as to clarify the Council's intent. In this regard, we note that the SCCMP now contains a definition of "feasibility" (as in the often-used phrase "unless no feasible alternative exists") on page V-45, which we are glad to see. However, there are other terms which we believe should also be defined. For example, in Policy #2a on page III-17, which deals with residential development in critical areas, we recommend that the phrase "strictly for private gain" be either specifically defined or removed from the policy.

(p. III-54). Policy #2a. We suggest, that the term "undisturbed" be defined or otherwise clarified.

Response

The definition of "feasibility" has been further clarified, and the Glossary relocated in a more prominent place in the program document (see page v after the Table of Contents).

The Council has not attempted to specifically define the phrase "strictly for private gain" because it is felt that this concept is generally understood to imply that no public benefit would accrue from completion of the project under consideration. Legal and economic considerations, as well as philosophical aspects, could be debated ad infinitum in any attempt to reach a specific definition. In practice, the Council has interpreted this phrase in denial of a permit application from an individual for filling of marsh above mean high water to create a residential lot.

A definition of "previously undisturbed wetlands" has been added to the Glossary.

Please note change to policies in the FEIS. Also please refer to Response No. 7 - NRDC comments and associated changes to the document.

Comment

11. We think the chapter on policies should better reference the requirements of Executive Order 11990, Protection of Wetlands, and of Executive Order 11988, Floodplain Management. As a specific example, Policy #1b on page III-30 which deals with agricultural activities within the coastal zone addresses only tidal wetlands. Since approximately 50 percent of South Carolina's coastal zone wetlands are non-tidal, a major gap in coverage exists and should be rectified.

Response

Coastal management programs should contain policies addressing wetland and floodplain uses or impacts which are consistent with the Executive Orders on Wetlands and Floodplains. It is not necessary to delineate the specific requirements of each Executive Order.

of flood loss, minimize the impact of floods on human safety, health and welfare, and preserve the beneficial values served by floodplains.

Comment

12. The document acknowledges that the currently identified URBs constitute a "limited number of activities" (p. III-8), but states that because of the rural character of much of the coastal zone "ample suitable site locations remain available for most proposed uses." An additional argument present is that local and county governments "have not exhibited any trend toward excluding particular types of activities." While this may be true at the present time, we suggest that the Council consider establishing some mechanism for monitoring local actions concerning other "uses of regional benefit."

The program emphasizes the fact that the Council has the authority to review local ordinances, regulations, etc., to determine if uses of regional benefit could be arbitrarily excluded (p. III-9).

The most important means that the State has to prevent unreasonable exclusions by local governments is its eminent domain authority. No procedures have been established for invoking the eminent domain authorities of the Budget and Control Board or Development Board. Who determines that an unreasonable exclusion is threatened? What standards are used to make determination? Does the council have the ability to require other State agencies to use the eminent domain authority?

Response

The Council would welcome the opportunity to work closely with DOI staff in formulation of such a monitoring mechanism to identify activities for inclusion as URBs in the future.

The authority for URB implementation is the State's eminent domain powers. Review and evaluation of local ordinances, as mandated by §10 of the South Carolina Act is simply an additional mechanism that may, in some instances, strengthen this section of the program.

While the Council has no direct authority to invoke the eminent domain powers of other State agencies, these agencies are bound by §7(A) of the Coastal Act to implement their authorities in keeping with the coastal program. The statute includes the URB section, and Memoranda of Agreement between the Council and these agencies document this cooperation. In addition, while the Council would not be the sponsor agency for these URB projects, it would obviously be in the interest of the sponsor agency to use its eminent domain power to realize the achievement of its proposed project. Given the scope of URBs contained in the SCCMP (i.e., transportation, recreation) the questions raised about the exercise of eminent domain by the Budget and Control Board are not relevant. However, the various State agencies are required to exercise their authorities when appropriate as a result of being "networked" into the proposed SCCMP.

Comment

13. We are concerned about the use priorities which are established for shellfish areas. Both commercial and recreational shellfish areas are recognized as GAPCs, but it appears that use priorities are only established for commercial lease areas (p. IV-13). In remedying this apparent omission, we suggest that the State define highest priority uses as those which enhance the shellfish resource and improve or restore its harvestability. We further suggest that uses which degrade the productivity or harvestability of the shellfish grounds be specifically prohibited.

Response

The State of South Carolina agrees with concerns raised about use priorities for shellfish areas. Please note changes to the document (p. IV-13) which clarify that the priorities of use apply to both commercial and recreational shellfish areas.

[illegible] the reference to the Charleston earthquake of 1886 on p. I-7, which apparently is not followed up by any subsequent discussion of earthquake hazards or program policy considerations. In view of the devastating nature of the 1886 disaster, it seems that some evaluation and identification of potential earthquake hazard areas in the coastal zone is warranted.

Response

A fuller discussion of earthquake hazards has been added to Chapter I, Part II. The State has recognized the potential hazards associated with earthquake fault areas with program policies where appropriate.

Comment

15. We note that there appears to be a present lack of information on coastal zone hydrology, and we recommend that the Council take appropriate actions during program implementation to fill such information gaps. We feel that the management program (particularly as articulated in the policies in Chapter III) could then be strengthened by including information on the interrelationship between surface water and ground water within the coastal zone.

Response

The South Carolina Water Resources Commission has extensive ground water studies presently underway for the coastal zone. As improved information becomes available in the future, the Council will certainly refine and strengthen its program. The Council welcomes continued close cooperative efforts with DOI staff to develop both data and new policy proposals in the future.

Comment

16. We also recommend that your discussion of Federal activities (pp. V-15 through V-20) be revised to reflect the recent Department of Justice opinion that Federal activities are subject to the consistency requirements of Section 307(c)(1) of the Federal Act only where such projects are likely to directly affect a State's coastal zone. As you know, the Department is currently working with your office to assure that the Justice opinion is implemented appropriately.

With regard to Federal licenses and permits (p. V-23), we do not agree that all geological and geophysical exploration permits issued by the U.S. Geological Survey directly affect the coastal zone. We believe that this review should be limited to drilling operations only. Also, States will not have the opportunity to review and approve "applications for permit to drill" (listed as Item 2 under Permits Associated with OCS Activities on p. V-23) if the OCS plan describing the drilling activity was subject to consistency review pursuant to 307(c)(3)(B).

Response

The program document has been revised to reflect the recent Department of Justice Opinion which states that Federal Consistency provisions shall apply to Federal activities which directly affect the coastal zone. This opinion requires deletion of reference to "significant" effects on the coastal zone.

The State does intend to review the license and permit activities referenced above. However, if during program implementation, this review appears unwarranted, the program document will be refined to reflect this change in emphasis.

17. Draft Environmental Impact Statement. We believe that the DEIS concentrates on the program's positive impacts and fails to describe adequately the environmental "trade-offs" which can be expected to occur.

Response:

OCZM believes that the discussion in Part III, Chapters 4, 5, and 6 of the South Carolina DEIS adequately addresses the potential environmental trade-offs that could occur as a result of Federal approval of the South Carolina Coastal Management Program. South Carolina is currently implementing a major portion of the program (i.e., the permitting and State level consistency/certification procedures) under the mandate of the South Carolina Coastal Management Act. The effects of Federal approval are basically those associated with Federal consistency and the effect that additional Federal dollars will have on the State's ability to better implement its permitting and program implementation activities. We believe that the negative environmental effects associated with these activities are negligible.

Comment:

18. On page IV-20, under "Mining Operations," the report states that "Extraction of minerals by mining is a basic and essential activity, making an important contribution to the economic welfare of this State and the Nation." Because of this importance, we believe that South Carolina should include mineral resources in the list of national interests on page III-5.

Response

The South Carolina coastal program identifies mining operations as Geographic Areas of Particular Concern at the State level, but does not concur that these would always be of scope or significance to warrant national interest designation.

Comment

19. In South Carolina, the SCORP Exchange Council is the vehicle for continuing coordination and citizen participation in the SCORP planning process. The South Carolina Coastal Council is a member of the SCORP Exchange Council. Because of this, we recommend all major actions involving coastal recreational and cultural resources have SCORP Exchange Council involvement.

Response

The objectives of the SCORP Exchange Council for recreation are adopted as objectives of the coastal program, as shown on p. III-42. Continued close cooperation with both DOI and SCORP will be Council practice in the future.

Hugh A. Benton
May 7, 1979

Comment

1. Our one objection is to the "Note" on page V-16. It is much too restrictive and is an over-zealous definition of what constitutes "significantly affecting the Coastal Zone." It is a ruling imposed only on Federal agencies as no other person or body is required to submit all its development projects within the coastal zone to the State for approval. In fact, it effectively grants the State final review authority for all military construction, an authority certainly not contained, or contemplated, within the Act of 1972. Hence, it is requested that the "Note" be deleted in its entirety.

Response

See change in the program document on p. V-17. The document was in error and the change now reflects a proper interpretation of §307 of the CZMA.

Westvaco Corporation takes a keen interest in the proposed South Carolina Coastal Management Program. Westvaco manufactures paper, packaging, chemicals and lumber. Over one million acres of forestland are managed in the Southeast to supply our mills with wood fiber. One-half million acres comprise Southern Woodlands, most of which is in South Carolina. Approximately 350,000 acres lie in the Coastal Zone of South Carolina as defined in the Coastal Management Program. Westvaco has a longstanding record of firm commitment to the multiple-use concept, that is, the management of our timber resources in conjunction with water, wildlife and recreational values.

Comment

1. Of particular concern is the definition of wetlands to include upland freshwater areas that affect estuarine systems. Plainly a liberal interpretation of this definition could have far-reaching impacts on our operations. For example, please reference "Roads and Highways" (p. III-21). Many acres of productive timberland are accessible only through wetlands as defined by the program. Most Westvaco roads constructed through wet areas are fill roads, and use of culverts maintains the general natural drainage pattern. Bridging these areas, as recommended in the program, would not be economically feasible.

Response

Freshwater wetlands are included in the definition of areas subject to management within the coastal program. However, the language of the resource policies for wetland protection, specifically those on p. III-22, does not place an unnecessary burden on timber production and associated activities since bridging of wetlands is required whenever feasible. The definition of "feasibility" as shown in the glossary contains the concept of economic as well as environmental consideration, which must all be balanced.

Comment

2. In reference to "Forestry" (p. III-31), management of logging operations so that drainage characteristics remain at pre-existing water quality, volume and rate of flow will prove difficult if not impossible. Any logging operation will disrupt those parameters to some extent, but the majority of these disruptions are temporary and not considered serious. Perhaps acceptable limits to changes in quality, volume and flow should be developed, along with monitoring mechanisms.

Also in reference to "Forestry," avoidance of disruption of freshwater marshes for timber-related activities is a very broad policy. Would increased runoff in a swamp which eventually drains into a marsh constitute disruption? Again, the potential impact on our operations appears to be quite large.

Response

The SCCMP recognizes that management of logging operations in a manner that ensures drainage characteristics are unchanged is a difficult task. The policies which guide the Coastal Council in its decisionmaking are intended to limit the adverse effect that timber operations may have on coastal resources. We recognize that in South Carolina, it may, in many cases, be difficult to avoid completely the disruption of freshwater marshes for timber activities. Policy #1(b) on p. III-31 is intended to minimize such disruption and to ensure that alternatives are considered where possible. All the policies in the section on Forestry are sufficiently flexible for the applicant to demonstrate special constraints or conditions for specific project proposals.

3. We also have concern for the prohibition of dredge or strip mining operations in critical areas "unless no feasible alternatives exist and the benefits of mining outweigh the adverse impacts" ("Mineral Extraction," p. III-32). We request that the phrase "unless no feasible alternatives exist" be omitted, and a provision added whereby minerals may be mined in critical areas if acceptable reclamation measures are employed. We hope that the availability of mineral resources will weigh heavily as a benefit. The language, however, certainly leaves room for unreasonable restrictions on mineral resource utilization.

Response

Because of their value as coastal resources and their fragile nature, certain "critical areas" of the coast were identified in the 1977 South Carolina Coastal Management Act. These critical areas--beaches, primary sand dunes, coastal waters, and tidelands--as well as other wetlands are intended to receive special management attention. Extensive mineral extraction activities generally would not be compatible with resource protection in these areas. The policy referenced on p. III-32 is not unreasonably restrictive since feasibility of alternatives, as well as the benefits of obtaining mineral resources must be considered by the Council.

Comment

4. Under "Wildlife and Fisheries Management" (p. III-51) the wording again is too broad. Certain interpretations of "significant negative impact," "healthy and viable condition" and "to the maximum extent possible" could have serious implications for forest management activities.

Response

The Council will interpret these phrases reasonably, relying on the biological expertise of staff from both SCWMRD and the Coastal Council. Note the language of policy 1) a), p. III-51, which states: "In reviewing permit applications relative to wildlife and fisheries resources, social and economic impacts as well as biological impacts will be considered."

Comment

5. We also suggest that under "Boat Ramps" (p. III-48, 1d and 2a), a more detailed definition of "environmentally acceptable materials" be developed.

Westvaco certainly shares the Council's commitment to conservation of South Carolina's coastal resources. It is our opinion, however, that in the above areas the language is too all-inclusive for effective implementation of the plan in the manner intended.

Response

See change to program document, p. III-46 under "Findings."

The document does have a discussion of the factors which make materials unacceptable for boat ramp construct[illegible]

PART I

INTRODUCTION

A. The Federal Coastal Zone Management Act

In response to intense pressure and because of the importance of coastal areas of the United States, Congress passed the Coastal Zone Management Act (P.L. 92-583) (CZMA) which was signed into law on October 27, 1972. The act authorized a Federal grant-in-aid program to be administered by the Secretary of Commerce, who in turn, delegated this responsibility to the National Oceanic and Atmospheric Administration's (NOAA) Assistant Administrator for Coastal Zone Management, who heads the Office of Coastal Zone Management (OCZM). The Coastal Zone Management Act of 1972 was substantially amended on July 26, 1976, (P.L. 94-370). The Act and its 1976 amendments affirm a national interest in the effective protection and careful development of the coastal zone, by providing assistance and encouragement to coastal states to develop and implement rational programs for managing their coastal areas.

Broad guidelines and the basic requirements of the CZMA provide the necessary direction to states for developing coastal management programs. These guidelines and requirements for program development and approval are contained in 15 CFR Part 923, as raised and published March 28, 1979, in the Federal Register. In summary, the requirements for program approval are that a state develop a management program which:

(1) Identifies and evaluates those coastal resources recognized in the Act that require management or protection by the states;

(2) Reexamines existing policies or develops new policies to manage these resources. These policies must be specific, comprehensive

and enforceable, and must provide an adequate degree of predictability as to how coastal resources will be managed,

(3) Determines specific uses and special geographic areas that are to be subject to the management program, based on the nature of identified coastal concerns. Uses and areas to be subject to management should be based on resource capability and suitability analyses, socio-economic considerations and public preferences;

(4) Identifies the inland and seaward areas subject to the management program;

(5) Provides for the consideration of the national interest in the planning for and siting of facilities that meet more than local requirements; and

(6) Includes sufficient legal authorities and organizational arrangements to implement the program and to insure conformance to it.

In arriving at these substantive aspects of the management program, states are obliged to follow an open process which involves providing information to and considering the interests of the general public, special interest groups, local governments, and regional, state, interstate and Federal agencies.

Section 305 of the CZMA authorizes a maximum of four annual grants to develop a coastal management program. After developing a management program, the state (territory) may submit it to the Secretary of Commerce (or her representative in this case, the Assistant Administrator

of NOAA for Coastal Zone Management) for approval pursuant to Section 306 of the CZMA. If approved, the state is then eligible for annual grants under Section 306 to implement its management program. If a program has deficiencies which need to be remedied or has not received approval by the time Section 305 program development grants have expired, a state may be eligible for preliminary approval and additional funding under Section 305(d).

Section 307 of the Act stipulates that Federal agency actions shall be consistent, to the maximum extent practicable, with approved management programs. Section 307 further provides for mediation by the Secretary of Commerce when a serious disagreement arises between a Federal agency and a coastal state with respect to a Federal consistency issue.

Section 308 of the CZMA contains provisions for grants and loans to coastal states to enable them to plan for and respond to onshore impacts resulting from coastal energy activities. To be eligible for assistance under Section 308, coastal states must be receiving Section 305 or 306 grants, or, in the Secretary's view, be devloping a management program consistent with the policies and objectives contained in Section 303 of the CZMA.

Section 309 allows the Secretary to make grants to states to coordinate, study, plan, and implement interstate coastal management programs.

Section 310 allows the Secretary to conduct a program of research, study, and training to support state management programs. The Secretary

may also make grants to states to carry out research studies and training required to support their programs.

Section 315 authorizes grants to states to acquire lands for access to reaches and other public coastal areas of environmental, recreational, historical, aesthetic, ecological, or cultural value, and for the preservation of islands, in addition to the estuarine sanctuary program to preserve a representative series of undisturbed estuarine areas for long-term scientific and educational purposes.

B. SUMMARY OF THE SOUTH CAROLINA COASTAL PROGRAM

The South Carolina Coastal Program is based, in large part, on the South Carolina Coastal Management Act of 1977 (SCCMA). Basically the Act accomplishes four things:

1) It establishes a permanent South Carolina Coastal Council (SCCC).
2) It provides for the development and administration of a comprehensive Coastal Management Program.
3) It sets up a permitting process for activities occuring in the four "critical areas" of the coastal zone (tidelands, coastal waters, beaches and primary ocean-front sand dunes).
4) It provides a mechanism for State and local agency consistency with the State's approved Coastal Management Program throughout the coastal zone.

COASTAL ZONE BOUNDARY:

The South Carolina coastal zone is defined in Section 3(B) of the South Carolina Coastal Management Act of 1977 as :

> All coastal waters and submerged lands seaward to the State's jurisdictional limits and all lands and waters in the counties of the State which contain any one or more of the critical areas. These counties are Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown.

The critical areas are defined in Section 3(J) as: coastal waters, tidelands, beaches and primary ocean-front sand dunes.

The South Carolina Coastal Council employs a two-tier approach to management of activities having a direct and significant impact on coastal waters. The "critical areas" will receive more intensive attention through the direct permitting system, while the remainder of the coastal zone will be managed through cooperation with other State agencies amd their adherence to coastal program policies.

MANAGEMENT AUTHORITIES:

All lands and waters of the coastal zone (the State's eight coastal counties) were considered in the development of the program. Two types of management authority were granted to the SCCC:

1) Direct permitting authority over the "critical areas"; 2) indirect management authority, through a SCCC certification process, of coastal resources throughout the coastal zone, which includes coastal waters and submerged lands seaward to the State's jurisdictional limits, as well as the lands and waters of the eight coastal counties.

A fundamental part of the coastal management program is the SCCC's exclusive authority to issue permits for alterations in the "critical areas". In addition, the SCCMA directs the SCCC to issue rules and regulations for the implementation of its permitting program. Through Section 8(B)(11) of the SCCMA, the SCCC is required to review and certify the compliance of permit applications administered by other State agencies with the policies of the coastal management program.

RESOURCE POLICIES:

One of the major changes in the area of coastal resources management resulting from the development of a Coastal Program in South Carolina has been the creation of resource "policies". In review and certification of permit applications in the coastal zone, the SCCC will be guided by its identified coastal management program policies. In addition to these policies the State has outlined general considerations which will be used in permitting or certifying the compliance of activities occuring in the coastal zone. Certain of these "considerations" are important to note:

- o The possible long-range, cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area.
- o The extent of negative impacts on identified Geographic Areas of Particular Concern (GAPCs). The determination of negative impacts will be made by the SCCC in each case with reference to the priorities of use for the particular GAPC.

In critical areas of the coastal zone program policies are also guided by general considerations. Important considerations include: the extent to which activities are water-dependent and/or water-related; the extent to which the development could affect existing public access; and the extent to which the activity could cause erosion.

The policies contained in the program along with the general considerations outlined as a basis for decision-making represent a major step forward in

management of coastal resources that produces a predictable and equitable way of balancing economic and resource conservation goals.

Program policies concerning shore erosion and public access also represent significant changes for South Carolina. The SCCMA mandates the SCCC to develop a comprehensive beach erosion control policy and gives authority to the SCCC for implementation of this policy. This includes authority to remove erosion control structures which adversely affect the public interest.

The SCCC also has the authority to accept and expend Federal and State erosion control funds only in areas which provide full and complete access to the public. The South Carolina erosion control plan will also identify those coastline areas which are most severely eroding.

Barrier islands represent both a major economic resource and potential hazard for South Carolina. The Coastal Program policies provide specific guidance for the further orderly development of this resource. In addition the State has developed a new policy which does not allow for the expenditure of State of Federal funds for new bridge or causeway access to any previously undeveloped barrier islands.

NATIONAL INTEREST AND USES OF REGIONAL BENEFIT:

In addition to the legislative mandate contained in the Federal CZMA of 1972 for consideration as the national interest, the SCCMA(Section 8(B)(6)

also requires that the State provide for adequate consideration of the national interest in developing and implementing its coastal program. The following concerns are identified to be in the national interest:

1) National Defense
2) Energy Production and Transmission
3) Coastal Resources

    significant fish species and habitats
    threatened wildlife habitats, public recreational areas, drinking water supply, historic, cultural, and archeological sites
    barrier islands

When national interest considerations for facilities and for resource conservation conflict, the Coastal Management Program resolves the conflict by examining resource policies for activities subject to management as well as the permitting rules and regulations which are applicable to the specific facility or associated activity. Consultation with relevant Federal agencies occurs on a continuing basis.

Uses of regional benefit as identified by the SCCC include transportation facilities and parks. Through the use of South Carolina's Public Works Eminent Domain Law, which allows any Federal agency, State public body or authorized corporation to acquire real property necessary, a system exists which ensures that adequate sites are, or can be set aside, for different uses of regional benefit. In conclusion, the most significant changes

which will occur as a result of the development and approval of South Carolina's Coastal Program are:

1) The articulation of State-level policies regarding management of the State's coastal resources.
2) State and Federal agencies must be consistent with the State's coastal resource policies.
3) The State has developed a Shore Erosion Management Plan.
4) All State and Federal funds (i.e., public investments) for shore erosion protection will be tied to the provision and/or maintenance of shorefront access.
5) The State has developed specific rules and regulations for permitting of alterations in coastal "critical areas".
6) The State has committed itself to making certain permitting decisions based, in part, on water dependency and water relatedness.
7) The State has defined "no feasible alternative" to mean feasible site location, as well as, no design or construction (technical) alternative. (Further feasibility considerations are discussed in Part II of the DEIS.)
8) The State has determined to limit vehicular access to all undeveloped barrier islands through its public investment policies for transportation and other public services.

C. How the South Carolina Coastal Program Meets the Requirements of the Coastal Zone Management Act:

Requirements	Sections of Approval Regulations	Location in Pro. Document (Chapter)
Sec. 306(a) which includes the requirements of Sec. 305:		
305(b)(1): Boundaries.	923,31, 923.32	III(A)
	923.33, 923.34	III(C)(3)
305(b)(2): Uses subject to management.	923.11	
305(b)(3): Areas of particular concern.	923.21, 923.23	IV(A)
305(b)(4): Means of control.	923.41	V(A)
305(b)(5): Guidelines on priorities of uses. . . .	923.21	IV(A)
305(b)(6): Organizational structures.	923.46	V(A)
305(b)(7): Shorefront planning process.	923.24	I [illegible])
305(b)(8): Energy facility planning process. . . .	923.13	IV [illegible]
305(b)(9): Erosion planning process.	923.25	IV[illegible]
Sec. 306(c) which includes:		
306(c)(1): Notice: full participation; consistent with Sec. 303.	923.58, 923.51	V(F)&(G)
	923.56, 923.3	
306(c)(2)(A): Plan coordination.	923.56	V(F)
306(c)(2)(B): Continuing consultation mechanisms. .	923.57	V(F)&(D)
306(c)(3): Public hearings.	923.58	V(F)
306(c)(4): Gubernatorial review and approval. . . .	923.48	Gov. Letter
306(c)(5): Designation of recipient agency.	923.47 →	Gov. Letter
306(c)(6): Organization.	923.46 →	V(A) and II
306(c)(7): Authorities.	923.41, 923.47 →	V(A)
306(c)(8): Adequate consideration of national interests.	923.52	III(C)(1)
306(c)(9): Areas for preservation/restoration. . .	923.22	IV(A)
Sec. 306(d) which includes:		
306(d)(1): Administer regulations, control development, resolve conflicts.	923.41	V(A)(B)&(C)
306(d)(2): Powers of acquisition, if necessary. . .	923.41	V(A)
Sec. 306(e) which includes:		
306(e)(1): Technique of control.	923.41-44	V(A)& III(C)(3)
306(e)(2): Uses of regional benefit.	923.12	III(C)(2)
Sec. 307 which includes:		
307(b): Adequate consideration of Federal agency views.	923.51	V(F)
307(f): Incorporation of air and water quality requirements.	923.45	V(E)

PART II

DESCRIPTION OF THE PROPOSED ACTION

(PROGRAM DOCUMENT)

SOUTH CAROLINA COASTAL PROGRAM

South Carolina Coastal Council

SOUTH CAROLINA COASTAL COUNCIL
(July, 1979)

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Representative Jean B. Meyers
Representative William Campbell

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dated by saline waters whether or not the saline waters reach the area naturally or through artificial water courses and those areas that are normally characterized by the prevalence of saline water vegetation capable of growth and reproduction.

15. **Water-Dependent**—A facility which can demonstrate that dependence on, use of, or access to, coastal waters is vital to the functioning of its primary activity.

16. **Water-Related**—Significantly enhanced economically by proximity to the shoreline (water).

GLOSSARY

1. **A-95**—Office of Management and Budget Circular A-95; an interagency notification and review process by which state, local and regional levels of government have an opportunity to comment on proposed projects or programs involving Federal funding. The goal is to avoid Federal or Federally-assisted actions which would not be in keeping with state or local efforts, plans, or policies, or would work against other Federal efforts.
2. **Beaches**—those lands subject to periodic inundation by tidal and wave action so that no nonlittoral vegetation is established.
3. **Certification**—The procedure of Coastal Council review and approval or disapproval of the permit applications processed by other State agencies (in the coastal zone) based on determination of the project's compliance with policies of the coastal management program.
4. **Coastal waters**—the navigable waters of the U.S. subject to the ebb and flood of the tide and which are saline waters, shoreward to their mean high-water mark.
5. **Coastal Zone**—By law, the coastal zone in South Carolina consists of all the lands and waters out to the three-mile limit of State jurisdiction in 8 counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper and Georgetown.
6. **Consistency Determination**—A decision made with respect to a direct Federal activity/development project, a Federal permit or license, or a Federal funding or assistance program, which ascertains whether such Federal-level action is in compliance with policies of the coastal management program ("consistent to the maximum extent practicable"). See Chapter V.
7. **Critical Areas**—By law, the critical areas of South Carolina are the coastal waters, tidelands, beaches and primary ocean-front sand dunes seaward of the boundary line determined by the Coastal Council. (See Chapter III, p. III-5 and definitions on this page.) In these areas the Coastal Council has direct jurisdiction for permits to perform any alteration.
8. **Feasible** (feasibility)—As used within the coastal program, (for example, "unless no feasible alternative exists") feasibility is determined by the Coastal Council with respect to individual project proposals. Feasibility in each case is based on the best available information, including technical input from relevant agencies with expertise in the subject area, and considering factors of environmental, economic, social, legal and technological suitability of the proposed activity and its alternatives. Use of this word includes the concept of reasonableness and likelihood of success in achieving the project goal or purpose. "Feasible alternatives" applies both to locations or sites **and** to methods of design or construction, and includes the no action alternative.
9. **GAPC**—Geographic Areas of Particular Concern. See Chapter IV, p. IV-1.
10. **Networking**—Linking together the legal authorities of the various State agencies with jurisdiction in the coastal zone to enable comprehensive management of coastal resources. This is accomplished through application of the certification process, mandated in Sections 7(A) and 8(B)(11) of the S.C. Coastal Management Act of 1977.
11. **OCS**—Outer Continental Shelf, specifically, used in reference to off-shore oil and gas developments.
12. **Previously undisturbed wetlands**—those having no visible, physical evidence of previous impoundment, that is, separation from adjacent rivers or estuaries by artificial diking.
13. **Primary ocean-front sand dunes**—those dunes which constitute the front row of dunes adjacent to the Atlantic Ocean. (The critical area boundary is further defined in the Rules and Regulations for Permitting, as follows: If the crest of a primary front row sand dune is not reached within 200 feet landward from mean high water, that sand dune is not considered adjacent to the Atlantic Ocean. Council permitting authority shall extend: (1) to the landward trough of the primary front row sand dune if the crest of this dune is reached within 200 feet landward from mean high water, (2) to the seaward side of any maritime forest or upland vegetation if reached before the primary front row sand dune, and (3) to the seaward side of any permanent man-made structure which was functional in its present form on Sept. 28, 1977, where such structure is located seaward of any primary dune.)
14. **Tidelands**—all areas which are at or below mean high tide and coastal wetlands, mudflats, and similar areas that are contiguous or adjacent to coastal waters and are an integral part of the estuarine systems involved. Coastal wetlands include marshes, mudflats, and shallows and means those areas periodically inun-

chapter I
the coast of
south carolina

A. INTRODUCTION

Because South Carolina has been slow to develop the large industrial base common to many other coastal states, it is blessed with vast unspoiled natural areas. However, increasing, and often conflicting, demands upon coastal resources have made it necessary to balance the needs created by burgeoning populations and concomitant development against those for preservation of the environment. South Carolina's General Assembly clearly recognized the need for such a balance when it passed an act designed "to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State." (S.C. Coastal Management Act of 1977, Act 123)

One reason for the multitude of conflicting interests within the coastal zone is the fact that it is attractive – as a place to live and a place to play, as an industrial site and as the only possible location for occupations such as shipping and fishing. The coastal zone has played an important part in the State's cultural and historical development, and consequently contains a number of irreplaceable sites. The aesthetic and ecological resources found in the coastal zone are unique and equally irreplaceable.

South Carolina's coastal zone can be divided into three segments, based on both physical and sociological distinctions. The morphology of the coast represents a transition zone between the North Carolina and Georgia shorelines. From the North Carolina border to Winyah Bay, the coast forms a gentle crescent, called an arcuate strand. The coast in this section is characterized by broad sandy beaches, few tidal inlets, a well-developed dune system and generally sparse salt marshes. In contrast, the southern section of the coast from Bulls Bay to the Georgia border is fronted by a series of barrier islands separated from the mainland by a wide zone of salt marsh. Tidal inlets are more numerous, and in some areas there is little or no dune development. Extending thirty kilometers along the shore between the northern and southern coastal segments lies the Santee River Delta, the largest deltaic complex on the east coast. Unfortunately, this delta is eroding at a rapid rate due to damming and diversion projects which have cut down on the flow of fresh water and sediments.

The physical characteristics of each section of the coast have been important in determining the economic and social character which developed over time. The sandy beaches of the arcuate strand in Georgetown and Horry Counties have nurtured a thriving tourist economy centered around Myrtle Beach. Georgetown, the other principal center of population in the northern segment of the coastal zone, has an industrial economy. This is due in part to the abundant forests of the region, which supply the City's most significant industry – the pulp mills – with raw materials.

The central portion of the coast, dominated by the greater Charleston area, is the major permanent population center as well as industrial center in the coastal zone. Due to its natural harbor, Charleston has become a port of major importance and has attracted a number of industrial and manufacturing concerns. In addition to its importance as a center of commerce, Charleston possesses a number of cultural and historical attributes unequalled in the State or the nation. The Spoleto Festival celebrating the arts has become an annual event in the port city. During the colonial era, Charleston is said to have eclipsed even Boston as a city of consequence, and it remained an important center for social and intellectal life even after the devastation of the War Between the States.

The natural history of the lower part of the coast – Jasper, Beaufort and Colleton Counties – has had a great influence on the economic and social development of the area. Because of the extensive tracts of marsh, estuary and forest, population and industrial growth have been constrained to some degree. The numerous sea islands, often isolated, have given rise to a culture all their own. Beaufort and Port Royal are the principal population centers, although the development of exclusive resort property on Hilton Head Island has led to increased growth in nearby Bluffton. Fishing and leisure-related activities are the primary form of industry in the tri-county region.

The fact that much of South Carolina's coastal zone remains unspoiled may be attributed in large part to the plantation system and to the aftermath of civil war. The plantation system served to keep large tracts of land under single ownership and in non-commercial use at least until the time of the War Between the States. During Reconstruction, many old plantations were sold to hunt clubs or to large corporations whose owners allowed the fields and rice impoundments to revert to their natural state. This situation has served to protect much of the South Carolina coast from rapid development. Wise management and equitable resource allocation decisions will be necessary to provide for needed economic expansion while preserving a rich and unique heritage for future generations.

B. LOW COUNTRY HISTORY

The Indians

Any history of South Carolina's low country must necessarily begin with its first settlers, the Red Carolinians. Ethnologists have divided the American Indians living north of Mexico into some sixty stocks based on language. The stocks represented among the Indians who inhabited the South Carolina low country are the Muskhogean, the Siouan and the Yuchi.[1]

Low country Indian tribes were numerous and small, and the earliest Indian inhabitants of this area consisted of wandering groups who lived in an area only as long as the game they depended on lasted. In time these tribes began to settle down and develop an agrarian lifestyle.[2]

All of the Indians in the low country and in South Carolina as a whole had certain things in common - "....even the most primitive among them had attained a fairly diversified agriculture; they all built permanent or semi-permanent houses; they were all village dwellers. Their culture, although subject to wide tribal variations, was based primarily upon the production of food crops and secondarily upon hunting."[3]

It is tragic that the growth of western civilization resulted in the demise of so many of the American Indian tribes. A few Catawba families living in York County (in the northcentral portion of the State) are the only remnant left of all the many tribes that once inhabited South Carolina.

The first white South Carolinians were indebted to many of the low country Indians for their friendship and generosity through the sharing of their food and their assistance against enemy attack. We shall always be indebted to them for the legacy they left us, part of which is evident today in the lovely names of many of our low country islands and rivers - names such as Waccamaw, Ashepoo, Bohicket, Edisto, Wadmalaw, Kiawah, Wando, Santee and Combahee.

Spanish and French Attempts at Settlement

The first recorded visit of Europeans to South Carolina's coast was made by Spaniards from the Spanish colony of San Domingo (then called Hispaniola). Two ships met at sea - one dispatched by Judge Lucas Vasquez de Ayllon and which was returning from a voyage of exploration, the other headed out on a mission to capture Indians for slaves. The captains of the two vessels joined forces and headed for the continent where they made port on June 24, 1521, probably at Winyah Bay.[4] After enticing, under the pretext of friendship, some 150 Indians to come aboard the two vessels, they suddenly put to sea with their hapless "guests." One of the ships sank, and many of the enslaved Indians aboard the other vessel starved themselves to death after reaching San Domingo.[5]

In 1525, two ships were dispatched by de Ayllon to explore the coast of the continent and return those few Indians who had survived captivity.[6] In 1526, de Ayllon himself set out with a fleet of seven vessels and some 500 men and women. In August, 1526, they founded the settlement of San Miguel de Gualdape on what is thought to have been the shores of Winyah Bay. The settlement (the first European settlement in South Carolina), plagued by mutiny, fire, uncommonly cold weather and discouraged by the death of de Ayllon, was soon abandoned. The next attempt at settlement was to be made by the French thirty-six years later.[7]

In February, 1562, the Frenchman Jean Ribaut set sail with two ships and 150 persons, mostly Huguenots, to establish a French colony on the Carolina coast.[8] The purpose of this endeavor was two-fold: to found a religious asylum for the Huguenots and to further the cause of France against Spain by establishing an outpost in the New World.[9]

Ribaut crossed the ocean to Florida and proceeded along the coast to a place which he named Port Royal, the same as in present-day South Carolina.[10] There, on Parris Island, he established Charlesfort and left thirty men to protect it while he returned to France for supplies and reinforcements.[11] Upon his arrival there, Ribaut found France in the midst of religious wars. This and other complications prevented his return to the settlement at Charlesfort where life presented ever-increasing hardships for those left to protect it. A lack of food (in spite of the generosity of the local Indians), monotony and the merciless discipline of their commander resulted in their killing him and setting sail for France in a makeshift ship.[12] After suffering the hardships of bad weather and starvation which forced them to cannibalism, they were rescued through their chance encounter with an English ship. Thus ended French attempts at formal settlement in Carolina.[13]

In 1564, the French established Fort Caroline on the St. John's River in the present State of Florida.[14] This settlement led to Spanish massacre of the Frenchmen at Fort Caroline, bloody reprisal by the French and

the decision by Spain to build a series of forts along the coasts of South Carolina, Georgia and Florida to discourage further French activity.[15]

In 1566, Menendez established Fort San Felipe on Parris Island about two miles from the remains of Charlesfort. The settlement survived until 1576 when an Indian uprising forced the Spanish to abandon the fort and withdraw to St. Augustine. The following year, 1577, they rebuilt near the ashes of San Felipe which had been burned by the Indians. The new fort, San Marcos, lasted for ten years. In 1587, the Spanish withdrew after the English destruction of St. Augustine necessitated a reduction of their frontier posts. Spanish friars, however, continued their mission work for nearly one hundred years afterward in small outposts located in what is today North and South Carolina.[16]

The British

In 1629, Charles I of England granted to Sir Robert Heath a charter to all America from ocean to ocean between north latitudes 36 and 31. No genuine attempts at settlement were made under this charter, and it was declared forfeited in 1663 when Charles II granted to eight of his most faithful supporters the ownership of the same territory. A second charter was granted, in 1665, to these eight Lords Proprietors, as they were called, because the Heath Charter had not been properly annulled. The chief difference between the 1663 and 1665 charters was an extension of the boundaries of the granted land to 36 degrees 30 minutes on the north and 29 degrees on the south, that is, from Virginia to a point 65 miles south of St. Augustine.[17]

The eight men chosen by King Charles to receive the enormous land grant were: the Earl of Clarendon, the Duke of Albemarle, Lord Craven, Lord Berkeley, Lord Ashley, Sir George Carteret, Sir William Berkeley and Sir John Colleton - with Lord Ashley (Anthony Ashley Cooper, Earl of Shaftesbury) taking far more interest in the venture than any of the others.[18] For the territory, the King was to receive certain returns on whatever profits were made from its development. The charter empowered the Proprietors to make laws, to establish (with popular consent) the Anglican Church as the official State Church, and to grant freedom of worship to all who would settle in whatever colony might be founded. The laws made by the Proprietors were to be approved by the people of the colony, thus a certain degree of self-government was to be allowed.[19]

In 1669, Lord Ashley assumed a leadership position among the group of Proprietors and began to make firm plans for a colony at Port Royal, South Carolina. Joseph West was appointed governor and commander-in-chief until an appointed fleet of three vessels should land in Barbados on the way to their final destination.[20] Thus, in August, 1669, three ships, the **Carolina**, the **Albemarle** and the **Port Royal**, under West's command, left England and headed for Barbados.[21] Arriving there in October, the ships encountered a storm which wrecked the **Albemarle** and necessitated its replacement by the **Three Brothers.**[22]

In mid-November the fleet set sail from Barbados, and after touching at the island of Nevis, the ships became separated by a storm. The **Port Royal** was wrecked in the Bahamas after six weeks of wandering, and many passengers died on shore before they were able to hire a ship to take them to Bermuda where the **Carolina** had already taken refuge. Months passed before news was received from the **Three Brothers.**[23]

In Bermuda Col. William Sayle was appointed governor (West's leadership having expired in Barbados), and, under his command, the **Carolina** and a new Bermuda vessel set sail for Port Royal. On their arrival in March, 1670, an Indian chief, the cacique of Kiawah, urged the newcomers not to settle at Port Royal but rather in his home territory of Kiawah which was on the banks of the Ashley River. The colonists took the chief's advice, and in early April they landed and chose a nine acre site on the western bank of the Ashley, a location invisible from the ocean and the topography of which allowed for easy defense from both the river side as well as landward. The colonists named their settlement Albemarle Point in honor of the eldest Proprietor, but the Proprietors later changed the name to Charles Town in honor of the king.[24]

The **Carolina** and its companion ship had entered Charleston harbor from Port Royal in April, 1670; on May 23 the **Three Brothers** finally made her arrival after surviving a storm which had driven her as far north as Virginia.[25]

Establishing the Colony

The settlement at Charles Town began with about 148 persons, the majority of whom were English. There were, however, a few persons of Scotch and Irish background and, according to some accounts, three Negro slaves.[26] On completion of a protective palisade and temporary housing, the settlers began to clear ground

and to plant crops such as wheat, corn, peas, indigo, tobacco and cotton.

The need for protection from the Spanish as well as from hostile Indians (particularly the fierce Westos, said to have been cannibalistic) was of paramount concern during the early days of the colony, and with good cause, for in August, 1670, Spanish from St. Augustine, along with their Indian allies, came to destroy the settlement. Fortunately for the Charles Town settlers, the would-be attackers were caught in a hurricane and forced to retreat.[27]

It was during these early times that Dr. Henry Woodward became of invaluable service to the colony. Dr. Woodward had joined the passengers of the **Carolina** at Nevis and had accompanied them to help establish their settlement in the New World. Earlier, he had lived with the Indians at Port Royal, had learned their language and customs and had gained their friendship and confidence.[28] Through his assistance the Charles Town settlers were able to establish a flourishing trade with many of these people, a trade that was the key to the colony's early success and ultimate permanence.

In February, 1671, 106 settlers arrived from Barbados, and in time Barbadians came to compose about half the population. Because many of them were experienced with colonial life, they dominated the affairs of the colony for some time.[29]

With the increase in population, the threat of attack from the Indians and Spanish was lessened, and some people began to move out from their fortified village site onto farms and plantations.[30] Others established satellite towns such as James Town on James Island (1672-1674) and New London or Wiltown (near Edisto Island) which died out around 1800.[31] Indian trade, lumbering and naval stores soon brought considerable wealth into the young colony.

Although good relations had been established with many of the Indians, the settlers had their share of problems with some others. As early as 1671 a small expedition was sent out to chastise the Coosas who had been stealing hogs and provisions and had finally murdered some of the colonists. The expedition was a success, and a number of Indians were taken prisoner and made into slaves although Indian slavery had been forbidden by the Proprietors.[32]

The Move to Oyster Point

Almost from the beginning of the settlement, plans had been made to eventually move the town from the west bank of the Ashley to the peninsula between the Ashley and Cooper Rivers, a place called Oyster Point.[33] At the end of 1679, the Lords Proprietors gave instructions that the official port town be moved to Oyster Point, and in 1680, the move to the new location was begun.[34]

The colony grew quite rapidly during the decade between 1680-1690. Many Dissenters from England and a large number of French Huguenots, all seeking religious freedom, found their way to Charles Town during this period.[35] By 1700 the colony contained even more of a mixture of peoples with the arrival of Dutchmen, Irish, Baptists, Sephardic Jews, Quakers, and a few privateers turned planters.[36] Indian trade and naval stores continued to bring wealth into the colony.

Development of the Plantation System

No longer feeling the need for living close together in one place, some people moved out of town and took up land along the rivers. The resulting system of large plantations soon became an established way of life, and Charles Town's well-being was dependent upon and virtually inseparable from their prosperity.

Although plantations were begun with the founding of the colony, it was the successful planting of rice that was responsible for the rapid spread of the plantation system[37] and its attendant institution of slavery. The plantations thus flourished at the expense of the Negro as well as the Indian, whose land was continuously encroached upon.

Three great crops - rice, indigo and cotton - were responsible for the accumulation of tremendous fortunes by Carolina low country planters. The first of these staple crops was rice, planted as early as 1672. A new strain, brought in from Madagascar in the early 1690's, increased the quantity and quality of the crop which virtually became the money of the Province.[38] "....for over two hundred years its characteristics and requirements molded Low Country life as did nothing else."[39]

The second staple crop, indigo, although grown as early as 1670, became of importance after its successful culture and processing by a precocious young girl, Eliza Lucas. Her father, Governor of Antigua, brought his family to the Carolina low country and placed Eliza in charge of his plantations while he returned to his duties

in Antigua.[40] When she was only eighteen years old, Eliza began experimenting with various types of indigo seed sent to her by her father. After a successful growing season, an assistant was hired to help her learn the difficult and complicated technique of processing the plant. Miss Lucas, despite her assistant's deceiving her and sabotaging the process, mastered the art of producing the valuable dye and shared her knowledge with her neighbors. By the late 1740's, indigo was bringing great wealth into the South Carolina low country.[41]

The planting of indigo ceased during the Revolution, and with the loss of the subsidy from the British government following the Revolution, the revival of the crop, as one of commercial importance, never occurred.[42]

Grown all during the Colonial era, the third great crop, cotton, became "king" in parts of the low country after 1793, the year in which Eli Whitney invented the cotton gin.[43] "In the Low Country itself cotton built new regions of plantations and made over old ones left derelict by indigo, doing for sections like Upper St. John's, Berkeley, and the Sea Islands what rice had done for the Santee and the Combahee."[44]

So integral a part of low country history were the plantations that some space must be allowed here to discuss the type of life they supported. Charles Town's primacy over other colonial towns was insured by the business of the Indian trade but "was further developed by the steady interchange of life as well as business between it and the plantations."[45] South Carolina became a sort of City-State, and the name of Charles Town became interchangeable with its surrounding territory. Many prosperous Charles Town merchants were also prominent planters, and an aristocracy was formed among families of prominence and wealth.[46]

Fortunes made by the planting of rice enabled the building of fine new plantation houses or the addition of fine wings and porticoes to older structures. For some time, colonial era plantation families stayed in the country during the summer and spent much of the winter social season in Charleston.[47]

About the time of the Revolution and sometime after, the rise of malaria caused plantation families to move during the warm months (May - October) from their mosquito-infested plantations to little villages set in the pine lands and along the coast. "Sea-Island people chose the beaches for themselves, inlanders the pine lands, and lightly built, airy little houses with many piazzas were spotted along the sand dunes or scattered among the pines, where the breezes of the ocean or the terebinthine odors of the pines would protect the plantation people from the night miasmas."[48] Thus came into being villages or towns such as Summerville, Pineville, McClellanville, Plantersville, Pinopolis, Mt. Pleasant, Walterboro, Jacksonboro, and Rockville. Some of those families of greatest wealth went into the Piedmont and mountain area of South Carolina as well as into North Carolina, Virginia, New York and New England. "Newport was made fashionable largely by South Carolinians who summered in the neighborhood,...."[49]

The Yemassee War, 1715 - 1717

From 1715 - 1717 the low country experienced the Yemassee War, spearheaded by the Yemassee Indians and including most of the tribes over which the settlers had exercised sway. "The conspiracy involved so many Indian nations . . . extending from the coast to the middle of the present State of Alabama, that only lack of Indian cooperation saved the whites."[50]

This war, caused by "Indian resentment of long-standing abuses by traders, followed by settlers' taking up Yemassee lands," resulted in the death of some 400 colonists and left South Carolina impoverished.[51] Stoney relates that the Indians "destroyed or looted some two hundred houses throughout the Low Country, driving even the prosperous Goose Creek people away from their plantations."[52] The salvation of the colony was due to the decision of the Cherokees to ally themselves with the South Carolinians. In November, 1717, the war was formally brought to a close, but its aftermath was felt for years to come.[53]

Royal Rule, the Revolution and After

One good outcome of the Yemassee War was the change, in 1719, from proprietary rule to that of the Crown.[54] "Proprietary government had numerous faults, often magnified by lengthy and uncertain communications which delayed vital decisions for months and permitted minor irritations to accrue into major problems."[55]

One unforgiveable insult to the colonists came during the Yemassee War when the proprietors "not only neglected to send aid to the colony . . ., but even refused to ask assistance from the King. . ."[56] In 1719, through a bloodless revolution, the majority of the colonists deposed their proprietary governor, formed a

new Assembly and waited for the royal government to take charge. Finally, in 1721, a provisional royal governor arrived to take charge, and the colony began its period of royal rule which lasted until 1776.[57]

Although Charles Town was the cultural and political center of colonial South Carolina, two other low country towns, Beaufort and Georgetown, became of importance in colonial times. Beaufort (located approximately midway between Charleston and the South Carolina-Georgia border) and Georgetown (located midway between Charleston and the South Carolina-North Carolina border) are the second and third oldest cities in South Carolina, and are the only colonial towns other than Charles Town which survived. Founded in 1710, Beaufort was wiped out five years later in the Yemassee War.[58] Almost immediately the town was rebuilt and "in time it became a small metropolis for great indigo and sea island cotton plantations surrounding it. By the 1850's it was one of the most fortunate and delightful communities of the state, the center of an affluent and cultivated society."[59]

By 1723 the people living in the Winyah area had petitioned the colonial government to establish a port of entry in their vicinity to avoid freight charges to Charleston and so that local produce could be shipped directly to foreign destinations.[60] Thus, the port of Georgetown, third town in the province, was eventually established. There is some difference of opinion as to the time of its beginning; McCrady states that the town was laid out shortly before 1734.[61] In time, Georgetown became a busy shipping point for rice, the cultivation of which dominated life in that area for some two hundred years.

The French and Indian War (1754-1763), the culmination of a long struggle between England and France for dominance in the New World, ended with victory for England. It was during and after this war that antagonism arose between the thirteen colonies and their mother country. Before the war there had been no centralized body with authority to make and enforce colonial policy. However, after 1763, England began to reform and tighten the machinery for administration and enforcement of the Acts of Trade and Navigation, and the colonies stoutly resisted.[62]

The low country saw the arrival of the Revolution in 1776 with the British attack on Fort Moultrie, and in 1780 Charles Town and the surrounding area were taken by the British. The end of the war left the low country devastated. "Great areas of land were so fought over that not even wild animals survived in them..."[63] The low country was further hurt by the loss of living men as well as those who died, for many prominent Loyalists left the area and never returned. In addition to all the other losses was that of the British market for indigo, and plantation communities were abandoned, and many plantation houses simply fell to pieces.[64]

Soon after the Revolution the name of Charels Town was changed to Charleston, and the seat of government was transferred to Columbia; county seats became established, and South Carolina ceased to be a City-State. Gradually economic growth began again in the low country. Once again rice brought great wealth to this area - this time through the new method of **tidal culture** which set water to work cultivating rice on the richest type of soil.[65]

Before the tidal culture method was used, rice was grown as an upland crop, without irrigation. Then as the advantages of flooding became known, early in the 18th century, cultivation was moved into cleared swamp lands fed by freshwater streams[66] so that water could be impounded and applied to the fields. Rain water was also impounded in "reserves" and used for flooding the crops. Flooding the rice greatly promoted its growth and killed the weeds and grass which formerly had to be cleared by hoeing.

Soon after the Revolution the tidal culture of rice was developed and was so effective that enough rice was produced to be shipped from South Carolina to England and the West Indies and all over Northern Europe and the Mediterranean. Consisting of a system of banks, ditches, floodgates and trunks, tidal culture provided a method whereby the rice fields could be kept as dry or as wet as the crop required. The following is a simple explanation of what was involved.

Great acreages of land beyond the salt water reach of high tide were cleared along the coastal rivers, and with enormous labor, thousands of acres were diked by digging canals or ditches along the edges of the rivers and creeks and using the excavated mud to make an enclosing bank. Within this enclosed or impounded area, a network of smaller ditches was cut and cross banks were formed to divide the area into a number of fields and provide a means of drainage and irrigation.[67]

To control the systematic, precise flooding and subsequent draining of the fields for the maximum yield of rice, floodgates and trunks were installed perpendicular to the rivers and creeks and the adjacent canals. A trunk was essentially a rectangular wood box with a floodgate at either end. As the flood tide flowed in from

the ocean and pushed the fresh water back up the distant reaches of the coastal rivers and creeks, the outside floodgate on the trunk was manually opened, allowing fresh water to flow in through the trunk and force the inside gate to swing open for the flooding of the fields. As the tide began to ebb, the lower water level in the creeks caused the water in the fields to begin flowing out and in so doing automatically forced the inner floodgate to swing shut, holding the water in the fields until such time as the rice was ready for a drying period. At this point, the inner gate was manually opened, on an ebb tibe, to allow for drainage.

The zenith of rice planting in South Carolina was reached between 1850 and 1860, and its demise occurred during the late 19th and early 20th centuries. Several factors contributed to the death of this great industry: 1) several devastating hurricanes which severely damaged the rice field dikes, 2) a lack of capital required for the expensive recovery from these storms, 3) a loss of much of the labor force which turned to other industries and 4) most especially, the introduction of rice into Louisiana and other states which had land capable of supporting heavy machinery and thus were able to produce rice much more cheaply than South Carolina.[68]

The Rise of Cotton

In 1793, Eli Whitney invented the cotton gin, and the raising of cotton then became a profitable venture. Its effect on the South Carolina low country was almost immediate, and the planting of cotton spread the plantation system well into the Middle Country. The Sea Islands were especially blessed by this crop, and wealthy island planters became famous for their particular strains of the famous black-seed cotton of tropic origin.[69]

Natural Disasters

More than once the South Carolina low country has bowed before the relentless hand of nature which has dealt the area powerful blows in the form of hurricanes as well as a terrifying earthquake. According to early writers the most severe hurricane in colonial times was the Great Hurricane of 1752 which apparently caused the greatest amount of devastation in the area of Charleston. Another memorable storm, that of 1822, struck the coast between Charleston and Georgetown. Its amazing energy caused a tremendous tide in that area and resulted in a high death toll on the plantations around Georgetown.[70] A third devastating hurricane occurred in 1893, resulting in great destruction and many deaths on the islands southwest of Charleston and near Beaufort.[71]

Perhaps the most terrifying natural disaster to befall the low country was the earthquake which struck on Tuesday, August 31, 1886, and was felt throughout the State. Great destruction and a number of deaths occurred in Charleston. The following description was written by Carl McKinley, an eyewitness, and was published in the City's **Year Book** of 1886.

> The rising sun on Wednesday morning looked on empty and broken homes and on streets encumbered with continuous lines or heaped masses of ruins, amidst which the wearied and shelterless citizens gathered together in little groups, or picked their way from place to place wondering at the extent of the damage inflicted everywhere and with renewed thankfulness in view of the perils escaped.[72]
>
> The ruins lay piled in the streets, yards and gardens, and the houses from which they had fallen seemed ready to crumble of their own weight. Travel was confined to the middle of the streets and was impeded there. It is impossible to estimate, even approximately, the amount of masonry that was thrown into the streets....[73]
>
> Thousands of blacks and whites alike - no difference was recognized and no discrimination shown - were the recipients of the bounty of their more fortunate fellow-citizens, who proved to be neighbors indeed in the hour of misfortune.[74]

Growth of Transportation

In the latter part of the 18th century and the first half of the 19th century, the low country and other areas of South Carolina turned their efforts towards increasing their means of transportation. In 1786 a company was formed to build a canal and locks to connect the Santee and Cooper Rivers, thus improving transportation and commerce between the coastal areas and the upland. Work was begun in 1793, using slave labor, and after six years the twenty-two mile long Santee Canal was completed and opened for general commerce. The canal

helped to encourage the commercial growth of South Carolina for nearly half a century.[75]

In 1828 a railroad from Charleston to Hamburg (on the Savannah River) was laid out, and another rail line was established from Charleston to Moncks Corner, St. Stephen and Florence. In 1860 the Charleston-Savannah Railroad was built. The coming of the railroads brought about a decrease in the dependence on roads and introduced a greater vitality to the economy of the low country area.[76]

Civil War and Its Aftermath

The War Between the States marked the end of the great plantation era, and the period following the war was one of tremendous change for the low country. Many of the plantation houses, which had escaped the ravages of war, were abandoned, and farming continued largely under the share-crop system.[77]

The war brought an end to the repressive laws of slavery, and for the first time blacks were legally citizens. Many of them were sold land by their former owners. Others were given property by the Federal government.[78] Both blacks and whites, however, suffered greatly after the war, for "Grim poverty and wholesale demoralization"[79] held the area in a vice grip for some time.

In time rice and cotton again made money for the low country but never to the extent shown before the war. Gradually the crops had to be abandoned, the final blow to rice being several devastating hurricanes, and to cotton, the boll weevil.[80] The pesky boll weevil was a blessing in disguise, however, for low country planters were forced to diversify. Truck farming and tobacco cultivation subsequently brought prosperity to many areas that had depended on either rice or cotton.

The late 19th and early 20th centuries have seen the slow recovery of the low country from the disastrous effects of the War Between the States as well as the hardships of the great depression of the 1930's. In the Berkeley-Charleston-Dorchester area, phosphate mining and the building of fertilizer plants just to the north of Charleston helped the economic picture of the area as did lumbering before the beginning of the First World War. With the establishment of the Navy Yard, in 1901, Charleston and surrounding areas began a dependency on the military-related industry.[81] Since the 1930's, the port of Charleston has grown in importance both to the low country and the entire State as well. Historic Charleston has become a mecca for many tourists interested in seeing a city of living history, and today tourism is Charleston's second most important industry.

The Waccamaw region of the low country, with its tall stands of sturdy pine forests, has enjoyed the economic benefits of the pulpwood and logging industries.[82] The City of Georgetown has become an important port, and its lovely historic district is attracting a growing number of tourists. The fishing industry of the region continues to grow, and that area of the Waccamaw known as the Grand Strand has in recent years felt the prosperity of a rich and flourishing tourist trade.

The area of Colleton, Beaufort and Jasper counties has probably experienced the most difficult times of any area within the low country following the War Between the States and the great depression. Phosphate mining around Beaufort helped the economic picture prior to 1900, and during the first half of this century, truck farming, the fishing industry and the military bases have been the area's mainstay. Today the future of this area looks promising with the gradual influx of new industries and the increasing numbers of tourists who are attracted to the great beauty and charm of historic Beaufort and the lovely, modern-day resorts of Hilton Head and Fripp Islands.

The South Carolina low country is proud of its rich historic heritage which, along with a great natural beauty, makes the area a unique and desirable place in which to live. The low country today is an exciting place of growth and change. With proper respect for their rich cultural and natural heritage, low country citizens of present and future generations can enjoy the benefits of economic growth while protecting the precious and irreplaceable amenities that make this area so very special.

FOOTNOTES

1. David Duncan Wallace, **South Carolina: A Short History, 1520-1948**, Columbia, 1961, p. 5. Hereinafter cited as Wallace, **Short History** .
2. **Historic Preservation Plan,** Berkeley-Charleston-Dorchester Regional Planning Council, June, 1972, p. 1. Hereinafter cited as **Preservation Plan,** B-C-D.
3. Chapman J. Milling, **Red Carolinians**, Columbia, 1969, p. 4.
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6. Joseph I. Waring, M.D., **The First Voyage and Settlement at Charles Town, 1670-1680**, Columbia, 1970, p. 3. Hereinafter cited as Waring, **Voyage and Settlement.**
7. **Birth of a City**, p. 1.
8. Waring, **op. cit.**, p. 5.
9. **Birth of a City**, p. 1.
10. Waring, **op. cit.**, p. 5.
11. **Birth of a City**, p. 1.
12. Wallace, **Short History**, pp. 19-20.
13. Waring, **Voyage and Settlement**, p. 6
14. **Ibid.**, p. 6.
15. Wallace, **Short History**, pp. 20-21.
16. **Birth of a City,** p. 2.
17. Wallace, **op. cit.**, pp. 23-24.
18. **Ibid.**, pp. 24 & 26.
19. **Ibid.**, p. 24.
20. **Ibid.**, p. 26.
21. Waring, **Voyage and Settlement,** p. 22.
22. Wallace, **op. cit.**, p. 27.
23. **Ibid.**, p. 27.
24. **Ibid.**, pp. 28-29.
25. **Ibid.**, p. 28.
26. **Ibid.**, pp. 27 & 31.
27. Samuel Gaillard Stoney, **Plantations of the Carolina Low Country**, Charleston, 1964, pp. 15-16. Hereinafter cited as Stoney, **Plantations.**
28. Wallace, **op. cit.**, p. 29.
29. **Ibid.**, p. 30.
30. **Birth of a City,** pp. 15 & 20.
31. **Preservation Plan**, B-C-D, p. 1.
32. Waring, **Voyage and Settlement**, p. 38.

33. **Birth of a City**, p. 20.
34. Waring, **op. cit.**, p. 50.
35. Wallace, **Short History**, pp. 37-38.
36. Stoney, **Plantations**, pp. 18-19.
37. **Ibid.**, p. 21.
38. **Ibid.**, p. 22.
39. **Ibid.**, p. 22.
40. **Ibid.**, p. 28.
41. **Birth of a City**, p. 35.
42. **Ibid.**, p. 35.
43. Stoney, **Plantations**, p. 38.
44. **Ibid.**, p. 39.
45. **Ibid.**, p. 24.
46. **Ibid.**, p. 25.
47. **Ibid.**, p. 34.
48. **Ibid.**, pp. 34-35.
49. **Ibid.**, p. 36.
50. Wallace, **Short History**, p. 87-88.
51. **Ibid.**, pp. 86 & 90.
52. Stoney, **Plantations**, p. 24.
53. Wallace, **op. cit.**, p. 90.
54. Stoney, **op. cit.**, p. 24.
55. **Birth of a City**, p. 48.
56. **Ibid.**, p. 48.
57. Wallace, **Short History**, pp. 101-102.
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59. **Ibid.**, pp. 269-270.
60. George C. Rogers, Jr., **The History of Georgetown County**, Columbia, 1970, P. 139.
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73. **Ibid.**, p. 358.
74. **Ibid.**, p. 361.
75. "The Santee-Cooper: A Pioneer Effort in South Carolina Canaling," **South Carolina Magazine**, August, 1971, pp. 7-9 and p. 16.
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82. **Survey of Historic Places**, Waccamaw Regional Planning & Development Commission, September, 1971.

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1. Marshes and Wetlands

a. The Salt Marsh Ecosystem

South Carolina has been greatly blessed by possessing one of the richest and most nearly unique habitats on earth, that of the salt marsh and tidal estuaries of the low country. So familiar is the salt marsh to most of us who live in the low country, that we tend to take it for granted. Many of us, whether we come from the up-country of South Carolina or whether our homes are on or near the coast, have failed to educate ourselves to the importance of this tremendous natural resource.

The coastal zone of South Carolina is an area where land and sea meet, the place where fresh waters from inland lakes and streams join with inflowing salt water from the ocean. Estuaries, inlets or arms of the ocean, are formed at this meeting place, and alongside the intricate maze of estuaries and creeks flourish thousands of acres of salt marsh. South Carolina contains some 504,445 acres of coastal marshes, more than any other Atlantic coast state. Of this amount, 334,501 acres are classified as salt marsh.

The prominent species of salt marsh vegetation, **Spartina alterniflora** (smooth cordgrass), grows abundantly along our coast. This species is one of the most remarkable plants on earth because of its ability to live and thrive in salt water. So productive is the natural salt marsh that it manufactures as much or perhaps even more organic material than the richest, most productive wheat field. As strange as it may seem, a crop of salt marsh plants, especially smooth cordgrass, is extremely valuable even when dead and decaying. Each fall the grass dies and is decomposed by bacteria. The mixture of dead grass and bacteria is called detritus and has been referred to as a "rich soup" because it serves as a major source of food for many of the higher organisms in the salt marsh ecosystem. "Bacterial decomposition is a slow process, and although aided by mechanical wave action, it may take a year for bacteria to break down completely each season's crop of **Spartina**. Consequently, detritus is available as a food source year-round." ("Salt Marsh: A Question of Survival," Pete Laurie, **South Carolina Wildlife**, March-April, 1975, p. 27.)

Detritus provides nourishment not only for the microscopic zooplankton - including the larval stages of shellfish and fish - but for adult clams, mussels, oysters, crabs, shrimp and certain fish. (Plankton is the term for the small plants and animals that drift and float in the oceans and estuaries. **Zooplankton** refers to the tiny animal forms that are a part of plankton.) All these creatures serve in turn as food for various types of fish as well as countless shore birds such as gulls, terns, egrets, skimmers and oystercatchers. Thus, it can be seen that all creatures living in the salt marsh ecosystem depend either directly or indirectly on the marsh grasses for their food supply.

In addition to providing food, the salt marsh serves as a shelter and nursery grounds for many species, including shrimp. Without the shelter provided by the exposed root systems of the marsh, the larval stages of shrimp, crabs, oysters, clams, etc. would not be able to survive long enough to reach adulthood.

In addition to the creatures already mentioned, many mammals, as well, find shelter and food in the salt marsh and estuaries. One of these is the familiar raccoon which satisfies its appetite on fish, shellfish and crabs. The bottlenose dolphin, a marine mammal commonly referred to as the porpoise by South Carolina citizens, enters the estuaries, salt water rivers, and creeks from the ocean to feed on fish which are thought to be its main source of food.

The salt marsh, while serving as a tremendous source of food and shelter for many thousands of living creatures also provides a nesting place for birds such as the marsh wren, red-winged blackbird and clapper rail or marsh hen. Other creatures found within this complicated ecosystem are the diamondback terrapin, loggerhead sea turtle and, at times, even the alligator.

For many years the marshlands have made possible a vigorous sports fishery and a viable commercial fishery that have offered recreation and employment for many of South Carolina's citizens. As if all the above mentioned things were not enough, the salt marsh serves as a buffer area between the ocean and the inland. While the sand dunes of the beaches absorb the pounding of the ocean, the marshlands slow down and absorb the daily inrush of the ocean's flow thus preventing erosion of the coastline.

Still another service performed by the salt marshes is that of a filter. It is here that pesticides and other pollutants are broken down from dangerous compositions into forms which are less harmful to the environment. Thus it can be seen that without the salt marsh the shrimping and other fishery industries, and many of

the beauties and wonders of the marsh life would be drastically depleted.

b. Brackish-Water and Tidal Freshwater Marshes

In addition to the large acreage of salt marsh, coastal South Carolina contains 34,962 acres of brackish-water and 64,531 acres of fresh-water marsh. Situated between the salt and tidal fresh-water marshes, the brackish marsh represents a transition zone between those two wetland types and contains plant species characteristic of both.

Those **brackish marshes**, which are closer to the ocean than other brackish marsh areas, look very much like the high zone of the salt marsh and contain vast stands of black needlerush (**Juncus romerianus**), which in some areas extend down to the edge of the creeks. Generally, however, smooth cordgrass (**Spartina alterniflora**) will be found along the water's edge. Among the other plants found in more seaward brackish marshes are the salt marsh bulrush, marsh elder, sea myrtle, marsh-hay cordgrass, and sea ox-eye.

Proceeding further up the tidal rivers and creeks away from the ocean, the black needlerush is replaced by giant cordgrass (**Spartina cynosuroides**), but other plants common to the high zone of salt marshes may still be found. In addition to these plants are found those which are typical of fresh-water marshes - cattails, sedges, wild rice, smartweeds, giant cutgrass, pickerel-weed, water parsnip, sawgrass, alligator-weed, etc.

Tidal fresh-water marshes are found along coastal rivers beyond the salt water reach of high tide where the water is fresh or relatively low in salinity. Here the diversity of plant species is greater than in either the salt or brackish marshes, and the predominant force governing plant distribution is the fresh-water river. There is no clearly defined boundary between the fresh and brackish-water marshes. The change is a subtle one whereby marsh plants found in the upper brackish marsh region gradually become more prominent in the fresh-water marsh. Both areas play an important role in their contribution of nutrients into the overall estuarine system and in the habitat they provide for numerous land and aquatic species.

c. Coastal Impoundments

Unique to South Carolina and several other South Atlantic coastal states are rice field impoundments dating back to times when rice culture was a source of great fortunes to low country planters. At first rice was grown as an upland crop, without irrigation. Then as the advantages of flooding became known, early in the 18th century, cultivation was moved into cleared swamp lands next to freshwater streams so that water could be impounded and applied to the fields. Flooding the rice greatly promoted its growth and killed the weeds and grass which formerly had to be cleared by hoeing.

Soon after the Revolution the tidal culture of rice was developed. Consisting of a system of banks, ditches, floodgates and trunks, creation of impoundments for tidal culture provided a method whereby the rice fields could be kept as dry or as wet as the crop required.

A complete description of rice cultivation appears in Chapter I (B) "Lowcountry History," p. I-6.

The coastal impoundments in existence today cover some 70,451 acres of land. The majority of these impoundments represent former rice fields which are being managed to attract waterfowl for hunting. Other uses made of impoundments include cattle pasturage, water reserves, wildlife sanctuaries and mariculture.

When used to attract waterfowl, impoundments are managed to encourage growth of desired vegetation for duck food by manipulation of water levels, marsh burning or a combination of these two practices. Depending on their location along the coastal creeks and rivers, impoundments may be flooded with either brackish or freshwater. Thus, the flooding of different impoundments results in an obvious difference in their plant communities.

Impoundments can be very rich in nutrients, and when properly managed and allowed to periodically drain into the open system, they can contribute to the nutrient supply. There are facts which some persons feel support a theory that properly managed impoundments may be more productive than an open, natural system. However, it is universally accepted that "proper management" is a subject about which there is a tremendous lack of knowledge. Great expenditures of money and many years of exacting, scientific research would be required to find out if this theory is correct. Because creation of impoundments destroys acreages of productive, natural marsh and converts the impounded areas into artificially managed environments, it is a questionable practice which must be approached with great care.

d. Mud and Sand Flats

Within the salt water rivers and creeks are found numerous mud and sand flats — long, essentially flat stretches of soft, dark silt (mud) and similar areas composed of sand. These areas are covered during high tide and become exposed when the tide is low.

The presence of either sand flats or mud flats along the shore of a river or creek is chiefly dependent on the shape or surface of the bottom and the speed of the water currents which carry suspended sediments. As currents slow down, the heavier sand particles drop to the bottom helping to form **sand** flats, leaving the clay and silt sediments in suspension. Only when the currents become very slow do the clay and silt settle out to form **mud** flats.

Although they may appear barren to the uninformed passer-by, the mud and sand flats are teeming with a rich variety of life. The animals which make up mud and sand flat communities may be divided into two main groups - permanent dwellers, which spend their entire adult lives on the flats, and temporary dwellers, which move on and off the flats in search of food during high and low tides. Permanent dwellers such as worms, crustaceans and certain types of clams obtain their food by ingesting sediment and utilizing the organic matter and bacteria which it contains. Most types of clams feed at high tide by extending their siphons up through the sediment, in which they remain burrowed, into the water column where they are able to filter out phytoplankton (microscopic plants) and detritus (decaying plant and animal matter). A variety of snails obtain their nourishment by scavenging for detritus along the surface of the sand and mud.

As the tide comes in and covers the flats, animals such as blue crabs and various species of fish arrive to feed on the worms, clams, snails and crustaceans. With the rhythmic change of the tide, the flats become exposed once more, and a new group of predators arrive - creatures such as shore birds, ducks, otters and racoons.

Perhaps the most important members of the mud and sand flat community are the bacteria which feed on dead plant and animal matter and recycle nutrients back into the water so that they can be used by the phytoplankton. Other small but important members of this community are the diatoms and blue-green algae, microscopic plants found in the surface sediments. These plants serve as a source of food for animals such as snails, certain clams and polychaete worms.

Because mud and sand flats provide essential habitat and food for a wide variety of animals as well as play an important role in the cycling of nutrients, they are an important resource of our coastal zone. Being close to man's activities (both those activities on the shore as well as those in the waters), they are vulnerable to shoreline development and different forms of pollution. Care must be taken to protect these areas so that they may continue to play their vital ecological role in the coastal environment.

e. Oyster Reefs

In many sections of coastal rivers and creeks are found clusters of oysters called reefs, bars or oyster beds. Oyster reefs are formed over a period of time as oyster larvae, carried by tidal currents, find and attach themselves to solid material or other suitable substrate. After attaching themselves to a substrate, the animals become sessile or immobile and mature into adults. Other oyster larvae continue to attach to the substrate as well as to the sessile adults, and a cluster of oysters or a reef evolves and increases in height, width and length.

Other organisms such as algae, sponges, bryozoans, barnacles, mussels and worms live on the reef surfaces, and still other animals find shelter in crevices formed by the reef growth. In time an entire balanced community of plants and animals evolves.

Oyster reefs are an important natural resource of South Carolina's coastal zone, and, like the mud and sand flats, they are very susceptible to man's activities, particularly the activities of overfishing, dumping of pollutants and dredging. Because oyster reefs are a unique habitat and are important from both an environmental and economic point of view, care must be taken to properly utilize them as renewable resources and to protect them from damage or destruction.

f. Swamps and Bottomlands

The meaning and connotation of the word "swamp" vary greatly from one region of the country to

another. The terms swamp, river bottom, bottomland, hardwood bottom, and floodplain forest are often used synonymously. Strictly speaking, however, swamps are permanently flooded areas whereas floodplain forests become flooded periodically when the rivers along which they lie swell from heavy rainfall and overflow their banks.

There are two main types of swamps in South Carolina's coastal zone - the river or alluvial swamp such as those occupying the floodplains of the Waccamaw, Pee Dee and Santee Rivers and the non-alluvial or inland swamp such as Four Holes located approximately thrity-five miles northwest of Charleston. A river swamp depends on the river for its existence. Occurring in bottomlands (floodplain forests), a river swamp either borders the river or is found between the floodplain forest and adjacent uplands. A non-alluvial or inland swamp does not occupy the floodplain of a river or stream that runs in a clear-cut bed. Non-alluvial swamps are fed by and owe their existence to springs and slowly meandering streams.

Only recently have the importance and vital ecological role of swamps been understood. Today we know that swamps are immensely important in the controlling of both floods and water pollution. When a flooding river spreads its waters into a bordering floodplain or bottomland forest and swamp, surrounding upland is buffered from the river's excess water, and people in the river's lower reaches experience considerably less danger from flooding. The excess water is absorbed by the forest and later released into aquifers, underground layers of porous, water-containing rock.

In addition to helping control floods, swamps act as nutrient traps, assimilating and using the nutrients deposited in them from the flooding of rivers and streams. Swamps also help control water pollution by serving as natural sewage treatment plants; the deposits of forest debris which accumulate on the swamp floor provide an effective form of filtration.

Swamps play a tremendously important role as preserves of animal life (their remoteness probably being the salvation of some species) and serve as marvelous tools for teaching, learning and research. Dr. Charles H. Wharton, biologist at Georgia State University, has made the following statement about river swamps. "The river swamps are ideal examples of what we mean by 'open space', 'green belts', and 'natural corridors'. They may function in many ways: sponges for regulation of the vital water cycle, giant kidneys for waste purification, convalescent wards for the esthetically ill, outdoor classrooms for school children and oxygen machines for air quality." In addition to all of these vital functions, swamps make a tremendous contribution to lumbering and other forest product industries through their sustained yield of many economically important tree species.

The river swamps and bottomlands of South Carolina's coastal zone contain a diverse representation of hardwoods including trees such as baldcypress, tupelo gum, sweetgum, blackgum, sycamore, southern hackberry, oaks, elms, ashes, hickories, red maple, American holly, red mulberries and others. Small trees and shrubs such a pawpaw, spicebush, blue beech, planer tree, blue-stem palmetto and strawberry bush are also found as well as numbers of woody vines.

The non-alluvial, black-water swamps, of which Four Holes is the most outstanding, are dominated by baldcypress, tupelo and black gum. The black water of the cypress swamps, feared by many people who think of it as dirty, disease-carrying and mosquito-infested, is, on the contrary, clear, potable, pure and free of fever-causing mosquitos. (Although clear, the water appears black due to the effect of tannic acid contained in the bark and leaf litter of the swamp floor.) It is only those swamps which are altered or virtually destroyed by man which tend to fit the former description.

Of concern to many citizens is the fact that in the past a considerable part of South Carolina's swamps has been significantly altered, destroyed or irrevocably damaged due to improper lumbering practices, dredging and the construction of impoundments behind hydroelectric dams. Our coastal zone is fortunate to contain a part of Four Holes swamp, bought by the Nature Conservancy and the National Audubon Society in 1971. This 3,415 acre black-water swamp contains 1,800 acres of virgin cypress and tupelo gum, thought to be the world's only remaining tract of virgin tupelo-cypress swamp. Today the swamp is a National Audubon Society sanctuary featuring an interpretive/visitors center and a 6,500 foot boardwalk through the forest.

g. Savannahs

Located within South Carolina's coastal zone are wetland areas known as savannahs. Savannahs are seasonally-flooded grasslands located in poorly-drained interstream flats or depressions within pine flatwoods.

A savannah originates after low pine woods are cut and the cut-over area is burned. If the area is not burned yearly or at least once every two years, the grasslands give way to other vegetation, and the communities such as evergreen shrub bogs come into being. Thus, fire is vital to the existence of the savannah type ecosystem.

Soil of savannahs is nutrient-poor and highly acid, thus the plants found in these areas are those which can tolerate harsh soil conditions - grasses, sedges, orchids and the fascinating "insect-eating" plants such as the sundews, pitcher plants and the famous Venus fly-trap.

Many savannahs have been protected from fire, and as a result they have disappeared along with their specialized flora. In order to protect these unique areas which provide habitat for both statewide and nationally endangered species such as the Venus fly-trap and white fringed orchid, savannahs must be properly managed to provide for the annual or semi-annual burning necessary for their existence.

h. **Pocosins**

Scattered throughout South Carolina's coastal zone are wetlands known as pocosins. A pocosin is a low, flat, swampy area located in a savannah type environment such as those found in the Santee Delta area and in the pine savannahs of the Francis Marion National Forest. Pocosins consist of water-logged, peaty soil and, in wetter sections, contain a ground cover of sphagnum moss. Generally characterized by dense broad-leaved shrubs, small evergreens and thorny vines, pocosins form nearly impenetrable thickets.

The water table of pocosins fluctuates considerably and enables them to maintain their special sort of ecosystem. Invading marsh plants are eliminated during dry periods, and many types of bacteria and fungi are destroyed in the surface soil layer during high water levels. The destruction of bacteria results in an absence of decay. Thus, leaves and other debris are preserved and become peat.

Common shrubs found in pocosins and adapted to long periods of waterlogging and drought are: fetterbush, ti-ti, honeycup, gallberry, shining inkberry, sweet pepperbush, Virginia willow, chokeberry, blueberry, and huckleberry. A number of endangered and threatened plants including the Venus fly-trap, green-fringed orchid and spring-flowered goldenrod occur in the pocosins of South Carolina's coastal zone.

i. **Carolina Bays**

Similar in many ways to pocosins, Carolina Bays are curious, elliptically-shaped depressions all of which are aligned in the same northwest-southeast direction. There is much speculation as to the geological origin of the bays which are found scattered throughout the coastal plains region of the Carolinas and northern Georgia. One theory, popular for many years, attributes their original formation to a shower of meteorites which hit the earth's surface thousands of years ago. Another theory has it that the bays were spawning beds for schooling fish at a time when the ocean covered much of the present-day coastal plain. Still another theory, which takes more factors into consideration than any of the others, is that Carolina Bays were formed by vast underground movements of water which resulted in sump action. In spite of much research and study, however, the geological phenomenon of the Carolina Bay remains a tantalizing mystery.

Biologically similar to pocosins, Carolina Bays differ mainly in their water depth, being generally deeper than pocosin communities. Whereas pocosins are relatively uniform and are usually covered by one particular community, Carolina Bays may have several different biological communities within a few yards of each other, and thus exhibit a remarkable range of habitats, for example - marsh, swamp, savannah and sand hills.

2. Barrier Islands and Beaches

Parallel to South Carolina's shoreline lies a very important and dynamic coastal zone resource, the barrier islands and beaches. Called barrier islands because they form a barrier or protection for the mainland against the relentless action of the ocean, these islands are part of an immense chain which stretches from Maine, down the Atlantic coast and around the Gulf of Mexico to Texas.

Barrier islands are formed by various geologic processes – in most cases, through the transportation and deposition of sand by wind, tide, wave action and ocean flooding. Because they lie parallel to the shoreline and bear the brunt of the ocean waves, storms and flooding, barrier islands are constantly being shaped and reshaped, eroding (wearing away) and accreting (building up) in a dynamic, never-ending evolution.

A typical South Carolina barrier island is thin and elongate in shape, fringed with extensive salt marsh on the landward side and having a beach and sand dune system on the front side bordering the ocean. Most of the larger, forested islands contain interior waterways and wetlands.

Barrier islands are dominated by energy stresses, that is to say, by wave force, wind and tidal energies and ocean flooding which determine their constantly changing shape. Hurricanes as well as seasonal winter storms have a great impact on barrier islands and play an equally important role in shaping them.

An initial view of the barrier island system may result in the conclusion that barrier islands are very unstable. This is true in terms of human development which is not compatible with erosion and the devastating effect of hurricanes. However, in terms of ecology, the natural stresses brought to bear on barrier islands, by wind, tides, waves and flooding, are the very things which allow them to survive.

> It is the dynamic nature of the barrier island system that makes it stable. The island beaches offer little resistance to storm waves, and effectively absorb and dissipate the tremendous forces which confront them.
>
> In the natural system, storm waves frequently breach the island dunes and flood the island. As waves wash over the dunes during storms, they carry sand and shells onto the island and distribute them across the grasslands, marshes, and even into the estuary behind. Storm overwash, therefore, actually contributes new sediments to the islands. In this fashion, overwash serves to maintain the island by supplying sand from the beach and offshore areas for new dune growth, adding to the island's elevation, and extending the island laterally into the estuary. (**Barrier Islands and Beaches**, Technical Proceedings of the 1976 Barrier Islands Workshop, Annapolis, Maryland, May 17-18, 1976, p. 2.)

Larger barrier islands contain shrubs and forested woodlands, whereas smaller frequently flooded islands are devoid of trees and are dominated by hardy grasses such as sea oats (**Uniola paniculata**) and salt meadow cordgrass (**Spartina patens**). Barrier islands usually lack a complete representation of the fauna found on the mainland. This situation is the result of the distances between the islands and the mainland along with the inability of some species to cross salt water barriers. Characteristic of some barrier islands are special populations or subspecies of animals, especially mammals, which through their isolated situation develop characteristics which distinguish them from their relatives on the mainland.

Of absolute necessity to a barrier island's existence is its beach, dune and offshore sand bar system. The beaches protect and insure the existence of the highland area of the islands by absorbing and dissipating the tremendous forces exerted on them by waves and tidal currents. Just as the highlands depend on the beaches for stability, the beaches depend on the dunes for the replenishment of sand which is washed away from them by the stresses of waves, tidal currents and periodic storms and hurricanes.

Offshore sand bars play a very significant role in the "sand-sharing" system by providing sand for the replenishment of existing dunes as well as for the forming of new ones. As sand from the bars is washed ashore, it is blown inland where it builds up and strengthens existing dunes and thus lends more protection against hurricanes and storm tides. In areas where no dunes exist, they may begin to form where flotsam and jetsam, grasses or other obstructions on the beach block the wind and cause it to drop its load of sand. In a short time grasses such as sea oats take root and anchor the sand in place with their extensive root systems. Without the anchoring assistance provided by the grasses, dunes would not be able to build up or stay intact.

One of the most important benefits provided by barrier islands is their creation of the proper conditions necessary for the development and continuing existence of salt water wetlands and estuaries. By breaking the force of the ocean waves and creating behind them semi-enclosed, protected areas of low energy stresses, barrier islands permit the mixing of ocean and fresh waters necessary to the development and maintenance of the extensive network of estuaries and wetlands.

South Carolina has a total of some forty barrier islands along its coast. A few of these are protected, state and federally-owned lands set aside for conservation and preservation purposes. Some of the islands contain no development or very sparse development; others are heavily developed or are being heavily developed as exclusive, second-home/resort areas.

On islands where development has taken place without consideration or understanding of the natural

forces constantly at work, tremendous problems have arisen with erosion and accretion. Slowly we are coming to understand that the forces governing barrier islands are uncontrollable. They may be predicted, but they cannot be subdued, nor should they be. Man must learn to respect and to live in a design with them.

3. Forested Areas

Since the beginning of the first permanent European settlement in South Carolina our coastal zone forests have been of tremendous importance. In the early days of the colony, forest products such as lumber, masts for ships, turpentine, pitch and tar were manufactured for export, and considerable fortunes were made from the forest products industry.

The coastal zone's forests remain commercially important. With 19.2 percent of the forest lands of the State, the coastal zone produced 17.0 percent of the physical volume (cords) of pulpwood and 30.1 percent of the physical volume (board feet) of other forest products produced in South Carolina in 1975. The delivered value of these forest products (at rail yard, truck yard or mill site) was $52.1 million or, 26.7 percent of the ($195.1 million) value for the whole State.

In addition to their economic value, which can be established in dollars and cents, is their inestimable value as wildlife habitat, waste treatment plants, producers of oxygen, flood and erosion controllers, and havens where man can retreat from civilization to renew his senses and perhaps find his proper place in the scheme of living things.

The eight coastal zone counties contain a total land area of some 4,392,960 acres. The 1978 U.S. Forest Service statistics show that of this total land area, 2,961,876 acres are forested land, and of this total, 2,933,734 acres are commercial forest lands. The coastal zone is endowed with a wide variety and abundance of trees. Below is a list of some of the more important commercial species as well as others which are familiar to residents of the coastal zone.

Baldcypress (Taxodium distichum): Most often associated with very watery sites such as swamps. Trunk flares out at base into a swollen, deeply-lobed buttress-like structure. Roots send up woody growths called "knees" which protrude above water; exact function of knees is not known. Fibrous bark ranges in color from light gray to brownish red; its light green leaves are alternate, two-ranked and deciduous. Important commercially. Heartwood is very resistant to decay and is used for things such as docks, bridges, greenhouses, cooling towers, vats, boats and river pilings.

Loblolly Pine (Pinus taeda): Has pale green needles 6-9 inches long. Bark is thick and bright reddish-brown in color. Bark is divided by shallow fissures into broad, flat-topped plates covered with thin scales. Tree often reaches 100 feet in height. Has tall, straight trunk. Important commercially. Wood is used mainly for building materials such as framing, sheathing, subflooring, joists and interior finish. Also used for pilings, crossties, mine timbers, pulp and paper.

Slash Pine (Pinus elliottii): Has dark green, lustrous needles. Bark is gray to reddish-brown, rough, separating on the surface into large, thin scales. Commonly grows to 100 feet in height. Tall, straight, tapering trunk. Important commercially. Wood is heavy, hard, durable. Wood used for production of naval stores, pulp and paper.

Sweetgum (Liquidambar styraciflua): Has star-shapped leaves made up of 5 deeply separated, pointed lobes; round, bur-like, hard, woody fruit. Grows best on rich bottomlands reaching height of 120 feet. Its wood is used for veneer, plywood, boxes, baskets, crates, pulpwood, etc.

Water Oak (Quercus nigra): Has variably shaped leaves 2-4 inches long which are broader at apex than at base. Is a bottomland species but also grows on upland soils. Has slender, straight trunk. Important commercially. Wood is used for rough construction lumber.

Red Maple (Acer rubrum): Leaves 3-5 lobed and have coarsely-toothed margins. Leaves 2-6 inches long; turn brilliant scarlet, orange or bright yellow in autumn. Bark thick, dark gray on old trunks and is sep-

arated by vertical ridges into large plate-like scales. Tree may reach 120 feet in height. Often planted as an ornamental.

Live Oak (Quercus virginiana): Has widespreading crown and gnarled branches. Is one of the most characteristic trees of the coastal region of the Deep South. Seldom grows to more than 50 feet in height but may have crown-span of 150 feet or more. Wood is very difficult to saw and dry. Was prized for blocks on sailing ships.

Southern Magnolia (Magnolia grandiflora): An evergreen tree often planted as an ornamental. Leaves shiny bright green on upper surfaces, leathery, and covered on the lower surfaces with rusty-colored fuzz. Leaves oblong, 5-8 inches long, 2-3 inches wide. Tree has beautiful white, fragrant flowers 7-8 inches across. Tree often pyramidal with tall, straight trunk and is sometimes 100 feet or more in height. Bark varies from gray to brown. Wood is hard and heavy; used for crates, boxes, rough flooring.

Flowering Dogwood (Cornus florida): Is admired for the white drifts of flowers it adds to woodlands in spring; small tree, occasionally up to 40 feet in height. Dogwood berries provide a favorite food for deer, wild turkey, squirrels and songbirds.

Palmetto (Sabal palmetto): Is the official State Tree. Commonly known as the Cabbage Palmetto. Long associated with history of South Carolina. Is represented on State Flag as well as on the State Seal where it is symbolical of the defeat of the British fleet by the colonists stationed in a Palmetto fort on Sullivan's Island. Tree is an attractive feature of coastal S.C. Has long column-like stems with broad crown of leaves first growing upright, later spreading nearly at right angles with the stem, finally hanging downward before shedding. "Wood" made up of strands of heavy fiber cells with the strands scattered in a softer, pith-like tissue. Used for fences and underwater pilings. Leaves used for thatch, mats, brooms, brushes.

4. Wildlife

The coastal zone contains a great variety and abundance of wildlife. Aside from hundreds of species of inconspicuous invertebrates, the fauna of the coastal zone is rich in fishes, amphibians, reptiles, birds and mammals.

South Carolina, and especially the low country, has produced and has been visited by eminent naturalists who have contributed much to the overall knowledge of the native fauna. In 1664 William Hilton, in his historic trek up the South Carolina coast, wrote the following: "The Country Abounds in Turkey, Quails, Curlews, Plovers, Teile, Heron; and as the Indians say, in Winter, with Swans, Geese, Craines, Duck and Mallard, and innumerable of other waterfowl, whose name we know not, which lie in the Rivers, Marshes, and on the Sands." The first true naturalist to study the fauna of South Carolina was Mark Catesby who in 1731 published **The Natural History of Carolina, Florida and the Bahama Islands.** William Bartram, another famous naturalist, traveled extensively through the Carolinas, Georgia and Florida from 1773 to 1778 making a study of the native fauna.

Born in 1785 in Saint-Domingue, John James Audubon, the great naturalist-artist, spent much time in the South Carolina low country studying its bird life, collecting specimens, sketching and painting. His friend, the Reverend John Bachman, an eminent Lutheran minister as well as a renowned scientist, supported Audubon by offering his home in Charleston as an ornithological research headquarters and by accumulating and writing descriptive material for Audubon's **Birds of America** as well as his later work, **Quadrupeds of North America.** The rare Bachman's Warbler is named after this unusual minister/scientist. Other well-known naturalists native to the South Carolina low country include E. Burnham Chamberlain (ornithologist), Alexander Sprunt, Jr. (ornithologist), E. Milby Burton (ornithologist, ichtheologist, historian), Arthur T. Wayne (ornithologist), Robert Hemphill Coleman (mammalogist, mathematician), and Dr. G. Robert Lunz (marine biologist). Botanists who have pioneered in describing the flora of South Carolina include Thomas Walter, **Flora Caroliniana,** 1740; Andre Micheaux, **Flora boreali Americana,** 1803; Stephen Elliott, M.D., **Sketch of the Botany of South Carolina and Georgia,** 1821; Henry William Ravenel, **Fungi of Carolina,** 1852; and Alvin W. Chapman, **A Flora of the Southern States,** 1860.

The following is a brief overview of wildlife resources, excluding fishes, found in South Carolina's coastal zone.

a. Amphibians

A total of five families of frogs and toads is found in the coastal zone of South Carolina - Spadefoot toads, "true toads," tree frogs, "true frogs" and narrow-mouthed toads. These five family groups are represented by a total of twenty-two species. Being among the more inconspicuous members of the fauna, these animals, including the green tree frog, the bullfrog, the spring peeper and the southern toad, are perhaps most familiar to the layman through their loud reproductive chorusing.

In addition to frogs and toads, the coastal zone amphibians include salamanders, more fishlike and less specialized creatures than frogs and toads and having primitive segmentation on their bodies and tails. A total of nineteen species, including mole salamanders, the red-spotted newt and the Congo eel, is found in the coastal zone.

b. Reptiles

The reptiles are represented in South Carolina's low country by turtles, lizards, snakes and one member of the crocodilian family, the American alligator.

1) **Turtles:** Turtles belong to one of the most ancient groups of animals in existence today. They are unique in that their bodies are encased in a bony, scale-covered shell to which their vertebral column and ribs are fused. Turtles have no teeth, but a horny beak with a strong cutting edge helps them obtain their food.

Turtles found in the coastal zone of South Carolina include amphibious and terrestrial species. Some of the more familiar species in the area are the snapping turtle, the yellow-bellied turtle, the mud turtle, the eastern box turtle, the diamondback terrapin, and the loggerhead sea turtle. The Atlantic loggerhead, a Federal threatened species, is the only sea turtle which nests on the South Carolina coast. (The Atlantic ridley, the Green sea turtle, the Hawksbill turtle and the Leatherback turtle are occasionally found in the State's offshore waters.) Mating occurs during April and May, and the females begin nesting on the beaches above the mean high tide line in late May or early June. Nesting usually continues until mid-August.

During the past century there has been a decline in the number of loggerheads, mainly due to the high mortality rate among the young and to nest predation by animals such as sand crabs, feral hogs and raccoons as well as by humans. The Atlantic loggerhead is protected by both Federal and State law. The capture or molesting of these animals and the predation of their nests is strictly forbidden.

2) **Lizards:** Closely related to snakes, the majority of lizards are easily distinguished from their relatives by their limbs, their visible external ear openings, and their movable eyelids. Fewer species of these animals are found in temperate areas of the world than in the tropics. Most familiar to coastal zone residents are the Green Anole (often misnamed Chameleon) which can change color, the various skinks and the glass lizard (sometimes called glass snake) which lacks legs and is often mistaken for a snake.

3) **Snakes:**The snake is a reptile characterized by the lack of external and internal ears, an absence of limbs, fixed eyelids, a left lung which is either reduced or absent and a forked tongue which is used in combination with its olfactory organs in the roof of the mouth and which enables the animal to smell its environment.

There is a total of ten families of snakes in the world. Three of these families are represented in South Carolina and the coastal zone. All of the harmless snakes in the coastal zone belong to Family Colubridae which contains the majority of the world's species. Perhaps the most familiar of these snakes to coastal zone residents are the kingsnake, the watersnakes, the garter snake, the grass snake, the yellow rat snake (chicken snake), the red rat snake (corn snake) and the hog nose snake, often called the spreading adder.

The poisonous snakes found in the coastal zone belong to two families, Family Elapidae and Family Viperidae. The former group is represented by the coral snake, probably the most brilliantly colored snake in North America as well as the most deadly. These snakes are fossorial or burrowing and are not readily observed. They are docile animals and are the least dangerous to man because of this trait as well as the method of injecting their poison. In order to inject a lethal dosage into a human, this small snake must get a good grip and actually chew into the flesh. The coral snake, along with the other members of its family, produces a neurotoxic poison which affects the nervous system.

All other poisonous snakes in South Carolina and the coastal zone belong to Family Viperidae. Those species found in the coastal zone are: the copperhead, the canebrake rattler, the pigmy rattler, the diamondback rattler and the cottonmouth moccasin. All of these snakes are known as Pit Vipers because of the heat-

sensitive pit located between the nostrils and the eye. This pit enables the animal to locate its warmblooded prey without depending on its eyesight.

Pit Vipers have long, hollow fangs on either side of the upper jaw. When not in use these fangs fold back in the snake's mouth. When striking, the snake opens its mouth, allowing the fangs to become erect. As it strikes its victim, haemotoxic poison, which destroys the red blood cells, is forced from the animal's poison sacs through the hypodermic-like fangs into the victim. Because of their highly specialized fangs, the Pit Vipers are much more dangerous to humans than the docile coral snake.

It is unfortunate that human beings seem to have an ingrained fear and hatred for snakes. Like all other creatures, snakes play an important role in the balance of nature. Non-poisonous snakes should never be killed. Unless a poisonous snake is found in an area inhabited or frequently used by humans, it also should be allowed to live and play its role in the natural scheme of things.

4) **Crocodilians:** Crocodiles and alligators are the only remaining members of the great subclass Archosaura, which includes dinosaurs, pterosaurs and others which became extinct more than 70 million years ago. The Family Crocodylidae is represented in South Carolina and the coastal zone by the American alligator. In the past this animal has been on the official United States list of endangered species. By receiving this protected status, the alligator has made a comeback in various parts of the country, including areas within South Carolina, and in those particular areas, its status has been changed from endangered to threatened. This change in status does not take away the animal's protection, however; it is still strictly forbidden to capture, molest or disturb these animals.

c. **Birds**

Arthur T. Wayne, one of South Carolina's most eminent ornithologists, stated that South Carolina "stands easily first among the States of the Union in ornithological history." South Carolina truly does have an impressive ornithological record with seventy-seven birds having been made known to science for the first time from this state.

Approximately 300 species of birds have been recorded in South Carolina, and the majority of these can be seen in the State's coastal zone during the course of a year. Because of the conspicuousness of birds, more is known generally about them than most other animals.

Birds are unique among living creatures in that they are the only animals with feathers, and of all living creatures only birds and mammals are warmblooded, that is to say, capable of retaining a constant body temperature. Some of the other characteristics of birds are: 1) a lack of teeth, 2) an elongated mandible, 3) large, well-developed eyes, 4) hollow, air-filled bones for lightness, and 5) various other physiological adaptation which allow for and aid in flight.

Birds can be classified ecologically according to their season of appearance as follows:

Permanent resident - Can be seen at a location in any month of the year. Normally breeds in this locality.

Winter resident - Migratory. Present at locality only in winter. (Winter residents of the coastal zone arrive from the north in the early to late fall and leave the area in late winter or early spring.)

Summer resident - Migratory. (Coming from points farther south, summer residents arrive in the coastal zone in spring, breed in the area and leave in late summer or early fall.)

Transient - Migratory. Passes through a locality in fall and again in spring on its annual migration.

The coastal zone of South Carolina has an abundance of bird life, for a wide variety of habitats attracting a wide variety of species is found in this area, for example: beaches, mudflats, salt marshes, brackish and freshwater marshes and ponds, swamps, woodlands and open spaces. Some of the best known species and the type habitat in which they are found are listed below.

Habitat	Species
Beaches	Laughing Gull, Herring Gull, Royal Tern, Eastern Brown Pelican, Common Tern, Willet, Western Sandpiper, Wilson's Plover
Mudflats	Black Skimmer, Willet, American Oystercatcher, Laughing Gull, Western Sandpiper, Ruddy Turnstone

Salt Marsh	Great Blue Heron, Green Heron, Little Blue Heron, Louisiana Heron, Snowy Egret, American Egret, Clapper Rail, Redwinged Blackbird
Brackish and Freshwater Marshes and Ponds	Anhinga, Pied-billed Grebe, Horned Grebe, Wood Duck, Ring-necked Duck, Canvas-back, Ruddy Duck, White Ibis, Mallard, Blue-winged Teal, Greater Yellowlegs
Swamps	Anhinga, Prothonotary Warbler, Swamp Sparrow, Red-eyed Vireo, Carolina Wren, Screech Owl, Pileated Woodpecker, Barred Owl
Woodlands	Turkey Vulture, Red-tailed Hawk, Red-shouldered Hawk, Bobwhite, Woodcock, Screech Owl, Chuck-Will's-Widow, Downy Woodpecker, Parula Warbler, Cardinal, Painted Bunting, Crow
Open Areas	Boat-tailed Grackle, Common Grackle, Rufous-sided Towhee, Starling, Cedar Waxwing, Robin, Catbird, Brown Thrasher, Mockingbird, Ground Dove, Eastern Bluebird

The Francis Marion National Forest contains several colonies of the endangered Red-Cockaded Woodpecker. Other endangered bird species found in the coastal zone are the Southern Bald Eagle, the Brown Pelican, and Bachman's Warbler. Several species of birds once abundant in the South Carolina coastal zone but extinct today are the Carolina parrakeet, the Ivory-billed Woodpecker and the Passenger Pigeon.

d. **Mammals**

Mammals are divided into three main groups: **egg laying mammals,** which are the most primitive group and are restricted to the Australian Region of the world; **marsupials** (the pouched mammals), found principally in Australia but also occurring in South America and represented in North America by the opossum; and the **placental mammals** to which most living mammals belong.

The following characteristics distinguish mammals from all other animals:

Mammary glands — milk producing glands for feeding of the young.

Hair.

Endothermy — the ability to keep a constant body temperature. (This characteristic is also true of birds.)

The first reference to South Carolina's mammals was given by the young English naturalist, Mark Catesby (1743); however, very little material was published before 1830. In the period 1830-1860 the Reverend John Bachman, a Lutheran minister and distinguished scientist residing in Charleston, published several studies on South Carolina mammals. Bachman, who achieved worldwide acclaim as a mammalogist, collaborated with John James Audubon in the collection of specimens and the preparation of the text of their study, **Viviparous Quadrupeds of North America**, still referred to by present-day zoologists.

Relatively little study was undertaken in South Carolina from Bachman's time until the middle of the Twentieth Century. The most comprehensive, in-depth study on mammals in South Carolina was done by R. H. Coleman (1919-1954). Coleman studied all species but concentrated on the smaller animals. F. W. Sherman and E. B. Chamberlain have also contributed to the knowledge of South Carolina's mammal fauna.

South Carolina, including the coastal zone, contains mammals representing eleven groups called Orders which are distinguished mainly on the basis of differences in limb structure, form of the digits, and the teeth.

Order Marsupialia (Pouched Mammals) - This Order is represented by a single species, the opossum, one of the most interesting mammals in the State and related to the kangaroo, wallaby and other marsupials found in Australia and South America. Opossum young are born after a gestation period of about 12-13 days and, like all marsupials, are very poorly developed at birth. The new-born opossums are so small that 17-20 of them will fit in a teaspoon. In order to survive, the tiny babies must crawl into their mother's pouch where they attach themselves to her nipples and remain for three months.

Order Insectivora - This Order includes the moles and shrews whose main diet consists of insects. Moles are adapted to an underground existence by having a torpedo-shaped body, minute eyes and ears, broad forefeet for digging and scraping and an almost naked tail. The species which are found in the coastal zone are the Eastern Mole and the Star-nosed Mole.

Shrews are tiny, secretive animals found in damp, shady habitats with a thick cover of leaves and vegeta-

tion. They are aggressive little animals with a voracious appetite and a very high metabolic rate. A shrew lives for about one year, literally burning itself out in a never-ceasing search for food. Those species found in the coastal zone are the Southeastern Shrew, the Short-tailed Shrew and the Least Shrew.

Order Chiroptera - This Order is composed of the bats. Bats are known to have existed 50 to 60 million years ago and are the only mammals which can fly. Those found in South Carolina are insectivorous, but in other areas of the world, bats may eat fruit, nectar, fish or blood. Bats which feed on insects locate their prey by means of a highly sophisticated echo-location system.

Bats have drastically declined in South Carolina and other parts of the United States due to the widespread use of insecticides. Some of the bats found in the South Carolina coastal zone are: the Silver-haired Bat, the Big Brown Bat, the Red Bat, the Big-eared Bat and the Free-tailed Bat.

Order Endentata - This Order, which contains anteaters, sloths and armadillos, is represented in South Carolina's coastal zone by the Nine-banded Armadillo. This animal has been extending its range northward and eastward from Texas for several decades and has possibly reached South Carolina naturally; however, some records of its occurence here have no doubt involved escaped or released pets.

Order Lagomorpha - Rabbits. Rabbits are one of the most plentiful animals in South Carolina and the coastal zone. Over 1.5 million were estimated to have been killed in the State by hunters in 1964. The two species occurring in the coastal zone are the Eastern Cottontail and the Marsh Rabbit.

Order Rodentia - Rodents. Rodents are the most abundant of the mammals. The characteristic shared by all members of this group is a single pair of chisel-like upper incisors which are used for gnawing. Some of the rodents found in South Carolina's coastal zone are the Gray Squirrel, the Fox Squirrel, the Flying Squirrel, Rice Rat, Eastern Harvest Mouse, Cotton Mouse, Golden Mouse, Cotton Rat, Pine Vole, Black Rat and House Mouse.

Order Cetacea - Whales. This group of mammals contains the largest living animal on earth, the Blue Whale, larger than any dinosaur known to have existed. The cetaceans or whales are included in this discussion because they may be observed swimming in the coastal waters and are occasionally found stranded on our beaches.

Most of the whales which have been observed off the South Carolina beaches are toothed whales. The following species are recorded from our state:

1. Atlantic Beaked Whale
2. True's Beaked Whale
3. Goose-beaked Whale
4. Pigmy Sperm Whale
5. Dwarf Sperm Whale
6. Sperm Whale
7. Common Dolphin
8. Short-finned Pilot Whale
9. Grampus or Risso's Dolphin
10. Killer Whale
11. False Killer Whale
12. Striped Dolphin
13. Long-beaked Dolphin
14. Spotted Dolphin
15. Bottle-nosed Dolphin - This is the common inshore dolphin of South Carolina's coastal waters. Most South Carolina residents refer to it as the porpoise.
16. Minke or Little Piked Whale
17. Sei Whale
18. Fin-backed Whale
19. Humpback Whale
20. Atlantic Right Whale

Order Carnivora - Carnivores. The name carnivore means meat eater. However, this term is not an entirely accurate description of the eating habits of all species in this order, for many carnivores are omnivorous,

eating both plant and animal food. The following carnivores are found in South Carolina's coastal zone.

Red Fox - This animal is probably not an original resident but was introduced into the State. It is omnivorous, consuming such food as rabbits, mice, rats, birds and berries.

Gray Fox - This animal occurs statewide. It eats a variety of plant and animal food.

Black Bear - The Black Bear, which may be black or brown in color, is found in coastal zone swamps as well as in other parts of the State. Bears are omnivorous, eating almost any type of food which is available to them.

Raccoon - This species occurs abundantly in the coastal zone and throughout the State. Raccoons are noted for their dexterity and curiosity. They are omnivorous animals and, in the coastal zone, find much of their food in the salt marshes.

Long-tailed Weasel - This secretive animal occurs statewide, but there are few records of its occurrence. Weasels feed on small animals such as rats, shrews, mice and rabbits, killing their prey by a well-placed bite on the base of the neck or skull.

Mink - This semi-aquatic mammal occurs statewide. In the coastal zone, it is found along the rivers and in the salt marshes. Its diet consists of rats, mice, fish, frogs, snakes, birds and aquatic insects.

Striped Skunk - This animal, rare in the coastal area, probably occurs throughout the State. It frequents open farm land and feeds on such items as small mammals, insects, carrion and fruit.

River Otter - This graceful swimmer occurs statewide, frequenting rivers, ponds, lakes and salt marshes. Its diet consists of fish, crustacea, clams, insects and birds.

Cougar, Panther, Puma, Mountain Lion - The outstanding characteristics of this mammal are its size, long tail and short head. A full-grown puma may reach 7 feet in length and may weigh 200 pounds. Although this beautiful cat is considered to be extinct in South Carolina, infrequent reports of sightings of this animal continue to be made. The Puma is on the official U.S. list of endangered species.

Bobcat, Wildcat - This cat probably occurs throughout the State but is found in greater numbers in the low country of South Carolina. It frequents swamps, bottomlands and densely wooded areas, feeding on rats, rabbits, grass and small birds.

The Red Wolf, once a part of the coastal zone's fauna, became extinct here by 1850. Found today only in the coastal areas of Louisiana and Texas, it is considered by some to be America's most rare mammal. In 1976 a pair of Red Wolves was brought to Bulls Island, South Carolina. Placed there by the U.S. Fish and Wildlife Service in an experiment aimed at saving this rare species, it is hoped that these animals will reproduce and provide offspring to be placed in other areas originally a part of their natural habitat.

Order Pinnipedia - Seals, Sea-Lions, Walruses. The term Pinniped means having finlike feet or flippers. Two pinnipeds have been recorded in South Carolina's coastal waters - the Harbor Seal and the California Sea Lion.

The Harbor Seal is an uncommon visitor to South Carolina's coastal waters. It has occasionally been seen on buoys in and near Charleston Harbor and has been recorded from Hilton Head Island and the mouth of the Santee River. The only other pinniped recorded from South Carolina's coast is the California Sea Lion. Three individuals appeared in the vicinity of Charleston, one being found in 1972 and the others in 1973. The animals had probably escaped or were released from captivity somewhere on the east coast.

Order Sirenia - Manatees. The Florida Manatee, an essentially fresh-water animal, occasionally appears in South Carolina's coastal waters. The manatee is a large aquatic mammal with small eyes and an absence of external ears. There is no visible separation of the head and body. Its fore flippers are paddle-shaped, and its tail is flattened laterally. Adults may weigh more than 1500 pounds and may exceed a length of 12 feet. This animal, which feeds on aquatic vegetation, moves north along the coast from Florida in the warmer months. The Florida Manatee appears on the official U.S. list of endangered species.

Order Artiodactyla - Even-toed Hoofed Animals. Today Feral Swine and the White-tailed Deer are the only artiodactyls of South Carolina and the coastal zone. Ferel Swine are not native mammals like the White-tailed Deer, but they have been established in the coastal zone since the time of the first settlements. Frequenting bottomland swamps, they range into open country to feed at night.

The graceful and very beautiful White-tailed Deer is probably the best known mammal in the coastal zone. Officially designated in 1972 as the State Animal, the White-tailed Deer inhabits a variety of habitats from bottomland swamps to relatively open land. It is believed that this animal is more abundant today than when the State was first settled by Europeans.

Two other artiodactyls, now extinct in South Carolina, were a part of the coastal zone fauna during the colonial era - the Elk and the American Bison. Unfortunately, these magnificent animals were extirpated by hunting and the onward push of civilization.

5. **Marine Resources:** (See "Living Marine Resources," Chapter IV.)

6. **Soils**

Knowledge of underlying soil types is essential for wise land-use planning. It is widely recognized that not all soil types are suited to all land uses; at the same time, certain soil types are highly desirable for some activities, such as farming and forest production, and prudent resource management practices dictate that these soil types should be reserved for their most appropriate use.

Soils are produced by the interaction of natural processes such as wind and water action, temperature, and bioturbation (caused by plant and animal activity) with the underlying rock material. Except for a very small area in Berkeley County, soils in South Carolina's coastal zone fall within the Atlantic Coast Flatwoods land resource area. Soils in this vicinity are a mixture of sand and loam, and are moderately well to poorly drained. Drainage is an important factor to consider when development is undertaken, particularly if septic tanks are to be used. In the areas closest to the shore, soils tend to be poorly drained as a result of clay subsoils. Elevations range from sea level to only 100 feet above, meaning that much of the soil of the coastal zone lies in broad flats or shallow depressions. These depressions, known as Carolina Bays, contain very fertile deposits and are often used by farmers who "find the high organic content of the 'bay' floors highly desirable for farming and report yields to be fifty percent higher than in adjacent areas." (Kaczorowski, Raymond T., "Origin of the Carolina Bays" in **Terrigenous Clastic Depositional Environments,** Miles O. Hayes and Timothy W. Kana, Eds., Technical Report No. 11-CRD, Coastal Research Division, Department of Geology, University of South Carolina, Columbia, SC, 1976, pp. 11-19.) The fertility of the soil in the rest of the coastal zone ranges from low to medium, making it less than ideally suited for agriculture.

Like the inland soils, the sands of South Carolina's beaches vary depending upon the interaction of physical processes with various source materials. The arcuate strand area, stretching from the North Carolina border to Cape Romain, has the most stable structure at the moment, although erosion has been severe in the geologic past. The source of sand is ancient beach ridge, deposited by the oceans of the Pleistocene. The Cape Romain-Bull's Bay area sands are more coarse than most along the South Carolina coast since they are close to the Santee River system from which they are derived, and consequently have not been exposed to as much wave action. On the other hand, the sand of the barrier island systems to the south of Cape Romain is relatively fine. These sands are further removed from their sources and have undergone a great deal of reworking by wind and wave action. Unfortunately. because the barrier islands are receiving very little new sand, erosion is a problem along the southern portion of the coast.

7. **Geology**

South Carolina lies in three geographic provinces: 1) the mountainous Blue Ridge province of the northwestern edge of the State; 2) the Piedmont (foothills) province, which stretches from the Blue Ridge to the Fall Line; and 3) the Coastal Plain, reaching from the Fall Line to the seacoast. This Coastal Plain varies in width from 120-150 miles and covers an area of more than 20,000 square miles or nearly two-thirds of the State.

For millions of years this area was probably a part of the ancient continent of Appalachia whose eastern shore may have lain along the outer edge of the present Continental Shelf. It appears that during the Triassic (185 million years ago) the land was shattered by faults, and at the end of the Lower Cretaceous (125 million years ago) a continental warping formed the Appalachian Mountains and tilted down the land lying east, south and southwest of that area. With this downward tilting of land, the sea level rose in the present area of our Coastal Plain and possibly reached as far as the present Fall Line.

A study of the geologic history of South Carolina's Coastal Plain reveals numerous advances and retreats of the sea during which sediments were deposited and planed off over and over again. The entire Coastal Plain area consists of sedimentary deposits, ranging in age from Upper Cretaceous (65 million years ago) to Recent (2 million years ago), laid on top of ancient rocks such as granites, schists and other crystalline rocks. The numerous changes in sea level were partly due to tiltings of the land and partly to variation of world climate. During a series of "ice ages" when world climate was much colder than at present, the polar ice caps tied up

much of the ocean's water, thus causing a drop in sea level When the climate gradually became warmer, much of the ice melted and returned to the ocean, causing substantial rises in sea level and inundating tremendous land areas.

Most of South Carolina's Coastal Plain deposits are unconsolidated and are soft or soluble. Therefore, they are most easily eroded than the hard crystalline rocks of the Piedmont region. As streams tumble off the more resistant rocks at the edge of the Piedmont into the softer sediments of the Coastal Plain, a series of rapids or falls is formed, thus the term, "Fall Line."

The Coastal Plain is divided into five geographic divisions as follows:

1) the marine coastal terraces or "low country,"
2) the Aiken Plateau,
3) the High Hills of Santee,
4) the Richland red hills, and
5) the Congaree sand hills.

Because the coastal zone, as defined in South Carolina's Coastal Zone Management Act of 1977, roughly composes the same area as the marine coastal terraces, the remainder of this discussion will be limited to an overview of the geology of that area.

The marine coastal terraces occupy more than two-thirds of the present Coastal Plain. For thousands of years the area of the terraces was a level plain. With the recurrent rising and falling of sea level, deposits were laid down; and during temporary stands of the sea, sand bars were built across mouths of bays. As the sea withdrew, the bars remained to mark the abandoned shoreline. The area between two successive shore lines is treated as a separate terrace, and seven of these terraces have been identified and named in South Carolina's Coastal Plain. They are, from the oldest to the most recent, the Pamlico, Talbot, Penholoway, Wicomico, Sunderland, Coharie and Brandywine.

The present shoreline, which forms the seaward boundary of the most recent terrace, has a total length of 1,241 miles, including 281 miles of mainland and 960 miles around islands. From Cape Fear, North Carolina, to South Carolina's Winyah Bay, the coast forms a great arc and is distinguished by miles of fine sand beaches broken by several inlets including Little River Inlet, Murrells Inlet and North Inlet. From Winyah Bay to the Savannah River, the coast line trends to the southwest and is broken by numerous barrier islands, sea islands, bays, inlets and rivers.

The Charleston area has a history of seismic activity. A major quake occurred in this area in 1886 (see page I-7) and is described in a 1977 report conducted by the U.S. Department of the Interior **(Studies Related to the Charleston, South Carolina, Earthquake of 1886** - A Preliminary Report, Geological Survey Professional Paper 1028, Edited by Douglas W. Rankin, U.S. Department of the Interior, 1977.). No major seismic activity has occurred since 1886; however, the Middleton Place-Summerville area is still considered a geologically active zone.

8. Climate

The climate of South Carolina's coastal zone is referred to as a marine subtropical climate in which the winters are short and mild and the summers long, warm and humid. Proximity to the warm Gulf Stream waters which flow northward along the northeast coast of the United States helps to produce this type of climate and moderates temperature extremes of both summer and winter.

The coastal zone's summer season begins in May and lasts until the end of September. In the summer months, the land heats up more rapidly in the morning than the adjacent ocean water, and warm air masses begin to rise. By afternoon this rising, warm air begins to be replaced by the cooler, more dense ocean air, thus creating a sea breeze. In the evening, the reverse process occurs, creating a land breeze which blows out to sea. Further inland, summer temperatures are higher than those along the shore because the sea breeze's influence lessens with distance from the ocean. Rainfall is relatively heavy during the summer season, most of it coming as showers and thunderstorms. Occasional tornadoes, tropical storms and hurricanes add to the amount of rain received during the summer. The average air temperature along the coast in summer is around 80 degrees F. to 82 degrees F.

The months of October and November are known as "Indian Summer" and are characterized by warm, dry, sunny days and cool nights. Many persons find these months to be the most pleasant time of the year.

The winter months are characteristically mild with an average winter morning temperature of about 40 degrees F. and an afternoon maximum around 60 degrees F. About 18% of the annual precipitation falls in winter, and although frozen precipitation is fairly rare, it does occur occasionally.

March and April are a transition period during which rapid warming takes place. This period is marked by windy and occasionally cold weather in March to generally warm, pleasant weather in April. The ocean temperature during these months rises from 56 degrees F. to around 70 degrees F.

The coastal zone occasionally experiences tropical storms and hurricanes during the hurricane season which lasts from May to November. A hurricane is a well-developed cyclonic storm, usually of tropical origin. The characteristics of a hurricane are violent, counterclockwise winds that produce tremendous waves and surges and torrential rainfall. Each hurricane varies in size and duration. Generally, they extend over thousands of square miles, reach a height of 30,000 feet or more, and last from nine to twelve days.

Most of the hurricanes affecting South Carolina form west of the Antilles, but some form in the Caribbean. In most cases, as these hurricanes approach the Florida and Georgia coasts, they turn northeastward and remain over the ocean before landfall in South Carolina. Others make a limited penetration of the Florida and Georgia mainlands and then move parallel to the southeastern seaboard. The majority of hurricanes pass well offshore of South Carolina and inflict little damage.

The most damaging and memorable hurricanes to hit South Carolina's coast occurred in 1885, 1893, 1911, 1940 and 1959. These storms cost many lives and millions of dollars in property damage. Damage was caused by high speed winds, rainfall and flooding.

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D. COASTAL ECONOMY

1. Introduction

The eight counties designated by the General Assembly as the coastal zone of South Carolina have a land area of 6,864 square miles, which is 22.7 percent of the total land area of the State. In 1975 this area was estimated to have 20.9 percent of the State's population, 18.5 percent of the civilian labor force, 18.6 percent of the civilian employment, and 16.8 percent of the State's unemployment. These data reveal that the coastal zone of South Carolina does not differ very much from the State as a whole with respect to population density, labor force participation, and percent of the labor force unemployed. These data also suggest that the coastal zone has sufficient unused human resources to provide a basis for substantial economic growth.

Principal economic activities within the coastal zone are agriculture, silviculture, fisheries, recreation and tourism, government and industry.

In spite of a significant recession in 1974-75, the economy of the State and its coastal zone has grown fairly steadily over the past decade, and indications are that it will continue to do so for at least the next several years.

2. Economic Characteristics

South Carolina's coastal zone is characterized by a very uneven distribution of population and employment opportunities. In 1975 Charleston County alone had 45.0 percent of the area's total population. The oceanfront counties (Jasper, Beaufort, Charleston, Georgetown and Horry) had 73.0 percent of the coastal zone population in 1976. The population is even more unevenly distributed during the week when there is a net flow of commuters from the remaining counties of the coastal zone.

For simplicity's sake, much of the discussion which follows will deal with South Carolina's coastal zone in terms of three broad regions: the Low Country (Jasper, Beaufort and Colleton Counties) the Greater Charleston Region (Berkeley, Charleston and Dorchester Counties) and the Waccamaw Region (Georgetown and Horry Counties). See Figure D-1.

3. Transportation and Utilities

South Carolina's coastal zone has 443.66 miles of main track railroad and is serviced by Amtrack, Seaboard Coastline and Southern Railways.

Major commercial air traffic in the coastal zone is handled by the Myrtle beach AFB/Jetport and the Charleston AFB/International Airport. In 1976 the Myrtle Beach facility recorded 72,043 total passenger emplanements, while there were approximately 400,000 emplanements at Charleston. Total commercial vehicle operations at the Charleston Airport in 1977 numbered 22,121, and of these, 2,017 were air taxi operations used to carry passengers over short distances. The Charleston Airport is serviced by Eastern, National, Delta, Southern and Piedmont Airlines.

The only major seaport in the coastal zone is the Port of Charleston which ranks twelfth in the nation in dollar value of general cargo handled (after ranking thirty-fifth in the 1930's). Much smaller port facilities are also operated by the South Carolina Ports Authority at Georgetown (Waccamaw Region) and Port Royal (Low Country Region). In the 1976-77 fiscal year, a total of 1,392,750 tons of cargo were received at South Carolina's ports. Cargoes ranged from waste materials to fresh fruit. During the same period, 2,259,445 tons were exported through South Carolina's ports.[2]

Charleston is the southeastern terminus of an interstate highway (I-26) which connects with a number of other interstate systems serving major population and industrial centers in the eastern half of the United States. Interstate 95, a major north-south route, passes west of Horry and Georgetown Counties in the Waccamaw Region and connects with a four-lane highway leading to Myrtle Beach. After passing through Dorchester County near St. George, it continues through central Colleton and Jasper Counties and on into Savannah, Georgia.

The South Carolina coastal zone is served by two investor-owned electric utility companies and by six electric cooperatives. The South Carolina Electric & Gas Company of Columbia serves all of the coastal zone counties except the northernmost - Horry - which is served by the Carolina Power and Light Company of Raleigh, North Carolina.

FIGURE D-1

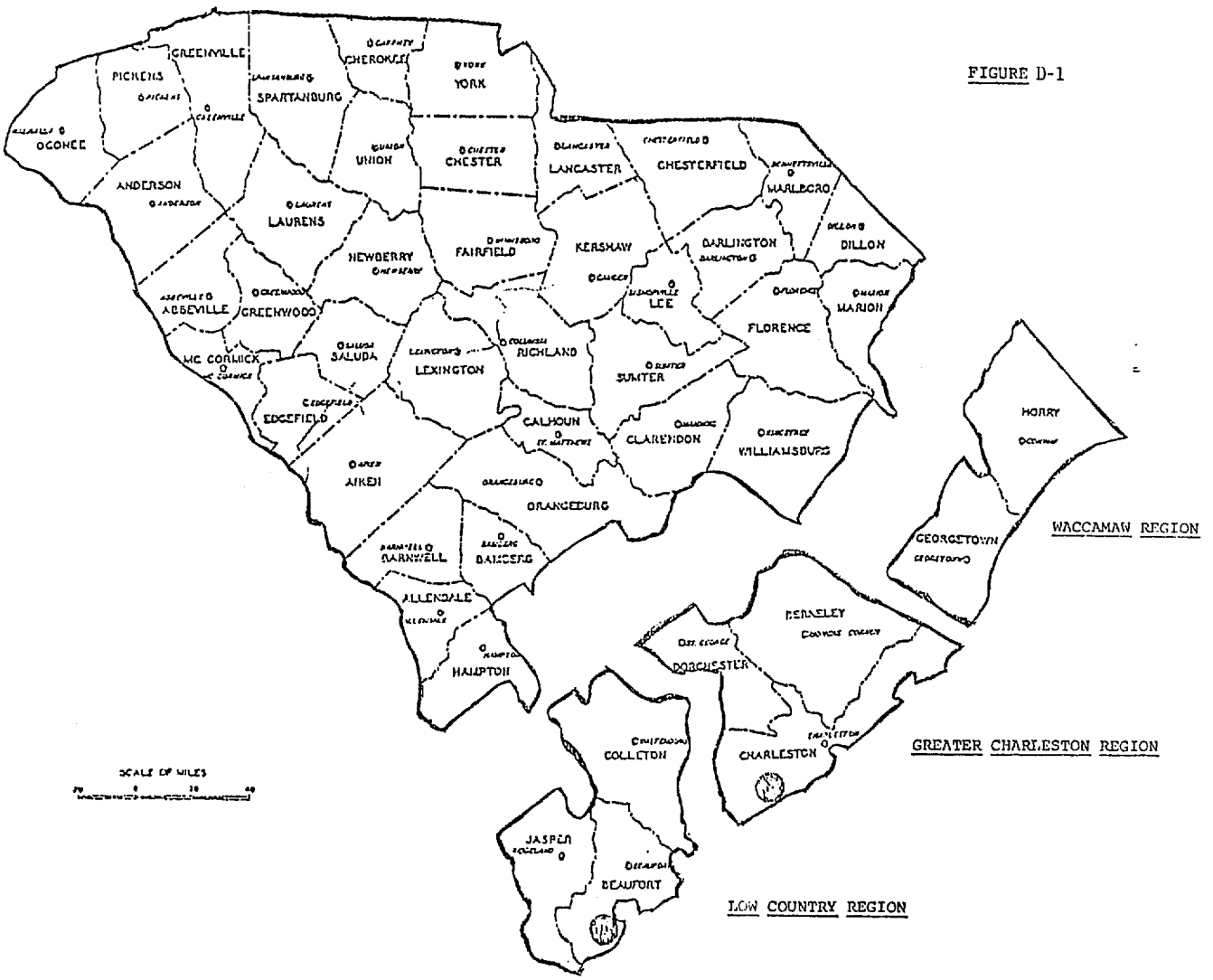


FIGURE D-1
GREENVILLE
PICKENS
SPARTANBURG
CHEROKEE
YORK
OCONEE
ANDERSON
UNION
CHESTER
LANCASTER
CHESTERFIELD
MARLBORO
LAURENS
NEWBERRY
FAIRFIELD
KERSHAW
DARLINGTON
DILLON
ABBEVILLE
GREENWOOD
LEE
FLORENCE
MARION
MC CORMICK
SALUDA
LEXINGTON
RICHLAND
SUMTER
EDGEFIELD
CALHOUN
CLARENDON
WILLIAMSBURG
HORRY
AIKEN
ORANGEBURG
GEORGETOWN
WACCAMAW REGION
BARNWELL
BAMBERG
ALLENDALE
BERKELEY
DORCHESTER
HAMPTON
COLLETON
CHARLESTON
GREATER CHARLESTON REGION
JASPER
BEAUFORT
LOW COUNTRY REGION
SCALE OF MILES

4. Economic Activities

a) **Agriculture**

A 1967 land-use survey identified 11.9 percent of the land in the coastal zone as cropland and 2.5 percent as pasture. Corresponding figures for the State as a whole were 20.0 and 5.4 percent respectively, indicating that agriculture is of relatively less importance in the coastal zone than in the State as a whole. However, in 1975 agriculture provided 3.3 percent of the total labor and proprietors' income in the coastal zone (see Table D-1), while farm income for the State as a whole was 3.2 percent of the total. The high coastal zone figure was due primarily to the Waccamaw area which derived 11.3 percent of its income from farm sources. The Low Country area obtained 3.2 percent of its income from agriculture, while the figure for the Greater Charleston Region was only .9 percent.

These percentages are likely to increase in the future. In the December 15, 1977, report to the State Budget and Control Board, the South Carolina Division of Research and Statistical Services noted that "with or without a farmers' strike, the long term trend of the decline in prices will keep pace with increases in the prices of other consumer goods and services."[3]

The Low Country coastal zone accounted for 22.5 percent of the cash receipts from marketing crops by South Carolina farmers in 1975, a share which is almost exactly the same as the coastal zone's 22.7 percent share of the total land area of the State. The State's most valuable crop, tobacco, was also the coastal zone's most valuable crop, with Horry County ranking first among all the counties of the State in tobacco sales. The farmers of the coastal zone marketed only 11.2 percent of the State's second most valuable crop, soybeans, and 20.7 percent of the corn crop, which ranked third in both the coastal zone and the State. In terms of cash value, vegetable crops (produced mostly in Charleston and Beaufort Counties) were second only to the tobacco profits of the norther coastal zone region.

The farmers of the coastal zone marketed 25.0 percent of the hogs and 10.2 percent of the cattle sold by South Carolinians in 1975. In all, the coastal zone's share of crops and livestock was 18.3 percent of the State total.[4]

b) **Forestry** (Silviculture)

As of 1967, 62.8 percent of the coastal zone was forested land. (See Table D-2.) The Waccamaw Region had by far the most forested land, with 72.0 percent of its total area falling into this category. The Greater Charleston Region had only 55.3 percent forest land, while the Low Country fell in between with 63.4 percent forest land. Presumably, the amount of forest land is lower now due to pressure from industrial and residential development. It is, however, important to bear in mind that much of the federally owned land in South Carolina is forest land, making the actual totals higher than they appear to be.

Although large, the quantity of forest in the coastal zone is only 19.2 percent of the total forest land of the State, based on 1975 figures. However, the income derived from coastal zone forests is 26.7 percent of the State's forest-derived income, indicating that silviculture plays a somewhat more important role in the economy of the coastal zone than it does in some other areas of the State.

The coastal zone produced 17.0 percent of the physical volume (cords) or pulpwood and 30.1 percent of the physical volume (board feet) of other forest products produced in South Carolina in 1975. The delivered value of these products was 52.1 million, or 26.7 percent of the value for the whole State.[5]

c) **Fisheries**

All commercial fish landings in South Carolina occur within the coastal zone. The total value of the 1976 catch was $14,069,569, which can be broken down as follows:

	Volume (pounds)	**Value (dollars)**
Shrimp (heads on)	8,053,006	$11,043,381
Blue Crabs, Hard	5,739,936	975,847
Clams, Hard (meats)	172,464	208,686
Oysters (meats)	1,187,077	759,063
Squid	12,454	3,311
All fin fish	5,713,661	1,079,281

TABLE D-1

Labor and Proprietors' Income by Major Source,
Three Economic Areas of South Carolina Coastal Zone, 1975[a]

Source	Low Country		Greater Charleston		Waccamaw		Coastal Zone		State	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
	(Thousands of Dollars)								(Millions)	
Farm	$ 11,587	3.2	$ 12,843	0.9	46,892	11.3	$ 71,322	3.3	$ 325.6	3.2
Private Nonfarm	148,513	41.3	751,460	55.0	283,145	68.2	1,183,188	55.3	7,429.0	74.1
Government	199,881	55.5	601,599	44.1	85,262	20.5	886,742	41.4	2,271.1	22.7
Total	359,981	100.0	1,365,902	100.0	415,299	100.0	2,141,182	100.0	10,025.7	100.0

[a] Reported by place of work.

SOURCE: Regional Economics Information System, Bureau of Economic Analysis, U.S. Department of Commerce, Special Tabulation.

TABLE D-2

Land Use in South Carolina Coastal Zone Counties, 1967

County	Total land area[1]	Not inventoried		Inventoried by Soil Conservation Service				
		Federal	Other[2]	Cropland	Pasture	Forest	other land	
							Total	Non-farm
	(Thousands of acres)							
Beaufort	372.0	13.8	20.8	44.4	10.0	153.0	130.0	13.0
Berkeley	704.0	201.0	32.5	50.6	13.0	386.2	20.7	4.7
Charleston	605.0	101.0	49.2	42.8	18.9	260.0	133.3	59.9
Colleton	671.0	0.0	29.9	103.3	28.0	482.3	27.5	15.0
Dorchester	364.0	0.0	6.3	56.2	8.5	278.8	14.2	3.5
Georgetown	520.0	0.0	22.6	28.7	6.2	419.5	42.9	36.9
Horry	736.0	3.6	42.4	159.8	15.5	485.3	29.4	15.1
Jasper	428.0	6.6	14.2	36.2	12.0	297.8	61.2	3.7
Zone Total	4,400.0	326.0	217.9	522.0	112.1	2,762.9	459.2	151.8
State Total	19,338.3	1,042.7	1,141.2	3,865.4	1,037.7	11,427.1	824.3	291.4

1 Excludes water areas larger than 40 acres and rivers wider than 1/8 mile.

2 Urban and built-up areas, and small water areas.

SOURCE: **South Carolina Soil and Water Conservation Needs Inventory,** Soil Conservation Service, USDA Columbia, South Carolina, May 1970.

It is obvious that the shrimp fishery is by far the most important one in the State. It accounts for 41.0 percent of the volume and 78.0 percent of the ex-vessel value of all catches over the years 1974, 1975, and 1976. In descending order of importance, shrimp is followed by the blue crab, fin fish, and oyster/clam fisheries.

The majority of South Carolina-caught seafood is shipped out-of-state. In 1976 only six to eight percent of the total shrimp harvest was sold at dockside, while South Carolina retailers, chainstores and restaurants each received less than five percent of the harvest.[6]

The numerous recreational fishery resources of the coastal zone, including the nationally famous freshwater striped bass fishery of the Santee-Cooper Lakes, are of high quality and are used fairly heavily. In 1977 they included thirteen ocean fishing piers, sixty boat ramps, thirty-three marinas, four boat rental businesses, nine artificial fishing reefs, forty-nine charter boats (which usually carry four to six people) and nineteen "head boats" (which can carry up to 118 anglers). Recreational crabbing and shrimping are popular as is the recreational harvesting of oysters and clams.[7]

d) Recreation and Tourism

The most accessible beaches in South Carolina are located in Horry and Georgetown Counties. It is not necessary to cross extensive reaches of marshlands and islands to reach these beaches, as is the case for beaches in southern South Carolina and Georgia. Furthermore, these beaches are closer than others to the thickly populated and industrialized Piedmont region of North and South Carolina. As a result, there has been, and continues to be, substantial development of tourist and recreational facilities along most of the coast of Horry County and the northern half of Georgetown County.

When one considers the numerous attractions in South Carolina's coastal zone, it is not surprising that recreation and tourism-related activities make a significant contribution to the region's economy. Since much of the income derived from tourism comes from out-of-state, it may represent a more significant input into South Carolina's economy than at first appears to be the case. However, this is difficult to assess without detailed knowledge of how much is spent by South Carolinians in other states. In 1977, 36.1 percent of all travelers entering South Carolina were "visitors" whose primary destination was a location within the State. Of the 14,290,619 visitors to the State in 1977, 56.2 percent had destinations within the coastal zone. This figure may be low, however, as 12.2 percent of the destinations listed were in the undefined "Other" category. It is likely that at least some of the destinations listed in this category fell within the coastal zone.

Geograhphical breakdown reveals that 33.2 percent of the visitors to the coastal zone headed to the "Grand Strand" in Horry County, and 18.3 percent went to the Charleston Region, while only 4.7 percent listed destinations in the Low Country Region.

Expenditures by visitors to South Carolina in 1977 totaled $1,085,332,894. The importance of tourism to the economy of the coastal zone is indicated by the fact that 77.6 percent of all visitor expenditures in the State were made within the coastal area. Again, geographical breakdown reveals that a disproportionate share of expenditures in the coastal zone (45.3 percent) were made in the Grand Strand area followed by 22.5 percent in the Charleston area and 9.8 percent in the Low Country area. Of this last category, 8.6 percent was spent at Hilton Head alone.

As might be expected, the largest expenditures are made for lodging (31.9 percent) followed closely by those for food (28.7 percent). Gifts and miscellaneous items account for 15.3 percent of the tourist dollar, while 13.6 percent is spent on auto-related needs, and only 0.5 percent is spent on entertainment. Since these figures apply to the entire State, the percentages may vary within the coastal zone, but the ranking of expenditures undoubtedly remains constant.[8]

Recreation and tourism depend to a large degree on a number of factors unrelated to the coastal zone **per se**, factors such as the weather, national economy, and the season. Seasonality in the coastal zone is fairly easy to predict: tourism peaks in the summer quarter and is at its lowest point in the winter quarter. The effect of seasonal changes on related industries should be kept in mind; although, in 1976 tourism and recreation showed such an upsurge that growth in lodging and recreational services continued after the close of the season.

e) Industry and Government

Employment in the six major industry groups plus government is reported in Table D-3. Total employment in the industries listed was 178,570 for the coastal zone. This figure is 18.3 percent of the total for the State.

TABLE D-3

Average Annual Nonfarm Wage and Salary Employment,[a] South Carolina Coastal Zone, by Economic Area and Industry Group, 1975

Industry Group	Low Country		Greater Charleston		Waccamaw		Coastal Zone		State	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Manufacturing	3,920	16.4	14,300	12.5	10,320	25.7	28,540	16.0	336,300	34.0
Contract Construction	1,730	7.3	9,000	7.9	2,220	5.5	12,950	7.3	61,800	6.0
Transp., com., & pub. ut.	810	3.4	6,700	5.8	1,100	2.7	8,610	4.8	40,300	4.0
Wholesale & ret. trade	4,290	18.0	24,400	21.3	9,030	22.4	37,720	21.1	175,600	18.0
Fin., ins. & real estate	1,890	7.9	4,900	4.3	1,470	3.7	8,260	4.6	39,100	4.0
Miscellaneous	4,200	17.6	16,100	14.1	9,290	23.1	29,590	16.6	124,600	12.0
Government	7,010	29.4	39,100	34.1	6,790	16.9	52,900	29.6	200,100	20.0
Total	23,850	100.0	114,500	100.0	40,220	100.0	178,570	100.0	977,800	100.0

[a] Employment reported by place of work.

SOURCE: **South Carolina Statistical Abstract, 1976.** S.C. Division of Research and Statistical Services, Columbia, S.C., p. 68.

TABLE D-4

Number of Establishments, Employment and Payrolls South Carolina Coastal Zone, 1974[a]

Economic Area	Number of Estab.	Employees week of March 12, 1974		Annual Payroll, 1974	
		Number	Per Estab.	Total ($1000's)	Per Worker (Dollars)
Low Country	1,568	17,172	11.0	107,775	6,276
Greater Charleston	5,966	76,207	12.8	533,528	7,001
Waccamaw	2,746	28,887	10.5	197,925	6,852
Coastal Zone	10,280	122,266	11.9	839,228	6,864
State	48,743	799,046	16.5	5,863,565	7,338

[a] Does not include: Self-employed persons, agriculture and domestic service, government and railroads.

SOURCE: **U. S. Bureau of the Census, County Business Patterns, 1974: South Carolina.** U. S. Government Printing Office, Washington, D. C., 1976, p. 63.

(The coastal zone has 20.9 percent of the State's population.) Worthy of special notice among the industry employment figures in the various regions is the relatively low level of manufacturing employment in all but the Waccamaw Region. Georgetown, with 41.4 percent employed in manufacturing, was the only coastal county which exceeded the State percentage of manufacturing employees. It was also the only coastal county for which the average annual wage ($7,975 in 1974) was above the State's average.

Also noteworthy are the large percentages employed by government in the Low Country and Greater Charleston Regions. This is especially significant because the figures include only the civilian employees of military facilities. Large public sector employment may be both an advantage and a liability to the economy of the coastal zone. The coastal zone withstood the rather severe 1975 recession better than other areas of the State, yet remains highly vulnerable to economic shocks from political decisions regarding the nature, level, and location of government expenditures - especially military expenditures.

Data on 1974 employment, payrolls and numbers of establishments in the coastal zone and the State as a whole are summarized in Table D-4. The coastal zone had 21.2 percent of the establishments, 15.3 percent of the employees (in the week of March 12) and 14.3 percent of the payrolls of those industries covered by the survey. The average number of employees per establishment was considerably lower in the coastal zone than in the State as a whole, and only one county (Georgetown, with an average of 15.2 employees/establishment) was even close to the State average of 16.5. The coastal zone, therefore, is characterized by a number of small business establishments rather than by larger industrial centers.

3. Income and Employment Trends

At the outset, it is important to note that any discussion of the economy of the coastal zone must include an awareness of the economy of the State as a whole as well as the national economy. South Carolina was identified as one of six states most sensitive to national economic developments by the Bureau of Economic Analysis and the Department of Commerce. This means that swings of the business cycle are larger in the State and the coastal zone than elsewhere.

Data on population, labor force, employment and unemployment in the coastal zone and its three major subdivisions are given in Table D-5. It should be noted that these data, unlike the employment data in Tables D-3 and D-4, are based on county of residence rather than place of work, and that agriculture, self-employed, unpaid family, and domestic workers are included. The data in Table D-5, therefore, are not strictly comparable with the data in Tables D-3 and D-4. Also, in 1975 (the year covered by Table D-5) there was a significant economic recession as compared with the previous year (covered by Table D-4).

South Carolina's economy has maintained a steady recovery rate since the 1974-75 recession, and a growth rate above that of the South Atlantic Region and the rest of the nation is predicted. According to the 1977 Economic Report prepared by the South Carolina State Budget and Control Board, "this trend is expected to continue for the next four years as South Carolina narrows the gap between the region and the nation in jobs and especially in incomes."[10]

Unemployment

The rate of unemployment for the State in 1975 was 8.7 percent as compared with 4.1 percent in 1973 and 5.9 percent in 1974. Thirteen of the forty-six counties had over 11 percent of their labor force unemployed, and in three, the rate of unemployment in 1976 was above 15 percent. In contrast, only two of the eight coastal counties had above 10 percent unemployment in 1975, and for the coastal zone as a whole, the rate was only 7.9 percent. It is clear from these figures that the relative impact of the recession was less in the coastal zone than in the rest of the State. Recent data from the Division of Research and Statistical Services indicate that the State unemployment rate in December of 1977, 4.7 percent, was the lowest since December of 1973. A downward trend in unemployment in South Carolina (which presumably would affect the coastal zone) may be underway, since the adjusted rate for 1977 was 5.4 percent, down from 6.9 percent in 1976.

Labor Force Participation

Labor force participation is defined as the percentage of the total population sixteen years of age or older in the labor force at a given point in time. Georgetown and Horry Counties had labor force participation rates more like those in the rest of South Carolina than the other coastal counties, both having over 40.0 percent

TABLE D-5

Estimated Average Annual Labor Force, Employment and Unemployment in South Carolina Coastal Zone Counties, 1975[a]

County	Population	Civilian labor force		Number employed	Unemployed	
		Number	% of pop.		Number	Percent
Beaufort	53,100	18,050	34.0	16,640	1,410	7.8
Berkeley	64,400	21,700	33.7	19,700	2,000	9.2
Charleston	262,900	91,000	34.6	84,500	6,500	7.1
Colleton	28,700	11,100	38.7	10,080	1,020	9.2
Dorchester	44,300	14,600	33.0	13,500	1,100	7.5
Georgetown	37,800	15,180	40.2	13,540	1,640	10.8
Horry	85,100	41,300	48.5	38,200	3,100	7.5
Jasper	12,900	4,970	38.5	4,450	520	10.5
Zone total	589,200	217,900	37.0	200,610	17,290	7.9
State total	2,818,000	1,180,000	41.9	1,077,000	103,000	8.7

[a] Reported by place of residence. Total employment includes agricultural workers and non-agricultural self-employed, unpaid family and domestic workers.

SOURCE: **South Carolina Statistical Abstract, 1976,** S. C. Division of Research and Statistical Services, Columbia, S. C., p. 63.

TABLE D-6

Labor and Proprietors' Income by Industry Group, Three Economic Areas of South Carolina Coastal Zone, 1975[a]

Industry Group	Low Country		Greater Charleston		Waccamaw		Coastal Zone		State	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
	(Thousands of Dollars)								(Millions)	
Farm	$ 11,587	3.2	$ 12,843	0.9	$ 46,892	11.3	$ 71,322	3.3	325.6	3.2
Manufact.	$ 29,024	8.1	167,214	12.2	95,767	23.1	292,005	13.6	3,193.8	31.9
Construction	15,950	4.4	90,655	6.6	19,877[b]	4.8	126,482[b]	5.9	634.4	6.3
Mining	—	—	—	—	—	—	—	—	20.1	0.2
Trade	31,826	8.8	193,576	14.2	65,757	15.8	291,159	13.6	1,424.0	14.2
Fin., Ins. & Real Estate	21,600	6.0	46,913[c]	3.4	12,707	3.1	78,220[c]	3.7	401.2	4.0
Transportation & Pub. Utl.	9,406	2.6	76,995	5.6	12,058	2.9	98,459	4.6	510.7	5.1
Services	36,688	10.2	168,739	12.4	66,280	16.0	271,707	12.7	1,211.5	12.1
Other Ind.	—	—	—	—	7,749	1.9	—	—	33.2	0.3
Government	199,881	55.5	601,599	44.0	85,262	20.5	886,742	41.4	2,271.1	22.6
Fed. Civil	23,656	6.6	241,537	17.7	11,195	2.7	276,388	12.9	461.7	4.6
Fed. Milit.	49,480	41.5	204,378	15.0	36,359	8.7	390,217	18.2	696.1	6.9
St. & Local	26,745	7.4	155,684	11.4	37,708	9.1	220,137	10.3	1,113.3	11.1
Total	$359,981		$1,365,902		$415,299		$2,141,182		$10,025.7	
Fed %		48.1		32.7		11.4		31.1		11.5

[a] Reported by place of work.
[b] Includes $2.4 million allocated to Georgetown.
[c] Includes $2.0 million allocated to Berkeley and Dorchester Counties.

SOURCE: Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce Special Tabulation.

labor force participation. Horry County, with a labor force participation rate of 41.9 percent, exceeded the South Carolina rate of 40.5 percent. None of the other six coastal counties had as much as 39.0 percent of the population in the civilian labor force.

Income

Income produced in South Carolina's coastal zone in 1975 was $2.14 billion, which was 21.4 percent of the total produced in the State. The percentage increase from 1970 to 1975 (not adjusted for inflation) was somewhat higher for the coastal zone (61.7) than for the State (56.2) or the nation (55.0). Although these figures are in part a reflection of the relatively low levels of development in the coastal zone prior to 1970, they do demonstrate that the coastal zone economy is healthy.

The amounts and relative importance of income from farms, private non-farm enterprise and activities, and from government are summarized in Table D-1 for the State as well as the coastal zone and its three major regions.

A comparison of the income data in Table D-1 with the employment data in Table D-3 reveals that in the coastal zone, incomes per worker are much higher in government work than in the private sector of the economy.

The relative importance of government as a source of income is probably due to the large proportion of federal, as opposed to state or local, employers. (See Table D-6.) It also is a reflection of the seasonal and/or irregular nature of many recreation and tourism-related jobs. A third factor contributing to the relative importance of government employment is the low wage rate of many jobs in the private sector of the coastal zone.

A more detailed breakdown of the sources of income in the State, the coastal zone and its three major regions is presented in Table D-6. Except for the government-related distortion discussed above, industry groups in the coastal zone are similar in importance as employment and income sources. One major exception is wholesale and retail trade, which is less important as a source of income than as a source of employment. Presumably, this reflects the low wage structure of retail trade and the seasonality of some coastal zone enterprises.

The employment and income data presented in Tables D-1, D-3, and D-6 are based on the worker's place of employment, rather than place of residence. Such data may be a poor indication of the income and welfare of the residents of a particular county or area. This is true because workers commute across county lines to work, and because personal income includes income from capital and land (dividends, interest and rent) and "transfer payments" such as pensions, annuities (including Social Security) and welfare payments. All of these adjustments were made to produce the personal income data of Table D-7.

The State average per capita income was 84.3 percent of the national average of $5,460 reported by the Department of Commerce in the Statistical Abstract of the United States, and the ratio for the coastal zone was approximately the same. For the various counties, the per capita incomes in 1976 were the following percentages of the U.S. average:

Low Country:	Beaufort	118.7%
	Colleton	66.3%
	Jasper	58.4%
Greater Charleston:	Berkeley	68.0%
	Charleston	90.1%
	Dorchester	76.7%
Waccamaw:	Georgetown	75.1%
	Horry	85.0%

When a large proportion of the total income goes to a relatively small percentage of the total population, the average income per person or per family is a poor indication of the welfare of most of the people. A much better indicator is the median family income, the amount which is midway between the lowest and highest incomes in the county. In 1969 (the most recent year for which such data are available) Beaufort County, with the highest average income per capita in the State, ranked only fourth among the eight coastal counties and twenty-sixth among the State's forty-six counties in median family income. For median family income of black families, Beaufort County ranked thirty-sixth in the State and fourth in the coastal zone. Thus, it is apparent that Beaufort County's unusually high per capita income is concentrated within a small segment of the population and cannot be viewed as typical.

TABLE D-7

Personal Income[a] of Residents of South Carolina Coastal Zone, by Economic Area & Major Source of Income, 1975

	Low Country		Greater Charleston		Waccamaw		Coastal Zone		State	
	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
	(Thousands of Dollars)								(Millions)	
Labor & Proprietors	361,108	73.8	1,299,387	75.6	391,568	71.2	2,052,063	74.4	$ 9,622.4	74.0
Div., Int. & Rent	63,350	13.0	182,560	10.6	75,788	13.8	321,698	11.7	1,502.5	11.5
Transfer Payments	64,657	13.2	236,385	13.8	82,693	15.0	383,735	13.9	1,881.4	14.5
Total	489,115	100.0	1,718,332	100.0	550,049	100.0	2,757,496	100.0	13,006.3	100.0
Population	94,700		371,600		122,900		589,200		2,818,200	
Income Per Capita	$ 5,165		$ 4,624		$ 4,476		$ 4,680		$ 4,615	
Percent of U.S.	94.6		84.7		82.0		85.7		84.5	

[a] Reported by county of residence.

SOURCE: Regional Economics Information System, Bureau of Ecomonic Analysis, U.S. Department of Commerce Special Tabulation.

From the **Charleston Air Force Base International Airport Yearly Report,** 1976, compiled by the South Carolina Aeronautics Commission.

2. From the 1977 **South Carolina Statistical Abstract,** South Carolina Budget and Control Board. Prepared by the Division of Research and Statistical Services.

3. Division of Research and Statistical Services, **Report to the State Budget and Control Board,** December 15, 1977, p. 4.

4. These data were obtained from the S.C. Crop and Livestock Reporting Service in cooperation with the Department of Agricultural Economics and Rural Sociology, Clemson University.

5. These data were compiled by the Forestry Department of Clemson University.

6. Theiling, Dale, **Catch and Effort Data for Commercial Fisheries in South Carolina,** prepared for the National Marine Fisheries Service, January 4, 1978.

7. Data obtained from a 1977 report by David M. Cupka, Marine Resources Division, South Carolina Wildlife and Marine Resources Department, Charleston, S. C.

8. From data compiled by the South Carolina Department of Parks, Recreation and Tourism.

9. **Ibid.**

10. **Economic Report of the State of South Carolina,** prepared by the State Budget and Control Board, August, 1977, p. 23.

11. Division of Research and Statistical Services, **Report to the State Budget and Control Board,** February 16, 1978, p. 2.

E. POPULATION CHARACTERISTICS

The coastal zone contains approximately one-fifth of the population of South Carolina. Table E-1 summarizes population data for the eight coastal counties, the coastal zone, and the State for census years 1960 and 1970, with provisional data for 1976. In 1960 the population of the coastal zone was 19.6 percent of the total population of the State, but by 1976, the coastal zone's share of the State population had risen to 21.2 percent. Fully 75 percent of this increase took place within the Charleston Standard Metropolitan Statistical Area.

In 1975 the Charleston SMSA (comprised of Berkeley, Dorchester, and Charleston Counties) had a slightly larger population than the mid-state Columbia SMSA, but a substantially smaller population than the Greenville-Spartanburg SMSA, located in the northwestern part of the State. The Charleston SMSA ranked 97th among the nation's 159 "large" Standard Metropolitan Statistical Areas (populations of 200,000 or more) listed in the 1977 **Statistical Abstract of the United States.**

1) Trends

As is evident from Table E-1, the population of Charleston County itself increased very little relative to that of Berkeley and Dorchester Counties, which showed increases of 44.9 percent and 25.2 percent respectively for the six year period. Horry County also showed a relatively large percentage of growth during this period (23.5 percent). In fact, only Charleston and Colleton Counties were below the State as a whole in their percentage of population increase between 1970 and 1976. Figure E-1 illustrates the changes in coastal county population relative to that of other areas of the State.

2) Age Structure

Table E-2 summarizes the age structure of the coastal counties based on the most recent (1970) census data available. Since the Census of Population counts people where they are living at the time of the census rather than where they make their permanent residence, the presence of large groups of military personnel and/or college students can noticeably distort the age distribution of the population. Thus, Beaufort County's unusually high percentage of eighteen to twenty year olds (15.9%) can be explained by the basic training facilities at Parris Island, which process large numbers of young adults. The Ship Yard and other U.S. Navy facilities in Charleston, on the other hand, include a larger percentage of mature adults. Like Beaufort County, Charleston County has a relatively high percentage of young adults (eighteen to twenty year olds). This is probably explained by the presence of the Medical University, the College of Charleston, Baptist College and the Citadel, all of which are located in Charleston County.

3) Sex-Race Distribution

Sex and racial distributions are presented in Table E-3. In 1970 the total State population of 2,590,516 included only 7,045 individuals who were not classified as either white or black. Therefore, the term "blacks" may appropriately be used to refer to the non-white population of the coastal zone and of South Carolina.

The male/female distribution within the coastal zone is, by and large, typical of the State as a whole. The only exception is the unusually high percentage of white males in Beaufort County, which is probably a result of Marine and Navy training facilities located there.

4) Geographical Distribution

Details of the geographical distribution of South Carolina's population are presented in Table E-4. In 1970 only Charleston and Beaufort Counties had an urban population greater than the State average of 47.6 percent, although Berkeley County was close, with 45.8 percent of its population classified as urban. Since Table E-4 is based on 1970 data, it does not take into account the recent population growth in Berkeley and Dorchester Counties; the present urban/rural ratios would undoubtedly be quite different from the 1970 data. This also holds true for the population density figures in Table E-4. The populations of Berkeley, Dorchester and Horry Counties, in particular, have increased dramatically since 1970, causing concomitant increases in the population per square mile.

5) **Housing**

The housing characteristics presented in Table E-5 reveal that in all but Charleston and Horry Counties, the population per occupied dwelling unit exceeds the State's mean. With the exception of Georgetown, Jasper and Colleton Counties, the median value for owner-occupied dwelling units exceeded the State average. As is to be expected, the values for Jasper and Colleton Counties are considerably lower than for the rest of the coastal zone, due to their rural character and relatively low per capita incomes.

6) **Education**

A final aspect of interest is the quantity and quality of education available to residents of the coastal zone. Table E-6 presents data on the number of schools in each county, total enrollment (excluding kindergarten), and the median school years completed by persons twenty-five years of age or older.

Unfortunately, the last category is based on 1970 census data and, as a result, is not strictly comparable with the rest of Table E-6. However, it does call attention to a serious disparity between the levels of education attained by blacks and whites in the coastal zone. While the gap between the two groups may have narrowed since 1970, it has not disappeared and is deserving of attention.

TABLE E-1

Coastal County Population
1960, 1970 and 1976[a]

County	1960 Number	1970 Number	1976 Number	1976 Percent of Coastal Zone population	1976 Percent of State population	1976 Percent change in population 1970-1976
Jasper	12,237	11,885	13,800	2.3	0.5	16.3
Beaufort	44,187	51,136	58,400	9.7	2.1	14.3
Colleton	27,816	27,622	29,200	4.8	1.0	5.3
Dorchester	24,383	32,276	46,800	7.8	1.6	44.9
Berkeley	38,196	56,199	70,400	11.7	2.5	25.2
Charleston	216,382	247,650	260,200	43.1	9.1	5.1
Georgetown	34,798	33,500	38,000	6.3	1.3	13.3
Horry	68,247	69,992	86,400	14.3	3.0	23.5
Coastal Zone	466,246	530,260	603,200	100.0	21.2	13.8
South Carolina	2,382,594	2,590,516	2,848,000	—	100.0	9.9

[a] Provisional data.

SOURCE: South Carolina Statistical Abstract (1977), pages 10, 12.

TABLE E-2

Coastal County Population by Age
April 1, 1970

County	Total Number	Percent under 5 yrs.	Percent 5-13 yrs.	Percent 14-17 yrs.	Percent 18-20 yrs.	Percent 21-44 yrs.	Percent 45-64 yrs.	Percent over 65
Jasper	11,885	9.6	21.7	10.3	5.0	24.8	20.1	8.5
Beaufort	51,136	9.4	17.8	9.3	15.9	31.3	11.9	4.5
Colleton	27,622	9.4	20.5	9.6	5.0	25.9	20.2	9.3
Dorchester	32,276	9.9	22.3	9.3	4.5	30.4	17.5	6.1
Berkeley	56,199	11.8	24.8	9.1	4.8	31.6	13.8	4.1
Charleston	247,650	9.3	19.5	8.2	6.8	34.0	16.7	5.5
Georgetown	33,500	9.8	22.2	10.9	5.4	25.9	18.9	6.9
Horry	69,992	9.1	19.8	9.2	5.7	30.2	18.9	7.1
South Carolina	2,590,516	9.1	19.1	8.7	37.0	37.0	16.3	6.3

SOURCE: U. S. Bureau of the Census, Decennial Census of Population, 1970.

TABLE E-3

Coastal County Population by Race and Sex
April 1, 1978

County	All Races[a]			White			Black		
	Total #	Male %	Female %	Total %	Male %	Female %	Total %	Male %	Female %
Jasper	11,885	48.6	51.4	42.9	21.2	21.7	57.1	27.4	29.7
Beaufort	51,136	57.7	42.3	66.2	40.2	26.1	32.9	77.1	15.8
Colleton	27,622	48.3	51.7	52.8	25.6	27.3	46.8	22.5	24.3
Dorchester	32,276	48.9	51.1	64.4	31.8	32.5	35.1	16.8	18.3
Berkeley	56,199	49.2	50.8	69.5	34.5	35.0	29.7	14.5	15.5
Charleston	247,650	51.2	48.8	68.0	36.0	32.0	31.4	15.0	16.5
Georgetown	33,500	48.4	51.6	51.5	25.4	26.1	48.4	22.9	25.4
Horry	69,992	49.2	50.8	75.0	37.0	38.0	24.9	12.1	12.8
South Carolina	2,590,516	49.1	50.9	69.3	34.4	34.9	30.5	14.5	15.9

[a] "All races" includes 7,045 persons not classified as white or black.

SOURCE: U. S. Bureau of the Census, Decennial Census of Population.

TABLE E-4

Coastal County Resident Population
Rural and Urban, April, 1978

County	Total Population	Population per sq. mi.	URBAN Number	URBAN Percent[a]	RURAL Number	RURAL Percent[a]
Jasper	11,885	18.2	—	—	11,885	100.0
Beaufort	51,136	88.3	25,657	50.1	25,479	49.8
Colleton	27,662	26.3	6,257	22.7	21,365	77.4
Dorchester	32,276	56.7	3,839	11.9	28,437	88.1
Berkeley	56,199	50.6	25,745	45.8	30,454	54.2
Charleston	247,650	263.7	202,654	81.8	44,996	18.2
Georgetown	33,500	41.3	13,280	39.6	20,220	60.4
Horry	69,992	60.7	20,551	29.4	49,441	70.6
South Carolina	2,590,516	85.7	1,232,195	47.6	1,358,321	52.4

[a] Percentages may not equal 100 due to rounding.

SOURCE: U. S. Bureau of the Census, Decennial Census of Population, 1970.

TABLE E-5

Coastal County Housing Characteristics
1970

County	Total Year Round Housing Units	(Occupied Housing Units) Owner Occupied No. of Units	Owner Occupied Median Value (Dollars)	Renter Occupied No. of Units	Renter Occupied Median Contract Rent (Dollars)	Pop. per occupied unit	Vacant year round housing
Jasper	3,660	2,229	7,600	1,053	30	3.6	378
Beaufort	13,854	7,077	14,100	4,896	91	3.5	1,881
Colleton	8,537	5,547	9,300	2,229	30	3.5	761
Dorchester	9,718	6,657	13,600	2,116	59	3.6	945
Berkeley	16,165	10,362	14,400	4,178	90	3.8	1,625
Charleston	75,882	39,330	16,400	28,773	71	3.4	7,779
Georgetown	10,306	6,265	11,100	2,497	38	3.8	1,544
Horry	24,259	12,336	14,300	7,675	59	3.4	4,218
South Carolina	17,495[a]	10,553[a]	13,000	5,412[a]	50	3.4	1,530[a]

[a] Average for all 46 South Carolina Counties.

SOURCE: U. S. Bureau of the Census, 1970 Census of Population and Housing.

TABLE E-6

Coastal County Education

County	Public Schools[a]		Private Schools[a]		Median School Years Completed[b]		
	Number	Enrollment	Number	Enrollment	All Races	White	Black
Jasper	4	3,080	2	474	8.5	10.6	6.2
Beaufort	19	9,562	6	1,104	12.0	12.5	7.5
Colleton	17	6,445	3	900	9.3	10.6	6.8
Dorchester	16	11,435	4	810	11.1	12.2	6.9
Berkeley	28	20,515	5	708	10.7	11.9	6.8
Charleston	84	52,265	28	7,577	12.0	12.3	8.2
Georgetown	20	9,127	6	918	9.2	10.8	6.3
Horry	38	18,819	4	702	10.4	11.1	7.3
South Carolina	1,168	620,003	197[c]	44,111	10.5	11.4	7.6

[a] 1975 - 1976 scheduled year.

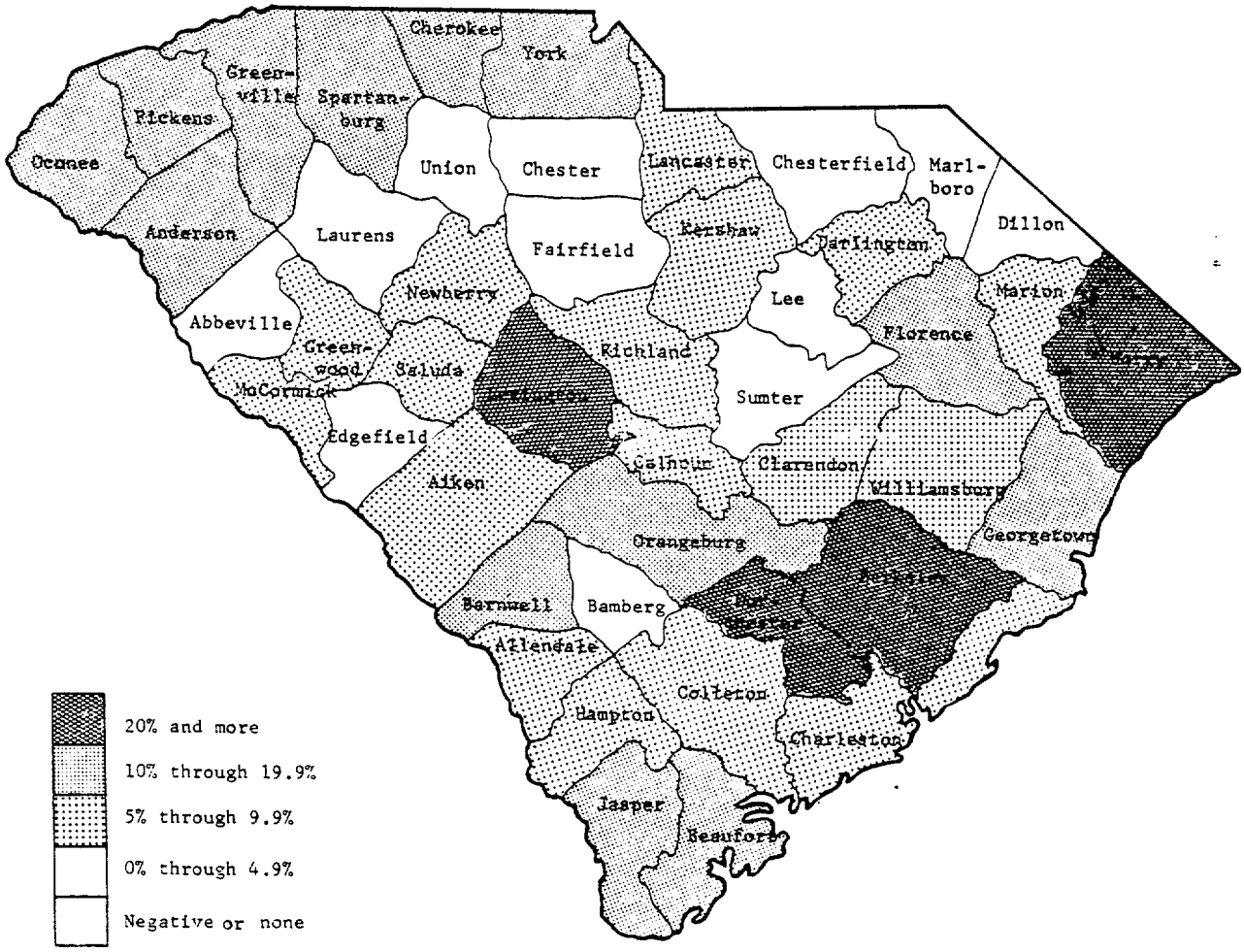
[b] by persons 25 years or older, based on 1970 census data.

[c] Those private schools from which reports were not received are not included.

SOURCES: S. C. Department of Education, **Annual Report of the State Superintendant of Education,** 1976; U. S. Bureau of the Census, Decennial Census of Population, 1970.

FIGURE E-1

PERCENT CHANGE IN SOUTH CAROLINA COUNTY POPULATION
APRIL 1, 1970 TO JULY 1, 1977 (PROVISIONAL)



Source: **South Carolina Statistical Abstract, 1978.**

Waccamaw Region

The Waccamaw Region, consisting of Horry and Georgetown Counties, is somewhat more developed than the Lowcountry Region, with most development centering around Myrtle Beach and Georgetown. Like the Lowcountry, the Waccamaw Region is dependent to a large degree on agriculture and the tourist industry, although there is far more manufacturing activity in this region than in the Lowcountry. (See Table F-2.)

Farm, Forest and Undeveloped Land

By far the greatest percentage of land in the Waccamaw Region is devoted to agricultural and forest uses or is left undeveloped. In Georgetown County approximately 97.6% of all land falls into this category, while in Horry County the figure is 94%. The greatest portion of this land is devoted to forestry. Georgia Pacific, International Paper Co., and Westvaco are engaged in profitable timber-producing ventures in the region. This land-use category also includes wetlands, which are particularly prevalent along the Waccamaw, Pee Dee and Santee Rivers. Beaches, dunes and vacant land all contribute slightly to the total in this category.

TABLE F-2

1977 Existing Land Use Inventory by County
Waccamaw Region
(In acres)

	Georgetown	Percent of County	Horry	Percent of County
Residential	9,245	2.0	13,956	1.9
Commercial	256	——	299	——
Industrial	1,803	.35	1,632	.22
Public or Semi-Public	1,022	.20	5,786	.78
Agricultural or Undeveloped	502,103	97.0	695,467	94.2
TOTAL	519,680	100.0	738,560	100.0

SOURCE: Waccamaw Regional Planning and Development Council, 1977.

Residential

There are nine incorporated areas within the Waccamaw Region, although most are small. All but three have (1975 estimated) populations of less than 3,000, and even the "large" cities are relatively small. Georgetown, with a population of 11,200, is the largest, followed by Myrtle Beach (10,370) and Conway (9,845) in Horry County. Conway, termed the "gateway to the Grand Strand," benefits greatly from its location on major thoroughfares and from the beach-bound tourist traffic which stops there. Georgetown is the county seat of Georgetown County and is also important as an industrial and historical site. Myrtle Beach is the focal point of the Grand Strand and is, in addition, one of the primary tourist centers in the Southeastern United States.

The majority of residential development consists of single-family units, although some condominium and apartment development has occurred. In addition, a number of mobile homes, most of which are on individual lots, are found in the region. The Grand Strand area, predictably, has a great deal of seasonal housing.

Residential development in Georgetown and Horry Counties is limited by a number of physical factors such as the large quantity of fresh and salt water present, poor drainage, and soil which is unsuited for foundations. Because of the drainage problems, septic tank use is curtailed; sewage treatment facilities are limited in rural areas, and as a result, housing construction is slowed.

Commercial - Industrial

There is very little commercial development **per se** in the Waccamaw Region; in fact, "commercial" is the smallest category of developed land. With several exceptions (notably Myrtle Beach) commercial activity is widely scattered so as to serve the widely scattered population of the region. Neighborhood stores and highway related development make up the bulk of all commercial centers. Industrial development is not only more prevalent, but more concentrated. It represents the third largest land-use category in the Waccamaw Region, yet is confined almost entirely to the City of Georgetown and environs. Such a situation results from the availability of adequate water and sewage facilities, public utilities, and rail and highway transportation systems.

Public and Semi-Public

As is the case in the rest of the coastal zone, much of the public and semi-public land in the Waccamaw Region is devoted to recreation. In Georgetown County the public is served by Brookgreen Gardens and Huntington Beach State Park as well as by a number of public boat landings and community recreational facilities. There are also a number of wildlife preserves and state game management areas. Finally, private facilities open to the public include Brown's Ferry Park, Rocky Point Park, and various golf courses. Horry County also has a number of golf courses, most of which are in the Grand Strand area. Myrtle Beach State Park is also located in Horry County.

Public and semi-public lands also include church-owned land and educational facilities. Churches and cemeteries make up the bulk of non-recreational public land in Horry County, followed by local parks, clubs and schools. Coastal Carolina College and Horry-Georgetown TEC are significant facilities in the Waccamaw Region as they generate secondary commercial and residential development in addition to providing educational opportunities.

Berkeley-Charleston-Dorchester Region

Of the three major divisions in the coastal zone, the Berkeley-Charleston-Dorchester Region is the most highly developed. The peninsular portion of the City of Charleston is almost totally developed and is the focal point of the region for government, health, education, financial, legal, commercial and cultural activities. The tri-county area is anticipating rapid growth in the coming years, making land-use planning an essential task of local government.

Agriculture and Resource Production

Nearly three out of every four acres in Charleston County are devoted to resource production, mainly in the form of forests or marshland. A great deal of this land lies within the Francis Marion National Forest. Dorchester County also has a large amount of marsh (25% of the total land area) and forestland, as well as a greater proportion of farmland than Charleston County. Most of the farms in Dorchester County are located in the northern half of the county, which is still predominantly rural. Berkeley County has less land available for development than either Charleston or Dorchester Counties - nearly 45% of the total land area is covered by water, wetlands, or National Forest. Of the country's total land area 13.2% is devoted to agricultural uses, which have long been the economic mainstay of the area. Primary products include tobacco, cotton, corn, soybeans, truck, timber, livestock and dairy products. As is the case in the rest of the Berkeley-Charleston-Dorchester Region, farms are becoming larger and fewer in number while the value of both investments and products sold is increasing.

Residential

As in the rest of the coastal zone, construction in the Berkeley-Charleston-Dorchester area is limited by soil type and drainage. Residential development accounts for approximately 35% of all developed land in Charleston County, 30.2% in Dorchester and 25.0% in Berkeley County. Berkeley County residential development is centered around the Goose Creek and Hanahan areas, with some growth in and around Moncks Corner. Resort areas at Lakes Marion and Moultrie have attracted a large number of mobile home parks. Residential development in Dorchester County centers around Summerville, is largely suburban in character and generally blends into the Greater Charleston area. Greater Charleston, of course, is the major population

F. COASTAL LAND USE

All of the coastal counties are beginning to develop comprehensive land-use plans. However, at the present time, existing land uses are of far greater importance than projected land uses, for in many cases they define the limits within which planning must occur. Land use in the coastal zone will be discussed in terms of the three regional planning districts — Lowcountry, Waccamaw and Berkeley-Charleston-Dorchester. Unfortunately, land-use categories are not strictly comparable for the three regions; therefore, care must be exercised in interpreting the land-use tables in this section.

Low Country Region

Land use in the Lowcountry (Beaufort, Colleton and Jasper Counties), perhaps more than in any other region, has been shaped by the natural setting. Because much of the region's land is covered by marsh or dense forest, development of any kind is precluded. Added to this constraint is the fact that the region is criss-crossed by waterways, making transportation difficult. Thus, only agricultural enterprises (particularly timber farming) have been possible until very recently, when improved accessibility made economic development possible.

Agriculture and Forestry

Approximately three-fourths of the land in the Lowcountry Region of the coastal zone is devoted to agricultural uses. Over 70% of the land in Colleton and Jasper Counties is timberland, and even Beaufort County, the most developed of the three, has over 40% forested land. Because of the extensive development of forestry, a number of related businesses have located in the vicinity. Agricultural development depends to a large degree on factors such as soil conditions, topography and drainage, as well as transportation. Unfortunately, some areas which are suitable for agricultural development are also prime sites for urbanization, leading to potential conflicts between interest groups.

Residential

The Lowcountry Region is characterized by a large number of municipalities with very small populations. In fact, with the exception of three, all of the region's municipalities had populations under 2,500 in 1970. Port Royal's 1970 population was 2,865, while Walterboro and Beaufort are considerably larger, with 1970 populations of 6,257 and 9,434 respectively.

The Beaufort-Port Royal area is the largest industrial-population center in the region and has the greatest potential for future growth. Walterboro is also a potential center for rapid growth, as is Bluffton. Bluffton's potential, however, is dependent upon the ultimate development of the Victoria Bluff area as a deep water port. (The Victoria Bluff site has been called "the last natural deep water port on the east coast," but because of its extraordinary beauty it is also a prime site for preservation.) The completion of I-95 has opened the way for tourist-related development in the towns of Ridgeland, Hardeeville and Yemassee, although whether this actually occurs remains to be seen.

Commercial and Industrial

Because of the importance of agricultural and forestry-related ventures, commercial and industrial development is limited. What little there is occurs primarily on the outskirts of the urban centers of Beaufort-Port Royal and Walterboro. Urban development related to the tourist industry has grown rapidly on several of the sea islands in recent years. Hilton Head and, to a lesser degree, Fripp Island are becoming prominent resort areas.

The Port Royal Sound area has been designated as the Growth Center for the Lowcountry Region, meaning that it will be the focal point for economic stimulus in the area. Thus, the Port Royal Sound area should provide new jobs and better services - commercial, industrial, educational and public. The City of Beaufort is at the hub of this activity, having the necessary population and services required by business. In the past four years, nine firms have located within the Growth Center, creating 500 new jobs. (The source of this information is **The Lowcountry Overall Economic Development Program Update: 1976-1980**, prepared by the Low-Country Council of Governments.)

Public and Semi-Public

The Lowcountry Region has a great deal of public and semi-public land in three major categories: military, water and wetlands, and recreation, open-space and historic areas. All three of the area's military installations are in Beaufort County. They are the Parris Island Marine Base, the U.S. Marine Air Station and the U.S. Naval Hospital in the City of Beaufort. Although the hospital has a negligible effect on land use patterns, the remaining two installations are significant land users.

While only 8.5% of Colleton and 8.8% of Jasper County consist of wetlands, Beaufort County's wetlands cover 36.1% of the total land area. Obviously then, wetlands are a significant factor in development, especially in Beaufort County. Because they are extremely sensitive to disruption from development and attendant pollution, wetlands require special planning and preservation efforts so that their ecological, aesthetic and recreational values remain unimpaired.

The final category of public lands is a large and diverse one, encompassing recreation, open space, and historic sites. Many of the latter are centered around the Beaufort and Port Royal areas since that is where some of the earliest colonization took place. Beaufort boasts a specific district, Historic Beaufort, designed to protect sites of special historic significance within the city.

Open spaces within the region are extensive, due to the vast expanses of wetlands, timberland and land in agricultural production. Many large private land holdings have been designated as wildlife refuges or game management areas, adding to the quality as well as quantity of open space.

There are two state parks in the region: Hunting Island State Park in Beaufort County and the Colleton Wayside State Park in Colleton County. In addition, the James Webb Wildlife Refuge and the Savannah River Wildlife Refuge in Jasper County are publicly owned. Nearly thirty public boat landings and a number of privately owned concerns augment the recreation potential of the area.

TABLE F-1

1977 Existing Land Use Inventory by County
Low Country Region
(In acres)

	Beaufort	Percent of Total	Colleton	Percent of Total	Jasper	Percent of Total
Residential	20,160	5.4 %	9,734	1.4 %	5,326	12.7 %
Commercial	602	.16%	1,670		1,555	.37%
Industrial	798	.21%	576	.09%	403	.10%
Forestry	139,787	37.2 %	466,757	69.5 %	311,544	74.7 %
Agriculture	54,993	14.6 %	125,150	18.6 %	48,599	11.6 %
Public	21,160	5.6 %	8,128	1.2 %	9,535	2.3 %
Wetlands	135,816	36.1 %	56,893	8.5 %	36,673	8.8 %
Water	2,260	.60%	3,029	.45%	3,645	.87%
TOTAL	375,576	100 %	671,937	100 %	417,280	100 %

SOURCE: Lowcountry Council of Governments, 1977.

center in the region. In addition to the cities of Charleston and North Charleston, significant population centers are located in resort developments on some of the neighboring sea islands.

Commercial and Industrial

The center of industrial development in the region is located along the deep water channels of the Cooper River on the Charleston peninsula. North Charleston is the largest employment source in the industrial area. In all, industrial/manufacturing, transportation, communication and utilities, and trade and services make up 4.6% of Charleston County's total land area. The corresponding figure for Dorchester County is 2.8%, while in Berkeley it is only 1.9%. Commercial uses in Berkeley County are concentrated in the Goose Creek, Hanahan and Moncks Corner vicinities, while industry is more scattered. Industrial usage in Dorchester County, on the other hand, is concentrated in the northwest portion of Summerville; commercial and service activities are also concentrated primarily in Summerville and St. George. In all cases, commercial activity tends to follow transportation corridors.

Public and Semi-Public

Federal, State, municipal and county government entities own approximately 22% of all Charleston County land. This unusually high total can be explained by the presence of the Francis Marion National Forest, the Cape Romain National Wildlife Refuge, State-managed Capers Island and the Santee Coastal Reserve, military installations, a number of educational facilities including the College of Charleston, The Citadel, and the Medical University, and, finally, the State Ports Authority property.

Both Berkeley and Dorchester Counties lack a sufficient number of recreational facilities, particularly in rapidly growing urban areas. Thus, Dorchester County's .8% and Berkeley County's .3% of public and semi-public properties consist largely of schools, churches, libraries and the like. Berkeley County has a great deal of federally-owned land, some of which is as yet undeveloped.

TABLE F-3

1974 Existing Land Use — Berkeley County

DEVELOPED LAND

Land Use	Acreage	Percentage of County	Percentage of Developed Land Area
Residential	8,957.4	1.27	24.75
Commercial	694.2	0.10	1.92
Industrial	3,395.7	0.48	9.38
Public & Semi-Public	2,116.1	0.30	5.85
U.S. Government	12,250.0	1.74	33.85
Transportation	8,775.6	1.25	24.25
			100.00

UNDEVELOPED LAND

Land Use	Acreage	Percentage of County	Percentage of Developed Land Area
Agricultural	92,811.0	13.18	X
Marshes & Swamps	107,700.0	15.30	X
National Forests	143,500.0	20.38	X
Water Bodies	66,300.0	9.42	X
Vacant	257,500.0	36.58	X
	704,000.0	100.00	

SOURCE: Berkeley-Charleston-Dorchester Regional Planning Council. Based upon field survey, 1974, and resulting Existing Land Use Maps.

TABLE F-4

1974 Existing Land Use — Charleston County

Type of Use	Acres	% of County
Productive Land	514,300	77.8
Vacant Land	86,200	13.0
In-Land Water	60,200	9.1
Total	660,700	100.0
Productive Land	514,300	77.8
Developed	66,700	10.0
Resource Production	447,600	67.7
Developed Land	66,700	10.1
Residential	23,800	3.6
Industrial/Manufacturing	1,800	0.3
Trans., Comm. & Utilities	14,200	2.1
Trade & Services	14,400	2.2
Social & Cultural	12,500	1.9
Resource Production	447,600	67.7
Land Area	301,700	45.6
Marsh	145,900	22.1

SOURCE: **Land Use Survey and Analysis, Charleston County, S.C.**, BCDRPC, 1975.

TABLE F-5

1974 Existing Land Use — Dorchester County

Land Use	Acreage	Percentage of County	Percentage of Developed Land Area
Developed Land			
Residential	5,719.0	1.57	30.23
Commercial	473.0	0.14	2.50
Industrial	818.7	0.22	4.33
Public & Semi-Public	2,876.0	0.80	15.20
Transportation	9,030.0	2.48	47.74
Undeveloped Land			
Marshes and Swamps	91,986.4	25.26	——
Agricultural	65,050.0	17.86	——
Vacant	188,186.9	51.67	——
	364,140.0	100.0	100.0

SOURCE: Berkeley-Charleston-Dorchester Regional Planning Council. Based upon field survey, 1974, and resulting Existing Land Use Maps.

chapter II
coastal planning process

A. THE SOUTH CAROLINA COASTAL MANAGEMENT ACT

"An Act To Establish The South Carolina Coastal Council And Provide For Its Powers And Duties For The Protection And Improvement Of Coastal Tidelands And Wetlands Under A Coastal Zone Management Plan; Provide For Enforcement Of Policies Of The Council And Penalties For Violations; And Authorize Legal Proceedings For The Determination Of Tidelands Properties." (Act 123 of the 1977 South Carolina General Assembly.)

Introduction

This is the title to South Carolina's coastal management law. The Coastal Management Act recognizes the value, variety and richness of South Carolina's coastal resources and, at the same time, the diversity of uses and demands that may threaten these resources. The need for a State effort to manage the wise conservation and use of these valuable resources of the coastal zone is the major finding of the General Assembly and sets the stage for the management program outlined in the Act.

Specific policies and directives to guide implementation of the management program are based on one general policy, that being "to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State." (§ 2(A)) In general, the policies call for the development of coastal resources in a planned and environmentally-sensitive manner through implementation of a comprehensive tidelands protection program and through coordination of comprehensive programs of other levels of government (municipalities, counties, regional agencies, other State agencies, and Federal agencies).

In the following discussion, the basic provisions of the S.C. Coastal Management Act are explained.

S.C. Coastal Council

The S.C. legislature created the South Carolina Coastal Council to implement the Coastal Management Act and to initiate the coastal management effort for the people of the State. The Council is composed of eighteen members. Eight are chosen by the goerning bodies of the eight counties which comprise the coastal zone, each county having one representative. Six members are chosen from the six congressional districts of the State by the members of the General Assembly who represent those districts, each district having one chosen by the Senate Fish, Game and Forestry Committee and one appointed by the President of the Senate, and two members of the House of Representatives, appointed by the Speaker of the House, are the ex-officio members. Council members serve four-year terms, except for the ex-officio or legislative members, whose terms are coterminous with their terms as members of the General Assembly.

The Coastal Council is granted a variety of powers and duties to enable formulation and implementation of a comprehensive coastal management program. The employment of a staff, including professionals in administration, biology, planning, civil and hydrological engineering, environmental law and environmental engineering, is the first basic power. The Council may apply for, accept and spend money from public and private sources to support activities undertaken to implement the Coastal Management Act and the Federal Coastal Zone Management Act of 1972. Rules and regulations may be promulgated by the Council to carry out the provisions of the State Act. The Council has the duty of administering and enforcing the provisions of the Act and its own rules and regulations through orders or by seeking enforcement through the courts. Other duties include serving as the coordinating State agency for any program of tidal surveying conducted by the Federal government and coordinating the efforts of all public and private agencies engaged in making tidal surveys of the coastal zone. The Council also is directed to encourage and promote the cooperation and assistance of State agencies, regional councils of government, local governments, Federal agencies and other interested persons. Additional specific powers and duties are granted to the Council to carry out the management program and permit program.

The Coastal Management Program

The Coastal Management Act outlines the essential elements of a coastal management program based on comprehensive planning and coordination of existing resource management and regulatory programs. The

State legislation requires that the Council hold public hearings or community forums and afford participation in the development of the management program to all interested citizens, local governments and relevant State and Federal agencies. The cooperation of State and local agencies in the administration and enforcement of the Act is also mandated.

The scope of the coastal management program and of the Coastal Council's authority is based on definitions of the geographic areas and specific resources which must be considered in development of this program. Two types of management authority are granted in two specific areas of the State. The Council has direct control through a permit program over critical areas, which are defined as coastal waters, tidelands, beaches and primary ocean-front sand dunes. Direct permitting authority is specfically limited to these critical areas. Indirect management authority of coastal resources is granted to the Council in counties containing one or more of the critical areas. This area is called the coastal zone and consists of the following counties along the South Carolina coast: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry and Jasper. The coastal zone includes coastal waters and submerged bottoms seaward to the State's jurisdictional limits, as well as the lands and waters of the eight coastal counties.

Upon approval by the General Assembly and the Governor, the management program which is developed as outlined by the Act becomes the final management program for the State. The policies, rules and regulations, and other tools of the management program thus become official State policies which will manage the use of the State's coastal resources. Section 7 (A) of the Act requires State and local agencies to exercise their authority in accordance with these policies.

The mandate to the Coastal Council includes several specific elements which should be considered in program development. An inventory and designation of areas of critical State concern, including significant natural and environmental, industrial, port and recreational areas is mentioned. An identification of coastal resources and uses of land in the coastal zone and an evaluation of the quantity, quality and capability for use now and in the future is another element outlined in the Act. The Coastal Council must also consider the use of critical areas for nature-related activities such as aquaculture, mariculture, game and non-game habitat protection projects, endangered flora and fauna protection projects and waterfowl and wading bird management.

All of the lands and waters of the coastal zone are to be considered in developing this comprehensive management program. The Council is directed to gather necessary expertise and knowledge of the State's coastal resources, their use, and the effects of their use. The Council must then establish broad guidelines on priority of uses in critical areas and determine present and potential conflicts in the use of coastal resources. The Council must guide resolution of such conflicts through the development of coastal resource policies and criteria.

The management program as developed by the Council must provide for the consideration of the local, regional, State and national interest in the siting of energy, transportation and other public facilities. A review process of the management program that involves local, regional, State and Federal agencies and interested citizens must be developed, as well.

Specific management authority concerning several resources and activities is granted to the Council by the Coastal Management Act. The Council is directed to manage those estuarine and marine sanctuaries designated by the U.S. Secretary of Commerce. The Act mandates the establishment, control and administration of pipeline corridors by the Council, and control over the location in critical areas of such pipelines used for transporting fuel is also the responsibility of the Council. In coordination with the South Carolina Wildlife and Marine Resources Department, the Coastal Council must monitor the waters of the State for oil spills and report spills to the South Carolina Department of Health and Environmental Control, the United States Coast Guard and the Environmental Protection Agency. The Council must direct the State clean-up operations of oil spilled in the State's territorial waters in coordination with the Department of Health and Environmental Control. The Department of Health and Environmental Control and the Coastal Council must also work together in the planning and review of existing water quality standards and stream classifications in the coastal zone.

An important feature of the management program which is specifically outlined is the development of comprehensive beach erosion control policies. The Act mandates research on the effects of erosion control methods and the dynamic drift systems of sand and sand dunes and identification of critical erosion areas. The Council is granted permit authority for erosion control structures it deems adverse to the public interest. The Act makes the Coastal Council responsible for the management of the State's beach resources and the

activities which affect those resources.

The South Carolina States Ports Authority is directed to develop a management plan for port and harbor facilities and navagation channels. Upon approval of the plan by the Coastal Council, the management plan for the ports of the State will become part of the coastal management program. The plan must include a designation of areas appropriate for use by public and private port and harbor facilities as well as military and naval facilities.

In addition to the mandate for State and local agencies to cooperate in the development, administration and enforcement of the Coastal Management Act, the legislation provides a means for local governments to submit local plans and regulations for the critical areas for Council consideration of whether they are consistent with the management program. The Council may also offer technical assistance and support to local and regional governments in developing local plans and regulations which better manage coastal resources.

The Permit Program

A fundamental aspect of the coastal management program is the authority granted to the Coastal Council to issue or deny applications for permits for alterations of critical areas. This authority is exclusive to the Coastal Council which is directed to issue rules and regulations to administer the permit process and is mandated to seek public involvement in the development of these rules and regulations. The general policies declared in the Coastal Management Act serve to guide development of this permit program, and specific considerations serve to guide the Council's evaluation of each permit application.

The Act requires Council consideration of the effects of proposed alterations to the critical area of the production of fish, shrimp, oysters, crabs or any marine life or wildlife or other natural resources. The effects on endangered or rare species habitats must also be considered. The Council must weigh the extent of the effects of proposed alterations on public access to tidal and submerged lands, navigable waters, beaches and archeological sites in the coastal zone. The effects of proposed alterations on the flow of navigable waters and the extent to which erosion, shoaling of channels or areas of stagnant water would occur must be considered by the Council in decisions on permit applications. The extent to which the activity requires a waterfront location and the extent of the economic benefits as compared with benefits from preservation in a natural state are other factors to be weighed by the Council. Adverse environmental impacts which cannot be avoided through reasonable safeguards must be considered in deciding whether or not an alteration will be permitted in the critical areas.

The legislation provides applicants or affected parties with a permit appeal process. Direct appeals are made to the Coastal Council. Appeal to the circuit court of the county where the project would be developed is provided as a last resort.

The Council is granted authority to issue orders to seek court action to enforse the rules and regulations and any condition made part of a permit approval. The legislation has authorized the Council or any person adversely affected by any violation of the Act to bring suit in the circuit court of the county where the violation occurs. For such violations that destroy critical areas, the Council may complete restoration of the area and then sue in the appropriate circuit court. Violations of the Act are deemed misdemeanors and are punishable upon conviction of the violation, by imprisonment of not more than six months or by a fine of not more than five thousand dollars, or both, for the first offense. Imprisonment for one year or a fine of ten thousand dollars, or both, are applicable to each subsequent offense.

Determination of Ownership

The Coastal Management Act provides persons claiming an ownership interest in tidelands with a process to determine the validity of such claims. A person may institute a court action against the State of South Carolina for the purpose of determining such claims, and a jury trial may be demanded if desired. Nothing contained in the Act shall be construed as changing any rights or interests in any tidelands. The only responsibility of the Coastal Council under this provision is to publish the outcome of such suits in the State Register.

B. THE FEDERAL COASTAL MANAGEMENT PROGRAM

The Federal Coastal Zone Management Act (P.L. 92-583) was signed into law in October, 1972, in response to a growing recognition of the importance of and the growth pressure on the coastal zone of the United States. The results of a series of studies on coastal areas and their environment and resources alerted Congress to the need for legislation to promote a comprehensive approach to wise management of these resources. Amendments to the Act in 1976 (P.L. 94-370) substantially expanded and refined the coastal program.

The Congressional findings of this Act begin by stating that, "There is a national interest in the effective management, beneficial use, protection, and development of the coastal zone." (Section 302(a)) The diversity of coastal zone resources and the increasing pressure from competing demands for their use are also emphasized. To achieve the national policy of preserving, protecting, developing, and where possible, restoring or enhancing coastal resources (§ 303), Congress selected the following approach:

> The key to more effective protection and use of the land and water resources of the coastal zone is to encourage the states to exercise their full authority over the lands and waters in the coastal zone by assisting the states, in cooperation with Federal and local governments and other vitally affected interests, in developing land and water use programs for the coastal zone, including unified policies, criteria, standards, methods, and processes for dealing with land use decisions of more than local significance. (Section 302(h))

The Act authorizes Federal grants-in-aid, administered through the Secretary of Commerce. The National Oceanic and Atmospheric Administration (NOAA), Office of Coastal Zone Management (OCZM) has been delegated the responsibility to guide this program of grants to the coastal states.

The Governor of each eligible state (30 states bordering the Atlantic, Pacific, Gulf of Mexico and Great Lakes, and four U.S. territories) designates a state agency to take the lead role in developing a coastal program. Broad, general guidelines for the framework of these programs are expressed in Section 305 of the Act. Further guidance in development of a coastal program is offered in regulations from OCZM, dated March 28,1979, (15 CFR Part 923, **Federal Register**44(61):18590-18624)which explain the procedure for a state to qualify, the policies which must be followed in drafting the state program, and the requirements for a state program to receive approval.

During its planning process each state must address certain general items, specified in § 305 of the Act.

1. Identification of coastal zone boundaries.
2. Inventory and designation of areas of particular concern.
3. Guidelines on priority of uses in particular areas.
4. Permissible land and water uses that could have direct and significant impact on coastal waters.
5. Management proposals to control these uses.
6. Organizational structure to implement the program.

Cooperation and consultation with Federal, state and local units of government, and opportunity for public input are also required.

It is significant to note, that while guidelines and certain minimum requirements are provided, OCZM allows flexibility and encourages each state to develop its own approach to meet the needs and coastal resource problems of that particular state. Also, there are no regulatory powers or sanctions associated with the Federal Coastal Zone Management Act - it is a voluntary program providing financial assistance to states which choose to participate.

Once a state program is completed, it is submitted to OCZM for approval. Upon approval, the state becomes eligible for funding, authorized in Section 306 of the Act, to implement or administer the state coastal program.

The requirements which state programs must meet in order to receive program approval (in other words, the guidelines by which each state effort is reviewed by OCZM) have been revised and issued in final form in March, 1979 (15 CFR 923, **Federal Register** 44 (61): 18590-18624). In addition to program approval require-

ments, they include the procedures for submission of the state program, qualification to receive 306 administrative grants, and policy guidance for administration of the approved program.

The Federal Coastal Zone Management Act stipulates that Federal activities affecting the coastal zone shall be, to the maximum extent practicable, consistent with an approved state coastal management program. This provision of Section 307, is referred to as the "Federal consistency" requirement. Section 307 further provides for voluntary mediation guided by the Secretary of Commerce in the event of disagreements between a Federal agency and a state with respect to administration of the state's program.

Section 308 of the Act provides for a Coastal Energy Impact Program (CEIP) to provide funding for states and local governments to deal with the impacts resulting from development of energy resources in the coastal zone. There are several types of Federal funding available under this program:

- Formula grants based on specific impacts of Outer Continental Shelf (OCS) energy activity.
- Planning grants to study and plan for economic, social and environmental impacts associated with energy facilities.
- Loans and bond guarantees to States and local governments to improve public facilities and services needed as a result of energy activity (plus provision for grants if they are unable to meet the loan or bond obligations because the energy activity does not generate sufficient tax revenues).
- Grants for mitigating unavoidable loss of environmental or recreational resources.

Section 309 enables states to obtain grants, to coordinate, study, plan, and implement interstate coastal management programs. Section 310 deals with Federal research programs and grants to states for studies and training that will support coastal management. Finally, Section 315 of the Act authorizes grants for acquisition of lands for access to beaches and other public recreational, environmental or cultural resources; for preservation of islands; and for the estuarine sanctuary program.

chapter III
management of
coastal resources

A. GOALS AND OBJECTIVES

The policy of the State of South Carolina in the Coastal Zone Management Act of 1977 is to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State.

In an effort to guide the State's coastal management program in keeping with this policy, the following goals and objectives have been developed by the South Carolina Coastal Council:

Goal:

Development of a management program that will achieve a rational balance between economic development and environmental conservation of natural resources in the coastal zone of South Carolina.

Objectives:

1. To protect and conserve coastal land and water areas of a significant resource value, including those of scientific, geologic, hydrologic and biologic importance.
2. To encourage and assist in research pertaining to coastal natural resource systems and economic and social impacts in order to develop a comprehensive data base to aid in making rational decisions.
3. To protect and sustain the unique character of life on the coast that is reflected in its cultural, historical, archeological, and aesthetic values.
4. To promote increased recreational opportunities in coastal areas and increased public access to tidal waters in a manner which protects the quality of coastal resources and public health and safety.
5. To develop and institute a comprehensive beach erosion policy that identifies critical erosion areas, evaluates the long-term costs and benefits of erosion control techniques, seeks to minimize the effects on natural systems (both biological and physical), and avoids damage to life and property.
6. To encourage new coastal development to locate in existing developed areas, capable of accommodating additional growth, and in areas determined to be more environmentally and economically suitable for development.
7. To resolve existing use conflicts and minimize potential conflicts among activities through improved coastal management reflecting the public's desires, natural resource capacity, and expected costs and benefits.
8. To encourage new water-dependent activities to locate in shoreline areas where adverse social, economic and environmental impacts can be minimized and to encourage the inland siting of facilities which are not water-dependent.
9. To promote employment of thorough assessments of probable energy benefits, positive and negative economic effects and probable social and environmental impacts as the basis for decisions on development of energy resources; and to ensure that affected local governments obtain sufficient financial and technical assistance to adequately cope with these impacts.
10. To support the wise commercial development of harbors, rivers and waterways for trade and commerce in locations and using methods which maintain the natural environmental integrity of the coastal region.
11. To protect and, where possible, to restore or enhance the resources of the State's coastal zone for this and succeeding generations.
12. To develop a coastal program with flexibility for revision and improvement with the evolution of increated knowledge and experience in managing coastal resources.

Goal:

To develop a permitting system for activities in critical areas of the coastal zone (beaches, primary sand dunes, tidelands, and coastal waters) that will serve to implement the goals and objectives of the management program and promote the best interests of all citizens of South Carolina.

Objectives:

1. To develop and implement a streamlined and simplified permitting system for activities in critical areas which maintains the integrity and purpose of the management program.

2. To include conditions and stipulations in permits for activities approved for critical areas in order to minimize negative impacts on water quality, marine productivity, beach and shoreline stability, and other environmental aspects.
3. To give full consideration to the Rules and Regulations for Permitting, as promulgated by the Coastal Council, in thorough and comprehensive reviews of all permit applications.
4. To specify environmentally suitable methods of design, construction and development in critical areas and assist permit applicants to incorporate these environmentally suitable alternatives in their proposals.

Goal:

To promote intergovernmental coordination and public participation in the development and implementation of the coastal management program for South Carolina.

Objectives:

1. To provide full opportunity for participation by relevant Federal, State, and local government agencies, concerned organizations, and the general public in the development, implementation, and updating of the Coastal Management Program.
2. To increase public awareness and encourage public participation in the development of the Coastal Council's management program and decisions made pursuant to that program.
3. To strengthen the planning and decision-making capabilities of cities and counties in the coastal zone through provision of financial, technical and other assistance, and provide for coordination of local comprehensive plans and ordinances with the policies and rules and regulations of the coastal management program.
4. To promote coordination and use of existing State programs to minimize duplication of efforts, conflicting actions and permit processing delays, and to achieve coastal management objectives and policies.
5. To provide adequate representation of the interests of the State of South Carolina in Federal agency decisions and actions affecting the coastal zone.

B. COASTAL ZONE BOUNDARY

The Federal Coastal Zone Management Act and the guidelines promulgated thereunder require 4 elements to a state's coastal zone boundary:

1) inland boundary
2) seaward boundary
3) areas excluded from the boundary
4) interstate boundaries

(Sections 923.30-923.34, **Federal Register**, Volume 44, No. 61 March 28, 1979)

The South Carolina Coastal Council employs a two-tier approach to management of activities having a direct and significant impact on coastal waters. The "critical areas" will receive more intensive attention through a direct permitting system while the remainder of the coastal zone will be managed through cooperation with other State and local agencies.

The South Carolina coastal zone is defined in Section 3(B) of the South Carolina Coastal Management Act of 1977 as:

> (A)ll coastal waters and submerged lands seaward to the State's jurisdictional limits and all lands and waters in the counties of the State which contain any one or more of the critical areas. These counties are Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper and Georgetown.

The critical areas are defined in Section 3(J) as coastal waters, tidelands, beaches and primary oceanfront sand dunes. The meaning of each of these four terms is detailed in Section 3 of the Act as shown in Appendix B, and also in the Glossary.

With biological field surveys and aerial photography, the Council has found the point on the upper reaches of the estuarine systems where tideland vegetation changes from predominately brackish to predominately fresh and has established a coastal water and tideland boundary using the nearest recognizable physical features within the area. This boundary is graphically depicted on the maps in the Appendices and verbally depicted in Appendix K(30-10) with a further discussion of the basis for its determination in Appendix L.

For beaches and sand dune critical areas, the Council employs the definition found in the Act in making a case-by-case determination of the critical area boundary.

The seaward boundary of the coastal zone is the State's jurisdictional limits, the three mile outer limit of the United States' territorial sea. The inland boundary is the inland boundary of each of the eight counties having critical areas. These lines are described in Title 4, Chapter 3 of the Code of Laws of South Carolina (1976).

Within the South Carolina coastal counties there is considerable Federally controlled land excluded from the coastal zone boundary under Section 304(1) of the Federal Coastal Zone Management Act of 1972, as amended. The Appendices contain a site-specific map indicating, under current OCZM interpretation, those lands which are "by law subject solely to the discretion of or which is held in trust by the Federal government, its officers or agents and are, as such, to be excluded from the coastal zone." Chapter V, addressing Federal government coordination, provides more specific discussion of Federally excluded lands.

The interstate boundaries separating South Carolina from Georgia, on the south, and North Carolina, on the north, are described in Section 1-1-10 of the Code of Laws of South Carolina (1976). The State of North Carolina also utilizes the two-tier approach to management, as described in the Final Draft, The North Carolina Coastal Plan (November, 1977). The first tier Areas of Environmental Concern include Coastal Wetlands, Estuarine Waters, Public Trust Areas, Estuarine Shorelines, Ocean Beaches, Frontal Dunes, Ocean Erosion Areas, Inlet Lands, Small Surface Water Supply Watersheds, Public Water Supply Well-Fields and certain Fragile Natural Resource Areas. These areas closely coincide, in scope, with the critical areas. In addition the North Carolina coastal area includes Brunswick County, the coastal county adjacent to the South Carolina-North Carolina line. Therefore, similar regulatory programs will be employed on either side of the border, and it appears that the North Carolina coastal zone boundary is compatible with that of South Carolina.

In Georgia the Coastal Resources Division of the Department of Natural Resources (the Department) is

charged with developing a statewide coastal management program. At present the Department administers the Coastal Marshlands Protection Act of 1970, an Act which requires permits for alterations in marshalnds. Marshlands are statutorily defined by tidal fluctuation as areas below the ordinary high tide line and functionally as that point below which ordinary cultivation cannot take place. The jurisdictional scope of the Department for permitting in marshlands is similar in scope to the tidelands and coastal waters critical areas of Council jurisdiction. The State of Georgia has not completed a draft management program. The Department is charged with developing the program, and at present the Department is defining the inland boundary of the coastal zone by rail rights-of-way, highway rights-of-way and county lines. Adjacent to the South Carolina-Georgia line, the Chatham County-Effingham County line is the inland boundary. Chatham County appears to include all areas of direct salt water influence. Although the geographical extent of the Georgia Coastal Zone is less than that of the South Carolina Coastal Zone along the state border, the Council considers the two boundaries to be compatible in coordinating interstate activities.

C. USES OF MANAGEMENT CONCERN

1. CONSIDERATION OF NATIONAL INTEREST

Section 306(C) (8) of the Federal Coastal Zone Management Act and Section 923.52 of the coastal zone management development and approval regulations (**Federal Register**, Vol.44, No. 61, March 28,1979)require that the national interest receive adequate consideration in planning for and siting of facilities which are necessary to meet requirements more than local in nature. This requirement calls for an identification of the national interest associated with facilities that may be required in the South Carolina coastal zone to meet requirements more than local in nature, for an identification of the national interest in the conservation of coastal resources potentially affected by such facilities, and for a description of the process which allows consideration of the national interest in the implementation of the coastal management program. In addition, Section 8 (B) (6) of the South Carolina Management Act requires the Coastal Council to provide for adequate consideration of the national interest in developing and implementing the coastal management program.

Section 302 of the Federal Coastal Zone Management Act states that:

(a) There is a national interest in the effective management, beneficial use, protection, and development of the coastal zone.

(b) The coastal zone is rich in a variety of natural, commercial, recreational, ecological, industrial, and esthetic resources of immediate and potential value to the present and future well-being of the Nation.

Thus, the primary focus for the consideration of national interest is the balancing between the provision of facilities which are in the national interest and the protection of coastal resources which are also in the national interest.

Where the national interest in the consideration of facilities and in resource conservation conflict, the coastal management program resolves the conflict through the policies contained in the Resource Policies (Chapter III, C, 3) and the rules and regulations applicable to the specific facility or associated activity. These potential conflicts were considered in the development of the Coastal Council's policies and regulations.

The regulations and policies for activities in the coastal zone embody considerations of the relative values of resources and their uses in particular ways. With energy facilities and other facilities or activities in which there is a national interest, the value of the facility is evaluated in relation to the value of the coastal resources affected by such facilities or activities. The regulations and policies balance these values within the framework of the purpose of the management program. Consideration of the national interest for particular types of facilities and resources is thus reflected in the applicable policies and regulations governing activities associated with such facilities or resources.

The identification of facilities and coastal resources which are in the national interest was guided by Federal laws and regulations; executive policy statements; Federal agency studies and reports; interaction between the Coastal Council and staff; interstate agency information and plans; and response to a National Interest-Federal Consistency Questionnaire.

The following concerns are considered by South Carolina to be of such long-range, comprehensive importance as to be in the national interest:

1. National Defense
2. Energy Production and Transmission
3. Maintenance of Navigation
4. Coastal Resources:
   a) Significant fish species and habitats
   b) Threatened wildlife habitats
   c) Public recreation areas (for example, shoreline access and undisturbed natural areas)
   d) Drinking water supply
   e) Historical, cultural and archeological sites
   f) Barrier islands
   g) Wetlands

The process for considering the national interest in program implementation is the direct permitting authority and the review and certification process of the Coastal Council. Applications for facilities or activities in critical areas are placed on public notice, which Federal agencies also receive. Coastal Council review of these applications will consider the national interest as reflected in the regulations and policies, and will alsc consider the comments from the public and from Federal agencies concerning national interests involved in making a decision on the permit application. National interest consideration may also be raised for Coastal Council deliberation by Federal agencies at any time. Such deliberation may result in changes or additions to Coastal Council regulations or policies. Applications for permits from other agencies in the coastal zone are reviewed by the Coastal Council for certification of compliance with the coastal management program. The national interest is considered during this review, and the policies embodying national interest considerations must be complied with by the proposed facility or activity to receive certification.

MANAGEMENT FOR FACILITIES AND RESOURCES IN THE NATIONAL INTEREST

National Defense

All of the Resource Policies (Chapter III, C, 3) of the management program apply to national defense facilities if such facilities are not on Federal lands, which are excluded from the program. The Resource Policies of particular interest for national defense are:

Transportation
a) Ports
b) Roads and Highways
c) Airports
d) Railways

Dredging
a) Dredging
b) Dredge Material Disposal

Energy Production and Transmission

The energy facilities and activities which are considered to be in the national interest are all those defined in Section 923.52 (c) of the coastal zone management development and approval regulations (**Federal Register**, Vol. 44, No.61, March 28,1979) and include, for example, electric generating plants, petroleum refineries and associated facilities, gasification plants, facilities associated with liquified natural gas, uranium enrichment or nuclear fuel processing facilities, and oil and gas facilities. The Energy Planning Process (Chapter IV, B) fully discusses the regulatory authority, policies and planning process for facilities and activities associated with energy production and transmission.

Maintenance of Navigation

The vital importance of maintaining navigation has been stressed by numerous aspects of the program document. Navigation channels are identified both as Areas of Special Resource Significance and as Geographic Areas of Particular Concern. Navigation is also a consideration the Council must make in all permit decisions. Under Section 15(A)(2) of the S.C. Coastal Management Act, the State Ports Authority must review and certify to the Council that permit applications in the critical areas would not unreasonably restrict navigation before the Council may issue the permits. Resource Policies for Transportation, Dredging and Marine-Related Facilities specifically address navigation.

Coastal Resources

Significant Fish Species and Habitats

The Resource Policies for Recreation and Tourism, Marine-Related Facilities, Wildlife and Fisheries Management and the Living Marine Resources section (Chapter IV, E) of the management program describe significant fish species and their habitats for coastal South Carolina. Resource Policies affecting significant fish species and their habitats include all policies affecting wetlands and waters, especially:

Residential Development
Marine-Related Facilities
Wildlife and Fisheries Management
Dredging
a) Dredging

b) Dredge Material Disposal
Erosion Control

Threatened Wildlife Habitats

Resource Policies, in conjunction with the priorities for use of Geographic Areas of Particular Concern (GAPCs), govern the activities that affect threatened wildlife and their habitats. Of particular interest are Resource Policies for: Residential Development; Transportation; Recreation and Tourism; Wildlife and Fisheries Management; and Public Services and Facilities. As specific policies under these and other areas indicate, activities that disturb threatened or endangered wildlife and vegetation, including their habitats, are discouraged in the coastal zone.

Public Recreation Areas (such as beaches, undisturbed natural areas)

In addition to the special management given GAPCs that contain Public Recreation Areas, several Resource Policies governing activities associated with recreational resources are also applicable. Of particular interest are Resource Policies for: Recreation and Tourism; Marine-Related Facilities, Erosion Control; Transportation; Coastal Industry; Dredging; and Public Services and Facilities.

Drinking Water Supply

Drinking water supply is affected by several factors, including adequacy of recharge areas, amount of extraction from supply, and purity of supply. The Resource Policies in general seek to direct activities in the coastal zone in such a way as to protect this invaluable resource. Of particular interest are Resource Policies for: Coastal Industries; Commercial Development; Public Services and Facilities; and Residential Development. In addition, designated groundwater recharge areas (identified by the S.C. Water Resources Commission) will be GAPCs and will be managed according to the priorities of use specified in the GAPC section.

Historical, Cultural, and Archeological Sites

Historical, cultural, and archeological sites will be included as GAPCs if designated to the National Register and may be included if they are eligible for designation. Priorities of use for those areas will govern proposed activities that might affect these resources. The Resource Policies generally discourage activities that would disturb such resources. Of particular interest are Resource Policies for: Transportation; Coastal Industries; Residential Development; and Recreation and Tourism. These policies will aid in preserving those resources in which there is a national interest.

The provision of improved, and protection of existing, public access to these valuable recreational areas is addressed in the Beach and Shoreline Access segment (Chapter IV (D)).

Barrier Islands

The national interest in barrier islands is reflected in several Resource Policies and is specifically reflected in Chapter IV (C), Erosion Control Program. Barrier islands are also included as Areas of Special Resource Significance in part XII of the Resource Policies. In managing activities affecting these valuable natural resources, the Resource Policies must balance sensitive ecological needs with the increasing pressures for their development. The following Resource Policies are of additional concern for protecting the national interest in these resources: Residential Development; Transportation; Commercial Development; Recreation and Tourism; Marine-Related Facilities; Dredging; and Public Services and Facilities. In addition, where GAPC designations are on part or all of a barrier island, the areas will be managed according to the priorities of use for the GAPC.

Wetlands

The national interest in wetlands is reflected throughout all the Resource Policies, which provide strong protection against unwarranted dredging, tilling or other pemanent alteration of salt, brackish and freshwater wetlands. The ecological significance of these wetland areas is fully described in Chapter I(C), The Natural Environment, and Chapter IV(E), Living Marine Resources.

2. ACTIVITIES OF REGIONAL BENEFIT

INTRODUCTION

Section 306(e)(2) of the Federal Coastal Zone Management Act of 1972, as amended, requires that South Carolina make provision within its coastal zone management program to assure that local government regulations do not unreasonably restrict or exclude land and water uses of regional benefit. The initial step of this requirement is identification of those activities which are determined to be of regional benefit. Once selected, each state coastal management program must demonstrate the state legal authority which will assure that these activities are not unreasonably excluded from locating in the coastal zone by local government actions.

DEFINITIONS

Tracking the language of the Federal regulations for achieving program approval (15 CFR 923), activites are considered to be of regional benefit in the South Carolina coastal zone if they:

1) have been identified as **Activities Subject to Management,** that is, those determined to have **direct and significant impact** on coastal waters,

and

2) result in a **multi-county** environmental, economic, social or cultural benefit.

Unreasonable local restriction of an activity is that which is arbitrary or capricious. It involves a local decision not based on rational or legal factors and implies an exclusion which works to the detriment of the region.

FINDINGS

Because of the rural character of much of South Carolina's coastal zone, ample suitable site locations remain available for most proposed uses now and in the foreseeable future. This limited urbanization also presents less need and demand for regional-type facilities. Most public services are provided on a county-wide basis. Local and county governments in the coastal zone have not exhibited any trend toward excluding particular types of activities, particularly those which offer benefits to an area of greater than local concern.

Therefore, at this time a limited number of activities have been identified to be of regional benefit. The focus is on those coastal land and water uses which, by their nature, might require extension through more than one county or which meet a clearly recognized need, not only for the coastal region but for the State as a whole.

THE ACTIVITIES

Activities of Regional Benefit in the South Carolina coastal zone are:

1) **Transportation facilities** - including highways, airports, railroads, ports and transit;
2) **Parks** - recreational areas of State or regional significance.

MANAGEMENT AUTHORITY

Section 8(B) (6) of the South Carolina Coastal Management Act states that the Council, in developing the management program, shall

> (P)rovide for adequate consideration of the local, regional, state and national interest in the siting of facilities for...public services necessary to meet requirements which are other than local in nature.

Consistent with the general networking scheme for South Carolina's coastal program, the present authority of other State agencies will be utilized to comply with requirements for Activities of Regional Benefit. Assurances that these State agencies are cognizant of their authority and are willing to employ it to implement the program will be provided through memoranda of agreement. Section 7(A) of the Act requires the cooperation of other State agencies and compels the respective agencies to administer their authority in accord with the Act and Rules and Regulations promulgated thereunder.

Section 923.12(b)(2) of the **Federal Register**, March 28, 1979, provides illustrations of techniques which may be utilized in assuring that uses of regional benefit are not restricted. The Coastal Council through means of its system of "networking" with other State agencies, the State's Public Works Eminent Domain Law, as well as through specific acquisition powers of othe State agencies, will assure that adequate sites are or can be set aside for different uses of regional benefit. The legal basis for this system is already in place through the present powers vested in State agencies to acquire sites as the need arises for particular uses of regional benefit.

The State of South Carolina has a Public Works Eminent Domain Law. Section 28-5-30, Code of Laws of South Carolina (1976) allows any federal agency, State public body or authorized corporation to acquire real property necessary for any public works project. Section 28-5-20 (1976 Code) defines public works project as "any work or undertaking which is financed in whole or in part by a federal agency or a State public body." This all-encompassing power of public domain is supplemented by specific acquisition powers of various State agencies.

The Development Board is authorized in Section 13-3-100 (1976 Code) to:

> Acquire by purchase, gift, condemnation or in any other manner any lands, waters, water rights, riparian rights, flowage rights, rights of way, easements, licenses, franchises, engineering data, maps, construction plans or estimates or any other property of any kind, real, personal or mixed, necessary or useful in carrying out its powers.

This Board may also employ the eminent domain power pursuant to laws for railroads, telegraph and telephone companies, power companies and highways.

At present, the primary function of the Development Board is to encourage and assist industrial and commercial development within the State. The Development Board, under Section 13-3-100 (1976 Code) is also empowered to acquire, build and maintain among other items, railroads, highways, pipelines, dams, tunnels and bridges. The Board may also construct and establish parks and playgrounds for the use of the State's citizens as well as take proper steps to prevent and control soil erosion and floods. These powers may be exercised through its own efforts and resources or may be accomplished jointly with the United States, other states, private corporations or private individuals.

In addition to the Development Board's ability to acquire recreational areas, the Parks, Recreation and Tourism Commission through Section 51-1-60 (1976 Code) is responsible for managing, developing and expanding recreational areas and for developing a coordinated plan to utilize the State's natural resources as tourist attractions. Upon approval of the State Budget and Control Board, this Commission is able to acquire land by gift or purchase in carrying out its mandate.

The State Budget and Control Board is also vested with broad authority. It is the State agency responsible for management of State-owned lands and waters. It may, under Section 1-11-80 (1976 Code), grant easements and rights of way for construction and maintenance of power lines, pipelines, water and sewer lines and railroad facilities over or under vacant lands and marshlands owned by the State, upon payment of reasonable value. This Board has the authority under Section 1-11-110 (1976 Code) to acquire real property for the State by gift, purchase, or condemnation. Finally, the Board has been granted authority to lease any State lands for the purpose of drilling for and producing oil and gas and other minerals, subject to the approval of the Attorney General (Sections 10-9-10 and 48-43-390, 1976 Code).

The State Ports Authority is charged with the promotion, development and maintenance of harbors and seaports and related facilities and is provided condemnation powers in Section 54-3-150 (1976 Code). In addition, the Department of Highways and Public Transportation may implement its broad powers of planning, construction and maintenance of the State highway system through eminent domain proceedings under Sections 57-3-610, 57-5-32 and 57-5-1340 (1976 Code).

Section 10(B) of the Act states:

> Any city or county that is currently enforcing a zoning ordinance, subdivision regulation or building code, a part of which applies to critical areas, shall submit the elements of such ordinances and regulations applying to critical areas to the Council for review. The Council shall evaluate such ordinances and plans to determine that they meet the provisions of this act and rules and regulations promulgated hereunder. Upon determination and approval by the Council, such ordinances and regulations shall be adopted by the Council, followed by the Council

in meeting its permit responsibilities under this act and integrated into the Council's Coastal Management Program. Any change or modification in the elements of approved zoning ordinances, subdivision regulations or building codes applying to critical areas shall be disapproved by the Council if it is not in compliance with the provisions of this act and rules and regulations promulgated hereunder.

The Council will determine if uses of regional benefit could be arbitrarily excluded under local ordinances or plans. Any ordinance or plan which could arbitrarily exclude uses of regional benefit will not be adopted.

Section 6-7-830(a) of the Code of Laws for South Carolina (1976), as amended, states that:

> All agencies, departments and subdivisions of this State that use real property as owner or tenant, in any county or municipality in this State shall be subject to the zoning ordinances thereof.

Apparently, this statute is addressed to state use of real property for offices, warehouses, maintenance facilities and other support facilities since Article 8, Section 14 of the South Carolina Constitution prohibits a local government from taking action which would eliminate "the structure and administration of any governmental service or function, responsibility for which rests with the State government or which requires statewide uniformity." The uses of regional benefit, as defined, relate to services and functions vested in state agencies and presumably are not subject to Section 6-7-830(a) of the Code.

3. RESOURCE POLICIES

INTRODUCTION

In addition to controlling activities in the critical areas of the coastal zone and preserving and protecting the priority use(s) of Special Management Areas (including Geographic Areas of Particular Concern), a comprehensive coastal management program must also include policies for management of the full range of activities which have a "direct and significant impact" on coastal waters. The need for this form of resource management was recognized in the Congressional findings of the Federal Coastal Zone Management Act of 1972, as amended, which describe the value of our coastal resources and the pressures for development from often competing uses. To achieve the National goals of this Act, Section 305 (D)(2) requires that to prepare an acceptable management program each state must include the following requirement:

> A definition of what shall constitute permissable land and water uses within the coastal zone which have a direct and significant impact on the coastal waters.

The South Carolina Coastal Council also is mandated by State legislation to consider various land and water activities. Section 8 (B) of the South Carolina Coastal Management Act of 1977 lists the following items to be considered in devising the State's comprehensive coastal management program:

(1) Identify present land uses and coastal resources.
(2) Evaluate these resources in terms of their quantity, qualtity and capability for use both now and in the future.
(3) Determine the present and potential uses and the present and potential conflicts in uses of each coastal resource.

A variety of opportunities are available for benefits to all South Carolinians through wise use and preservation of coastal resources. Man's activities in the coastal zone involve economic, social and environmental impacts which may have positive and/or negative effects. It is the resolution of possible conflicts and the guidelines and policies which must be considered in decision-making in order to reduce possible negative impacts which constitute the need for sound, logical planning and management of coastal resources.

Performance Standard Approach

As part of the Uses Subject to Management Segment, "States must develop policies and procedures by which uses, determined to be subject to the management program, will be allowed, conditioned, modified, encouraged or prohibited." (§923.11, **Federal Register**, March 28, 1979) This refers to the Federal requirement that each State first identify the coastal activities which are considered significant enough to warrant management, and then identify the policies and the legal authority or review process which will govern each of these activities.

The South Carolina coastal program has selected an approach that might be called "performance standards" which deals with the impacts of an activity on coastal resources rather than with the activity itself. It is an indirect method of managing activities in the coastal zone by assessing the impacts of a proposed action on coastal resources. With this approach, policies need not be developed for **all** aspects of a type of activity but only for those which would have direct and significant coastal impacts.

Review and discussion on projects or proposals will be determined on the individual merits of each application with consideration for the effects on the marine and estuarine environments, based on the following policies. This process will be implemented through the Council's direct authority for critical area permit applications and review and certification of the permits of other State and Federal agencies. (The procedural as well as legal aspects of both levels of management authority are addressed in full in Chapter V.)

The alternative approach of designating which activities are permissible in different geographic areas of the coast is seen in the context of the South Carolina coastal program as an option for local governments to regulate land development and use. This type of approach by local governments is fully encouraged and supported by the Coastal Council. However, in terms of the details involved in its implementation, this approach would be inappropriate for State management of the coastal zone as a whole. This type of plan would not allow sufficient flexibility for future decision-making at the State level, with changing technology and advancements in development alternatives which might offer ways to reduce environmental or other impacts.

Therefore, the performance standard approach seems best suited to the needs for management of coastal

resources in South Carolina. It meets the overall intent of the South Carolina Coastal Management Act "to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone..."

DEFINITION: ACTIVITIES WITH A "DIRECT AND SIGNIFICANT IMPACT"

The South Carolina Coastal Management Act of 1977 recognizes that there are specific parts of the coastal environment which are more vulnerable to the effects of man's activities than others. Experience and scientific research have demonstrated these ecosystems to be more fragile and, therefore, these "critical areas" are defined by the Act as coastal waters, tidal wetlands, beaches and primary sand dunes. To adequately manage these resources, the Act gives direct authority to the Coastal Council for issuance of permits for any alteration in these areas.

> Ninety days after the effective date of this Act no person shall fill, remove, dredge, drain or erect any structure on or in any way alter any critical area without first obtaining a permit from the Council. (Section 13 (C))

The Council evaluates these permits based on the general considerations of Section 15 of the Act and the specific project standards as presented in the Rules and Regulations for Permitting.

The South Carolina coastal program recognizes that in other parts of the coastal zone, some large-scale activities or particular aspects of man-made developments also can significantly impact coastal resources. In development of the comprehensive coastal management program, Section 8 (B) of the 1977 State legislation directs the Council to consider "all lands and waters in the coastal zone for planning purposes."

While the Council has no direct regulatory authority outside the critical areas of the coastal zone (Section 20, S.C. Coastal Management Act, Act 123 of the 1977 General Assembly) adequate management is provided through the Council's review and certification of permits of other State agencies. (Section 8 (B)(11), S.C. Coastal Management Act) (The legal basis for this management approach is explained in detail in the section "Legal Authorities.") The Federal consistency provisions of the Federal Coastal Zone Management Act of 1972, as amended, afford another mechanism for management throughout the coastal zone.

Identification of the activities which might have significant impacts has been based on the resource inventory and planning efforts of the coastal program staff since 1974; input from other participating local, State and Federal agencies; citizen working groups in the eight coastal counties; and the policy direction of the eighteen-member Coastal Council.

An activity is considered to have direct and significant impact on coastal waters and therefore is subject to management in the coastal zone if it entails one or more of the following criteria:

1) located in a critical area;
2) detrimental environmental impact upon a critical area (for example, water pollution upstream from an inland source which would then reach and result in degradation of the estuarine system);
3) adverse effects on the quality or quantity of coastal resources — natural, economic, social or historical;
4) disruption of access to a public coastal resource.

Activities Subject To Management

Below is a list of activities and areas of special resource significance which the Coastal Council has determined to meet the definition for having a potential for "direct and significant impact" on coastal waters. The policies of the South Carolina Coastal Council for each activity or area follow, beginning on p. III-16.

I. RESIDENTIAL DEVELOPMENT - p. III-16

II. TRANSPORTATION
- A. Ports - p. III-19
- B. Roads and highways - p. III-20
- C. Airports - p. III-23
- D. Railways - p. III-25
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III. COASTAL INDUSTRIES
- A. Agriculture - p. III-29
- B. Forestry (Silviculture) - p. III-31
- C. Mineral Extraction - p. III-32
- D. Manufacturing - p. III-33
- E. Fish and seafood processing - p. III-36
- F. Aquaculture (Mariculture) - p. III-37

IV. COMMERCIAL DEVELOPMENT - p. III-40

V. RECREATION AND TOURISM
- A. Parks - p. III 42
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VI. MARINE-RELATED FACILITIES
- A. Marinas - p. III-46
- B. Boat ramps - p. III-48
- C. Docks and piers - p. III-49

VII. WILDLIFE AND FISHERIES MANAGEMENT
- A. Wildlife and fisheries management - p. III-51
- B. Artificial reefs - p. III-51
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VIII. DREDGING
- A. Dredging - p. III-55
- B. Dredged material disposal - p. III-57
- C. Underwater salvage - p. III-58

IX. PUBLIC SERVICES AND FACILITIES
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GUIDELINES FOR EVALUATION OF ALL PROJECTS

1. In review and certification of permit applications in the coastal zone, the Coastal Council will be guided by the following general considerations (apply to erosion control and energy facility projects, as well as activities covered under Resource Policies):
   1) The extent to which the project will further the policies of the South Carolina General Assembly which are mandated for the Coastal Council in implementation of its management program, these being:
      a) "To promote the economic and social improvement of the citizens of this State and to encourage development of coastal resources in order to achieve such improvement with due consideration for the environment and within the framework of a coastal planning program that is designed to protect the sensitive and fragile areas from inappropriate development and provide adequate environmental safeguards with respect to the construction of facilities in the critical areas of the coastal zone;
      b) To protect and, where possible, to restore or enhance the resources of the State's coastal zone for this and succeeding generations." (Sections 2(B)(1) and (2), S.C. Coastal Management Act of 1977).
   2) The extent to which the project will have adverse impacts on the "critical areas" (beaches, primary ocean-front sand dunes, coastal waters, tidelands).
   3) The extent to which the project will protect, maintain or improve water quality, particularly in coastal aquatic areas of special resource value, for example, spawning areas or productive oyster beds.
   4) The extent to which the project will meet existing State and Federal requirements for waste discharges, specifically point sources of air and water discharge, and for protection of inland wetlands.
   5) The extent to which the project includes consideration for the maintenance or improvement of the economic stability of coastal communities.
   6) The extent to which the project is in compliance with local zoning and/or comprehensive plans.
   7) The possible long-range, cumulative effects of the project, when reviewed in the context of other possible development and the general character of the area.
   8) The extent and significance of negative impacts on Geographic Areas of Particular Concern (GAPCs). The determination of negative impacts will be made by the Coastal Council in each case with reference to the priorities of use for the particular GAPC. Applications which would significantly impact a GAPC will not be approved or certified unless there are no feasible alternatives or an overriding public interest can be demonstrated, and any substantial environmental impact is minimized.
   9) The extent and significance of impact on the following aspects of quality or quantity of these valuable coastal resources:
      i) unique natural areas — destruction of endangered wildlife or vegetation or of significant marine species (as identified in the Living Marine Resources segment), degradation of existing water quality standards;
      ii) public recreational lands — conversion of these lands to other uses without adequate replacement or compensation, interruption of existing public access, or degradation of environmental quality in these areas;
      iii) historic or archeological resources — irretrievable loss of sites identified as significant by the S.C. Institute of Archeology and Anthropology or the S.C. Department of Archives and History without reasonable opportunity for professional examination and/or excavation, or preservation.
   10) The extent to which the project is in the national interest.

I I . "In critical areas of the coastal zone, it is Council policy that, in determining whether a permit application is approved or denied, the Council shall base its determination on the individual merits of each application, the policies specified in Sections 1 and 2 (of the Act), and be guided by the following general considerations:

1) The extent to which the activity requires a waterfront location or is economically enhanced by its proximity to the water.

2) The extent to which the activity would harmfully obstruct the natural flow of navigable water. If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the South Carolina State Ports Authority declaring the proposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit.

3) The extent to which the applicant's completed project would affect the production of fish, shrimp, oysters, crabs or clams or any marine life or wildlife or other natural resources in a particular area including but not limited to water and oxygen supply.

4) The extent to which the activity could cause erosion, shoaling of channels or creation of stagnant water.

5) The extent to which the development could affect existing public access to tidal and submerged lands, navigable waters and beaches or other recreational coastal resources.

6) The extent to which the development could affect the habitats for rare and endangered species of wildlife or irreplaceable historic and archeological sites of South Carolina's coastal zone.

7) The extent of the economic benefits as compared with the benefits from preservation of an area in its unaltered state.

8) The extent of any adverse environmental impact which cannot be avoided by reasonable safeguards.

9) The extent to which all feasible safeguards are taken to avoid adverse environmental impact resulting from a project.

1 0) The extent to which the proposed use could affect the value and enjoyment of adjacent owners." (Section 15(A), S.C. Coastal Management Act of 1977)

RESOURCE POLICIES

On the following pages are the Resource Policies for each of the identified Activities Subject to Management. A brief statement of findings describes why each activity is of coastal management concern. These policies are organized in three separate sections:

1) Policies for the coastal zone, including that portion outside the critical area in which the Coastal Council has indirect authority (review and certification).

2) Policies for the critical areas, where the Coastal Council has direct permit authority. These policies are the Rules and Regulations for Permitting (R. 30-1 through 30-11, S.C. Code of Laws of 1976). Each policy or group of policies appears with a citation ("R. 30-____") for the corresponding regulation.

3) Recommended or enhancement policies which are endorsed by the Coastal Council.

Policies 1) and 2) are those which the Coastal Council is authorized to enforce through the authority of the coastal program and the S.C. Coastal Management Act of 1977. These policies are highlighted in the text with a bold outline along the margins.

Following the policies for each activity is a brief discussion of the management authority which will implement these policies. A matrix at the end of this section illustrates the network of implementation authorities. Chapter V(A) further documents the existing legal authorities.

I. RESIDENTIAL DEVELOPMENT

Findings

Paralleling the national pattern, more than 20 percent of the State's residents live in the coastal zone of South Carolina. Recently there has been a substantial increase in the building of both permanent and second-homes or seasonal housing in coastal counties by residents and non-residents of South Carolina who have purchased coastal land for residential development.

With expanding industry and commerce and related employment opportunities, plus the increasing attractiveness of the southeastern "sun belt" states as a place to work and play, this residential growth can be expected to continue. Adequate, sound housing is a basic need for residents of the coastal zone. There are still many suitable locations for this type of development; however, there can be negative environmental impacts from residential growth if it is not properly managed.

Housing projects can have adverse effects on coastal water resources and ecosystems. Of primary concern is adequate treatment and disposal of domestic sewage from the residences, which if not properly handled can degrade water quality and impact marine and aquatic species. Uncontrolled development patterns can also have effects of increased soil erosion, sedimentation and contamination of coastal waters and possible flooding problems from rapid storm water runoff. Another potential impact of residential growth is associated with loss of vital wetland areas if dredging and/or filling of these areas are allowed in site preparation or construction.

An almost infinite number of potential resource conflicts exists, and one development may have several effects. For example, in one instance a residential development may provide badly needed housing but in so doing disrupt commercial fishing by degrading water quality due to improperly controlled sewage effluent and increased storm water runoff. This same housing development if located on beach front property might conflict with recreation by restricting access to a public beach.

These potential conflicts are addressed in the following policies for residential growth, which provide guidance on reaching and maintaining a balance between development and conservation of coastal resources.

Policies

1) In the coastal zone, Council review and certification of State and Federal permits and comments on residential projects will be based on the following policies:

   a) Adequate sewage disposal service (septic tanks or treatment systems) which meet the Environmental Protection Agency, South Carolina Department of Health and Environmental Control, and local health department standards must be provided in residential development plans. Septic tanks should be permitted, where feasible, in low density residential developments when they are designed properly and soils are adequate to insure against pollutants leaching into surface or groundwater resources. Septic tanks must be situated a safe distance from the shoreline to ensure proper drainage and filtering of tank effluents before they reach the water's edge with special attention given in identified erosion areas. Policies for sewage treament plants and associated facilities appear in IX (A) of this section.

   b) Residential development which would require filling or other permanent alteration of salt, brackish or freshwater wetlands will be prohibited, unless no feasible alternatives exist or an overriding public interest can be demonstrated, and any substantial environmental damage can be minimized. These marshes are valuable habitat for wildlife and plant species and serve as hydrologic buffers, providing for absorption of storm water runoff and aquifer recharge, and therefore, their destruction for residential purposes must be avoided whenever possible.

   c) Location of new residential development in flood-prone river or other hazard areas is discouraged. When development does occur in flood hazard areas, the inclusion of natural, vegetated buffers between developed areas and the shoreline must be incorporated wherever possible to help absorb flood water surges. Within designated flood zone areas of participating communities residential development must meet existing Federal Flood Insurance Administration (Department of Housing and Urban Development) national building standards and

insurance requirements. Local governments in the coastal zone are urged to actively participate in the National Flood Insurance program.

d) Where appropriate, particularly adjacent to a critical area, drainage plans and construction measures for residential development shall be designed so as to control erosion and sedimentation, water quality degradation, and other negative impacts on adjacent water and wetlands. Example techniques include buffering and filtering runoff water; use of permeable surfacing materials for roads, parking and other paved areas within a subdivision; and grass ditching, surface drainage contours, or catchment ponds rather than direct storm water discharge. Best management practices (and any resultant regulations) designed to control nonpoint source runoff that are developed and implemented as part of the 208 Water Quality Planning process also apply to new housing projects. Developers proposing residential development activities should contact and work closely with local 208 planning agencies and local Soil and Water Conservation Districts.

e) Other activities associated with a residential development or subdivision will be subject to the policies for that activity, for example, dredging, docks and piers, marinas, commercial buildings, parking facilities or transportation access.

f) When local ordinances and plans applying to the critical areas are submitted to the Council for review, pursuant to Section 10(B) of the Act, such ordinances, plans or subdivision regulations must include provisions for insuring:

i) adequate non-critical area vehicular access to each subdivision lot,

ii) adequacy of septic tank or sewage treatment system disposal for each lot.

2) In the critical areas the Coastal Council has direct permitting authority and shall apply the following rules and regulations:

a) "The creation of.....residential lots strictly for private gain is not a legitimate justification for the filling of wetlands. Permit applications for the filling of wetlands and submerged lands for these purposes shall be denied." (R-30-12, (G)(2)(a)

b) "Nonwater-dependent structures such as apartment,.....(and other residences) have been constructed in the past on pilings over wetland areas. Such construction presents unnecessary encroachment on the aquatic ecosystem by shading out the underlying vegetation. Nonwater-dependent structures shall be discouraged from being sited over water and/or wetland areas. Only when public need is demonstrated and no feasible alternative sites are available should consideration be given towards approval of the proposed structure." (R. 30-12 (M))

c) "Nonwater-dependent structures such as residential buildings have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The siting of nonwater-dependent structures on the primary dunes or the beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged." (R. 30-13(D))

3) The Council **recommends** that the following policies be considered in planning residential development in the coastal zone:

a) Local governments are encouraged to develop local plans and procedures which promote clustering of residential development where growth is most compatible with coastal resources and where necessary public services can be most easily provided with least adverse impacts on these resources. Criteria to judge those areas most capable of accommodating new growth with minimal impact on coastal resources would be included in local plans.

b) Developers are encouraged to incorporate common-use recreational areas in proposals for large-scale residential developments. With regard to water and boat access, "developers of subdivisions, motels, and multiple family dwellings will be encouraged to develop single, joint-

use moorage facilities while their plans are in the development stage" (R. 30-12 (A)(2)(f)), combined with building covenants to limit the proliferation of individual docks and piers.

Management Authority

If located in the critical areas, as defined by the S.C. Coastal Management Act, proposed new residential uses would require a permit from the Coastal Council before beginning construction.

Outside the critical areas, the Coastal Council will review a number of State agency permits required for certain residential developments to determine that issuance of these permits is consistent with the preceding coastal management policies. This review and certification process is mandated in Section 7(A) and 8(B)(11) of the Coastal Management Act.

A S.C. Budget and Control Board permit is required for the filling of waters or wetlands below mean high water (MHW) in that part of the State outside Coastal Council permitting jurisdiction.

S.C. Department of Health and Environmental Control (DHEC) permits are required for the construction of subdivision water supply and waste disposal systems. Because of the rural and suburban character of much of the coastal zone, there are large areas not served by public water or sewer systems. This DHEC authority will bring a majority of new residential developments under the Council certification process.

DHEC is the State agency responsible for administration of the National Pollution Discharge Elimination System (NPDES) permit process. This permit is required not only for effluent discharges, such as from a sewage treatment facility, but in some instances for such point-source discharges as storm drainage pipes. DHEC is also the S.C. agency responsible for "401" water quality certifications (Section 48-1-50 (15), 1976 S.C. Code of Laws), which are determinations of allowable water pollution levels required for any activity involving another Federal permit.

(A detailed legal analysis of the authority of each agency and of the Council certification procedure is contained in the Legal Authorities chapter.)

In addition to State management authority, major residential developments receiving some form of Federal financial assistance will be subject to the A-95 review process for which the Coastal Council is a commenting agency. Some projects will also require the submittal of Environmental Impact Statements, thereby having further Council review. Federal permits will be required for any proposed housing construction in the wetland or water areas under jurisdiction of Section 404(33 CFR §323) of the Federal Water Pollution Control Act, as amended in 1976.

II. TRANSPORTATION FACILITIES

The construction and maintenance of all forms of transportation service are a vital part of the economic and social character and viability of the coastal zone. Almost always involving the expenditure of large sums of public money, investment in these facilities meets a definite need in the coastal zone, serving both coastal and State residents. Because of their role in national defense, as well as provision of access to coastal recreation areas and other resources, and contribution to general economic growth, transportation facilities are often in the national interest (p. III-5). Transportation systems are an important element in an overall coastal management program because they provide access to a variety of public resources — economic, as well as historic, social and recreational. There can be, however, potential environmental impacts from construction, maintenance, and operation of transportation in order to achieve the goals and objectives of South Carolina's coastal program.

A. PORTS

Findings

The ports and commercial waterways of South Carolina represent major economic enterprises that meet the needs of waterborne commerce for both the coastal zone and the entire State of South Carolina. These ports and commercial waterways also have a major national impact by providing a means of access to international and domestic markets.

The economic impact of port development is substantial. Statistics for 1973 (Pender, D.R. and R. P. Wilder. **Impact of the State Ports Authority Upon the Economy of South Carolina.** Division of Research, Bur. Bus. and Econ. Research, College of Bus. Administration, Univ. of S.C., 1974. Occasional Study No. 6) indicate that direct port employment was 15,000 jobs, and direct income to the ports equalled $253 million. Secondary economic impacts almost double the above factors for each year. Some 1500 firms in the State regularly use the ports.

In the last decade, the Port of Charleston has emerged as one of the south's major commercial cargo ports. In 1976 it surpassed all other ports in the South Atlantic region in the value of general cargo handled in world commerce. One of the nation's most rapidly developing container ports, Charleston is now the ninth ranked container port in the United States. Smaller State Port facilities are located at Port Royal and Beaufort.

Port development and associated activities can have major direct and secondary environmental impacts, particularly in relatively undisturbed areas. The main impacts on the water side are associated with dredging required to create and maintain navigation channels. This considerable dredging can modify the hydrology of a harbor, result in salinity changes, and degrade water quality, thereby having a detrimental effect on aquatic resources. Initial and maintenance dredging can also create dredge material disposal problems. In addition, ports which handle oil products or toxic substance cargoes will involve risks of spills resulting in water quality degradation.

The secondary effects of port development primarily affect land resources and land use. Ports generate a large volume of rail and truck traffic and oftentimes are a spur to intensive industrial and urban development.

The South Carolina Ports Authority is currently preparing a comprehensive ports management plan for submittal to the Council, as mandated by Section II of the Coastal Management Act of 1977. This plan, which will have public review, will be incorporated into the coastal program upon its approval by the Council. It will delineate present and potential commercially navigable waterways in the coastal zone and relate these to relevant land development and environmental policies.

Policies

In the coastal zone, Coastal Council evaluation of critical area permits or review and certification of permit applications for port development will be based on the approved ports plan and the following policies:

1) New port development should take place in existing industrialized areas where sufficient support

facilities are available including public utilities, rail and highway transportation access, and navigational channels which are already maintained, unless there are no feasible alternatives or an overriding public interest can be demonstrated, and any substantial environment damage can be minimized.

2) Port development should occur in areas that have adequate high ground (non-wetland) acreage for proposed current development and near-term expansion plans, and related facilities. Port development should be located in areas where the filling of productive salt, brackish or freshwater wetlands will not be required or can be minimized. If site preparation does not require filling in these wetlands, it must be clearly demonstrated that no other feasible alternatives exist or an overriding public interest can be demonstrated, and any substantial environment damage can be minimized.

3) To the extent feasible, port development and expansion should locate on existing channels so that the need for initial and maintenance dredging can be minimized.

4) New port development that will require maintenance dredging must identify adequate upland (non-wetland) spoil areas, ocean disposal, or other environmentally-acceptable alternative disposal techniques to meet the long-term demands for soil disposal.

5) Port areas must provide for the handling of dangerous and volatile cargoes and materials in relatively isolated or restricted areas, so that in the event of accident, measures can be implemented to contain any spills or other contamination with minimal environmental damage and limited threat to the health, safety and welfare of the public.

6) Wharves, piers, mooring dolphins and other port-related structures should not restirct or block navigation or alter the natural pattern of water currents.

7) Proposed port development or expansion and operation must meet existing air and water quality standards, as regulated by the Federal Environmental Protection Agency, and the South Carolina Department of Health and Environmental Control.

8) Port facilities developed by the State Ports Authority (SPA), as well as by private developers, must be sited, constructed and operated in a manner that is consistent with local and State development objectives as set forth in public documents such as comprehensive plans, zoning ordinances and performance standards.

9) Potential negative impacts on navigation which might restrict port and harbor activities in the area will be considered in evaluation of permits for marinas, docks and piers, transportation facilities (especially bridges), cables and pipelines and other relevant activities.

10) Port development or expansion plans must include provision for necessary breakwater or other wake protection measures along major navigable ship channels where appropriate in order to reduce erosion damage. These structures must be in compliance with other applicable policies and Rules and Regulations.

11) All bulkheads associated with a port area must meet the policies as stated in the Erosion Control Program (Chapter IV (C)).

12) All dredging and dredge spoil disposal policies, as stated in VIII (A) and (B) of the Resource Policies will be applied to port activities.

13) All piers and dockage must meet the policy requirements as stated in VI (C) of the Resource Policies.

14) Transportation projects associated with port development must follow the transportation policies stated in II (B)-(E) of the Resource Policies.

15) The policies for manufacturing will apply to port development and related industrial development (III (D) of the Resource Policies).

Recommended Policies

The Council also recommends that the following policies be considered for port and harbor development projects in the coastal zone:

1)Encouraging comprehensive study of potential secondary impacts of port and harbor development projects.

2)Maximizing the use of existing developed port areas, when feasible, before establishing new facilities in relatively undeveloped areas.

3) Encouraging the State Ports Authority (SPA) to diversify their activities and areas of concern to include ne promotion of sports and commercial fisheries and other marine activities.

Management Authority

In the critical areas, all new port facilities are under the direct permitting authority of the Coastal Council and subject to the Rules and Regulations thereunder. Both within and outside of the critical area, in instances where the permit of another State agency is required, the review and certification process of the Council will apply.

While not a permit agency, the South Carolina State Ports Authority (SPA) has the responsibility for the planning, construction, maintenance, and operation of the State's port system. Cooperative efforts between the Coastal Council and the Ports Authority, not only on project proposals, but also on long-range planning and policy development, are the best means to implement sound coastal management policies. The Legislature recognized the need for this cooperation when it mandated in Section II of the Coastal Management Act of 1977 (the Act) that the Ports Authority prepare and submit to the Council a management plan for port and harbor facilities and navigation channels. The port plan, upon approval by the Council, will become a part of the comprehensive management program.

Section 15 (A) of the Coastal Management Act states that:

> If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the South Carolina State Ports Authority declaring the proposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit.

In addition, the Memorandum of Agreement (MOA) between the two agencies is written so as to provide for cooperative efforts. Port projects and plans are subject to review and comment, and direct Coastal Council permitting in the critical areas, where applicable, based on the preceding policies. A further legal mandate for cooperative and consistent inplementation of the two agencies' programs is found in the Act in Section 7(A) and is further explained in the Legal Authorities and Networking section, Chapter V(A).

A majority of port and navigation projects also require Federal permits, and these permit reviews are subject to the Federal consistency provisions of the coastal program. Those projects involving Federal funding are subject to the Federal Office of Management and Budget (OMB) Circular A-95 review, and frequently to EIS review, under the National Environmental Policy Act.

B. ROADS AND HIGHWAYS (including bridges and transit facilities)

Findings

Roads and highways play a major role in shaping the growth patterns of the coastal area, as they do in other parts of the state. The motor vehicle is still the primary mover of people and goods, and access to and from the roadway network is a key factor in the economic gain of a community. Intersections, curb cuts and highway interchanges are often the site of extensive development.

In addition to these secondary effects, the construction, operation and maintenance of a roadway involve engineering and construction activities which may have direct negative environmental impacts if not properly managed. First and foremost is location of the facility itself, which may be routed along or through sensitive wetland areas or water bodies. The primary concern is destruction or significant deterioration of the ecological system mainly through dredge and fill operations. This is why bridges are favored in these areas over filling to create roadbeds or embankments which would result in loss of marsh habitat and disruption of waterflow or circulation.

Also associated with road and highway construction are possible impacts of drainage and sedimentation, through land clearing, grading, and slope stabilization. Changes in the natural drainage pattern may increase flooding hazards, and storm water runoff may become a problem. Water quality may also be affected due to heavy loads of toxic pollutants and nutrients from the road surface and adjacent embankments if care is not taken in design of roadways to handle storm water runoff.

Navigation presents another potential conflict when roads are planned to cross water bodies. Adequate clearance under bridges, rather than causeway construction, can ameliorate this problem.

Policies

1) In the coastal zone , Council review and certification of relevant State and Federal permit applications and comments on road or highway proposals will be based on the following policies:

a) Road and highway routes shall be aligned to avoid salt, brackish and freshwater wetlands wherever feasible. Where they cannot be avoided, bridging of these wetlands and all navigable waterways, rather than filling to create roadbeds, will be required wherever feasible. The use of existing fill areas or embankments for widening or improvement projects will be required wherever feasible. Whenever feasible, median and right-of-way widths shall be limited where they will impact salt, brackish, and freshwater wetlands.

b) Road structures through salt, brackish or freshwater wetlands or water bodies must be designed so as not to cause substantial changes in natural waterflow and circulation.

c) Bridges over navigable water bodies must provide adequate clearance for commercial or pleasure craft, where appropriate.

d) Care should be taken in design of roads to minimize direct drainage of roadway runoff into adjacent water bodies. Inclusion of techniques for filtering runoff water, such as grass ditching or vegetative buffers must be considered. During construction and in later maintenance, roadway embankments should be stabilized to minimize erosion and water quality degradation due to sedimentation problems.

e) Road, highway and bridging projects in wetland or water areas are strongly encouraged to include provision for placement of other utilities, such as cables or transmission lines, in their design to reduce the need for future disruption of adjacent wetlands or waterways.

f) Construction of private roadways for private access shall be aligned to avoid salt, brackish and freshwater wetlands wherever feasible, and, where applicable, must provide bridges, culverts or other means to maintain circulation and water flow. When practicable, permeable surfaces such as gravel or shell should be used rather than pavement.

g) When applicable to highway projects that require spoil disposal areas, the policies for dredge material disposal (Resource Policies VIII (B)) shall apply to that portion of the project proposal.

h) Road or bridge projects involving the expenditure of public funds to provide access to previously undeveloped barrier islands will not be approved unless an overwhelming public interest can be demonstrated, for example, provision of access to a public recreation area or other public facility.

i) Where feasible, new roads and bridges in the coastal zone should be designed to accommodate bicycle and foot paths and fishing catwalks and platforms.

j) The Coastal Council will cooperate and coordinate with the S.C. Department of Highways and Public Transportation in development and implementation of State policy and long-term planning for transportation in the coastal zone, through such mechanisms as the State Highway Action Plan.

2) In critical areas of the coastal zone, it is Council policy that:

a) Major highways, expressways...should be located inland from coastal wetland areas to the extent feasible inland from coastal wetland areas to the extent feasible.

b) In cases where wetlands cannot be avoided, bridging should be employed, to the maximum extent possible, rather than filling and embankment to create roadbeds.

c) Where wetlands will be destroyed, the productivity of these lands should be identified and weighed against public need in consideration of the project by the Council.

d) Structures over water should be designed so as not to alter the natural waterflow and circulation regimes or crease excessive shoaling. Adequate clearance for commercial and pleasure craft should be provided.

e) Maximum care shall be taken to prevent concentrated roadway runoff from entering adjacent water bodies.

f) Where appropriate, bridges and approaches should be designed to provide for the enhancement of public access by the utilization of fishermen catwalks, boat launching ramps and other structural features.

g) During the planning of a multi-lane widening or road improvement project, it is usually preferable to follow the existing alignment in wetland areas. Existing causeway and fill areas should be utilized wherever possible. The widths of medians of divided highways should be reduced as much as "possible wherever they cross wetland areas.

h) Roadway embankments and fill areas shall be stabilized by utilizing appropriate erosion devices and/or techniques in order to minimize erosion and water quality degradation problems.

i) The Council will encourage applicants for transportation permits to design such facilities to accommodate other public utilities, thus avoiding unnecessary future alteration such as that caused by the laying of cables or transmission lines in wetlands adjacent to an existing roadway." (R. 30-12(F)(2)a-i)

3) The council **recommends** that the following policies be considered for road and highway projects in the coastal zone:

a) Encouraging comprehensive study of the potential for secondary growth inducement from new road and highway construction;

b) Study of mass transit alternatives to road or highway construction in urban areas.

c) Encouraging project designs and route alignments which consider the impacts on locally-designated "Scenic Highways" and on other aesthetic considerations, for example, enhancement and protection of scenic vistas and preservation of unique tree canopies and other natural areas.

Management Authority

In the critical areas, roads and highways, both public and private, are under the direct permitting authority of the Coastal Council and subject to the Rules and Regulations thereunder.

While not a permit agency for highway construction, the authority for planning, construction, maintenance and operation of the State's highway system rests with the South Carolina Department of Highways and Public Transportation. Roadway projects by the Department are subject to review and comment by the Coastal Council based on the preceding policies, as outlined in the Memorandum of Agreement between the two agencies. In instances where the permit of another State agency is required for a roadway project, the review and certification process of the Coastal Council will apply.

Cooperative efforts between the Coastal Council and the Highway Department, not only on project proposals, but also on long-range planning and policy development, are the best means to implement sound coastal management policies. The Memorandum of Agreement (MOA) between these agencies is written so as to allow such cooperation. The legal mandate for cooperative and consistent implementation of the two agencies' programs is found in the Coastal Management Act of 1977 (Section 7 (A)), and is further explained in the Legal Authorities section of Chapter V.

The State Development Board, with the mandate of improving trade, commerce and employment opportunities in South Carolina, also has the authority to build or acquire roads and highways as part of the promotion of transportation systems in the State. Any projects proposed by the Development Board in the coastal zone would involve coordinated planning efforts with the Coastal Council based on the preceding policies, as mandated by the Act and outlined in the MOA. (Further legal analysis of this authority is provided in the Legal Authorities segment.)

A majority of road and highway projects also require Federal permits, and these permit reviews are subject to the Federal consistency provisions of the coastal program. Those projects involving Federal funding are subject to the Federal Office of Management and Budget (OMB) Circular A-95 review, and frequently to EIS review, under the National Environmental Policy Act.

Section 15(A) of the Coastal Management Act states that "If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the S.C. State Ports Authority declaring the proposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit."

C. AIRPORTS

Findings

Air transport is an increasingly important mode for the transportation of passengers and cargo, as has been highlighted in the discussion of coastal economy (Chapter I (D)). Airport facilities are generally of coastal zone management concern only when their construction or expansion may have significant impacts on coastal resources, for example, if extensive encroachment is proposed into productive wetland areas.

In addition to potential direct loss of unique natural habitats or valuable wetlands, the construction and operation of major airport facilities might result in water quality degradation if not properly managed, due to direct storm water discharge from paved parking or landing areas or from sedimentation and erosion. The development of adjacent land can pose a secondary concern if it may conflict with noise impact zones.

The Coastal Council supports the following goals and objectives of the South Carolina Aeronautics Commission, as summarized from the South Carolina State Airport Systems Plan, (second revision), March, 1975:

1) Provision of improved airports;
2) Expansion of scheduled air carrier service to and within the State;
3) Cooperation among State agencies with respect to airport-related highway and road access, recreation use and activity, environmental management, zoning, Federal regulation aid, and planning and plans implementation.

Policies

1) In the coastal zone, Council review and certification of airport permit applications will be based on the following policies:

a) To the extent feasible, new airport facilities shall not encroach into salt, brackish or freshwater wetlands. Permit applications involving dredge or fill to construct these facilities in wetland areas generally will be denied, unless no feasible alternatives exist or an overriding public interest can be demonstrated, and any substantial environmental damage can be minimized.

b) To the extent feasible, the best available techniques and methods shall be used during design, construction and maintenance of airports to avoid erosion or sedimentation problems and prevent concentrated runoff water from aircraft use areas, parking areas and support facilities from directly entering and degrading adjacent surface water bodies or underground resources.

c) Proposals for airport facilities must demonstrate that they will meet applicable Federal and State air quality and noise control guidelines.

2) In the critical areas of the coastal zone it is Council policy that:

a) "Airports should be located inland from coastal wetland areas to the extent feasible." (R. 30-12 (F)(2)(a))

b) "Where wetlands will be destroyed, the productivity of these lands should be identified and weighed against public need in consideration of the project by the Council." (R. 30-12 (F)(2)(c))

3) The Council also **recommends** that the following policies be considered for airport projects in the coastal zone:

a) Consideration of the existing and planned transportation system or network in the area, for example, relationship to other airports and access to adequate transportation service by other modes.

b) Encouragement of joint-use or regional airport facilities where feasible (for example, joint military and civilian airports).

c) Compatibility with character and use of the area; local governments are encouraged to develop plans and procedures which maintain appropriate, compatible use areas around **existing** airports.

d) Alignment of approach corridors and corresponding noise zones during airport planning should consider any bird rookeries located in the area.

Management Authority

The South Carolina Coastal Council has direct permit authority for all activities or alterations in the

critical areas of the coastal zone. This jurisdiction would include any proposed airport facilities located in the critical areas – beaches, primary sand dunes, coastal waters and tidal wetlands (salt and brackish).

The Aeronautics Commission has direct regulatory authority over the design, layout, location and other aspects of landing fields and landing strips for the State. Certificates of approval are required from the Commission in order to operate or establish an airport. After approval of the coastal management program by the Governor and General Assembly, a system of review and certification of other State agency permits and actions will be implemented. Aeronautics Commission certificates in the coastal zone will be reviewed by the Coastal Council, based on the preceding policies, as mandated in Section 7(A) and 8(B)(11). A Memorandum of Agreement facilitates the cooperative efforts of the two agencies.

Most airport facilities also involve Federal Aviation Administration (FAA) approval and/or financing, so these activities will be subject to A-95 review by the Coastal Council, and in some instances, Environmental Impact Statement (EIS) review.

D. RAILWAYS

Findings

Railroads are a principal means of transporting industrial, commercial and agricultural goods to market in coastal areas of South Carolina. They serve as an important supplement for other transportation modes, for example, linking industrial and manufacturing sites to port facilities. While passenger travel has diminished and railroads, generally, have declined in other parts of the nation, to a large extent they retain their economic importance in South Carolina.

The possible negative environmental effects associated with development of new railroads are similar to the impacts of roads and highways. These include:

1) loss of valuable wetland habitats if extensive dredge or fill is required;
2) disruption of water flow and circulation if properly designed bridges or other means to provide circulation are not utilized;
3) degradation of adjacent water quality if storm water runoff and sedimentation are not adequately controlled during construction and operation.

Sound management practices and implementation of the following policies will reduce the potential for these environmental problems when new railroad corridors are selected and developed.

Policies

1) In the coastal zone , Council review and certification of railway permit applications will be based on the following policies:

a) Railways shall be located away from salt, brackish or freshwater wetlands, to the extent feasible. In cases where these wetlands cannot be avoided, bridging rather than filling to create railway beds will be required wherever feasible.

b) Railroad structures through salt, brackish or freshwater wetlands or water bodies must be designed so as not to alter natural waterflow or circulation. Where bridging is not feasible, provision of adequate culverts or other means for water to flow through or under the structure will be required.

c) Bridges over navigable water bodies must provide adequate clearance for commercial or pleasure craft, where appropriate.

d) Railway projects in wetland or water areas are strongly encouraged to include provision for placement of other utilities, such as cables or transmission lines, in their design to reduce the need for future disruption of adjacent wetlands or waterways.

e) To the extent feasible design of railways shall include techniques to prevent direct drainage of runoff water into adjacent water bodies and stabilization of embankments to minimize erosion and water quality degradation due to sedimentation.

f) Conversion of abandoned railroad tracks, bridges and rights-of-way in the coastal zone for reuse as transportation or utility corridors or for recreational uses, such as fishing piers or bicycle trails, is encouraged.

g) The extension of new railway corridors should be based on comprehensive evaluation of the need to provide improved access to existing industrialized areas, or to planned or proposed developments suitable for manufacturing sites.

2) In the critical areas of the coastal zone , it is Council policy that:

a) "....Railways should be located inland from coastal wetland areas to the extent feasible.

b) In some cases where wetlands cannot be avoided, bridging should be employed to the extent possible, rather than filling and embankment to create roadbeds.

c) Where wetlands will be destroyed, the productivity of these lands should be identified and weighed against public need in consideration of the project by the Council.

d) Structures over water should be designed so as not to alter the natural waterflow and circulation regimes or create excessive shoaling. Adequate clearance for commercial and pleasure craft should be provided.

e) Embankments and fill areas shall be stabilized by utilizing appropriate erosion devices and/or techniques in order to minimize erosion and water quality degradation problems." (R. 30-12 (F)(2)a-d, h)

3) The Council also **recommends** that the following policies be considered for railway projects in the coastal zone:

a) Minimizing possible aesthetic impacts from placement of rail lines and bridges,

b) Integrating railroad planning and development with other transportation facilities, in order to provide adequate transportation systems; for example, where feasible, new highway bridges might be designed to include railways (especially in urban areas where land is more limited and transportation needs are greatest).

c) In floodplain areas railway alignment should parallel the path of water flow, to the extent feasible, in order to minimize disruption of the floodplain ecosystem.

Management Authority

Proposed new railroad construction activities located in any critical areas will require a permit directly from the Coastal Council. These projects will be reviewed according to the Rules and Regulations for Permitting, which are restated here as Council policies for the critical areas.

Outside the critical areas, but within the eight-county coastal zone, the Council will review and certify permit applications to other State agencies involved in railroad projects, based on the preceding policies. The Memoranda of Agreement with these agencies outline the review process as mandated under Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act of 1977.

Section 15(A) of the Coastal Management Act states that: "If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the South Carolina State Ports Authority declaring the proposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit."

The Budget and Control Board retains permit authority in State waters below mean high water (MHW) in those portions of the coastal zone beyond the critical areas. Any dredging and/or filling or placement of facilities below MHW for railroad construction will have to receive this Budget and Control Board permit. As addressed in the MOA between these two agencies, the Coastal Council then reviews and certifies the permit for compliance with coastal policies.

The Public Railways Commission is authorized to acquire land, including through condemnation, for construction and operation of railroads and related facilities in South Carolina. Activities of the Railways Commission will be subject to the terms of the future MOA between the Commission and the Coastal Council. (Private railroad companies have the same condemnation powers and authority to construct railroads and associated facilities. Railroad company projects will be subject to Coastal Council, Budget and Control Board, and other applicable permit requirements.)

The State Development Board may also build or acquire railroads as part of its mandate to promote th transportation systems of the State for improved trade, commerce and employment. Development Board pro-

jects are coordinated closely with the Coastal Council, as outlined in the MOA. Any State permits associated with Development Board railway projects in the coastal zone would be subject to review and certification by the Coastal Council.

In some instances, railway projects may also require Federal permits, subject to review and comment and to the Federal consistency provisions of the Coastal Council.

E. PARKING FACILITIES

Findings

Parking lots or garages and other parking structures are of coastal management concern only if they might infringe on valuable wetland areas, degrade water quality in adjacent wetland or water areas, or negatively impact a Geographic Area of Particular Concern (GAPC) or other unique and significant coastal resource. While provision of adequate parking areas is an important and necessary aspect of public and private commercial, residential and industrial development, these facilities need proper location and design to minimize possible negative impacts on coastal resources.

Policies

1) In the coastal zone, Council review and certification of permit applications for parking lots, garages or other parking facilities will be based on the following policies:

a) The filling or other permanent alteration of productive salt, brackish or freshwater wetlands will be prohibited for purposes of parking unless no feasible alternatives exist, the facility is directly associated with a water-dependent activity, any substantial environmental impacts can be minimized, and an overriding public interest can be demonstrated.

b) Proposed parking facilities must demonstrate compliance with applicable Federal and State water quality standards, specifically those addressing drainage and discharge of storm water runoff.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Nonwater-dependent structures such as parking garages have been built in the past on pilings over wetland areas. Such construction presents unnecessary encroachment on the aquatic ecosystem by shading out the underlying vegetation. Nonwater-dependent structures shall be discouraged from being sited over water and/or wetland areas. Only when public need is demonstrated and no feasible alternative sites are available should consideration be given towards approval of the proposed structure." (R. 30-12(M))

b) "Nonwater-dependent structures have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The siting of nonwater-dependent structures on the primary dunes or the beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged." (R. 30-13(D))

3) The Council also **recommends** that the following policies be considered in location and design of parking facilities:

a) Use of permeable surface materials such as gravel or shell rather than pavement, where appropriate, with consideration to possible air quality and groundwater impacts,

b) Retaining the maximum possible natural drainage and vegetative cover between parking spaces,

c) Provision of buffer areas around parking areas located adjacent to the critical areas, as visual and storm water runoff buffers.

Management Authority

The Coastal Council has permit jurisdiction over any activity altering a critical area of the coastal zone. Any proposal for a parking facility to alter a critical area must therefore obtain a permit from the Council. As stated in R. 30-12(M) of the Permitting Rules and Regulations, parking facilities are nonwater-dependent and

are discouraged from being sited in critical areas.

The Budget and Control Board regulates the use of land below mean high water outside the critical areas of the coastal zone. A permit to construct parking facilities on such land is required from the Budget and Control Board. The Department of Health and Environmental Control has permit jurisdiction over the construction and use of parking facilities if the storm water discharge from such a facility has been identified as a significant contributor to pollution. (Otherwise such facilities are exempt from the Department's National Pollutant Discharge Elimination System permit program.) The Council reviews and certifies the permits of these two agencies for compliance with the preceding coastal management policies, pursuant to Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act of 1977.

III. COASTAL INDUSTRIES

The South Carolina Coastal Management Program is concerned with promoting and maintaining a healthy coastal economy, as well as safeguarding coastal natural resources. To achieve this balance of development and environmental protection, there is need for sound management of the wide variety of coastal industries.

The coastal zone is unique in many of the resources necessary for particular water-dependent industrial activities, as well as its recreational and residential potential. But suitable site locations are limited, and many of the resources are finite. Competition for use of the coastal zone intensifies with growth and development.

This growth and development is increasing in South Carolina, with positive economic benefits but with potential negative environmental impacts. The importance of the following policies on coastal industries lies in the need to respond to these diverse economic interests, thereby furthering the well-being of coastal residents, while still protecting and conserving the unique, often fragile natural resources.

A. AGRICULTURE

Findings

The per acre value of farmland in the U.S. increased 9% in the year ending February, 1978. (**Land Use Planning Report**, May 1, 1978) Changing global weather patterns and resulting food shortages, increasing world population, inflationary pressures on food prices, the U.S. balance-of-payments and the possible offsetting role of farm products, low farm income, and loss of prime agricultural land to other uses have made agriculture a serious concern for coastal management.

Agriculture is a significant economic pursuit in South Carolina's coastal zone. In 1975, the eight county area had a 23 percent share of the State's crop lands, and 23 percent of the cash receipts earned by South Carolina farmers from marketing crops. (Stepp, James; **The Coastal Economy of South Carolina**, 1978) This contribution indicates the need to accommodate this industry in the coastal zone, which boasts favorable soils and climate for a variety of crops and livestock. Much of the land area suitable for farming is also highly desirable for other types of urban development; so as the coastal zone continues to grow there will be increasing pressure for conversion of agricultural areas.

While agriculture is a positive benefit to the economy and provides a source of food and fiber for citizens of the coastal zone, the State and the nation, there are potential negative effects on the coastal environment unless best management practices are employed:

> Water is also a significant output. With the exception of wind erosion and pesticide drift from aerial application, almost all agricultural pollution is associated with runoff from land being used for agricultural purposes...By volume, sediment is the most important agricultural non-point source pollutant. The process of erosion has been identified as the single most significant reaction that directly affects the coastal environment.
>
> (Hart, Robert D., "Cropland Pollution Control" in Clark, **Coastal Ecosystem Management**, 1977, p. 595)

The other potential water pollution sources include nutrients, such as nitrogen and phosphorus, which occur naturally in soil and are added as fertilizers. Elevated nutrient levels may result in oxygen depletion and resulting eutrophication of coastal waters.

In this State, the U.S. Department of Agriculture, the S.C. Land Resources Conservation Commission, and the local Soil and Water Conservation Districts have for years realized that conserving soil not only leads to more productive land, but also ensures higher water quality in our streams and reservoirs.

Policies

1) In the coastal zone, Council review and certification of permits related to agriculture will be based on the following policies:

a) The Council supports the utilization of coastal resources for productive agriculture in the coastal zone, particularly on prime agricultural lands (as defined by the U.S. Department of Agriculture and

South Carolina Land Resources Conservation Commission), as a positive element of coastal economy and to provide sources of food and fiber products to citizens of the State and nation.

b) To reduce negative impacts on productive tidal salt, brackish and freshwater wetlands:

i) The filling or other permanent alteration of these tidal wetlands for the raising of crops will not be approved;

ii) Ditching for drainage from uplands shall avoid passing through productive wetlands to the maximum extent practicable.

c) To minimize negative impacts on water quality from sedimentation and erosion, applicants for permits relating to agricultural activities are encouraged to work closely with the local Soil and Water Conservation District to obtain assistance in reducing sedimentation and erosion problems. Modern conservation techniques recommended by the local Soil and Water Conservation Districts and the U.S. Department of Agriculture Soil Conservation Service should be utilized, including:

i) Methods or techniques such as contouring should be used to reduce direct surface water runoff into adjacent wetlands or water bodies;

ii) Maintenance and utilization of the natural drainage pattern of the land is encouraged as much as possible;

iii) Use of buffer strips of natural vegetation along the edge between watercourses and cultivated soils is encouraged.

d) Best management practices (and any resultant regulations) designed to control nonpoint source runoff that are developed as part of the 208 Water Quality Planning process should be implemented through the management of agricultural activities. Those engaged in agricultural activities are encouraged to contact and work closely with the local 208 planning agency and the local Soil and Water Conservation Districts.

2) In critical areas of the coastal zone it is Council policy that:

a) The policies for dredging and filling (R. 30-12(G)) and construction of canals and pipelines (R. 30-12(D) and (1)) shall be applied when these activities are involved in agricultural use in the critical areas.

3) The Council also **recommends** that the following policies be considered with regard to agricultural use and practices in the coastal zone:

a) Encouraging the utilization of detailed soil surveys prepared by the National Cooperative Soil Survey (which includes Clemson University Experiment Station, U.S. Department of Agriculture - Soil Conservation Service, and S.C. Land Resources Conservation Commission);

b) That local land use plans include considerations for protecting agricultural lands from premature or undesirable conversion into other development activities;

c) Encouraging the full implementation of 12-43-220 of the Code of Laws of South Carolina (1976) by local governments within the coastal zone to allow property tax incentives to protect farmlands from conversion to other uses.

d) That the soil testing facilities of Clemson University be utilized to determine the correct types and amounts of fertilizers to be applied to agricultural lands.

Management Authority

The Coastal Council has permit jurisdiction over any activity which in any way alters a critical area of the coastal zone. Therefore, any agricultural activity that directly alters a critical area must have a permit from the Council.

Outside of the critical areas of the coastal zone there are few direct controls over agricultural activities. The Soil and Water Conservation Law (§ 48-9-1210-1320), administered by the S.C. Land Resources Conservation Commission empowers local Soil and Water Conservation Districts to adopt rules and regulations, after public referenda, to control soil erosion. As mandated by Section 7(A) this authority will be administered in conformance with policies of the approved coastal program.

State and local Areawide Waste Treatment Management Plans, under Section 208 of the Federal Water

Pollution Control Act (Public Law 92-500) are also authorized to address agricultural best management practices in terms of non-point source water pollution. Development and implementation of these planning and regulatory efforts is closely coordinated with the Coastal Council.

The South Carolina Budget and Control Board retains direct regulatory authority over activities below mean high water in the coastal zone outside the critical areas. These permits are reviewed and certified by the Coastal Council, as mandated in Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act.

B. **FORESTRY** (Silviculture)

Findings

Forestry is an important coastal industry, with the coastal zone producing 17 percent of the State's pulpwood production and 30 percent of the physical volume of other forest products in 1975. (Stepp, **The Coastal Economy of South Carolina**, 1978) Forest areas also serve numerous important natural functions, such as preventing soil erosion and stabilizing runoff, maintaining high surface-water quality, and providing significant wildlife habitat and recreational areas.

If not properly managed, timber harvesting can have severe impacts on coastal ecosystems primarily from disrupting hydrologic systems, and it is these aspects which are of coastal management concern. Uncontrolled logging in coastal watersheds has a high potential for disruption of the complex and delicate forest ecosystem. Increased erosion of soil and nutrients as a result of deforestation can accelerate sedimentation downstream and reduce water quality. The storm water run-off from clearcut areas can be nine times that from undisturbed areas thereby causing increased flooding. (John Clark, **Coastal Ecosystem Management**, 1977, p. 373-380) These problems are less severe in the South Carolina coastal zone than other parts of the nation because of the relatively flat terrain, but still warrant concern and attention so that proper timber harvesting practices can be ensured. The processing of forest products also can cause environmental damage if proper controls are not observed for air and water effluent discharges.

Policies

1) In the coastal zone, Council review and certification of permit applications related to timber production will be based on the following policies:

a) The Coastal Council will cooperate with and support the State Forestry Commission and local Soil and Water Conservation Districts in encouraging good forest management practices on private and public lands in order to maintain a supply of good quality timber into the future, while protecting other forest values.

b) The disruption of salt, brackish or freshwater marshes for timber related activities such as drainage or access way shall be avoided to the extent feasible. Where no feasible alternatives exist to prevent distuption in these areas, project designs must include the mitigation measures as identified in the policies for each related activity-for example, roads, dredging, etc.

c) Erosion control methods are strongly encouraged for all phases of timber operations in order to reduce:

i) excessive erosion and sedimentation;
ii) detrital, nutrient and chemical or toxic runoff; and
iii) disruption of hydrologic cycles.

Logging operations should be managed so that drainage characteristics through forested and swampland areas remain, to the extent feasible, at the pre-existing water quality, volume and rate of flow.

d) The policies applicable to the processing of timber products are those for manufacturing activities ((III) (D) of the Resource Policies).

2) In critical areas of the coastal zone, it is Council policy that:
Where related activities, including drainage ditches or access road construction are proposed for

critical areas, the appropriate Rules and Regulations for that activity will apply. (Drainage ditches - R. 30-12(L); Transportation projects - R. 30-12(F))

3) The Council also **recommends** that the following policies be considered in forestry activity in the coastal zone:

a) Timber harvesting should be carried out in such a manner as to minimize effects on and protect soils, watersheds, aesthetics, wildlife, and recreational values. If damage does occur, restoration plans should be developed and carried out within a reasonable time.

b) Local land use plans should include retaining prime forest areas for sustained timber productivity in the future.

Management Authority

Any alteration of a critical area requires a permit from the Coastal Council. Applicants for forestry or related activities that alter a critical area must obtain a permit from the Council.

Outside of the critical areas of the coastal zone the State Commission of Forestry conducts forestry activities on State owned forest lands, and offers guidance and technical assistance to private timber operations including fire prevention and control practices. The Forestry Commission's authority will be administered in conformance with the approved coastal management program and the Coastal Management Act, as mandated by Section 7(A) and through the Memorandum of Agreement (MOA) executed between the S.C. State Commission of Forestry and the Coastal Council.

The Budget and Control Board has jurisdiction for issuance or denial of the State permit for activities below mean high water (MHW) in the rest of the coastal zone outside the critical areas. These permit applications are subject to the review and certification authority of the Coastal Council, as mandated by Sections 7(A) and 8(B)(11) of the Coastal Management Act.

C. MINERAL EXTRACTION

Findings

Many mineral resources of great economic value may be found in the coastal zone, in tidal rivers and coastal waters and on the Continental Shelf under Atlantic Ocean waters. In addition to oil and gas, which are addressed separately under Energy and Energy-related Facilities, these minerals include sand, gravel, shell, salt and phosphates. They can be found on the surface, subsurface or in solution in the water.

Disturbances from mining activities may have physical, chemical and biological effects on coastal resources. These potentially adverse impacts are primarily associated with the loss of wetlands by dredging and/or filling, degragation of water quality, production of vast amounts of sediments and possible contamination of groundwater resources. Mineral extraction activities may have adverse topographic, physical or chemical effects if not properly conducted, and therefore, these activities are of concern for coastal management.

Policies

(Existing, active mining sites have been designated as Geographic Areas of Particular Concern (GAPCs) in the coastal zone, because of their unique mineral resource value and potential as development activities dependent on locating in the coastal zone.)

1) In the coastal zone, Council review and certification of mining permit applications will be based on the following policies:

a) Applicants for mining permits must submit an approved reclamation plan, as required by the Land Resources Conservation Commission under the S.C. Mining Act.

b) Dredge or strip mining operations are prohibited in wetland areas, unless no feasible alternatives exist and the benefits of mining outweigh the adverse impacts. If all or part of a mining site must involve

water bodies or wetland areas, policies for dredging (VIII (A) of the Resource Policies) shall apply.

c) To minimize negative impacts on water quality, the prevention of direct stormwater discharge from upland sites into adjacent wetlands or water bodies is required whenever possible through inclusion of such techniques as use of vegetated buffer areas, silt curtains and other erosion or sedimentation control methods. Negative effects on groundwater resources should also be avoided.

2) In critical areas of the coastal zone, it is Council policy that:
Policies for dredging activities (VIII of this section) and R.30-12(G) shall apply to mining operations.

3) The Council also recommends the following policies be considered in mining activities in the coastal zone:

a) Provision of scenic buffer areas around active mining sites;

b) That study of mineral resources be made before land is committed to development, and those areas found to contain significant mining resources be identified in local land use plans.

Management Authority

The Coastal Council has authority for a direct permit requirement for mining operations in critical areas of the coastal zone, based on Sections 5(E)-(I), and Section 13 of the S.C. Coastal Management Act of 1977.

In the coastal zone, within and outside the critical areas, the S.C. Land Resources Conservation Commission is responsible for implementation of the S.C. Mining Act. A permit, terms of which include a complete site reclamation plan, is required for any mining operation. The Coastal Council's review and certification of these permits, as required by Sections 7(A) and 8(B)(11) of the Coastal management Act, is confirmed by the Memorandum of Agreement between these two agencies.

Where mining operations extend below mean high water (MHW) outside the critical areas, the Budget and Control Board also has permit jurisdiction. These permit applications are subject to the review and certification procedure of the Coastal Council, as required by Sections 7(A) and 8(B)(11) of the Coastal Management Act.

The S.C. Department of Health and Environmental Control has authority over most mining operations for point-source discharge permits (NPDES) or best management practices (for non-point source runoff, under 208 Areawide Waste Treatment management planning).

Where mining operations are located in designated capacity use areas and groundwater pumping is required, a capacity permit is required from the Water Resources Commission.

D. MANUFACTURING

Findings

Coastal areas are attractive to five major types of industrial manufacturing:

1) Industries that benefit from location near low-cost water transportation systems;

2) Industries that derive power from water or use water for manufacturing processes or cooling purposes;

3) Industries that benefit from location near coastal population centers, but do not have direct dependence on water use or access;

4) Marine transportation industries;

5) Industries that depend directly on the marine environment for raw materials (Clark, J., 1978, **Coastal Ecosystem Management).**

The growth and development of manufacturing uses is increasing in the South Carolina coastal zone, with potential for positive economic benefits. Manufacturing plants are a source of both employee payrolls and property tax revenues. New and existing industries can provide a diversified economic base, complementing government employment (military) and the long-standing importance of agriculture, forestry and fishing.

While potential benefits exist, so do possible negative impacts associated with manufacturing uses if they are not properly managed. "Waste disposal, oil spills and the escape of toxic materials in aquatic ecosystems are all unfortunate by-products of industry which affect the coastal environment." (Ketchum, B., 1972, **The Water's Edge**, p. 107)

In addition to water and air pollution discharges, the possible environmental impacts of industrial development in the coastal zone include:

- possible destruction of wetlands and the associated flora and fauna, by filling, dredging and/or draining for site preparation;
- impacts on soil erosion and flood control as effects of site preparation;
- effects of site preparation and facility operation on the quality and quantity of surface and groundwater resources;
- impacts of related secondary development, such as transportation access facilities, sewage treatment plants or port development.

Not only do possible conflicts exist between industrial growth and natural systems, but between industrial activities themselves, which vary widely in the coastal zone. For example, commercial fishing depends on the same natural resource of coastal water that is also vital to some manufacturing uses for transportation, cooling water, or effluent discharge. There may be resulting negative impacts on quality from the manufacturing uses that, therefore, severely limit the viability of fishing enterprises.

The coastal zone is unique in many of the resources necessary for particular water-dependent industrial activities, as well as its recreational and residential potential. But suitable site locations are limited, and many of the resources are finite. Competition for use of coastal zone resources intensifies with growth and development.

At this juncture, the State's coastal zone still retains many miles of unspoiled coastline, and acres of productive marshes and forest and farmlands. Heavy manufacturing is relatively limited in the coastal zone. The importance of the following policies on coastal manufacturing lies in the need to respond to diverse industrial interests, thereby furthering the economic well-being of coastal residents, while at the same time protecting and conserving the unique, often fragile, natural resources.

Policies

1) In the coastal zone, Council review and certification of permit applications for manufacturing and related activities will be based on the following policies:

a) Nonwater-dependent manufacturing or industrial facilities will be prohibited from locating in shorefront areas unless there are no feasible alternatives. Nonwater-dependent industries will be encouraged to locate in inland areas.

b) The filling or other permanent alteration of productive fresh, brackish and saltwater wetland areas for manufacturing facilities and related activities or structures will be prohibited, unless no feasible alternatives exist and any substantial environmental impact can be minimized. To the extent feasible heavy industry shall be directed away from ecologically sensitive areas such as marshes, forested wetlands, pocosins, etc.

c) Manufacturing operations and sites should be designed and constructed to reduce erosion and sedimentation, and to limit the impacts from direct stormwater discharge into adjacent water bodies and wetlands. Persons proposing to develop manufacturing activities are requested to contact and work closely with the local Soil and Water Conservation District in the county for assistance in developing site plans which reduce sedimentation and drainage problems. Applicants must demonstrate consideration of the following means of reducing these problems and use of these methods where appropriate:

i) Provision of a buffer strip of natural vegetation between the facility and the wetland's edge. This vegetated area should be sufficient in each case to serve its intended purpose: providing a visual screen, a noise buffer, a purification system for stormwater runoff, or a protective area for more ecologically sensitive shoreline areas, especially fringing wetlands;

ii) During site preparation, care should be taken to control storm runoff, soil erosion, and accidental placement of sediments in wetland areas;

iii) The use of permeable surfaces in parking lots and bulk storage areas to provide water recharge areas and minimize the effects of stormwater runoff;

iv) Retain open space or natural (undisturbed) areas around manufacturing sites as buffer zones and recharge areas.

d) Manufacturing facilities must meet the applicable water quality and effluent limitation standards of the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control, under the National Pollution Discharge Elimination System, Sectons 401 and 402 of the Federal Water Pollution Control Act Amendments (Public Law 92-500). In some cases, pretreatment of industrial wastes before introduction into public waste treatment systems may be required, based on local 201 and 208 Waste Treatment Management Plans, as developed under the Federal Water Pollution Control Act. Siting of industrial facilities is encouraged in areas where waste discharges present the least ecological threat - for example, in areas where disruption of wetlands can be avoided or minimized, in areas with good tidal flushing and water circulation and along watercourses with relatively low water quality classifications.

e) Manifacturing facilities must meet applicable State and Federal air pollution standards and controls, as based on the National Clean Air Act, as amended (P.L. 91-604).

f) In instances where groundwater resources will be utilized either in the processing or effluent discharge stages of the production process, the project shall:

i) meet existing standards and/or management programs of the Water Resources Commission,

ii) prevent saltwater intrusion and land subsidence, to the extent feasible,

iii) where feasible, provide natural vegetated areas on the site where aquifer recharge can occur to mitigate the impacts of groundwater withdrawals.

g) When located in flood zone areas, manufacturing sites and structures must meet applicable floodplain management and construction requirements, as based on the Federal Flood Insurance Program.

h) To the extent feasible new water-dependent industries shall locate on already maintained channels of rivers to reduce the need for dredging of new channels. Where no presently maintained channel exists and one becomes necessary, the policies for dredging (VIII of the Resources Policies) will apply.

i) Dock or pier and berthing facilities associated with a manufacturing activity shall be designed to minimize possible negative impacts. The policies for docks and piers or other associated activities will apply.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Nonwater-dependent structures have been built in the past on pilings over wetland areas. Such construction presents unnecessary encroachment on the aquatic ecosystem by shading out the underlying vegetation. Nonwater-dependent structures shall be discouraged from being sited over water and/or wetland areas. Only when public need is demonstrated and no feasible alternative sites are available should consideration be given towards approval of the proposed structure." (R. 30-12 (M))

b) "Nonwater-dependent structures have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The siting of nonwater-dependent structures on the primary dunes or the beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged." (R. 30-13(D))

c) "The creation of commercial lots strictly for private gain is not a legitimate justification for the filling of wetlands. Permit applications for the filling of wetlands and submerged lands for these purposes shall be denied, except for erosion control (see R. 30-12(C)) or boat ramps (see R. 30-12(B)). All other dredge and fill activities not in the public interest will be discouraged." (R. 30-12(G)(a)).

d) Where other activities are associated with manufacturing development, such as construction of navigation channels, boat docks, or transportation access, the policies for that particular activity shall apply.

3) The Council also **recommends** that the following policies be considered in planning for or siting of manufacturing uses in the coastal zone:

a) Siting of industrial plants where they are served with existing well-developed road and railroad links to port areas and to major arterial transportation routes;

b) Development of local plans which direct manufacturing growth into areas committed to industrial use where services can be most readily provided;

c) Development of local plans which encourage comprehensive-type industrial parks, to facilitate well-planned, well-managed manufacturing and industrial centers that promote the advantages of locating in South Carolina;

d) Encouraging manufacturing that will provide significant new employment opportunities for coastal residents;

e) Considerations for minimizing noise and aesthetic impacts of manufacturing activities;

f) Consideration for allowing limited public access to the buffer zone as a recreational area.

Management Authority

Any manufacturing use or related activity proposed for the critical areas of the coastal zone would be required to obtain a permit from the Coastal Council. The policies for any related activity, and the procedures of the Rules and Regulations for Permitting would apply.

In the coastal zone outside the critical areas, the Council will review and certify the permits and projects of other State agencies to insure compliance with the Coastal Management program, as mandated in Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act of 1977.

The Budget and Control Board has authority for issuance of permits for activities below mean high water. Applications for these permits are reviewed and certified by the Council for compliance with the coastal management program.

Throughout the coastal zone, the Department of Health and Environmental Control is the State implementing agency for water quality and air quality standards. Permit applications for water and air discharges are subject to certification and review by the Council.

While not a permit agency, the State Development Board has the responsibility for planning and coordination to promote improved trade, commerce and employment opportunities in the State. Included in the Board's specific authority is promotion of industrial development. When appropriate, the Coastal Council will coordinate and support programs and projects of the Board to insure continued opportunities for manufacturing growth and development while at the same time maintaining sound coastal management policies.

Federal permits are required where any aspects of a manufacturing project fall under the jurisdiction of Section 10 of the Rivers and Harbors Act; Sections 401, 402 and 404 of the Federal Water Pollution Control Act Amendments; and the National Clean Air Act (P.L. 91-604, amend.). These permit applications are reviewed and certified by the Coastal Council, and are subject to Federal consistency provisions.

E. FISH AND SEAFOOD PROCESSING

Findings

Commercial fisheries are a significant contributor to the South Carolina coastal economy. The 1975 data for dock-side value of commercial fish landings was over $13 million. (Stepp, **The Coastal Economy of South Carolina.**) Development and use of fisheries resources certainly are water-dependent activities which can only take place in coastal waters and adjacent areas. The "Living Marine Resources" segment (Chapter IV (E)) details the fin-fish and shellfish resources of the coast, the vital link to marsh and other ecosystems and the policies for their management.

Seafood processing can have negative impacts on coastal resources, particularly water quality. While the dumping of waste fish or parts of fish can be viewed as a return of nutrients or energy to the ecosystem, the high concentrations of nutrients may result in euthrophication of near-shore waters if adequate water circulation is not present. Also, wastewater discharges must be monitored to insure that by-products of the processing operation do not degrade water quality. Because of the necessity for proximity to the shoreline, seafood processing can pose loss of wetland habitat if extensive dredging or filling are proposed for these facilities.

Policies

1) In the coastal zone, Council review and certification or permit applications for seafood processing

plant proposals will be based on the following policies:

a) Drainage or discharge from any proposed seafood packing or processing operations must meet applicable State and Federal water quality standards.

b) Proposed seafood processing operations must comply with policies for dock and piers, and dredging and filling, where applicable.

c) To the extent feasible fish and seafood processing operations shall not be located where there would be significant adverse impacts on salt, brackish or freshwater wetlands. Filling or other permanent alteration of these wetlands for such purposes will be denied unless no feasible alternatives exist and the public benefits outweigh the adverse impacts.

d) Adequate facilities for proper handling of sewage, litter and other waste products must be provided at the site of new docking areas associated with seafood processing.

e) Care must be exercised in the discharge of water used to pump out the holds of fishing vessels so that water quality is not unnecessarily degraded and so that such discharges comply with applicable Department of Health and Environmental Control and U.S. Coast Guard regulations.

2) In critical areas of the coastal zone, it is Council policy that:

a) If dredging or filling is required for construction or maintenance at a seafood processing plant, policies for dredging activities (VIII of the Resources policies; R. 30-12(G)) shall apply.

b) Policies for docks and piers (VI(C) of the Resources Policies; R. 30-12(A)) shall apply to these industrial/commercial facilities, where applicable.

c) "The ceration of commercial lots strictly for private gain is not a legitimate justification for the filling of wetlands. Permit application for the filling of wetlands and submerged lands for these purposes shall be denied, except for erosion control or boat ramps." (R. 30-12(G)(a))

d) Where marina or dock and pier-type construction is included, project proposals shall include facilities for the proper handling of petroleum products, sewage, litter, waste and other refuse..." (R. 30-12(E)(H).

3) The Council also **recommends** that the following policies be considered in fish and seafood processing operations in the coastal zone:

a) Consideration should be given to the utilization of fish wastes or by-products for meal or fertilizers.

Management Authority

In the critical areas of the coastal zone, the Coastal Council has direct permit authority over seafood processing plants and related facilities.

In the rest of the coastal zone, the Council will review and certify the permit applications of several other State agencies. The first is the Budget and Control Board, which has jurisdiction outside the critical areas for activities below mean high water, in wetland areas and submerged bottoms.

The Department of Health and Environmental Control (DHEC) has permit authority for direct wastewater discharges, and for "401" water quality certifications for projects which require Federal permits. Through coordinated, joint efforts of both agencies, the Council will review and certify DHEC permits for their compliance with coastal policies.

Federal permits may also be required for dredging or filling, construction of docking areas, and for wastewater discharged associated with seafood processing.

F. AQUACULTURE

Findings

Continuing world population growth and the associated increasing demand for food resources recently have focused more attention on one of the least-tapped sources of protein - the oceans. Traditional fishing activities, however, are encountering problems with best use of this resource, including lack of adequate research to improve knowledge of and techniques for long-term management, and lack of capital for development of

more efficient fishing methods.

Also, unrestricted development of coastal areas with its associated water pollution has led to destruction of some productive habitats and fishing areas and more limited harvests. To expand the potential of fisheries resources, increase protein production and reduce the cost per pound for the product, land-based or near shore culturing of fish or shellfish - aquaculture - is receiving increased attention. At present, the technology and cost of cultured seafood products is not competitive. However, with increasing energy and labor costs, aquaculture of some species, as an important coastal industry, may be a reality in the near future.

There are potential impacts associated with aquaculture activities which qualify them as having direct and significant impact on coastal resources. Since most aquaculture systems require large amounts of flowing water and surface area to be cost effective, tidal wetlands may be earmarked for diking to create impoundments for culture activities. This diking, while essential for proper culture management, may be more detrimental to the ecosystem as a whole since the function of the wetlands as biological filters and nursery areas for a variety of species and not just a "cultured" few will be lost. Therefore, it is important to weigh carefully food supplied by intensified management against food supplied by natural processes.

Policies

1) In the coastal zone, Council review and certification of aquaculture permit applications will be based on the following policies:

a) The impoundment of previously undisturbed, productive salt, brackish or freshwater wetlands for aquaculture will be prohibited where other feasible alternatives exist.

b) Aquaculture proposals must demonstrate compliance with applicable State and Federal water quality standards for discharge or drainage.

c) For each aquaculture proposal the value and yield which is anticipated from the project should be weighed against any environmental damage, such as loss of habitat from impounded areas. This consideration will be included by the Council in its decision-making, and applicants may be asked to provide relevant information towards the determination of such costs and benefits.

d) Applicants for aquaculture operations must provide an acceptable management plan for the operation.

2) In critical areas of the coastal zone, it is Council policy that:

a) Policies for dredging and filling and for marsh impoundments will be applied to aquaculture projects, where appropriate (R. 30-12(G) and (K)).

3) The Council also **recommends** that the following policies be considered in planning and research for aquaculture projects in the coastal zone:

a) Encouraging research efforts for "passive aquaculture" as opposed to use of artificial impoundments including:

i) fixed structure aquaculture (for example, setting supports and lines. This should be limited to open water areas where they can be placed on the periphery and not interfere with navigation);
ii) tray culture for shellfish;
iii) penning areas for soft shell crabs;
iv) trap culture for fish;
v) bottom culture, to avoid navigational problems;
vi) "agrarian" approaches, such as mechanized harvesters, seed beds, and restocking.

Management Authority

Any aquaculture activity that alters a critical area required a permit from the Coastal Council. The Final Rules and Regulations for Permitting apply to aquaculture activities which alter a critical area.

Outside of the critical areas in the coastal zone the Budget and Control Board has permit authority for uses of land and water below mean high water. Permit applications for aquaculture activities are subject to review

and certification for coastal management program compliance by the Coastal Council, under Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act. This certification authority extends to permits for impoundments or any other activity requiring a Board permit.

The Department of Health and Environmental Control has regulatory authority over aquaculture since many operations require an NPDES point-source discharge permit. The Wildlife and Marine Resources Department has regulatory authority over the living marine resource management aspects of aquaculture. In addition, the Wildlife and Marine Resources Department leases coastal bottoms for shellfish production. This regulatory authority must be administered in compliance with the approved coastal management program and the Coastal Management Act. The Council is granted enforcement authority for such compliance under Section 7(A) of the Act.

IV. COMMERCIAL DEVELOPMENT

Findings

The increasing number of commercial activities in the coastal zone is an integral part of growth. As population density increases, the commercial activities associated with residential and industrial development and coastal recreational activity will constantly expand to serve the varied needs of the people who live and visit in the coastal zone. South Carolina follows the typical pattern of higher population densities along the immediate coast than inland. In addition, the South Carolina beaches and barrier islands attract large numbers of visitors each year, and that portion of commercial activity which supports the tourist trade is a very significant aspect of coastal economy.

When evaluating the impacts associated with commercial activity, both the large-scale development and the cumulative effect of many small activities must be carefully considered. Commercial development requires not only buildings but also roads, parking lots, storm drain systems, water treatment facilities, etc., all of which have potential negative impacts. For example, increased development of buildings in flood prone areas or storm hazard areas which are not constructed adequately can raise the flood height and increase the loss of life and property. Disturbance of the natural drainage system by excessive clearing of vegetation, large areas of impermeable surfacing, etc. can cause soil erosion, sedimentation, contamination of coastal waters and a lowering of the water level in freshwater aquifers.

The solution to these and many other varied problems and potential negative impacts is not to stop development. Instead, the encouragement of certain types of construction, site preparation, and development standards can allow coastal resources to function naturally and regenerate themselves. In this way, commercial development which the people need and want can take place with minimum negative effects on coastal resources. Because much of South Carolina's coastal zone is still undeveloped, the State has a unique opportunity to develop in the least disruptive manner.

Policies

1) In the coastal zone, Council review and certification or permit applications for commercial buildings will be based on the following policies:

a) For locations immediately adjacent to the shoreline, water-dependent commercial activities will be given priority consideration. Water-dependent is interpreted here to include activities which functionally require access to shoreline, for example, ship or boat repair or commercial fishing. Second priority will be given to water-related commercial uses which are significantly enhanced economically by proximity to the shoreline, for example, motel or restaurant activities.

b) Commercial proposals which require fill or other permanent alteration of salt, brackish or freshwater wetlands will be denied unless no feasible alternatives exist and the facility is water-dependent. Since these wetlands are valuable habitat for wildlife and plant species and serve as hydrologic buffers, providing for storm water runoff and aquifer recharge, commercial development is discouraged in these areas. The cumulative impacts of the commercial activity which exists or is likely to exist in the area will be considered.

c) Location of new commercial development in riverine and coastal areas where flooding has been a recurring, serious problem is discouraged. Within the 100-year flood plain of coastal waters, commercial development must meet the existing Federal Insurance Administration (Department of Housing and Urban Development) national building standards. Inclusion of buffer areas and protection of salt, brackish and freshwater wetlands will help absorb flood water surges and is encouraged in commercial development plans.

d) Drainage plans and construction measures for commercial development should be designed to lessen or eliminate erosion, water quality degradation and other negative impacts on adjacent waters and wetlands - for example, through buffering and filtering runoff water, use of naturally vegetated and permeable surfaces rather than paving, and grass-ditching and surface drainage rather than direct storm water discharges. Best management practices developed as part of the Areawide 208 Waste Treatment Management Program should be implemented through the management of major new commercial developments.

e) Adequate sewage disposal systems (septic tanks or treatment systems), meeting Federal Environmental Protection Agency, South Carolina Department of Health and Environmental Control, and local health department standards must be provided in new commercial development.

f) Shorefront commercial development that disrupts existing public access will be prohibited. Developers of commercial property on immediate beach or river-front are strongly encouraged to provide such area for general public use in their plans. Policies in the Beach and Shoreline Access segment, Chapter IV (D), will be considered in review of commercial activities.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Nonwater-dependent structures such as parking garages, apartments, restuarants, and shops have been built in the past on pilings over wetland areas. Such construction presents unnecessary encroachment on the aquatic ecosystem by shading out the underlying vegetation. Nonwater-dependent structures shall be discouraged from being sited over water and/or wetland areas. Only when public need is demonstrated and no feasible alternative sites are available should consideration be given towards approval of the proposed structure." [R.30-12(M)]

b) "Nonwater-dependent structures such as commercial and residential buildings have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The siting of nonwater-dependent structures on the primary dunes or the beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged." [R.30-13(D)]

Management Authority

Any commercial activities and associated development which alter a critical area require a permit from the Coastal Council. Commercial buildings and structures must meet the requirements of the Final Rules and Regulations for Permitting to obtain a Council permit.

Outside of the critical areas in the coastal zone the Budget and Control Board has permit authority over the use of land and water below mean high water for any activity, including commercial developments. Council review and certification of these permits pursuant to Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act is based on the preceding coastal management policies. Similarly, permits required for certain air pollution, sewage treatment or other associated support facilities by the Department of Health and Environmental Control are also subject to Council review and certification.

V. RECREATION AND TOURISM

Findings

Recreation is physically and mentally important for people of all ages. As the leisure time of Americans continues to increase, recreation becomes an even more significant aspect of our daily lives. With expanding growth and development, the availability of open space or natural areas and of locations with adequate recreational facilities or equipment becomes a larger concern.

"More than half of all Americans vacation on the coasts and with current popluation trends, this use of the coasts will no doubt continue to expand." (Ketchum, **The Waters Edge**, 1975, pp. 12-13). Intensive studies in the early 1960's by the Outdoor Recreation Resources Commission indicated that 44% of outdoor recreation participants favored water-based activities over any others. Swimming, boating and fishing were ranked the highest. (U.S. Department of Commerce, NOAA, OCZM, **Coastal Recreation Handbook**, January, 1976).

Recreation is most certainly a booming coastal industry in South Carolina. There are a wide variety of recreational opportunities ranging from swimming, sailing and sport fishing to observing wildlife or scenic vistas. There are intensive amusement park-type receational activities such as those of the Myrtle Beach-Grand Strand area. And there are opportunities for more passive, contemplative recreation, such as walking or sitting alone on a wide expanse of beach. There are potential conflicts between these types of recreation and, hopefully, there will always be some of each type available to both citizens of South Carolina and her visitors. (Problems of Beach and Shoreline Access are discussed specifically in Chapter IV). The inevitable increasing demand for recreation in the coastal zone makes the following policies for management of recreational resources even more vital to the future of South Carolina's coastal zone.

A. PARKS (AND OPEN SPACES)

The following objectives expressed in the South Carolina Overall Outdoor Recreation Plan, 1975, by the U.S. Department of Parks, Recreation and Tourism, have been incorporated by the Coastal Council as the objectives of the Coastal Program for Parks and Recreation.

State Objectives

1) To recognize the importance of recreation as one of the basic needs to ensure the healthful and wholesome development of all citizens;

2) To provide adequate facilities, including public park lands developed for the benefit of our citizens; and

3) To ensure the significant, scenic, scientific and historic features of the State are preserved and enjoyed by all.

Definite Objectives

To relate recreation land needs to all statewide land needs and uses with special relationship to agricultural, educational, industrial, transportation and residential needs and those of significant natural, historic and cultural value. Particular consideration should be given to maintaining the ecological balance of fragile areas such as swamps, marshlands and wildlife habitats.

To ensure that natural areas for recreation purposes are designed to facilitate the safeguarding of their ecological balance.

To aid the development of the cultural potential of South Carolina by developing its historic heritage, arts and unique natural attractions for the enjoyment of residents and nonresidents.

To ensure the development of recreation facilities in areas of rapid growth and in locations that are easily accessible to the economically deprived and handicapped in order to help reduce extended private vehicular trips to recreation sites.

Policies

(A number of State parks in the coastal zone have been identified as Geographic Areas of Particular Concern (GAPCs) because of their unique value as natural areas and as important recreational use areas. The priority of uses for these specific parks is addressed in the GAPC segment, Chapter IV [A].)

1) In the coastal zone, Council review and certification of permits for parks and related facilities will be based on the following policies:

a) Water-dependent recreational uses will be given priority consideration over other types of recreational development in locations immediately adjacent to shoreline, wetlands or open water. For example, boating or swimming oriented parks would be considered water-dependent and receive priority over golf courses and tennis courts.

b) Parks and open spaces are preferred uses in wetland areas, flood prone areas, beaches, and other environmentally significant or sensitive natural areas, with due consideration for types and intensity of development which reflect the "carrying capacity" of the area to accommodate influxes of large numbers of people without destruction or disruption of natural systems.

c) Park plans and designs must incorporate the following design features where appropriate:

i) preservation of a maximum of existing natural vegetation and open space,

ii) maximum use of permeable surfaces (rather than paved surfaces),

iii) provision of adequate parking (based on "carrying capacity" of the park) or alternative transportation access located in-shore or in less sensitive areas,

iv) construction methods that mitigate erosion and other environmental damage,

d) Park proposals which include filling or other permanent alteration of productive salt, brackish or freshwater marshes will be denied, unless no feasible alternatives exist.

e) Cooperative local, State and Federal efforts to maintain or enhance existing air and water quality in and near valuable recreational resource areas.

2) In critical areas of the coastal zone, it is Council policy that:

Any park facilities which would require construction or alteration of a critical area would be reviewed for a Council permit on the basis of the Rules and Regulations for the particular type of project, for example, a dock and pier, or a walkway.

3) The Council also **recommends** the following policies be considered in the planning and design of parks and open space areas in the coastal zone:

a) Provision of nature interpretation areas and nature-oriented facilities;

b) Park structures and facilities which provide for elderly and handicapped visitors;

c) Provision of new scenic vistas to the ocean, beaches, wetlands and other natural areas, and protection and enhancement of existing scenic areas;

d) Consideration of energy use, with preference to non-motorized recreational access and activities when appropriate;

e) Analysis of the recreational potential of surplus State and Federal lands;

f) Maintenance of any fee charged for use of public recreational facilities at a nominal level;

g) Encouraging park development along utility easements and abandoned rights-of-way, and on dredge material disposal areas - especially intensive-type or active parks since these are areas of previously altered natural environment.

h) Structures which are visually compatible with natural surroundings, in terms of such factors as scale, building materials and color.

Management Authority

The Coastal Council had direct permitting jurisdiction over any proposed park facilities located in the critical areas - waters, wetlands, beaches, primary sand dunes. This is a very important aspect of park management since recreation at the water's edge is expected to be the most significant recreational demand.

Outside the critical areas, but within the coastal zone, the Department of Parks, Recreation and Tourism (PRT) will cooperate in implementation of the preceding policies of the Coastal Management Program. PRT is the lead State agency with respect to the development and maintenance of the State park system. The Memorandum of Agreement between these two agencies confirms and outlines this cooperative recreational planning effort mandated by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act.

Where any part of a proposed recreational area outside of critical areas will involve encroachment below mean high water (MHW), a permit would be required from the Budget and Control Board. These permits are reviewed and certified by the Coastal Council for their compliance with the coastal program.

The majority of public recreational facilities in the coastal zone (as throughout the State) will be financed in full or in part by the U.S. Department of the Interior, Heritage Conservation and Recreation Service. These project proposals will be subject to A-95 review as well as the Federal consistency proivisions of the coastal program.

B. **COMMERCIAL RECREATION** (tourist attractions, including, but not limited to amusement parks, boardwalks, and theme parks)

Findings

Commercial recreation or so-called "tourist attractions" are a significant economic enterprise and contribute to the success of many coastal areas in appealing to vacationers and travelers. While their construction and operation may require regulation for public safety or aesthetic reasons, these issues are primarily of local concern, in terms of local plans and building codes.

Commercial recreation facilities are of State-level coastal management concern only when they might alter a critical area, disrupt existing public access or significantly degrade water quality or other environmental factors. Observance of the following policies can ameliorate or reduce these possible negative impacts of tourist activities.

Policies

1) In the coastal zone, Council review and certification of permits for commercial recreation will be based on the following policies;

a) Proposals which include the filling, or other permanent alteration of productive salt, brackish or freshwater wetlands will not be approved unless no feasible alternatives exist.

b) For locations immediately adjacent to the shoreline, the water-dependent nature of the project must be demonstrated, particularly if adjacent wetlands or water bodies will be significantly impacted. Water-dependent is defined here to mean those activities which require access to waters of the coastal zone as an essential aspect of their primary function.

c) Construction methods and design features which minimize the possible degradation of adjacent water quality from erosion or storm water drainage are strongly encouraged, for example, use of silt screens and curtains, berm and swale drainage systems rather that direct discharge, and maintaining permeable surface rather than extensive pavement as much as possible.

d) Commercial recreation centers must demonstrate compliance with applicable State and Federal standards for sewage treatment facilities.

2) In critical areas of the coastal zone, it is Council policy that:

"a) Nonwater-dependent structures such as parking garages, apartments, restaurants, and shops have been built in the past on pilings over wetland areas. Such construction presents unnecessary encroachment on the aquatic ecosystem by shading out the underlying vegetation. Nonwater-dependent structures shall be discouraged from being sited over water and/or wetland areas. Only when public need is demonstrated and no feasible alternative sites are avaliable should consideration be given towards approval of the proposed structure.

b) Nonwater-dependent structures such as commercial and residential buildings have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The siting of nonwater-dependent structures on the primary dunes or the beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged."

3) Further, the Council **recommends** that the following policies be considered in planning for tourist attractions in the coastal zone:

a) Minimizing negative aesthetic impacts, for example, disruption of scenic vistas or significant alteration of the character of an area;

b) Development of local planning and zoning controls which address the location and design of tourist attractions;

c) Locating tourist activities in areas convenient to existing population centers rather than placement in remote areas which may encourage strip-development.

Management Authority

The South Carolina Coastal Council has direct permit authority over any activity in the critical areas of the coastal zone, including tourist-oriented or commercial recreation facilities. Therefore, the proposed construction of such structures on beachfront or primary dunes or in wetland areas is subject to permit requirements of the Council. Possible impacts on the critical areas are the major concern of these tourist developments.

In the rest of the eight county coastal zone, State permits are required from the Budget and Control Board for construction below mean high water (MHW). These permit applications are reviewed and certified by the Coastal Council for their compliance with policies of the coastal management program. This review and certification authority is mandated by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act of 1977.

The Department of Health and Environmental Control has permit authority over certain aspects of facilities open to the public, including sewage systems and other sources of environmental pollution. These permit applications are subject to the review and certification process of the Coastal Council.

In some cases where dredging or filling in waters or wetland areas would be required, such commercial recreation areas are under the jurisdiction of Federal permit authority on the basis of Sections 10 of the Rivers and Harbors Act and 404 of the Federal Water Pollution Control Act of 1972, as amended. These permits are subject to the Federal consistency provisions of the coastal management program.

IV. MARINE-RELATED FACILITIES

MARINAS, BOAT RAMPS, and DOCKS and PIERS

Findings

Marinas are facilities that provide boat launchings, storage, mooring, supplies and service. They, along with ramps and docks and piers, support an important form of water-dependent recreation and by definition must locate along shorefront areas. Recreational boating is a significant economic enterprise, as well as a leisure-time activity for its participants.

All marinas, boat ramps, and docks and piers will affect aquatic habitat to some degree, due simply to their location, the action of boats in the water and associated spills or discharges of oils and other waste materials. However, adverse effects can be minimized by utilizing proper location and design features. Along with location and design, boat ramp construction should consider the type of materials used. Unacceptable materials for ramp construction are those with potential to deteriorate from the action of waves or water and contribute to water quality degradation.

A. MARINAS

Policies

1) In the coastal zone, Council review and certification of permit applications and marina proposals will be based on the following policies:

a) To the extent feasible marinas shall locate only in areas that will have the least adverse impact on salt, brackish or freshwater wetlands and water quality.

b) To the extense feasible marinas shall be located in areas where maximum physical advantage exists and where the least initial and maintenance dredging will be required.

c) Marinas should avoid or minimize the disruption of currents. Dead-end or deep canals without adequate circulation or tidal flushing will not be permitted unless it can be determined that water quality will not be adversely affected.

d) Marina designs should minimize the need for excavation and filling of shoreline areas.

e) Provision of facilities for the proper handling of petroleum products, sewage, litter, waste and other refuse must be made in new marinas, with regard to South Carolina Department of Health and Environmental Control (DHEC) specifications.

f) In review and certification of marina permit applications outside the critical areas, the Council will consider the extent of public demand for the facilities, as demonstrated by the applicant.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Marinas should be located in areas that will have the least adverse impact on wetlands, water quality, wildlife and marine resources, or other critical habitats;

b) Marinas should not be located within 1,000 feet of open productive shellfish harvesting areas;

c) Marinas should be located in areas where maximum physical advantages exist and where the least initial and maintenance dredging will be required;

d) Marinas should avoid or minimize the disruption of currents;

e) Marina design should minimize the need for the excavation and filling of shoreline areas;

f) Open dockage extending to deepwater should be considered as a preferable alternative to the excavation of boat basins;

g) Turning basins and navigation channels shall be designed to prevent long-term degradation of water quality. Dead-end or deep canals without adequate circulation should be avoided. For example, the depth of boat basins and access channels shall not exceed that of the receiving body of water;

h) Project proposals shall include facilities for the proper handling of petroleum products, sewage, litter, waste, and other refuse with regard to the South Carolina Department of Health and Environmental Control (DHEC) specifications.

The following minimal on-shore restroom and shower facilities will be required as a condition of any marina permit so as to protect water quality of the affected waters.

No. Slips or Moorings	Toilet (Head) Men-Women	Urinals Men	Lavatories Men-Women	Showers Men-Women
1 - 20	1 - 1	1	1 - 1	1 - 1
21 - 40	1 - 2	1	2 - 2	2 - 2
41 - 60	2 - 3	2	2 - 2	2 - 3
61 - 80	3 - 4	2	3 - 3	3 - 3
81 - 100	4 - 5	3	3 - 3	3 - 3

If there are more than 100 slips, there shall be provided one additional toilet (head), lavatory and shower for each sex for each additional 40 slips or fraction thereof and one additional men's urinal for each 100 additional slips or fraction thereof.

Additional facilities are required by DHEC where restaurants, motels, laundries, and other non-water dependent structures are provided.

All pump-out and sewage facilities should be included in the public notice and certified by DHEC before permit approval. Also, DHEC can provide advice regarding the necessity of having hose connections from boats to shore-based sewage facilities where these boats are used as residences.

Trash receptacles or similar facilities should be plentiful and convenient for the proper disposal of trash, waste and noxious materials such as paints, rags and oil cans required for normal boat maintenance and repair.

Boat maintenance areas should be designed so that all bottom scraping and painting be accomplished over dry land allowing for proper control and deposition of residues, spills and storm water runoff.

i) Dry storage type marinas should be encouraged wherever possible;

j) Applications for construction of marina and commercial dock facilities will be considered by the Council only after demonstration by the applicant of public demand for the facilities;

k) Applications for marinas should include maintenance dredging schedules and dredged material removal sites when applicable." [R. 30-12 (E)(a-k)]

3) The Council also **recommends** that the following policies be considered in marina location and design:
   a) Adequacy of transporation access from the landward side,
   b) Adequacy of parking facilities,
   c) Upland facilities which are compatible with and enhance recreational boating opportunities.

Management Authority

In critical areas of the South Carolina coastal zone, permits are required from the Coastal Council for all new marina projects, including associated dredging and construction of docks, piers or other structures. (The Council's direct permit responsibility is explained in detail in the legal analysis in Chapter V [A].)

Beyond the critical areas, the creation of new marinas in the coastal zone is subject to the permit requirements of the Budget and Control Board for activities below mean high water (MHW). These permits are subject to the provisions of Sections 7(A) and 8(B)(11) of the 1977 Coastal Management Act by which the Coastal Council reviews and certifies each permit application in the coastal zone for compliance with provisions of the coastal program.

Permits may also be required from the Department of Health and Environmental Control (DHEC) if sewage treatment facilities are included as part of a marina project proposal or if 401 Water Quality Certification is required. Permits issued by DHEC in the coastal zone are subject to review and certification by the Coastal Council.

Marina facilities also require permits pursuant to certain Federal statutes which receive review and comment by the Coastal Council and its staff and will be subject to the Federal consistency provisions of the South Carolina coastal management program.

The State Ports Authority also has regulatory authority over marinas since Section 15(A) of the Act provides that:

If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the South Carolina State Ports Authority declaring the porposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit.

B. BOAT RAMPS

Policies

1) In the coastal zone Council review and certification of applications for boat ramps will be based on the following policies:

a) Filling of productive salt, brackish, or freshwater wetlands for boat ramp construction is prohibited unless no feasible alternatives exist in adjacent non-wetland areas. In addition, the amount of fill required must be minimized.

b) The following priorities are considered when justifying boat ramp location in sensitive areas:

i) public use - open to all citizens,

ii) restricted use - open only to citizens of a particular area or organization,

iii) private use.

c) Boat ramp locations requiring dredging of productive salt, bracking or freshwater wetlands to provide channel access to deep-water will be discouraged.

d) Boat ramps must be constructed of environmentally acceptable materials.

2) In critical areas of the coastal zone it is Council policy that:

a) "Boat ramp construction materials should consist of environmentally acceptable materials such as concrete or oyster shell. Environmentally unacceptable materials include, but are not limited to, asphalt roofing shingles, asphalt, and rubble;

b) Justification for boat ramp construction in environmentally sensitive areas shall be considered using the following priorities:

i) public use - open to all citizens,

ii) restricted use - open to citizens of a particular area or organization only,

iii) private use - use for one citizen or family;

c) In cases where private use is necessary, siting of ramps should be in areas where the least environmental impact will accrue to that area. Locations requiring dredging or productive wetlands to provide deepwater access to the ramp are discouraged;

d) The siting of 'public use' boat ramps is encouraged in easily accessible areas such as bridged and deadend causeways." [R. 30-12(B)(a-d)].

3) The Council also **recommends** the following policies be considered in location and design of public boat ramps in the coastal zone:

a) Provision of adequate transportation access from the landward side;

b) Provision of adequate parking in non-wetland areas;

c) Incorporation with other public recreational and boating facilities to improve recreation opportunities;

d) Adequate facilities, for example, trash recepticles, restrooms, drinking water fountains, lighting;

e) Provision for continuing maintenance.

Management Authority

In critical areas of the coastal zone, a permit from the Coastal Council is required for any boat ramps which are proposed. (All boat ramps must involve filling in periodically inundated areas, in fact, below mean high water, in order to provide boats with access to the water. This filling is defined by the South Carolina Coastal Management Act as an alteration to a critical area - in this case, tidelands and/or coastal waters).

Boat ramps located in other than critical areas of the State are subject to permit requirements of the Budget and Control Board for activities on State-owned submerged bottoms (below MHW). In the coastal zone, these permit applications are also reviewed and certified by the Coastal Council for consistency with the coastal management program, pursuant to Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act.

In some areas a Federal agency permit may be required. These permit applications must be reviewed and certified by the Coastal Council and are subject to Federal consistency provisions.

C. DOCKS AND PIERS

Policies

1) In the coastal zone, Council review and certification of permits for docks and piers will be based on the following policies:

a) Docks and piers will not be approved where they interfere with navigation or reasonable public use of the waters.

b) Docks and piers shall be constructed in a manner that does not restrict waterflow.

c) Docks and piers must be limited to a reasonable size and extension for the intended use.

d) Docks and piers should be located and designed to minimize disruption and shading out of salt, brackish or freshwater wetland vegetation.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Docks and piers shall not impede navigation or restrict the reasonable public use of waters;

b) Docks and piers shall be constructed in a manner that does not restrict waterflow;

c) The size and extension of a dock or pier should be limited to that which is reasonable for the intended use;

d) To preclude the adverse effects of shading marsh vegetation, walkways which are built over vegetated marsh and lead to the dock or pier shall not exceed four feet in width (unless the applicant can justify a need for a wider structure) and should be elevated at least three feet above mean high water;

e) Dry storage in uplands will be encouraged in preference to moorage in crowded areas;

f) Developers of subdivisions, motels, and multiple family dwellings will be encouraged to develop single, joint-use moorage facilities while their plans are in the development stage;

g) Project proposals shall include facilities for the proper handling of litter, waste, refuse, and petroleum products, where applicable;

h) Where docks and piers are to be constructed over bottoms under lease by the State for shellfish culture or other mairculture activity, the Council will consider rights of the leasee prior to approval or denial." [R. 30-12(A)(a-h)]

3) The Council also **recommends** that the following policies be considered in location and design of docks and piers:

a) Developing joint-use or community piers in future subdivisions rather than the proliferation of individual structures;

b) Use of construction materials which are easily maintained and repaired, for safety and aesthetic considerations;

c) Attention be given when property is subdivided to provide waterfront lot-owners with adequate riparian access, so that conflicts over the alignment of docks and piers will be avoided.

Management Authority

A permit directly from the South Carolina Coastal Council is required for docks and piers in the critical areas of the coastal zone. The Rules and Regulations governing permitting and the process specified therein are applied to docks and piers.

Outside the critical areas, a permit from the Budget and Control Board is required for activities involving

navigable waters of the State and all lands below the mean high water line in tidally-influenced areas and ordinary high water in non-tidal areas.

The Coastal Council reviews and certifies these permit applications in the coastal zone for their compliance with the coastal management program, based on the preceding policies, as mandated by Sections 7(A) and 8(B)(11) of the Coastal Management Act.

Docks and piers may also be subject to Federal agency permit authority based on Section 10 of the Rivers and Harbors Act and Section 404 of the Federal Water Pollution Control Act. The Coastal Council is involved in review and certification of such permit applications. Private docks and piers which meet certain size specifications are covered under the provisions of a general permit to the citizens of South Carolina from the U.S. Army Corps of Engineers. This is discussed in detail in Appendix K.

VII. WILDLIFE AND FISHERIES MANAGEMENT

A. WILDLIFE AND FISHERIES MANAGEMENT

Findings

The findings for this policy section are those presented in the Living Marine Resources Segment, Chapter IV(E).

Policies

The following policies were developed by the South Carolina Coastal Council in conjunction with the South Carolina Wildlife and Marine Resources Department for inclusion in the S.C. Coastal Program.

1) In the coastal zone, including critical areas, Council issuance or review and certification of permit applications which would impact wildlife and fisheries resources will be based on the following policies:

a) Activities deemed, by the South Carolina Coastal Council in consultation with the South Carolina Wildlife and Marine Resources Department, to have a significant negative impact on wildlife and fisheries resources, whether it be on the stocks themselves or their habitat, will not be approved unless overriding socio-economic considerations are involved. In reviewing permit applications relative to wildlife and fisheries resources, social and economic impacts as well as biological impacts will be considered.

b) Wildlife and fisheries stocks and populations should be maintained in a healthy and viable condition and these resources should be enhanced to the maximum extent possible.

c) Critical wildlife and fisheries habitat should be protected and enhanced to the extent possible.

Management Authority

The South Carolina Wildlife and Marine Resources Department is the principal State agency with statutory authority for the protection, management and conservation of wildlife and marine resources, including fish, game, non-game and endangered species. The Memorandum of Agreement between the Coastal Council and the Department confirms the cooperative relationship between the Council and the Department which has authority in the establishment, implementation, administration and enforcement of State game, fish and shellfish laws.

B. ARTIFICIAL REEFS

Findings

The artificial reefs off South Carolina represent a well-used resource for the State. Recreational fishing as a whole offers great economic potential to the coastal zone. Correspondingly, commercial fishing has increased, especially in live bottom areas. Groundfish resources over natural live bottoms are heavily harvested both by recreational, "head-boat" industry, and the commercial hook and line fish trap fisheries. Artificial reefs harbor some of these same and very desirable live bottom groundfish species; most notably, black sea bass (**Centropristes striata**), sheepshead (**Archosargus probatocephalus**), jack crevalle (**Caranx hippos**), weakfish (**Cynoscion regalis**), spotted seatrout (**Cynoscion nothus**), red porgy (**Pagrus sedecim**), grouper (**Epinephelus sp.**), and spadefish (**Chaetodiperus faber**). Also, artificial reefs and accompanying midwater reef structures serve to attract pelagic fishes such as Spanish mackeral (**Scomberomorus maculatus**), King mackeral (**Scomberomorus cavalla**), little tunny (**Euthynnus alletteratus**), cobia (**Rachycentron canadum**) and scads (**Decapterus sp.**). These artificial reef areas also serve as habitat for many species of encrusting and free-living invertebrates. In turn, due to visual aspects and their geological relief, these reefs provide excellent habitat for a wide variety of flora and fauna on otherwise barren, gently sloping, hard-sand shelf areas prevalent off the South Carolina coast. The relief provided by sunken objects, such as ships, landing craft and caisons, provides not only a visual attraction but a suitable substrate for attachment of fouling by encrusting organisms which in turn provide the basis of the food chain for resident as well as transient fish species.

Besides the benefits of these reefs to the recreational fisherman, recreational scuba divers enjoy these artificial reefs for their aesthetic values. These reefs are bustling underwater communities with large schools of fish, ie., spadefish and scads, solitary brilliantly colored wrasses, triggerfish and sea urchins. Also, these reefs

provide the spearfisherman an opportunity to enjoy this form of recreation.

The artificial reef serves as a source of relatively inexpensive controllable and accessible live bottom research. One is able to study marine live-bottom community ecology, fishery recruitment and energy flow by using artificial reef areas. Also, food habit and behavior studies are more easily accomplished in reef areas due to their accessibility and reliability for attracting and maintaining certain species of groundfish. These groundfish resources are hardly found so easily and in such numbers over open bottoms.

Numerous aspects of man's activities can impact these artificial reef resources. The South Carolina artificial reefs would not be threatened directly by Outer Continental Shelf (OCS) oil and gas development. These reefs are well inshore of all tracts and potential drilling sites. However, pipeline corridors could possibly traverse some reef locations. Probably the most impending development in and around reef locations would be the possibility of open water dredged material disposal. Open water spoil disposal on or near an established artificial reef site would have a deleterious effect on the fauna and flora of the reef due to covering and possible suffocation of encrusting organisms, increased turbidity and toxicity of spoil material.

Additionally, commercial fishing pressure, such as blackfish traps and trawling, may occur as prices and supplies of marketable groundfish diminish or are regulated in the middle and northeast of artificial reef areas. These pressures could possibly deny the recreational fisherman of harvest and enjoyment of the very activities for which these reefs were created initially, using public funds. Also, net dragging may disrupt reefs both physically, by altering contour, and biologically, by increasing turbidity and non-selectivity of harvest.

Policies

In the critical areas of the coastal zone, it is Council policy that:

a) The location and development of artificial reefs should not interfere with navigation or with existing fisheries, and they should be compatible with all existing and approved uses for an area.

b) Materials utilized in the construction of artificial reefs must not create any adverse environmental impacts.

c) The development of artificial reefs for fisheries management purposes shall be encouraged, particularly in areas where the biological productivity will be enhanced.

d) In considering areas for artificial reef development, the possible impacts on historical or archaeological resources in the area will be considered.

Management Authority

Many artificial reefs along the South Carolina coast are beyond the 3-mile limit of State jurisdiction, and therefore, located outside the coastal zone.

Any artificial reefs located landward of the 3-mile limit would be within the "coastal waters" critical area, as defined in Section 3 of the S.C. Coastal Management Act of 1977. Alterations in these areas are subject to the direct permitting authority of the Coastal Council. The Rules and Regulations for Permitting and the previously stated policies would be applied to all artificial reef proposals in the critical areas.

Coordination with the South Carolina Wildlife and Marine Resources Department (SCWMRD) will be essential in any artificial reef proposals or projects for siting, construction and maintenance. SCWMRD is the State agency mandated to protect, manage and conserve wildlife and marine resources.

C. IMPOUNDMENTS

Findings

Impoundments are wetland areas that have been separated from adjacent rivers and estuaries by a dike or series of dikes. There are usually flapgates or similar structures interspersed along the dikes that provide a method of controlling water levels within the impoundment. By selectively opening the flapgates on flood or ebb tides, water levels can be manipulated. Salinities within brackish impoundments can be controlled in a similar manner.

The majority of coastal impoundments in South Carolina were used for rice cultivation during the 1700's and are currently managed to attract waterfowl for hunting. Management techniques are variable but basically

consist of seasonal drawdown which drains the interior of the impoundments and which could eliminate natural wetland flora. Drawdown is followed by disking, burning, grazing or applying herbicides which further remove the flora (Landers **et. al.**, 1976). These techniques encourage the growth of attractive food plants for waterfowl but eliminate natural wetland production during important summer months.

Brackish impoundments are principally managed for widgeon-grass (**Ruppia maritima**), salt marsh bulrush (**Scripus robustus**) and dwarf spike-grass (**Eleocharis parvula**), which are excellent duck food species (Wilkerson, 1970). Other duck food plants, such as sago pondweed (**Potamogeton pectinatus**), soft-stem bulrush (**Scripus validus**), muskgrass (**Chara hornemannii**) and duckweeds (**Lemna** and **Spirodela**), may also be present (Tiner, 1977). Some natural but less desirable plants, from a duck management standpoint, may also persist in these diked wetlands. These plants include smooth cordgrass (**Spartina alterniflora**), black needlegrass (**Juncus romerianus**), glassworts (**Salicornia** spp.), marsh hay cordgrass (**Spartina patens**), giant cordgrass (**Spartina cynosuroides**) and others (Tiner, 1977). Under fresh-water conditions many other marsh plants which are desirable duck food are encouraged within waterfowl impoundments. Smartweeds (**Polygonum** spp.), panic grasses (**Panicum** spp.), wild millet (**Echinochloa** spp.), red root (**Lachnanthes caroliniana**), water shield (**Brasenia scherberi**), spike rushes (**Elecharis** spp.), pondweeds (**Potamogeton** spp.), arrow-arum (**Peltandra virginica**), white water-lily (**Nymphaca odordate**), southern naid (**Najas quadalupensis**), asiatic dayflower (**Aneilema keisak**), soft-stem bulrush (**Scirpus validus**), wild rice (**Zizania aquatica**), and watergrass (**Hydrochloa carolinensis**) (Conrad, 1965; Morgan, 1974). Cultivated crops, such as corn (**Zea mays**), brown top millet (**Panicum ramosum**), Japanese millet (**Echinochloa crusgalli**), wheat (**Triticum aestivum**), barley (**Hordeum** sp.), rye (**Secale cereale**), Italian rye grass (**Lolium** sp.), clover (**Trifolium** sp.), soybeans (**Glycine max**) and grain sorghum (**Sorghum** sp.), are planted in conjunction with summer drawdown in some fresh-water impoundments. Undesirable marsh plants found within fresh-water impoundments include alligator-weed, cattails, giant cordgrass, giant cutgrass, pickerel-weed, soft rush, sea myrtle, marsh fleabane, American frogbit, bladderwort, pennywort, coontail(**Ceratophyllum** spp.), waterweed, green algae (**Cladophora** spp.) and fanwort (**Cabomba caroliniana**) **(Conrad, 1965; Morgan, 1974; Tiner, 1977).**

Impoundments are areas of high productivity. When flooded, aquatic organisms are confined in an area where food is abundant and competition and predation is minimal. Fishes, such as the mummicho (**Fundulus heteroclitus**), the striped kikifish (**F. majilis**), eel (**Anguilla rostrata**), mullet (**Mugil cephalus**), spot (**Leio stomus xanthurus**), summer flounder (**Paralichthes lethostigma**) and others are found within impoundments. Some invertebrates found in impoundments include fiddler crabs (**Uca** spp.), blue crabs (**Callinectes sapidus**), snails (**Littorina irrorator** and **Melampus bidentatus**) and mussels (**Modiolus demissue**).

Impoundments substantially increase the utilization of wetlands by waterfowl and wading birds by enhancing resting and feeding opportunities. Although many species of fish and invertebrates can survive and even flourish within impoundments, very few can reproduce in this unnatural environment.

However, shallow wetland areas that are typically sites for impoundments are highly productive contributors of deritus to the estuarine food web and also supply vital habitat and nursery grounds for most commercial vertebrate and invertebrate estuarine species (Odum, 1961). Some important species using these nursery grounds are white shrimp (**Penaeus setiferus**), brown shrimp (**Penaeus aztecus**), blue crab (**Callinectes sapidus**), Atlantic oyster (**Crassostrea virginica**), croaker (**Micropogon undulatus**), menhaden (**Brevoortia tyrannus**), spot (**Leiostomus xanthurus**), pinfish (**Lagodon rhomboides**), and summer flounder (**Paralichthys lethostigma**) (Conner and Truesdale). When impounded, the function of wetlands in providing detrital export, nursery areas and estuarine habitat is removed from the estuarine system and consequently is extremely detrimental to the estuary from a marine fisheries standpoint.

Policies

1) In the coastal zone, the Council will apply the following policies in review and certification of permit applications for wetland impoundments:

a) Impoundment of previously undisturbed salt, brackish or tidal freshwater wetlands will be discouraged.

b) Impoundments are preferred in areas dominated by vegetation and water salinities characteristic of freshwater conditions rather than salt or brackish conditions.

c) The construction of dikes or embankments to create impoundments must not block public waterways navigable to commercial and recreational craft unless there is an overriding public necessity.

d) Wetland impoundments must be constructed in such a manner as to minimize adverse environmental impacts, including consideration for control of mosquitos.

e) Permit applications for wetland impoundments must include a detailed plan, subject to review and approval by the Council.

2) In critical areas of the coastal zone it is Council policy that:

a) "Impoundment of previously undisturbed saline and brackish water marshes shall be discouraged as these areas are among the most valuable and productive of our coastal wetlands.

b) The re-diking and embankment repair of former impoundments is preferred over the impoundment of undisturbed wetland areas.

c) Permit applications involving marsh impoundment proposals shall include details describing intent and use, as well as management plans which will be subject to Council review and approval, such management plans being a condition of any final permit and subject to enforcement." [R. 30-12(K)(2)a-c].

3) The Council also recommends that the following policies be considered in location and design of wetland impoundment proposals:

a) The inclusion of buffer zones, where appropriate, between the impoundment dike and the mean high water line of adjacent waterways, to help both in preventing erosion and providing limited marine and terrestrial habitat.

Sources - Impoundments

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VIII. DREDGING

Findings

Dredging is the removal of sediments from waterways or wetland areas for the purposes of maintaining or deepening and extending navigable channels, harbors or marinas; for laying cables or pipelines; or for obtaining suitable fill and construction material (sand and aggregate). All of these activities may at times be necessary, economically justified projects in the coastal areas, but there also are potential negative impacts associated with dredging. These impacts may present conflicts not only with preservation of environmental quality, but with other economic interests dependent on the same resources - for example, shell fishing and recreational boating, both dependend on good water quality.

The most obvious effect is direct destruction of the natural habitat provided in submerged bottoms or coastal wetlands, the important of each of these resources being increasingly recognized [Chapter I (C) and Chapter IV (E) of the program document]. In addition, the removal, transportation and consequent disposal of these sediments can result in problems of siltation, increased turbidity and pollution which degrade water quality.

Marine and estruarine organisms may be severely impacted with uncontrolled dredging. Perhaps the most vulnerable life forms are oysters, because they are sedentary creatures. "A deposit of 1/20 inch of silt or shell or rocks from dredging is enough to make attachment impossible for young oysters", (Clark, John C. **Coastal Ecosystem Management**, p. 93). Harvesting of oysters is a significant recreational as well as commercial fishing enterprise in the South Carolina lowcountry.

Dredging upstream, beyond the reach of saline or brackish waters (defined in the South Carolina Coastal Management Act as "critical areas") also can have significant negative impacts on estuarine areas. Since freshwaters drain into the estuary, their quality play important roles in the function of the estuarine system.

Disposal of the dredged material is another major concern. The provision of adequate disposal areas while at the same time avoiding potential environmental impacts is vital to maintaining navigation in the S.C. coastal zone. For example, suitable upland disposal sites would be necessary for a channel deepening project as an alternative to disposal in adjacent waters or wetlands. Proper maintainence of disposal areas is also a concern in terms of mosquito control.

Underwater salvage is a very specialized activity, which would only have significant impacts in coastal waters if dredging were associated with a particular salvage operation. Therefore, the concerns and policies for this activity are limited in nature.

The need exists for maintaining navigational access in the coastal zone, for national defense, commercial shipping, commercial fishing and recreational boating. Pipeline and cable construction also meet economic needs, for commercial, industrial and residential growth. But serious environmental consequences present a potential problem and make the following policies for dredging, dredge material disposal and underwater salvage vital for South Carolina's coastal resources.

A. DREDGING

Policies

1) In the coastal zone, Council review and certification of permit applications for dredging projects will be based on the following policies:

a) To the extent feasible dredging should be performed only during closed shellfishing season if proposed in a productive shellfish area.

b) Suspended sediments must be kept to a minimum. The use of structures such as weirs and silt curtains to minimize water quality degradation is encouraged. Where highly toxic sediments are encountered, dredging will be prohibited unless the activity is consistent with other dredging policies, as well as those for manufacturing or other industrial activities.

c) Dredging should not reduce water circulation, water currents, mixing, flushing or salinity in the immediate area.

d) Dredging for establishment of new canals which involves permanent alteration of valuable wetland habitats will be prohibited unless no feasible alternative exists or an overwhelming public interest

can be demonstrated. Establishment of canals for purposes of creating waterfront lots from inland property, especially where dead-end canals would result, will be prohitibed unless it can be demonstrated that there will be no significant environmental impacts.

2) In critical areas of the coastal zone, it is Council policy that:

a) Dredging for public projects in the wetland areas should be undertaken only if that activity is water-dependent and there are no feasible alternatives;

b) Dredge activities should be restricted in nursery areas, in public and private shellfish grounds during periods of migration, spawning, and early development of important sport and commercial species;

c) Dredging and excavation shall not create stagnant water conditions, lethal fish entrapments, or deposit sumps or otherwise contribute to water quality degradation;

d) Designs for dredging and excavation projects shall, where reasonable, include protective measures such as silt curtains, diapers, and weirs to protect water quality in adjacent areas during construction by preventing the dispersal of silt materials;

e) Dredged materials shall be deposited and contained in such a manner so as to prevent dispersal into adjacent wetland areas;

f) In general, excavation of materials from productive submerged and wetland areas for fill purposes shall be denied;

g) Wetlands shall not be utilized as depositories for waste materials except as discussed in R.30-12 (I);

h) A specialized form of dredging activity involves the creation and maintenance of navigational channels and access canals. These activities have a potential for severe environmental impacts and should meet a demonstrated public need;

i) To the extent feasible, project plans should utilize piers or catwalks, rather than channels or canals, to reach deep water areas;

j) Access canals shall be designed to insure adequate flushing and shall not create dead-end water or stagnant pockets. Open-end, U-shaped, or semicircular canals are generally preferred over dead-end canals, since they usually provide better water circulation;

k) Highway waterway construction that is slated to be tied into wetland areas should be constructed in the dry, if possible, so that sloping and stabilization of the banks can be completed before the plug is removed for the connection to open waters. Where dry construction is not possible, temporary plugs or silt curtains at the end of canals connected to waterways should be maintained until all sediment settles out;

l) The sides of navigation channels and access canals should be gently sloping rather than vertical to facilitate biological as well as physical stabilization of the canal banks;

m) When several landowners are to be served by a project, dredging for navigation channels and access canals should be well planned to prevent unnecessary excavation. Tributary canals in the highlands leading to a central navigation channel should be utilized rather than separate channels for each waterfront landowner;

n) The berm of access should be raised so that there is a gradual slope away from the canal edge. This will help prevent introduction of contaminants into adjacent wetland areas;

o) Alignment of channels and canals should make maximum use of natural or existing channels. Alignment of channels and canals should avoid shellfish beds, nursery areas, and spawning areas in highly productive wetlands. [R. 30-12(G) and (D)]

Management Authority.

In the critical areas of the coastal zone, a permit from the Coastal Council is required for any dredging activity other than a Federal activity (in which case Federal consistency provision would apply). The Final Rules and Regulations of the Council (presented in Appendix K) outline the conditions that must be satisfied for such permits to be issued.

Outside the critical area of the coastal zone, the Budget and Control Board has permit authority for dredging activity below mean high water. The Coastal Council must review and certify applications to the Budget and Control Board as being in compliance with the preceding policies, as mandated by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act, and as outlined in the Memorandum of Agreement between the two agencies.

In certain locations, permits from Federal agencies will be required for dredging operations. The Council will review and certify these permit applications for their consistency with the coastal program.

B. DREDGED MATERIAL DISPOSAL

Policies

1) In the coastal zone, Council review and certification of permit applications for dredged material disposal projects will be based on the following policies;

a) To the maximum extent feasible, dredged material must not be placed on high value natural habitats such as salt, brackish or freshwater wetlands; submerged vegetation; oyster reefs or tidal guts. Where upland disposal is not possible, areas of relatively low productivity should be utilized, or ocean disposal should be employed

b) Upland dredge material disposal sites must be stabilized and maintained where necessary to prevent erosion and direct water run-off.

c) Where water disposal is necessary, natural channels must not be blocked with dredged material and impact on existing water circulation should be minimized. Deposition in water areas of higher flushing rate will decrease damage from suspended sediments and oxygen depletion.

d) Consideration must be given to the temporal aspects of spoil deposition such as impacts on spawning seasons, fish migrations, waterfowl nesting and wintering areas, and mosquito control.

e) The selection of upland dredge disposal sites should include consideration for minimizing negative impacts on valuable terrestrial wildlife or vegetative habitats.

2) In critical areas of the coastal zone, it is Council policy that:

"a) Upland disposal of dredged material should always be sought in preference to disposal in wetlands. Where upland disposal is not possible, areas of relatively low productivity above mean high water mark should be utilized. Highly productive wetland areas or bottoms situated below the mean high water mark should not be utilized for disposal of dredged materials when other alternatives exist;

b) Open water and deep water disposal should be considered as an alternative if highland alternatives are not feasible. However, open and deep water disposal sites should be seriously considered only after careful consultation with the Council and other relevant State and Federal agencies;

c) Toxic and highly organic materials should be disposed of in highland areas behind impervious dikes;

d) Dikes surrounding disposal areas should be shaped and vegetated immediately to minimize erosion, with outfalls positioned to empty into non-wetland areas;

e) Future disposal sites shall be reviewed on a case-by-case basis;

f) Existing disposal areas should be utilized to the fullest extent possible; this utilization would include raising the height of the embankment to increase the holding capacity of the disposal area;

g) In evaluating potential sites for dredged material disposal, attention must be given to possible adverse impacts on public health and welfare as well as on critical fish and wildlife areas such as endangered species habitats, waterfowl wintering areas, and shellfish harvesting areas." [R. 30-12(I)]

3) The Council also **recommends** that the following policies be considered in planning for dredged material disposal:

a) Consideration for future maintenance of the spoil area, for example, development of spoil islands which have been found to be beneficial for terrestrial habitat and migratory waterfowl.

b) Abandoned sand or gravel pits in proximity to a dredge site, where spoil can be more adequately contained, should be used for disposal areas.

c) Consideration for reuse of spoil disposal sites, such as development of public parks or recreational areas.

d) Consideration for the mining of spoil areas so as to extend their life expectancies.

e) Prior to major dredging projects, the economic and environmental feasibility for alternative use of the dredged material should be studied. The physical and chemical characteristics of the spoil should be determined in order to decide the most appropriate disposal options. Spoil suitable as fill material for residential, commercial or industrial development should be utilized for such uses. Spoil shells can be used to stimulate oyster production or for dike construction. Beach renourishment and spoil disposal are related issues and should be addressed concurrently.

Management Authority

In the critical areas of the coastal zone, the Coastal Council has direct permitting authority for location of disposal sites for dredged material. The policies in the Rules and Regulations for Permitting, as well as the procedures thereunder, shall be applied.

Act 508 of the 1978 S.C. General Assembly (R. 601) gave the Coastal Council authority for the granting of rights and easements to the Federal government for spoil disposal sites for purposes of maintenance of navigable waterways, including the Atlantic Intracoastal Waterway. This authority was shifted from the S.C. Development Board where it had previously been located. (Chapter 5 of Title 3 of 1976 Code of Laws was amended, substituting the term "Coastal Council" for "State Development Board" wherever it appeared.)

Outside of the critical areas in the coastal zone, the Budget and Control Board has permitting authority for dredged material disposal sites which are below mean high water. Permit applications to the Budget and Control Board are reviewed and certified by the Coastal Council as being consistent with the Coastal Management Program, as mandated by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act.

Section 15(A) of the Coastal Management Act states that:

> If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the South Carolina State Ports Authority declaring the proposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit.

The Department of Health and Environmental Control has responsibility for vector control throughout the State. Their expertise in mosquito abatement and control will be important in evaluation of the plans for on-going disposal area management. Comments from DHEC, Vector Control Division, are solicited on all Coastal Council permit applications.

In most areas a Federal agency permit will be required for dredge material disposal. Permit applications to appropriate Federal agencies must be reviewed and certified by the Coastal Council, under Federal consistency provisions of the coastal management program.

C. UNDERWATER SALVAGE

Policies

1) In the coastal zone, Council review and certification of underwater salvage permits will be based on the policies for dredging activities when applicable, VI (A)(2), p. 107.

2) In the critical areas of the coastal zone, it is Council policy that:
Any dredging and dredge material disposal associated with a salvage operation will be subject to the policies for dredging, as expressed in the Rules and Regulations for Permitting, R.30-12(G), and VI (A)(1) of this section.

Management Authority

Underwater salvage operations are subject to the permitting authority of the Coastal Council if such opera-

tions will alter or disturb a critical area. The Institute of Archeology and Anthropology also controls such operations through a permitting program. Application for such permits will be reviewed and certified for consistency with the Coastal Management Program, as mandated by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act.

Outside of the critical areas in the coastal zone, underwater salvage operations may be subject to Budget and Control Board authority, in addition to that of the Institute of Archeology and Anthropology. Council review and certification of permit applications to the Budget and Control Board are required.

In some areas a permit for underwater salvage operations may be required by a Federal agency. Applications for these permits must be reviewed and certified by the Coastal Council, subject to Federal consistency provisions.

IX. PUBLIC SERVICES AND FACILITIES

Findings

The range of services and facilities provided by the public sector continues to increase with growing population and complexity of life-styles, especially in urbanized areas. In many instances, consideration of economics, efficiency or environmental constraints have led the way to government provision of these services — for example, sewer and water services which are very expensive for private concerns to construct and maintain. Individual systems such as wells and septic tanks are adequate where development is limited, but can have major environmental impacts in densely populated areas. For example, a proliferation of wells in some areas can seriously draw-down or drain the aquifer, reducing the groundwater resources, and possibly resulting in saltwater intrusion.

The continuing commercial and industrial expansion of the coastal zone in South Carolina will mean increasing populations which demand new and improved services. As rural areas are developed, the need to extend services to these areas will grow. The full range of public services must be supplied in order to provide for the needs of coastal residents, maintain economic interest to stimulate needed jobs, and at the same time conserve the environmental quality of coastal resources.

There are also potential negative impacts from these public facilities if they are not adequately planned and managed. Several activities are addressed under other headings, by specific type of activity, for example, recreation and transportation. For this section, public facilities include the following:

A. Sewage treatment
B. Solid waste disposal
C. Public/Quasi-public buildings
D. Dams and reservoirs
E. Water supply

Energy facilities are addressed in a separate section on Energy Facility Planning, Chapter IV(B).

In South Carolina's coastal zone, many of the benefits **and** potential negative effects of provision of public services have not yet been felt because growth was relatively slow in the past and most of the coastal zone is rural and undeveloped. Thus the following policies for coastal management of public services definitely will affect the future. In this State there is a unique opportunity to encourage positive growth and development while preserving and protecting coastal resources.

A. SEWAGE TREATMENT (treatment plants and associated transmission systems, lagoons, impoundments, and outfalls; septic tanks)

Findings

The provision of adequate sewage treatment systems in order to protect public health and welfare, as well as environmental quality in coastal communities becomes increasingly important with growing populations and urban densities. The importance of these issues was stressed in the Federal Water Pollution Control Act Amendments of 1972, which provided for Section 201 Facilities Construction Grants and 208 Areawide Waste Treatment Management planning.

Other than actual location of facilities in sensitive areas, the major negative impact associated with sewage treatment systems is potential water quality degradation from effluent discharge - either septic tanks **or** treatment plants. Septic tanks are only effective in treating sewage in areas where soils are suitable for proper drainage, where they are spaced adequately and where groundwater and surfacewater are sufficient distance away. The provision of central treatment plants also can present environmental problems. Eventual disposal of the effluent or sludge may degrade the quality of coastal waters, and possibly disrupt wetland systems, recreational activities and fish and shellfish resources. The same issue involved in the laying of other pipelines can be present in construction of sewer transmission systems.

The potential secondary impacts of growth inducement from sewage treatment facilities can result if sewer systems are extended into areas with little previous development. This type of growth catalyst is only a serious problem if sensitive or fragile areas are threatened or if local zoning or other regulation is inadequate to provide proper management.

Policies

1) In the coastal zone, Council review and certification of sewage treatment and disposal permit applications will be based on the following policies:

a) Sewage treatment facilities and transmission systems in the coastal zone must meet applicable Federal, State and local construction and water quality standards.

b) The Coastal Council will coordinate with designated 208 Areawide Waste Treatment Management implementation agencies (pursuant to Section 208 of the Federal Water Pollution Control Act Amendments, P.L. 92-500) and other agencies with responsibility for implementing comprehensive plans affecting sewage treatment, to ensure that proposed projects are compatible with growth and development plans and that alternative locations for sewage treatment facilities are considered.

c) Construction of such facilities in productive salt, brackish or freshwater wetlands will not be approved where feasible alternatives exist. For locations adjacent to such sensitive habitats, priority consideration will be given to major public facilities over smaller, private package plants.

d) Sewage treatment facilities shall be constructed to limit effluent discharge as much as possible into areas containing productive shellfish beds. Construction of facilities shall in no case degrade the existing water quality classification of the receiving water body, and if the current classification is not the highest achievable, the plans shall show a consideration for the water body ultimately achieving the highest classification. In addition, the facilities shall be constructed in conformance with the appropriate policies contained elsewhere in the plan. Where appropriate, construction of the facilities and associated transmission systems shall be timed so as not to disrupt spawning seasons or migrations of significant marine resources.

e) Outfall locations should consider water depth, circulation and mixing in order to protect water quality. Effluent should not be discharged into poorly confined or poorly flushed estuarine areas.

f) Maximum study and analysis should be given to alternatives to conventional treatment methods; for example, land disposal, water conservation techniques, land application and overland flow.

g) Council will ensure that all proposed septic tank systems requireing a State permit will meet current DHEC standards and regulations.

h) The Coastal Council will also coordinate with local health departments, DHEC, and other implementing agencies to ensure that septic tank standards and regulatory enforcement are adequate to protect coastal resources.

i) Extension of public sewage treatment systems with excess capacity into previously undeveloped areas where the resulting growth would have detrimental impacts on the critical areas is discouraged.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Normal repair and maintenance of sewer facilities are exempted from Council permit requirements by Section 13(D) of the Act. The discharge of treated effluent is also exempted provided, however, that the Council shall review and comment on these discharges. The Council is concerned primarily with wetland degradation problems which could involve commercially important shellfish, recreational fisheries, and critical wildlife habitats. Standards applicable to these installations are as follows:

i)Applications for the construction of lagoons or impoundments for waste treatment facilities, and similar activities should be denied when adverse effects on productive tidelands will result;

ii)Such facilities should not be constructed in or immediately adjacent to wetland areas and must be designed in such a manner that no effluent will be discharged into areas open for shellfish harvesting." [R.30-12(J)]

b) "Excavating activities in critical areas are sometimes required for the installation of transmission lines. These installations should be designed to minimize adverse environmental impacts. In addition to standards for dredging and filling, the following standards are applicable:

i)Creation of permanent open water canals to install pipelines is discouraged since such projects generally interfere with drainage patterns and may adversely affect water quality through

bank erosion;

ii)Dimensions of excavated canals for cables and pipelines should be minimal. Silt curtains are recommended for all excavations;

iii)All excavations in wetland areas should be backfilled with the excavated material after installation of the appropriate structure, while being careful to maintain the original marsh elevation;

iv)The appropriate erosion control measures shall be employed during the crossing of wetland areas. Where appropriate, revegetation with suitable wetland species will be required;

v)Alignments of new projects should be designed to utilize existing rights-of-way and topographic features wherever possible." [R.30-12(D)].

c) The Coastal Council will coordinate with the Department of Health and Environmental Control (DHEC) and the designated 208 Areawide Waste Management and 201 Construction Grants implementation agencies to ensure that protection of critical areas is given priority in their programs and that processes are developed to prevent adverse effects from sewage facilities and discharges.

d) The Coastal Council will coordinate with the Department of Health and Environmental Control and local health departments or other implementing agencies to ensure that septic tank standards and regulatory enforcement are adequate to avoid adverse effects on critical areas.

3) The Council also **recommends** that the following policies be considered in planning and design of sewage treatment facilities:

a) Providing visual buffer areas around sewage treatment facilities;

b) Private package treatment plants proposed in subdivision areas and other developments should either be contained in the existing 208 Waste Treatment plan or receive 208 program approval before they are constructed;

c) Excess capacity in treatment facilities should not be approved unless the projects are contained in 208 plans and meet population projections for the area.

Management Authority

In the critical areas of the coastal zone, proposed construction of any new structure or facility to treat sewage must first receive a permit from the Coastal Council. This authority extends to placement of pipes or lagoons or any other activity which alters a critical area. Normal maintenance and repair and actual effluent discharge are exempted; however, the Council has the opportunity for review and comment on these activities.

In the coastal zone outside of the critical areas, there is an overlap of State agency authorities for sewage treatment facilities. Both the Budget and Control Board and the Department of Health and Environmental Control (DHEC) have regulatory authority over several aspects of sewage treatment facility placement and operation, (discussed in detail in the Legal Authorities chapter). DHEC retains regulatory authority over septic tanks with flow rate of 1500 gallons per day or greater (Section 44-1-140, S.C. Code of Laws). The permits of these agencies, whether issued jointly or independently, are subject to review and certification by the Coastal Council to ensure compliance with the preceding policies, as mandated by Sections 7(A) and 8(B)(11).

B. SOLID WASTE DISPOSAL

Findings

Solid waste disposal may be a crucial problem in the future, since about nine pounds of solid waste is collected per day for each person in the U.S. (1972 data). In coastal areas where populations are concentrated, demand for disposal sites can be greatest while ecosystems are very fragile. The need for suitable upland disposal sites is clear since today it is recognized that productive wetlands are valuable habitat and should not be filled indiscriminately.

> In addition to their direct loss from filling with solid wastes, wetland and lower flood plain dump sites have high potentials for causing water pollution. In these areas there is a high rate of leaching of toxic chemicals, nutrient chemicals, and dissolved organic matter from the town dump into the groundwater, combined with the washoff of the same pollutants during rainstroms and flooding. Coastal waters may be adversely affected by the downstream flow of

polluted water from dump or landfill sites located far inland on coastal tributaries. (Clark, **Coastal Ecosystem Management**, 1977, p. 527)

The following policies for solid waste disposal are important for guiding the location and operation of disposal sites in the future in order to meet the need while protecting coastal resources.

Policies

1) In the coastal zone, Council review and certification of permit applications for solid waste disposal sites and facilities will be based on the following considerations:

a) All solid waste disposal sites in the coastal zone must meet applicable Federal, State water and air quality standards and local regulations for siting and operation.

b) The location of solid waste disposal or landfill sites in salt, brackish or freshwater wetlands will not be approved unless no alternative exists and an overwhelming public need can be demonstrated. Wherever possible, solid waste disposal sites must be located in appropriate upland sites, where they will not pollute surface waters, coastal waters or ground waters. Site-specific evaluations are made in each case by the Department of Health and Environmental Control to determine the suitability of the site, considering variables such as soil permeability, the characteristics of the leached refuse, and the distance from groundwater.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Wetlands shall not be utilized as depositories for waste materials." [R.30-12(G)(h)]

b) Policies for deposition of dredged materials shall also apply to solid waste disposal activities (excluding incineration).

3) The Council also **recommends** that the following be considered in solid waste disposal planning in the coastal zone:

a) Maximum study and analysis should be given to alternative means or techniques for refuse disposal such as recycling, reuse, burning for generation of electrical power, etc.

Management Authority

The alteration of a critical area, which includes filling or draining, requires a permit from the Coastal Council. The Final Rules and Regulations for Permitting apply to proposed solid waste disposal sites or facilities for critical areas [see R.30-12(G)].

Outside of critical areas in the coastal zone the Budget and Control Board requires permits for any use, including filling, of lands below mean high water. Permit applications for solid waste disposal in such areas must be reviewed and certified by the Coastal Council for compliance with the coastal management program. The Department of Health and Environmental Control issues permits for and otherwise regulates solid waste disposal outside of critical areas. Such permit applications are also subject to Council review and certification. The administration of these regulatory authorities must be in compliance with the rules, regulations and policies of the coastal management program as specified in Sections 7(A) and 8(B)(11) of the Coastal Management Act of 1977.

C. **PUBLIC/QUASI-PUBLIC BUILDINGS** (structures including but not limited to churches, governmental administration buildings, public park information centers, police and fire stations, public beach restroom facilities)

Findings

Although construction of new public or government buildings may serve a need in the public interest, the Council feels that these facilities should set an example for sound resource management in terms of location decisions, construction methods and building and site design.

Public and quasi-public buildings have potential negative impacts along similar lines to those associated with other developments, such as residential or commercial construction. They are of coastal management concern only if they involve problems of proposed dredging or filling in productive wetlands or impacts on water quality from erosion, storm water run-off or sewage discharges. There may also be conflicts with other

potential uses for the same site locations.

Policies

1) In the coastal zone, Council review and certification of permit applications for public/quasi-public buildings will be based on the following policies:

a) For locations immediately adjacent to the shoreline, the water-dependent nature of the structure must be demonstrated. A water-dependent facility is one which requires access to or use of the water as an essential aspect of its primary function.

b) Permanent alterations to productive salt, brackish or freshwater wetlands, from either dredging or filling for the construction of public buildings will not be approved unless no feasible alternatives exist or there is an overriding public interest or need.

c) The use of construction methods and site drainage plans which reduce erosion hazards and limit the direct discharge of storm water run-off are encouraged in order to protect coastal water quality. To the extent feasible, public buildings should not be located in high flood zone areas, as designated under the Federal Flood Insurance Program. Where public buildings must be located in these zones, they must meet applicable Flood Insurance criteria and/or building standards.

d) Plans for major public buildings or complexes must include adequate sewage disposal systems (septic tanks or treatment systems), meeting Federal Environmental Protection Agency, South Carolina Department of Health and Environmental Control, and local health department standards.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Nonwater-dependent structures such as parking garages, apartments, restaurants, and shops have been build in the past on pilings over wetland areas. Such construction presents unnecessary encroachment on the aquatic ecosystem by shading out the underlying vegetation. Nonwater-dependent structures shall be discouraged from being sited over water and/or wetland areas. Only when public need is demonstrated and no feasible alternative sites are available should consideration be given towards approval of the proposed structure." [R. 30-12(M)]

b) "Nonwater-dependent structures such as commercial and residential buildings have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The siting of nonwater-dependent structures on the primary dunes or beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged." [R.30-13(D)]

3) Further, the Council **recommends** that the following policies be considered with respect to public/quasi-public buildings in the coastal zone:

a) Encourage visual compatibility, to the maximum extent practicable with surrounding development and natural resources in terms of scale, height, materials, color, texture, and geometry of building and site design.

b) Development of local plans and development regulations that address the location and design of public/quasi-public buildings.

Management Authority

The construction of any public/quasi-public building in a critical area requires a permit from the Coastal Council. Any alteration of a critical area requires a permit under the Council's direct permit authority as implemented through the Final Rules and Regulations for Permitting.

The S.C. Department of Health and Environmental Control has permit authority for any septic tank (1500 gpd or greater) or sewage system associated with such buildings. These permit applications are subject to review by the Coastal Council for certification of compliance with the preceding policies of the coastal management program, based on Sections 7(A) and 8(B)(11) of the Coastal Management Act of 1977.

If fill below the mean high water is proposed for site preparation or construction, a permit would be

required from the Budget and Control Board. These permit applications also are subject to the review and certification process of the Council.

D. DAMS AND RESERVOIRS

Findings

Dams and reservoirs are not foreseen as a major issue for the South Carolina coastal zone because the nature of coastal rivers - which are broad, relatively slow-moving and pass through flat, low-lying areas, with little flooding problems - gives them limited suitability for hydroelectric or related flood control projects. However, because of the other benefits dams and reservoirs provide such as drinking water and recreational areas, they may become important in the coastal zone at some later time and must be included in the planning process now.

Most of the possible impacts of dams, reservoirs and rediversions which might locate in coastal waters are associated with the alteration of normal stream flow. These include water quality degradation, changes in salinity, loss of aquatic species habitat or adequate spawning periods, alteration of the character of downstream coastal marshes (Clark, **Coastal Ecosystem Management**, p. 602), and interdiction of upland sediments, in particular sand destined for coastal sediment budgets. Reservoirs or impoundments also may inundate areas of special geological significance, archeological importance or historic interest.

While many of the adverse environmental effects of dams and reservoirs cannot be avoided, there are management policies and techniques which can reduce the impact.

Policies

1) In the coastal zone, Council review and certification of permit applications or project proposals for dams and reservoirs will be based on the following policies:

a) Floodplain and ecosystem management and other non-structural solutions are generally preferred to the erection of dams or flood control structures.

b) Water control structures and water management programs should be designed to preserve or upgrade existing water quality. Best management practices should be used upstream of the dam or reservoir to reduce agricultural and construction run-off and sedimentation thereby reducing the threat of eutrophication in the reservoir. This will also reduce the load of sediments deposited behind the dams, thereby prolonging the life of the facility.

c) To the extent feasible, dams should allow for retaining some degree of circulation of waters and sediment flow. This will help preserve water quality and aquatic habitats downstream, and maintain the sediment budget, which is important to related erosion problems in beach and shoreline areas downstream.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Impoundment of previously undisturbed saline and brackish water marshes shall be discouraged as these areas are among the most valuable and productive of our coastal wetlands." [R. 30-12(K)(a)].

3) The Council also **recommends** that the following additional policies be considered for dams and reservoirs in the coastal zone:

a) Installation of fish lifts where appropriate to facilitate the migratory passage of fish,

b) Design of release gates to allow water to be let out from different depths in the reservoir for control of temperatures at appropriate levels for downstream aquatic life.

c) When wildlife habitats are inundated or otherwise disturbed by construction of dams or flood control structures, lands suitable for wildlife management should be acquired elsewhere.

d) Encourage the restoration of previous natural conditions in abandoned reservoir areas.

Management Authority

Any dam or reservoir proposed to alter a critical area would be under direct permit jurisdiction of the S.C.

Coastal Council.

The S.C. Land Resources Conservation Commission has permit authority over the construction of dams and reservoirs, other than those constructed by the U.S. Army Corps of Engineers or Soil Conservation Service, or licensed by the Federal Energy Regulatory Commission or S.C. Public Service Authority. This authority is for the safe maintenance of such structures and is based on the powers of inspection and certification for dams and reservoirs. (S.C. Dams and Reservoirs Safety Act, Act 60 of the 1977 General Assembly.) Permit applications for this activity will be reviewed by the Coastal Council for certification of their compliance with the preceding policies. This review and certification process is mandated by Sections 7(A) and 8(B)(11) of the S.C. Coastal Management Act.

The S.C. Public Service Authority (PSA) has authority to construct dams for certain purposes in the Cooper and Santee Rivers in the coastal zone. Coordination of the activities and policies of the two agencies, as mandated by Section 7(A) of South Carolina's coastal legislation, will be accomplished through provisions of the Memorandum of Agreement between PSA and the Coastal Council.

The South Carolina Budget and Control Board has authority for permits for alterations to waters or submerged bottoms of the State below the meah high water line (MHW), outside the critical areas. These permits are subject to the review and certification process of the Coastal Council as mandated by Sections 7(A) and 8(B)(11) of the South Carolina Coastal Management Act.

E. WATER SUPPLY

Findings

The provision of public drinking water supplies to residents and commercial and industrial users is a positive asset to the economic character of an area, This public service can, however, have negative effects, largely associated with the transmission of the freshwater. The laying of water pipelines can cause environmental damage where they cross productive wetlands or submerged bottoms. Withdrawal of water resources, whether public or private, can negatively impact groundwater resources, if not properly managed.

There are also potential secondary growth impacts from provision of new public drinking water systems. If public water supply is extended into previously undeveloped areas, it can induce rapid growth, with possible negative impacts if proper environmental management is not provided.

Policies

1) In the coastal zone, Council review and certification of permit applications for water supply facilities will be based on the following policies:

a) The Coastal Council will coordinate with the Water Resources Commission in its efforts to ensure that groundwater is adequately managed, and that proposed withdrawals will not cause saltwater intrusion, land settling or other negative impacts.

b) The Coastal Council will coordinate with designated 208 Areawide Waste Treatment Management implementation agencies (pursuant to Section 208 of the Federal Water Pollution Control Act) and other agencies with responsibility for implementing comprehensive plans affecting water supply, to ensure that proposed projects are compatible with growth and development plans and that alternative locations for water supply facilities are considered.

c) Water supply facilities and transmission systems in the coastal zone must meet applicable Federal, State, and local construction and water quality standards.

d) Construction of such facilities in or adjacent to productive salt, brackish, or freshwater wetlands will be prohibited unless no feasible alternatives exist. Construction activities should be timed so as not to disrupt shellfish harvesting, spawning seasons or migratory fish populations.

2) In critical areas of the coastal zone, it is Council policy that:

a) "Dredging and filling for public projects in wetland areas should be undertaken only if that activity is water-dependent and there are no feasible alternatives." [R. 30-12(G)(2)(b)]

b) "Excavating activities in critical areas are sometimes required for the installation of submerged cables, pipelines, and transmission lines. These installations should be designed to minimize adverse en-

vironmental impacts.

c) In addition to standards for dredging and filling, the following standards are applicable:

i)Creation of permanent open water canals to install pipelines is discouraged since such projects generally interfere with drainage patterns and may adversely affect water quality through accelerated bank erosion;

ii)Dimensions of excavated canals for cables and pipelines should be minimal. Silt curtains are recommended for all excavations;

iii)All excavations in wetland areas should be backfilled with the excavating material after installation of the appropriate structure, while being careful to maintain the original marsh elevation;

iv)The appropriate erosion control measures shall be employed during the crossing of wetland areas. Where appropriate, revegetation with suitable wetland species will be required;

v)Alignments of new projects should be designed to utilize existing rights-of-way and topographic features wherever possible." [R. 30-12(D)]

Management Authority

Water supply activities, including the use of pipelines, pumping stations and treatment plants, in a critical area require a permit from the Coastal Council.

Outside of the critical areas of the coastal zone, the Department of Health and Environmental Control (DHEC) and the Water Resources Commission have regulatory authority and issue permits concerning water supply. DHEC requires a permit for construction, expansion, or modification of public water supplies. Permit applications for this activity must be reviewed and certified by the Council for compliance with the coastal program as mandated by Section 7(A) and 8(B)(11) of the S.C. Coastal Management Act. In capacity use areas, as declared by the Water Resource Commission, permits are required for the extraction of more than 100,000 gallons per day of groundwater and may be required for lesser amounts. (This does not apply to domestic wells.) These permit applications are also subject to the review and certification authority of the Council.

X. EROSION CONTROL

The planning process, policies, and management authority for this element are contained in Chapter IV(C), Erosion Control Program.

IX. ENERGY AND ENERGY-RELATED FACILITIES

The planning process, policies, and management authority for this element are contained in Chapter IV(B), Energy Facility Planning Process.

XII. ACTIVITIES IN AREAS OF SPECIAL RESOURCE SIGNIFICANCE

The following types of areas in the South Carolina coastal zone have been identified through the resource inventory efforts of the Coastal Council and its staff as being unique and either environmentally fragile or economically significant to the coastal area and the State. These areas of special resource significance are:

-Barrier Islands
-Dune Areas (outside the critical areas)
-Navigation Channels
-Public Open Spaces
-Wetlands (outside the critical areas)

Because of this sensitivity and their role as an integral part of the coastal ecosystem, alterations in these areas are likely to have direct effects on the critical areas. Because of their value and characteristics the Coastal Council employs the additional resource policies presented in this section in review and certification of any permits associated with an activity in one of these areas. This is done in an effort to protect the value of the critical areas and of all coastal resources. The applicable policies for the individual activity which is proposed, as well as the general guidelines for evaluation of all projects, are also considered by the Council and its staff in permit and project reviews in these areas.

Management Authority

The Coastal Council has no direct permit authority in any of these areas (with the exception of critical areas of a barrier island and navigation channels, which come under the "coastal waters" category if within the critical areas boundary, and are then under the direct permit jurisdiction of the Coastal Council.) Resource policies in these areas will be implemented through the "network" of existing State agency authorities, and the Coastal Council's review and certification of the permit actions of these agencies, (as discussed in detail in the "Legal Authorities and Networking" segment of Chapter V.) The specific State agency with direct authority for each project will depend on the type of project or permit involved in the development proposal.

A. BARRIER ISLANDS

Findings

Barrier islands are elongated landforms of unconsolidated material (usually sand), situated seaward of the inland shoreline and parallel to the ocean. They are one of the most dynamic coastal ecosystems since they are constantly being reshaped by the forces of wind or waves. (A more detailed discussion of their geologic characteristics is provided in Chapter I, "The Natural Environment").

These unique, dynamic islands perform a number of roles in the coastal system. They are the location of much of South Carolina's Atlantic Ocean beach-front, and are often significant wildlife habitats. Barrier islands help to create the proper conditions for saltwater wetlands and estuaries behind them. They are also a valuable storm and erosion buffer for more inland areas, being most effective when their dunes and vegetation are well-developed and intact.

South Carolina has approximately 30 barrier islands, part of a chain along the Atlantic and Gulf coasts which extends from Maine to Florida and around to Texas. South Carolina is fortunate in that many of these islands are already under State or Federal ownership and are therefore maintained for recreational use or in a natural state as wilderness-type areas. A listing of both publically and privately-owner barrier islands is contained in Table 1, with an indication of their development status.

Policies

Because of their fragile and dynamic nature and their resource value, the Coastal Council will consider the following additional policies in review or permit proposals on barrier islands. (Within critical areas of a barrier island, the Rules and Regulations for permitting applicable to the proposed activity will apply.)

1) Construction and development on barrier islands shall retain to the extent feasible existing dune ridges, drainage patterns and natural vegetation in landscaping and construction plans in order to maintain the value of the island as a storm buffer. Intensive or high density type development may not be

TABLE 1 **BARRIER ISLANDS OF SOUTH CAROLINA**

ISLAND	DEVELOPMENT STATUS	PREDOMINANT OWNERSHIP
Waites	undeveloped	private
Pawleys	developed	private
North	undeveloped	State
South	undeveloped	State
Cedar	undeveloped	State
Murphy	undeveloped	State
Cape	undeveloped	Federal
Lighthouse	undeveloped	Federal
Raccoon Key	undeveloped	Federal
Bull	undeveloped	Federal
Capers	undeveloped	State
Dewees	undeveloped	private
Isle of Palms	developed	private
Sullivans	developed	private
Morris	undeveloped	private
Folly	developed	private
Kiawah	partially developed	private
Seabrook	partially developed	private
Deveaux	undeveloped	non-profit org.
Botany Bay	undeveloped	private
Eddingsville	undeveloped	private
Edisto Beach	developed	private
Pine	undeveloped	private
Otter	undeveloped	private
Hunting	undeveloped	State
Fripp	partially developed	private
Pritchards	undeveloped	private
Little Capers	undeveloped	private
St. Phillips	undeveloped	private
Bay Point	undeveloped	private
Hilton Head	developed	private
Daufuskie	undeveloped	private

SOURCES: 1) **The Status of Barrier Islands of the Southeastern Coast,** Langdon Warner, 1976, Open Space Institute and Natural Resources Defense Council

2) Coastal Council Staff Update

suitable on some barrier islands which are less stable or more prone to erosion or other hazard risks; these factors must be taken into consideration when alternative development plans are formulated.

2) Because of their proximity to and strong ecological relationship with the critical areas of the coastal zone, project proposals for activities on barrier islands must demonstrate reasonable precautions to prevent or limit any direct negative impacts on the adjacent critical areas (beaches, primary dunes, coastal waters and wetlands).

3) New road or bridge projects involving the expenditure of public funds to provide access to previously undeveloped barrier islands will not be approved unless an overwhelming public interest can be demonstrated, for example, provision of access to a public recreation area or other facility. Preference will be given to ferry access in those instances where public funds cannot be expended for road access.

4) The extension of public services, such as sewer and water facilities, to barrier islands should only be proposed in a comprehensive approach which considers the natural "carrying capacity" of the island to support development and which integrates these facilities to parallel the level of access which is available to the island.

5) The Coastal Council encourages and supports State, local and private efforts to acquire coastal barrier islands for inclusion in preservation and protection programs. Public recreational benefit should be one primary motivation for these efforts, and where appropriate, barrier islands should be maintained for recreational use, based on the capacity of individual areas to accommodate human activity.

B. **DUNE AREAS** (OTHER THAN CRITICAL AREAS)

Findings

Much like the barrier islands, the beaches and dunes along the South Carolina foreshore are also dynamic ecosystems, the focus of energy where sea and land meet. The sands of the beach area are constantly in motion. As the waters of the tides ebb and flow, this wave action removes and deposits sand on the beaches. Both because of their dynamic characteristics and their value as unique recreational areas, the South Carolina General Assembly found them to need special management consideration. Beaches are identified as "critical areas" by the South Carolina Coastal Management Act of 1977, and defined as "those lands subject to periodic inundation by tidal and wave action so that no nonlithoral vegetation is established" (Section 3(H)). Within this beach critical area, the Coastal Council has direct permit jurisdiction, and the Rules and Regulations for Permitting are applied to any proposed activity.

The dunes which fall landward of the beach zones are also an active area, comprised of sands which are only partially stabilized and subject to the effects of wind and waves. Dunes serve as valuable physical storm buffers, as wildlife habitats and as recreational and aesthetic resources. They are also linked with the beach area as a reservoir of sand to replace that which is lost from the beach on severe tides or storms. Because of this interdependence with the beach system, and their fragile structure and susceptibility to disruption because of this indiscriminate building or alteration, the primary ocean-front dunes are considered "critical areas" under the South Carolina Coastal Management Act. A permit must be obtained directly from the Coastal Council for any activity on a primary sand dune, and the permitting Rules and Regulations apply in these areas.

Of concern in this section are the dunes upland from or behind the primary dune. While not as crucial as the first dune adjacent to the Atlantic, the dune fields or landward ridges of unconsolidated sand are still vital as part of the overall storm protection and sand reserve system. The Coastal Council has no direct jurisdiction over proposed activities in these areas, but does have review and certification authority with regard to the major permits of other State agencies.

Policies

In review and certification of permit applications to other State agencies for proposals in the sand dune areas, the Coastal Council will consider the following additional policies:

1) Because of their proximity to and strong physical and ecological relationship with the beach and primary sand dune critical areas of the coastal zone, project proposals in secondary sand dunes must demonstrate reasonable precautions to prevent or limit any direct negative impacts on the adjacent

critical areas.

2) Special attention must be given in new construction activities in ocean-front areas to prevent or mitigate negative impacts on adjacent property owners, specifically, increased erosion or loss of protective dune formations on adjacent lots due to unnecessary destruction of or encroachment onto stable dunes.

3) Project proposals in ocean-front and sand dune areas must conform to the policies of the Beach Erosion, and Beach and Shoreline Access sections of the program, as well as other applicable Resource Policies.

Recommended Policies

1) Local governments with coastal shorefronts are encouraged to develop and implement strong local zoning and building ordinances for beach and sand dune areas.

2) Property owners, development interests and local governments are encouraged to institute and observe set-backs or buffer zones for construction in beach and dune areas.

C. NAVIGATION CHANNELS

Findings

Water-ways in the coastal zone which provide adequate depths for navigation are essential for commercial fishing and for surface water transportation, and also to recreational boating which is one of the most significant water-dependent recreational activities along the coast. These tidal rivers and bays also play important ecological roles for estuarine water circulation and as feeding habitats for waterfowl and varieties of finfish and shellfish.

Growing pressure for use of shorefront can have detrimental effects on navigational access if development is not properly managed. Increased erosion and siltation from upland developments can reduce the depths of navigation channels. Maintenance dredging and associated dredge material disposal are also related issues.

The South Carolina General Assembly recognized the significance of navigation along the coastline in identifying navigation as a specific consideration which the Coastal Council must make in all permit reviews in the critical areas. Section 15(A)(2) of the South Carolina Coastal Management Act of 1977 directs the Coastal Council to consider:

> The extent to which the activity would harmfully obstruct the natural flow of navigable waters. If the proposed project is in one or more of the State's harbors or in a waterway used for commercial navigation and shipping or in an area set aside for port development in an approved management plan, then a certificate from the South Carolina State Ports Authority declaring the proposed project or activity would not unreasonably interfere with commercial navigation and shipping must be obtained by the Council prior to issuing a permit.

Policies

(A majority of navigation channels in the South Carolina coastal zone are within the critical areas, and therefore, subject to direct jurisdiction of the Coastal Council for the issuance of the State permit required for any alteration, and the Rules and Regulations for Permitting shall apply, as well as the following general policies.)

The Coastal Council will consider the following policies in review and certification of permit applications for projects in or directly affecting existing navigation channels:

1) Development which would result in loss of navigability will be prohibited.

2) Development which might increase upland soil and shoreline erosion problems and resulting siltation of navigation channels must utilize the best mitigation measures feasible that will effectively relieve the problem.

3) The South Carolina State Ports Authority, as mandated under Section 15(A)(2) of the Coastal Management Act, shall review applications for permits in navigable waterways in the critical areas and certify prior to the issuance of such permit that the project or activity would not unreasonably interfere

with commercial navigation.

4) Resource Policies and Rules and Regulations for Permitting which apply to Dredging and Dredge Material Disposal shall be applied.

D. PUBLIC OPEN SPACES

Findings

(*NOTE* A number of State-owned or managed recreational and game management areas have been designated as Geographic Areas of Particular Concern (GAPCs). The priorities of use for each of these areas are addressed in that segment of the management program. For purposes of this section, public open spaces means State or local (county or municipal) parks or other open space areas, **other** than those designated as GAPCs.)

The values of public recreational and open space areas throughout the coastal zone cannot be overemphasized. They provide recreational and aesthetic opportunities and amenities which are both desired and needed by the people. With increasing populations and continued growth and development, these limited resources become even more precious, as increasing numbers of people seek to find recreational opportunities within more urbanized areas and from fewer available open spaces.

Open space is not only the basic resource necessary for development or recreational facilities, it also serves numerous other valuable functions. It can provide corridors for preservation of wildlife and may preserve unique natural areas and historic or archeological resources. Open space can serve as a buffer between incompatible types of development activity, and oftentimes open space increases the value of adjacent land.

Policies

The Coastal Council will apply the following policies in review and certification of permit applications located in or which would directly affect public open space areas:

1) Project proposals which would restrict or limit the continued use of a recreational open area or disrupt the character of such a natural area (aesthetically or environmentally) will not be certified where other alternatives exist.

2) Efforts to increase the amounts and distribution of public open space and recreational areas in the coastal zone are supported and encouraged by the Coastal Council.

E. WETLANDS (OUTSIDE THE CRITICAL AREAS)

Findings

In addition to the extensive areas of salt and brackish marsh within the critical areas along the South Carolina coastline, the State's coastal zone also contains over 60,000 acres of fresh-water marshes. These wetlands further up the creeks and rivers, beyond the reach of saltwater at high tides, have a great diversity of plant species. They play a vitally important role in contributing nutrients to the waters which eventually reach the estuarine system (the critical areas). Fresh-water marsh areas are active filters for improving water quality, and since they are linked with the downstream system, they affect water quality in the critical areas. The fresh-water marshes are important flood buffers and also function in maintenance of salinity levels in downstream estuaries.

Policies

The Coastal Council will apply the following policies in review and certification of permit applications in freshwater wetland areas:

1) Project proposals which would require fill or other significant permanent alteration of a productive freshwater marsh will not be approved unless no feasible alternative exists or an overriding public interest can be demonstrated, and any substantial environmental impact can be minimized.

AGENCIES WITH PERMITTING OR PLANNING/MANAGEMENT AUTHORITY FOR ACTIVITIES WITH A DIRECT AND SIGNIFICANT IMPACT ACTIVITY	Coastal Council	Aeronautics Comm.	Arch. & Anthropology	Budget & Control Bd.	DHEC	Development Bd.	Forestry Comm.	Highway Dept.	Land Resources	PRT	Patriot's Point	Railways Comm.	PSA	PSC	State Housing Auth.	SPA	Water Resources	Wildlife/Marine Resources	LOCAL	FEDERAL
RESIDENTIAL DEVELOPMENT	X			X	X										X				X	X
TRANSPORTATION																				
Ports	X			X												X				X
Roads & Highways	X			X		X		X								X			X	X
Airports	X	X		X		X													X	X
Railways	X			X		X						X				X			X	X
Parking Facilities	X			X	X														X	
COASTAL INDUSTRIES																				
Agriculture	X								X											X
Forestry	X						X													
Mineral Extraction	X			X					X											X
Manufacturing	X				X														X	
Fish & Seafood Processing	X				X															
Aquacultire	X			X	X													X		
COMMERCIAL DEVELOPMENT	X			X	X														X	
RECREATION & TOURISM																				
Parks	X					X				X	X								X	X
Tourist Attractions	X				X					X	X								X	
MARINE RELATED FACILITIES																				
Marinas	X			X							X					X			X	
Boat ramps	X			X							X							X	X	
Docks and piers	X			X						X						X				
WILDLIFE AND FISHERIES MAN.	X																X	X		
Artificial reefs	X			X														X		
Impoundments	X			X														X		
DREDGING	X			X																X
Dredge Material Disposal	X			X																X
Underwater Salvage	X		X																	
PUBLIC SERVICES & FACILITIES																				
Sewage treatment	X			X	X														X	X
Solid waste disposal	X				X														X	
Public/Quasi-public buildings	X				X					X	X								X	X
Dams & Reservoirs	X												X							X
Water supply	X				X												X		X	X
EROSION CONTROL	X						X	X								X			X	X
ENERGY ACTIVITIES	X			X	X	X	X						X	X			X		X	X

*A listing of the State agencies and citations for their statutory authority for each activity is included in Appendix C, p. C-15.

chapter IV
special management areas

A. GEOGRAPHIC AREAS OF PARTICULAR CONCERN

1. Introduction

Statutory Requirements

The Federal Coastal Zone Management Act of 1972, while recognizing the entire coastal zone of each state as an important and vital resource, also declares that certain areas are of even more, special significance, and warrant particular attention to their preservation and development. The Act requires, in Section 305(B)(3), that each state inventory and designate the "Areas of Particular Concern" within its coastal zone as part of the state's program.

Section 923.21 of the Coastal Zone Management Development and Approval Regulations (**Federal Register,** Vol. 44, No. 61, March 1979) defines the Federal requirements for Geographic Areas of Particular Concern (GAPCs). The subsection reads as follows:

(a) **Requirement.** In order to meet the requirements of subsections 305(b) (3) & (5) of the Act, States must:
(1) Designate geographic areas that are of particular concern, on a generic or site-specific basis or both;
(2) Describe the nature of the concern and the basis on which designations are made;
(3) Describe how the management program addresses and resolves the concerns for which areas are designated; and
(4) Provide guidelines regarding priorities of uses in these areas, including guidelines on uses of lowest priority.

The major emphasis in the GAPC segment of a coastal management program, from the Federal viewpoint, is on the adequacy of the State's authority to manage those areas or sites which have been identified. To a lesser extent, the reasons specific areas are significant as coastal resources and the criteria which establish this significance are also important for inclusion. The individual states may inventory and identify those areas which are significant given the coastal problems or issues which are characteristic of that particular state. Guidance for this designation process is provided in the coastal legislation passed in South Carolina in 1977.

Section 8(B)(4) of the South Carolina Coastal Zone Management Act (Appendix B) mandates that this comprehensive program include the identification of special management areas. It reads as follows:

In devising the management program the Council shall:

(a) Inventory and designate areas of critical state concern within the coastal zone, such as port areas, significant natural and environmental, industrial and recreational areas.

These "areas of critical state concern" parallel the geographic area of particular concern requirements mandated by the Federal legislation. The designation process and the areas identified as GAPCs can be devised so as to be consistent with policies for preservation and development of South Carolina's coastal resources, as stated in the South Carolina Coastal Zone Management Act.

Selected Approach

In order to meet both the Federal and State requirements, this report identifies, maps, and describes the Geographic Areas of Particular Concern in the eight-county coastal zone.

South Carolina has defined Geographic Areas of Particular Concern in its coastal zone in terms of four broad categories:

- Areas of unique natural resource value, including those exhibiting scarce or vulnerable natural habitats and physical features; those offering substantial recreational value; and those of vital importance in protecting and maintaining coastal resources.
- Areas where activities, development, or facilities depend on proximity to coastal waters, in terms of use or access.
- Areas of special historical, archeological or cultural significance.

For each of these categories, standards or criteria are defined, priority of uses within the area are specified, and the specific geographic sites or areas within the coastal zone are identified. Detailed descriptions of each designated site are found in the Appendix F.

In the earliest phases of coastal zone management in South Carolina, an extensive National Resources Inventory was completed. This inventory, the pertinent State and Federal regulations, and considerable assistance from the Heritage Trust Program were the intitial basis for designation of Geographic Areas of Particular Concern (GAPCs) within each of the four categories.

When a first draft of the GAPC segment was completed and adopted in draft form by the South Carolina Coastal Council, it was mailed to the many individuals, and State and Federal agencies on the Council's mailing list. Numerous comments, corrections, and additions were received as a result, and subsequently these have been incorporated.

In addition, the County Citizens Working Groups, organized in each of the eight coastal counties, (described in Chapter V(E) received copies of the first draft of the GAPC document. Meetings were held to discuss the Geographic Areas of Particular Concern in detail with staff and Council members. As a result, substantive input from every section of the coastal zone was received in the designation of South Carolina's Geographic Areas of Particular Concern.

The areas included in this section are of such special importance and concern to South Carolina that the State has established regulatory and/or management controls over them. The inclusion of these areas within the scope of the management program combined with the critical areas designated by the S. C. Coastal Management Act — tidelands, coastal waters, beaches, primary sand dunes — effectively cover all those areas of specific resource concern in South Carolina's coastal zone.

The authority which assures adequate management of GAPCs is Sections 7(A) and 8(B)(11) (described fully in the Legal Analysis section) of the South Carolina Coastal Management Act. This coordination and certification authority is affirmed by Memoranda of Agreement (MOAs) executed between the South Carolina Coastal Council and each of the State agencies with authority over GAPCs. These MOAs specify the type and level of coordination as well as that programs will be administered in a manner consistent with Council policies for the coastal zone of South Carolina. Their management in the future will be coordinated to ensure consistency with the policies of the Coastal Council for Geographic Areas of Particular Concern.

Implementation

Special management consideration will be given to those areas designated as GAPCs through the process of issuance of permits in the critical areas, and review and certification of permits in the coastal zone. When a project overlaps with, is adjacent to, or significantly affects a GAPC, the Council will carefully evaluate the project based on the criteria listed as the priority of uses which specifically address each type of GAPC. A project would be prohibited if it would permanently disrupt the uses of priority for the designated area. A project would be strongly discouraged or the permit conditioned if the project would interrupt, disurb or otherwise significantly impact the priority uses of the designated area.

For example, in consideration of the permit for a project adjacent to a State Park which would significantly interfere with the primary recreational activities of that GAPC, every effort would be made to preserve this highest priority use of the park. Although all listed priority uses would receive protection, the Council would be committed to especially safeguard the highest priority use.

Future Designation of Geographic Areas of Particular Concern

As development and implementation of the coastal zone program continues, other areas which may deserve particular attention will be further studied. Nominations of potential GAPCs can be made to the South Carolina Coastal Council by other State agencies, Federal agencies, local governments, organizations, and interested private citizens. A new designation would be possible under any of the three existing GAPC categories.

When these potential areas of concern are identified, they will be reviewed by the South Carolina Coastal Council to determine the nature of concern, if they satisfy the appropriate designation criteria, and what type of management needs exist to ensure adequate preservation or control of the areas. The South Carolina

Coastal Council can designate additional GAPCs after the management program has received final approval without requiring formal amendment to the program. Future designations can be accomplished by a majority vote of the Council once the required management authority is determined and executed.

New GAPCs would be automatically added, for example, when Heritage Trust Preserves and Scenic Rivers are designated as parts of the Heritage Trust Program or as a result of the Scenic Rivers Act in South Carolina. In addition, if a new natural resource area is developed or if a significant new coastal dependent activity needs special attention, application to the South Carolina Coastal Council for designation as a new GAPC would be appropriate. As new GAPCs are designated in South Carolina, the South Carolina Coastal Council will specify the priority uses for each new area.

Policies for Geographic Areas of Particular Concern

The South Carolina Coastal Council has designated the Geographic Areas of Particular Concern discussed in this document because of their unique importance as natural, aesthetic, recreational, scientific, or economic resources in the coastal zone. The existing State management authority for each GAPC is identified, and the priority of uses within each area is specified. In addition, management policies and permitting Rules and Regulations of the South Carolina Coastal Council for certain specified activities or alterations shall apply to designated GAPCs, where relevant.

Goals

The goals of the South Carolina coastal zone managemnet program for preservation and development of GAPCs are:

To give highest priority to the identified primary value of a GAPC when considering the preservation or development of that area.

To ensure that management of GAPCs is consistent with other policies of the South Carolina coastal zone management program.

Objectives

The management of GAPCs shall be carried out in such a manner as to:

- prevent, where possible, the disruption of valuable coastal resources;
- protect the integrity of natural resource areas and preserve the unique and fragile areas;
- protect the habitats of wildlife and marine species, particularly those with special commercial, recreational or ecological value;
- improve access to and management of recreational areas;
- increase the usefulness of and access to economically important resources, without undue restrictions on the activities, while minimizing negative environmental impacts;
- avoid preemption of appropriate commercial growth where it is consistent with the use of the areas;
- encourage environmentally sound growth patterns and development practices where growth and development are priority uses of the area;
- discourage development in high-risk areas, where damage to life, property, and coastal resources is likely to be severe.

Areas of Preservation and Restoration

The Federal Regulations (§923.22, **Federal Register**, Vol. 44. No. 61, March, 1979) state that:

> Designations may be made for the purpose of preserving or restoring areas for their conservation, recreational, ecological, or aesthetic values.

The categories of GAPC's entitled Areas of Unique Natural Resource Value and Areas of Special Historic, Archeological or Cultural Significance include those designations of preservation and restoration areas. The criteria for designation are outlined above on pages IV-1 through IV-3. The priority of uses specified for each area will guide the protection of the areas once designated.

2. Geographic Areas

a. Areas of Unique Natural Resource Value

Unique natural resource areas include those exhibiting scarce or vulnerable habitats, living marine resources, and physical features; those offering substantial recreational value; and those of vital importance in protecting and maintaining coastal resources.

This category of Geographic Areas of Particular Concern (GAPCs) is especially significant because South Carolina's natural environmental attributes are a resource of great value, for ecological, aesthetic, recreational and commercial reasons. In the past, development has been relatively slow, so there are still unspoiled natural areas and abundant wildlife in the coastal zone to enjoy and protect. For example, over 400,000 acres of tidal marsh represent a vital link in the life cycle of a majority of commercial and sport fish species. The forests, marshes, streams, beaches, and coastal waters warrant critical attention in the State's coastal management program because of both their ecological and economic importance. It has become increasingly evident that these are finite and limited resources which need careful preservation and thoughtful management.

Management Authorities

Several different programs which involve State ownership, regulatory or management authority over natural resource areas exist in South Carolina. The specific authority is described in detail for each individual program in the following pages and is used in conjunction with the Council's authority as described in the implementation section on the preceding page.

Criteria for Designation

The criteria for designation of a natural area as a GAPC are that the area offers unique or important natural features which warrant special attention in the coastal management program.

To indicate the resource values which make these areas particularly significant, general criteria have been developed, drawing from the objectives contained in each of these programs. (Certain of the individual programs have further, specific criteria which are used to quality areas for inclusion within the program, and these will be identified where such exist.)

The South Carolina Coastal Council recognizes the following criteria for designation of natural resource areas as Geographic Areas of Particular Concern:

1. The area consists of representatives of one or more coastal ecosystem types or habitats, is intact in the sense that essentially all of the expected species and ecological processes are present in normal numbers and vigor, and meets one of the following conditions:
   a. Alteration or destruction of the area would substantially impair the ability of one or more ecosystem types to perpetuate themselves;
   b. The area has qualified as critical habitat for an endangered or threatened species, under the Endangered Species Act of 1973;
   c. The area is unusually large or undisturbed in comparison to others of a similar kind, thus affording a unique opportunity for scientific observations or recreation.
2. The area represents superior habitat for species, which, while not endangered or threatened, are of vital importance as commercial or sports-oriented coastal resources.
3. The area affords maximum recreational opportunities in the coastal zone because of access to beaches or other waterfront, presence of unique physical or cultural features or natural habitats (see #1 above), and/or wide range of active and passive recreation opportunities in a natural setting.

1) The Heritage Trust Program

Management Authority

The South Carolina Heritage Trust Program was established by passage of State legislation in April, 1976, (Act 600 of 1976). (An Advisory Board and initial staff efforts had begun subsequent to an Executive Order in 1974.) The Heritage Trust Advisory Board and Wildlife and Marine Resources Commission administer a system which provides for inventory, preservation, use and management of unique and outstanding natural or cultural areas.

The public policy stated within the Act is:

> To secure for the people, both present and future generations, the benefits of an enduring resource of natural and cultural areas and features by establishing a system of Heritage Preserves and Sites.

This program provides for dedication of areas or sites by the owner to the Trust through transfer of fee simple title or lesser forms of ownership interest, such as open space easements. The Advisory Board and Wildlife and Marine Resources Commission review the proposed areas, which are nominated by the staff of the S.C. Wildlife and Marine Resources Department, other State agencies, and citizens of the State.

A major requirement of the program is provision of management criteria, rules and regulations, and "allowable use" guidelines for Heritage Preserves. A management plan must be developed for each property in the Heritage Trust. These management mechanisms are intended "to preserve the primary natural character of such areas or features and to provide the maximum public usage thereof which is compatible and consistent with the character of the area." (Section 4 (7))

Inventory

Staff of the Division of Natural Area Acquisition and Resource Planning of the South Carolina Wildlife and Marine Resources Department, with support from other experts in the field, have been actively engaged in thorough investigative surveys of the natural areas of the State. The objectives of this search are identifying "significant elements of the natural environment such as unique and outstanding features, rare and endangered plant and animal species, and natural areas representing the range of biological diversity found in the State." These data have been made available to the Office of Coastal Planning. As the Heritage Trust Program identifies priority areas for preservation or acquisition efforts, this information will also be reviewed by Coastal Council staff and considered for designation as GAPCs, or as future or potential GAPCs.

Priority of Uses

The following are the uses of priority for areas deeded into the Heritage Trust Program, beginning with the use of highest priority:

1) Uses which are consistent with the management plan developed for each property;
2) Uses which allow public enjoyment of the area as long as the primary natural character of the area is not disrupted;
3) Uses which are compatible with the area's wildlife and wildlife management.

Prohibited uses are any which jeopardize the integrity of the Heritage Trust Program.

Designated Sites

Because of their unique value as wildlife habitats and natural areas, Heritage Trust lands have been designated as Geographic Areas of Particular Concern.

Capers Island is the only site in the coastal zone which has been deeded into the Heritage Trust Program to date.

2) State Wildlife Preserves

The extensive system of wildlife preserves and game management areas owned or leased by South Carolina Wildlife and Marine Resources Department are irreplaceable resources, as both protected wildlife habitats and recreational hunting and fishing areas. Because of their value to residents and visitors of the South Carolina coastal area, they have been identified as Geographic Areas of Particular Concern.

Management Authority

The South Carolina Wildlife and Marine Resources Department (WMRD) is empowered to acquire land areas and enter into agreements with landowners and with the Federal government for purposes of managing wildlife species and establishing specific sanctuaries and game management areas (§ 50-3-100, Code of Laws of South Carolina, 1976). The areas owned and managed by WMRD are vital resources of the coastal zone, for

conservation of the State's wildlife and also for recreational hunting and fishing opportunities. As part of this management responsibility, a full management plan is prepared for each preserve, identifying short and long-term uses and guidelines for protection and use of the area.

Where critical areas, as defined in the South Carolina Coastal Management Act (Act 123 of 1977), occur within these preserves, additional control is afforded, since Coastal Council permits would be required for any alterations within the critical areas of these preserves.

Inventory

A complete listing of the wildlife and game management areas under ownership and/or management authority of the WMRD in the eight coastal counties was obtained through consultation with WMRD and by reference to **S.C. Public Land Ownership Inventory** (S.C. Land Resources Conservation Commission, 1977). These areas have been mapped into the Coastal Council's overlay mapping system.

Priority of Uses

The following are the uses of priority for areas designated as State Wildlife Preserves, beginning with the highest priority:

1) Uses which are consistent with the wildlife management plan for each preserve;
2) Uses which are compatible with the preserve's wildlife, wildlife habitats and wildlife management and simultaneously provide public recreational opportunities, such as hunting and fishing.

Designated Sites

Because of their significance as natural habitats and their inclusion under ownership and/or management authority of WMRD, the following areas are designated as GAPCs.

1) Turtle Island - Jasper County
2) Bear Island Game Management Area - Colleton County
3) Alexander Sprunt, Jr. Wildlife Sanctuary (Deveaux Bank) - Charleston County
4) Santee Coastal Reserve - Charleston County
5) Hatchery Game Management Area - Berkeley County
6) Moultrie Game Management Area - Berkeley County
7) Santee Delta Game Management Area - Georgetown County
8) North Island & South Island Plantation - Georgetown County
9) Samworth Game Management Area - Georgetown County
10) State-owned segment - Francis Marion Game Management Area (Santee-Cooper)

As new acquisitions are made into the State system of wildlife preserves and game management areas, these will be designated as GAPCs in the South Carolina coastal zone.

3) State Parks

State park facilities in the coastal zone are valuable resources for the recreational, scenic and educational enrichment of residents and visitors alike. Because of this significance, major existing parks have been recognized as Geographic Areas of Particular Concern.

Management Authority

The South Carolina Department of Parks, Recreation and Tourism (PRT) is mandated to control and maintain the State parks system, and can accept or purchase lands for this purpose, with approval of the State Budget and Control Board (§51-71, S.C. Code of Laws, 1976). PRT must prepare a master plan for each major park facility, identifying plans for development of facilities, and the preservation and use guidelines for the park.

On a more long-range basis, PRT is developing an update to the South Carolina State Comprehensive Outdoor Recreation Plan (SCORP). The function of SCORP is to provide a guide for statewide recreation planning and development, and to maintain eligibility for Land and Water Conservation funds from the Federal Heritage Conservation & Recreation Service.

Where critical areas form part or all of State park facilities, the Coastal Council will also have regulatory control. Any alterations within critical areas will require a Coastal permit. This authority will aid in assuring that the use and development of these cherished recreational resources remain consistent with policies and guidelines of the State's coastal zone program.

Inventory

The organization of studies for SCORP centers on six volumes, covering public and private outdoor and indoor recreation systems. Volume I of this planning process was a complete inventory of the State's physical characteristics, natural resources, and existing recreation facilities. This information has been made available to the Coastal Council. Consultation with staff of PRT has helped to identify the existing major parks in the eight county coastal zone (roadside parks, small neighborhood parks and the like have been exempted), and these have been mapped on 7½" U.S.G.S. quadrangle overlays.

Priority of Uses

The following are the uses of priority for State Parks, beginning with the use of highest priority:

1) Varied recreational activities open to the public;
2) Non-intensive uses which require minimal feasible alteration and maintain the natural functions of the area;
3) Provision of educational opportunities to visitors of the parks.

Designated Sites

The following existing State parks are designated GAPCs and are shown in the map index.

1. Hunting Island State Park - Beaufort County
2. Givhan's Ferry State Park - Colleton & Dorchester Counties
3. Old Ft. Dorchester State Park - Dorchester County
4. Edisto Beach State Park - Colleton County
5. Charlestowne Landing - Charleston County
6. Drayton Hall - Charleston County
7. Hampton Plantation - Charleston County
8. Huntington Beach State Park - Georgetown County
9. Myrtle Beach State Park - Horry County

As PRT and the Coastal Council identify other recreational resources which warrant particular State concern in the coastal program, these will be reviewed for designation. Proposed park sites should be included as priority or potential GAPCs. When new sites are added to the State parks system, these will be designated automatically.

4) Scenic Rivers

South Carolina is fortunate to have many river segments that still remain in a natural or near natural state. As such, these areas represent an important historical, cultural, and recreational resource. Rivers were the primary transportation system for early America, both for Indians and the later explorers and settlers. Consequently, archeological sites are found at waterfront locations.

Bounded by large expanses of swamp, several Lowcountry river segments have witnessed little development pressure and remain in primarily wilderness conditions. Other segments are good representatives of natural areas with wide species diversity.

As recreational resources, the rivers serve as a "one-way water trail," offering boaters a unique sense of adventure. The silent movement of a canoe affords the opportunity to observe numerous wildlife species which it would not be possible to approach in other modes of transportation. The recreational potential of South Carolina's coastal rivers is both impressive and unique.

In recognition of this tremendous resource, the Coastal Council recognizes river segments which have been designated as Scenic Rivers as Geographic Areas of Particular Concern.

Management Authority

In an effort to preserve and protect South Carolina's rivers, the 1974 South Carolina General Assembly passed the Scenic Rivers Act (Act 1106), which authorized the Water Resources Commission to designate scenic rivers. Proposals for designation may be made by State agencies, local governments, or citizens groups. To qualify, a river must possess unique and outstanding scenic, recreational, geologic, fish and wildlife, historic or cultural values, in addition to relatively unpolluted waters.

The Water Resources Commission is mandated to develop a comprehensive water and related use plan for designated rivers, with emphasis on protecting the significant resources of these scenic rivers. The Wildlife and Marine Resources Department assists the Commission in formulating and enforcing these plans and regulations.

The management plans for each river segment must address the following:

Class I — Maintenance of the wilderness character, with camping and river access allowed only at designated public access areas. Prohibiting new roads or buildings, mining and commercial timber harvesting.

Class II — Preservation of the scenic values, with riparian landowners allowed customary agricultural activities, silviculture, and construction of compatible farm-use buildings. Mining and construction of roads paralleling the river are prohibited.

Class III — Preservation of the scenic values, with landowners allowed agricultural, residential, recreational, commercial, and light industrial activities. Mining and construction of new roads paralleling the river are prohibited.

Where all or portions of a designated scenic river is located in the critical areas of the coastal zone, the South Carolina Coastal Council will also have management authority. A permit would be required for any activities or alterations in such a river segment.

The Federal Wild and Scenic Rivers Act (P.L. 90-542) was enacted in 1968. The three basic river classifications in that Act are 1) wild, 2) scenic, and 3) recreational. These classifications generally parallel the three categories in the South Carolina Act; however, rules for management in the Federal law are more rigorous.

There are presently no national wild and scenic rivers in the coastal zone of South Carolina. However, the Federal Heritage Conservation & Recreation Service has inventoried numerous rivers in the coastal zone of South Carolina.

Criteria for Designation

The following criteria are those established for a river segment to qualify under the South Carolina Scenic Rivers program:

Class I — Natural river

i) it must be free-flowing (no impoundments or diversions)
ii) the shorelines and scenic vistas must be essentially unchanged by man
iii) there must be no extensive paralleling roads closer than one mile
iv) in river gorges, there must be no extensive paralleling roads within one-quarter of the rim
v) there must be only a limited number of road crossings and spur roads

Class II — Pastoral river

May be partially or predominately used for agriculture, silviculture and other dispersed human activities which do not substantially interfere with public use and enjoyment of rivers and the shores.

Class III — Partially developed

The adjacent areas may be affected by works of man, but still possess actual or potential scenic, recreational or historic values.

Inventory

The Water Resources Commission has inventoried several rivers in the eight coastal counties. They are: the Little Pee Dee, Black, Edisto, Combahee, Salkehatchie, and Ashley Rivers. These same rivers have been inventoried by the Federal Heritage Conservation & Recreation Service and are being considered as potential designations under the Federal program. Information collected by the Commission includes flow characteristics, water quality, vegetation and wildlife data, and recreational amenities.

Priority of Uses

The following are the uses of priority for Scenic Rivers, beginning with the use of highest priority:

1) Uses which are consistent with the management plans developed by the Water Resources Commission with the assistance of WMRD. Each plan will be a comprehensive water and related use plan designed to protect the significant resources of each river section designated;

2) Uses which maintain long-term natural functions of the river while affording public recreational activities, especially those of a passive nature.

The lowest priority uses would be those not related to the goals of the Scenic Rivers Program but which do not alter, reduce, or degrade the river resources or the integrity of the Scenic Rivers Program.

Designated Sites

To date, there are no Scenic River segments in the coastal zone. When designations are made and easements or titles donated, these rivers automatically will be considered to qualify as GAPCs.

NOTE: The Ashley River, in Dorchester and Charleston Counties, has been named as eligible for designation. It appears to meet the Class II qualifications, but various segments may be given different classifications. If and when donations are made, individual plans will be formulated for each donation. Since this river segment is particularly rich in historical resources, the South Carolina Department of Archives and History is assisting the Commission in assessing the intentions of adjacent landowners regarding donation.

3) Marine and Estuarine Sanctuaries

The coastal waters and wetlands of the State are valuable natural resources which have yet to be spoiled by development or real estate speculation. The preservation and protection of these resources is paramount in determining the growth of the seafood as well as the tourist industries. There are many citizen groups active in pursuing these goals; and State governmental agencies, in particular the South Carolina Wildlife & Marine Resources Department, have instituted research programs to document and inventory the marine environment. On this basis, the Coastal Council feels that any area designated by the State of South Carolina, in conjunction with the U.S. Department of Commerce, as a marine or estuarine sanctuary will be a Geographic Area of Particular Concern (GAPC).

a) Marine Sanctuaries

Management Authority

Title III of the Marine Protection, Research, and Sanctuaries Act of 1972 (P.L. 92-532, 86 Stat. 1061), provides the Secretary of Commerce, with approval from the President, the power to designate those areas of ocean waters as far seaward as the outer edge of the Continental Shelf and all other coastal waters where the tide ebbs and flows, as marine sanctuaries. These sanctuaries are intended to preserve or restore such areas for their conservation, recreational, ecological or aesthetic values. The Secretary of Commerce, prior to designating a marine sanctuary, must consult with the Secretaries of State, Defense, Interior, and Transportation and give due consideration to the views of the responsible officials of the affected state. The designation becomes effective sixty days after it is published, unless the governor of the state involved certifies to the Secretary of Commerce that the designation, or a specified portion, is unacceptable to his/her state. In this

case the designated sanctuary will not include the certified unacceptable areas or become final until such time as the governor withdraws his certification of unacceptability.

On March 13, 1974, the Secretary of Commerce authorized the Administrator of the National Oceanic and Atmospheric Administration to exercise the authority granted under Title III. With this authority, NOAA has to develop proposed objectives, guidelines, criteria and procedures for designation of marine sanctuaries.

Potential marine sanctuary sites, where development seems imminent, are screened by the Federal Office of Coastal Zone Management (OCZM) and the National Marine Fisheries Service. Development includes potential offshore as well as onshore sites, and is considered "imminent" if it is likely to occur within 18 months, or if actions to be taken within 18 months will establish the likelihood of development. OCZM offers the opportunity for state coastal zone management offices, commercial fishing organizations, development interests, environmental groups and the public-at-large to submit recommendations for marine sanctuary sites.

If any marine sanctuary areas are designated by the Secretary of Commerce, the S.C. Coastal Council is mandated under the State coastal zone management law (Sec. 5(J), Act 123 of 1977) "to manage estuarine and marine sanctuaries and regulate all activities therein, including the regulation of the use of coastal waters located within the boundary of such sanctuary." The primary management authority would rest with the S.C. Coastal Council. Its regulatory authority would also apply since any marine sanctuary would be located within the State's critical areas.

To date, the general management principles for marine sanctuaries mainly address regulation of development to be harmonious with the overlying principles of preservation and protection of the sanctuary. The classification of these areas will not affect multiple use which may be permitted to the extent the uses are compatible with the primary(s) for which each sanctuary is established. The establishment of marine sanctuaries may be to complement public or private, local, State or Federal government lands which have been set aside for similar purposes. The overall management of the sanctuary must include an initial and comprehensive environmental assessment. (This should complete the original EIS which must be submitted upon nomination.) A continued monitoring program and guidelines to enforce the policies also must be formulated.

Criteria for Designation

The program objectives for marine sanctuaries emphasize the idea of preserving, restoring or enhancing these areas for their conservational, recreational, ecological, research or aesthetic values. Examples of coastal waters which might meet designation status include:

(a) Areas necessary to protect valuable, unique or endangered marine life, geological features, and oceanographic features;
(b) Areas to complement and enhance public areas such as parks, national or state monuments and other preserved areas;
(c) Areas important to the survival and preservation of the nation's fisheries and other ocean resources;
(d) Areas to advance and promote research which will lead to a more thorough understanding of the marine ecosystem and the impact of man's activities.

b) **Estuarine Sanctuaries**

Management Authority

Section 315 of the Federal Coastal Zone Management Act of 1972 addresses the subject of estuarine sanctuaries and states that the Secretary may "make grants to any coastal state for the purpose of acquiring, developing, or operating estuarine sanctuaries..." Thus, the initiative for participating in the estuarine sanctuary program lies with the state, whereas nominations for marine sanctuaries can come from local, state or federal agencies or any interested persons.

The term "estuarine sanctuary," as defined in the Act, means "a research area which may include any part or all of an estuary and island, transitional area, and upland in, adjoining, or adjacent to such estuary, and which constitutes to the extent feasible a natural unit..." The purpose of establishing an estuarine sanctuary is to set aside an area which would serve as a natural field laboratory where studies of "natural and human processes occurring within the estuaries of the coastal zone" can be made by scientists and students. (**Federal**

Register, Vol. 39, No. 108, Part IV, June 4, 1974)

These sanctuaries would be areas which are relatively undisturbed by man at the time of acquisition and, therefore, could be used to make baseline ecological measurements. The designation of these areas would provide them with long term protection, and multiple use of the sanctuaries would be allowed to the extent that such use or uses are compatible with the primary uses of research and education.

The estuarine sanctuary program is intended to provide research data which would assist in coastal zone management decision-making. The State's coastal zone management program must be designed to protect the estuarine sanctuary. Management of estuarine sanctuary and land and water use regulations and planning considerations must be applied to adjacent lands. Management of estuarine sanctuaries is the responsibility of the applicant state, and the sanctuaries are intended to be incorporated into the state coastal zone management program. However, designation does not have to await the development and approval of a state's management program where operation of the sanctuary would aid in program development.

In South Carolina, the Coastal Council and the management program, which is its responsibility, would have authority for estuarine sanctuary planning and implementation of the necessary management policies and techniques. At this time, there are no designated estuarine sanctuaries in the South Carolina coastal zone.

Criteria for Designation

State applications for grants to establish estuarine sanctuaries are carefully reviewed and judged on the following criteria:

1. Benefit to the coastal zone management program;
2. The ecological characteristics of the ecosystem, including its biological productivity, diversity and representativeness;
3. Size and choice of boundaries (should approximate a natural ecological unit);
4. Cost (Federal share of the cost for each sanctuary is limited to $2,000,000.);
5. Enhancement of non-competitive uses;
6. Proximity and access to existing research facilities;
7. Availability of suitable alternative sites already protected which might be capable of providing the same use or benefit;
8. Conflict with existing or potential competing uses;
9. Compatibility with existing or proposed land and water use in contiguous areas.

Inventory (1 and 2)

Inventories and studies have been accomplished, or are in the process of being completed, for most of the natural resources present in the coastal zone. Presently, "An Environmental Base Line Study of South Carolina Estuaries" is underway. Begun in February, 1973, by the S.C. Wildlife & Marine Resources Department (WMRD), this research is to determine basic biological, chemical and physical characteristics, and their interactions over a several year period. This study is funded by the Coastal Plains Regional Commission, WMRD and the U.S. Army Corps of Engineers. An inventory of South Carolina's coastal marshes has recently been completed by WMRD personnel, and research to determine major wetland plant species productivity is nearing completion. Both of these studies were funded, in part, by the S.C. Coastal Council.

Additionally, WMRD is funding studies dealing with recreational fishing, over-wintering shrimp management, shellfish resources and anadromous and ground fish stock assessments. The College of Charleston, under a grant from the U.S. Environmental Protection Agency, is beginning a study to document food webs, populations and productivity in a southeast coastal marsh. The University of South Carolina has recently finished and published a report through the Environmental Protection Agency entitled "The Dynamics of an Estuary as a Natural Ecosystem." The National Marine Fisheries Service has published a recent investigation by staff from WMRD and the College of Charleston entitled: "The Macrofauna of the Surf Zone off Folly Beach, South Carolina." The S.C. Water Resources Commission has funded many past studies including the "Port Royal Sound Environmental Study," "Wando River Environmental Quality Study," "The Cooper River Environmental Study," "The Tidelands Report," "Lower Santee River Environmental Quality Study,"

"Wando River Aerial Imagery and Marsh Productivity Study," "Volumetric and Related Characteristics of the Black River Reservoir near Charleston, S.C." Finally, the U.S. Fish & Wildlife Service is funding a 21 month study to characterize the sea islands of the South Carolina and Georgia coasts through WMRD.

Priority of Uses

Priority of uses will be determined for each sanctuary as it may be designated in the future. The priority of uses would be developed in accord with the Federal guidelines and monitoring program affecting the sanctuary and the Coastal Council's regulatory authority over sanctuaries.

6) Shellfish Areas

a) Commercial Leases

Commercial harvesting of oysters and clams produced approximately one million dollars of direct revenue to the State of South Carolina in 1976. The annual catch of oysters was over 1,100,000 pounds of meat, and the clam harvest for the year totalled 172,000 pounds of meat. These constitute extremely important economic resources of the coastal zone, and as such, the areas suitable for shellfish production in the coastal waters of the State are very significant. The Coastal Council recognizes those bottom areas leased for commercial shellfishing as Geographic Areas of Particular Concern.

Management Authority

Section 28-811 of the Code of Laws of South Carolina, governing the Marine Fisheries Laws for the State, authorizes the Wildlife and Marine Resources Department to lease portions of the water bottoms owned or controlled by the State, for the purposes of commercial shellfishing. Any State resident licensed to do business and who makes his/her livelihood primarily or largely through the commercial shell-fishing industry may lease shell-fish bottoms, in areas totalling not more than 1,000 acres to any one individual. (Leases for other than commercial uses may be made to State residents for areas totalling as many as two acres. The adjacent upland landowner has preference for a two acre lease in adjoining tidewaters, if this application is made before other leases are granted.) These lease agreements are valid for a five year period. Once an application has been made and the Division of Marine Resources has determined the area capable of producing shellfish, the boundaries are surveyed and established within the terms of the lease. No other leases for gathering shellfish can be granted within the perimeter boundaries.

Each lessee is required to plant 65 bushels of shell or seed oysters for each acre, in an effort to prevent over-harvesting and depletion of this valuable resource. "Each lease or portion of a lease from which oysters are harvested must be replanted during the following planting season." (Section 28-822, S.C. Code of Laws, 1976)

State permits for activities affecting State-owned bottoms are issued by the S.C. Budget and Control Board. For proposed activities within 1,000 feet of productive shellfish lease areas, lessees are given an opportunity to comment on permit applications. And through memoranda of agreement between the Budget and Control Board and the Department of Health and Environmental Control (DHEC), all activities such as discharges or dredging and fill within 1,000 feet of lease areas are carefully controlled. (DHEC determines water quality criteria and health standards for shellfishing, and the 1,000 feet criterion is a generally accepted standard.)

The South Carolina Coastal Council has authority over coastal waters and tidelands to mean high water, and above mean high water where wetlands are contiguous to coastal waters and integrally a part of estuarine systems. A Council permit is required for all activities or alterations in these "critical areas," as defined in Section 3 of Act 123 of 1977. In assessing permit applications, the Council must consider "The extent to which the applicant's completed project would affect the production of fish, shrimp, oysters, crabs or clams or any marine life or wildlife, or other natural resources in a particular area." (Section 15 (3)) The Interim Rules and Regulations for the Permit Process (Chapter 28, r. 32-1 through 32-11, **State Register**), state specifically that consideration will be given to the rights of the lessee when permits are being evaluated for construction of docks or piers over shellfish lease areas.

b) **Recreational Shellfish Grounds**

Recreational shellfishing is a popular outdoor activity along the coast of South Carolina. Gathering oysters and clams is not only a unique form of recreation, but a source of fresh seafood for families of the area. As a valuable coastal resource and habitat of a significant living marine resource, recreational shellfish grounds are recognized as Geographic Areas of Particular Concern.

Public oyster grounds are areas along the South Carolina coast where State residents may gather shellfish for their personal use, and these areas must be designated with metal signposts. State shellfish grounds, also marked with signs, are open to all recreational shellfishermen, and by permit to commercial shellfishermen (who may obtain their shells or seed oysters from these State-owned beds).

Management Authority

The Division of Marine Resources is mandated to keep open shellfishing areas for the personal use of South Carolina residents, with approval by the County legislative delegations. These public shellfish beds are not to exceed 50 acres in any one county, and their maintenance and adequate marking is the responsibility of the Division. (Section 28-792. S.C. Code of Laws, 1976)

The regulations for shellfishing, Section 28-761 of S.C. Code of Laws, apply to recreational shellfishing, and establish the season and the limits for gathering. The Marine Resources Division, Office of Conservation & Management of the S.C. Wildlife and Marine Resources Department (WMRD) has jurisdiction over these areas and conducts numerous management activities, including maintenance of markers; planting of shell and seed oysters, and thinning of over-crowded beds; and periodic surveying of additional productive areas.

The same management authorities of the Budget and Control Board, Department of Health and Environmental Control, and the South Carolina Coastal Council apply to public and State shellfish grounds as are applicable in commercial lease areas. A detailed discussion is offered in Part 1 of **F. Shellfish Areas.**

c) **Other State-managed Shellfish Grounds (Seed beds)**

Certain especially productive submerged bottoms in the Wando River, North and South Santee Rivers and North Santee Bay have been designated by the Marine Resources Division of the South Carolina Wildlife and Marine Resources Department as seed bed areas. These vital resource areas serve as one of the major sources of seed oysters and, in the case of the Santee River, seed clams, for transport to other coastal waters, in order to restore and enhance shellfish resources.

Management Authority

The Marine Resources Division of the Wildlife and Marine Resources Department (SCWMRD) manages these seed bed areas. There is no specific legislation dealing with seed beds; however, SCWMRD is mandated generally to 1) manage the State's fishery resources, 2) protect and develop shellfish resources, and 3) manage State-owned submerged bottoms. (Sections 50-5-20, 50-17-1250 and 50-17-1210 of South Carolina Code of Laws, 1976, as amended).

A special permit is required for commercial taking of clams or oysters in these areas. The public is allowed the same rights of use as on other public shellfish grounds.

Inventory

Shellfish areas have been included on the Coastal Council's 7½" U.S.G.S. quadrangle overlay map system, and the information can be computerized readily. This data was made available partly through cooperation with the Division of Marine Resources. In addition, commercial leases must be recorded with the Clerk of the Court in the county of jurisdiction, and this was another source of detailed inventory information. As new areas are leased or assigned for public use, or as shellfish grounds are removed from production or closed to shellfishing, these changes can be made in the mapped data.

Priority of Uses

The following are the uses of priority for all commercial and recreational shellfish areas beginning with the use of highest priority:

1) Water-dependent uses which do not reduce or degrade the quality of shellfish lease area or

limit access to the area;

2) Water-enhanced activities or nonwater-dependent uses which do not reduce or degrade the quality of the shellfish lease area or limit access to the area.

Designated Sites

There are sixty-four commercial shellfish leases, totalling approximately 5,500 acres in the South Carolina coastal zone. There are nine State shellfish grounds and another sixteen public grounds along the coast. In addition, there are state-managed subtidal seed oyster beds in the Wando River, and clam beds in the North and South Santee Rivers and North Santee Bay which are not leased, but are managed on an open and closed season basis. The map appendix in Volume II depicts these shellfish areas. Commercial leases, public shellfish grounds, State grounds, and other shellfish grounds (seed beds) are listed in Volume II, Appendix F.

7) **Groundwater Resources**

Groundwater is an abundant resource in the coastal zone of South Carolina; however, there are potential problems of quality and quantity. Proper management can ensure the continuing productivity of groundwater resources, but data collection and extensive study are necessary because this is a complex resource. Groundwater can flow vertically as well as horizontally, and vertical wells can pass through several aquifers. The water in each aquifer is likely to vary in quantity and quality. In such a case, it is difficult to determine which aquifer(s) might be responsible for the poor water quality or if the capacity of one of the aquifers might be exceeded, at the expected pumpage, to the detriment of other wells in the area.

Because groundwater serves as the vital water supply source for many coastal communities, and the resource may suffer from over-use or waste disposal problems (i.e., septic tanks and seepage from landfills), it is an extremely significant resource of the coastal zone. Those regions which have been identified as potential problem areas, requiring special regulation and coordination of groundwater use, are recognized as Geographic Areas of Particular Concern.

Management Authority

The Groundwater Use Act of 1969 (Section 70-31, S.C. Code of Laws, 1976) authorizes the Water Resources Commission to designate "capacity use areas" (CUA). The South Carolina Coastal Council supports the implementation of this act and designation of CUAs by Water Resources as significantly important. The designation process is as follows: A county, municipality or sub-division of State government may request a review by the Commission if it is believed that a situation exists, or is emerging, where the use of groundwater may require coordination or regulation to protect the interests and rights of residents, property owners or the general public. The Executive Director will then conduct an investigation and submit the findings and recommendations to the Commission. Recommendations will include identification of area groundwater problems, appropriate conservation measures, and boundaries of CUA.

Based on the report, the Commission may adopt an order declaring a CUA, give public notice of the declaration, and hold at least one public hearing. After the public hearing, the Commission will take final action on the CUA designation and publish that action as part of its official regulations.

Once a CUA has been designated, the Commission instructs the Executive Director to prepare proposed regulations commensurate with the degree of control which is needed. The Commission must hold at least one public hearing on the proposed regulations and publish the final action as part of the official rules. These regulations may be modified or revoked, subject to a public hearing.

These regulations may include the following provisions:

1) provisions requiring water users to submit reports concerning quantity and source of waters withdrawn and nature of use;

2) provisions concerning timing of withdrawals, to abate unreasonable adverse effects and salt water encroachment; and

3) provisions concerning well depth, spacing controls, prescribed pumping levels, and maximum pumping rates.

When adopting or modifying the regulations and when reviewing permit applications, the Commission will consider the following:

1) number of persons using an aquifer and their respective withdrawals;
2) nature and size of the aquifer;
3) physical and chemical nature of any impairment;
4) probable severity and duration of such an impairment;
5) injury to public health, safety or welfare which may result if such impairment were not prevented or abated;
6) kinds of businesses or activities related to groundwater uses;
7) the importance and necessity of the uses claimed by permit applicants and the extent of any injury or detriment expected to be caused to other water users; and
8) diversion or reduction in flows in other water courses or aquifers.

The South Carolina Department of Health and Environmental Control (DHEC) also has legal authority to protect groundwater resources, with regard to surface pollution. This is accomplished through a statewide permitting system for septic tanks and waste disposal by earth burial. (Acts 1157, 1094, 203 and 1492; Sections 32-8, 1202 and 1251, S.C. Code of Laws, 1976; regulations PC-SW-1 and 2; SCPCA-SWG-1, 2 and 3)

Criteria for Designation

The decision to designate a capacity use area is based on the report of the Executive Director of the Water Resources Commission, which describes the groundwater situation and trends. If the situation is poor or deteriorating such that the public interest is in jeopardy, a CUA is likely to be declared. Once this happens, no person shall withdraw, obtain or utilize groundwater in excess of 100,000 gallons per day (gpd) without first obtaining a permit from the Water Resources Commission. All permits will be subject to the CUA regulations adopted by the Commission.

Inventory

Presently, the Water Resources Commission is undertaking two capacity use area investigations and one reconnaissance level investigation in the coastal zone.

CUA Investigations	**Counties**
Lowcountry Area	Colleton, Hampton, Jasper, Beaufort
Waccamaw Area	Horry, Georgetown, Marion
Regional Reconnaissance Investigation	**Counties**
Trident Area	Charleston, Berkeley, Dorchester

The CUA studies have been funded jointly by the Water Resources Commission, the U.S. Geological Survey, and the Coastal Plains Regional Commission. In December, 1977, capacity use reports were completed for the Waccamaw Area recommending that the area be declared a capacity use area (#129, Spigner, Report on the Ground-Water Resources of Horry and Georgetown Counties; #8, Zack, The Occurrence, Availability, and Chemical Quality of Ground Water, Grand Strand Area and Surrounding Parts of Horry and Georgetown Counties). The area was declared a CUA by the Commission in November, 1978.

Among several serious ground water problems cited in the Waccamaw capacity use reports are problems related to regional water level declines, salt water contamination, and poor water quality. Procedures to implement capacity use regulations should be completed in early 1979.

Lowcountry capacity use reports are scheduled for completion in 1979 with the reconnaissance study of the Trident Area to be completed in 1980.

Priority of Uses

The Ground Water Use Act of 1969 is specific in the considerations which the Commission must make in determining whether and to what extent ground water use is permissable. Unreasonably adverse effects on the resource or on water users including public, potential and present users is not permitted. The Act provides that the water resources be put to beneficial use to the fullest extent capable to conserve and maintain conditions which are conducive to the development and use of the ground water resources.

In highest to lowest priority, the following priorities will apply to ground water uses in areas designated as capacity use areas within the coastal zone:

1) Ground water uses which are beneficial uses and are consistent with all provisions of the Ground Water Use Act and regulations promulgated by the Water Resources Commission.
2) Ground water uses which are wasteful, or not beneficial or are found to cause unreasonable adverse effects on other water users or the long-term condition of ground water resources in the coastal zone.

Designated Sites

Currently, only one area, the Waccamaw Area, has been declared a CUA. Several more steps, however, are required under the Ground Water Use Act, before capacity use regulations can be implemented. Investigations in other areas of the coastal zone may result in future CUA designations. As CUA regulations are adopted for specific problems within generally declared areas, all or a portion of declared CUAs in the coastal zone may be designated as GAPCs depending upon the relative extent of ground water use problems.

8. Threatened or Endangered Species Habitats

Policy has been affirmed by both the Federal government and State government in South Carolina that conservation of the natural ecosystem upon which endangered and threatened species depend is a high priority. Untempered economic growth and development can result in the depletion or extinction of various species of fish, wildlife and plants. These species of fish, wildlife and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to our people, our Nation, and to the international community.

The United States has committed itself through numerous treaties with other countries to a pledge of conservation involving migratory birds, fisheries and wildlife preservation, for example. The scope of our responsibility as people and a Nation to protect the delicate balance of the natural ecosystem is demonstrated by these treaties of Federal and State legislation. As a result, the South Carolina Coastal Council will recognize all designated threatened and endangered species habitats as Geographic Areas of Particular Concern.

Management Authority

In view of the National and State concern for endangered species, the South Carolina legislature passed the Non-game and Endangered Species Act in 1974 (Chapter 15, Section 50-15-10 through 50-15-90, S.C. Code of Laws, 1976) The Act instructs the Wildlife and Marine Resources Commission to conduct investigations on non-game wildlife to determine population distribution, habitat needs, limiting factors, and management measures necessary for their continued existence. Based on such investigations, the Commission must issue appropriate regulations and develop management programs. The regulations may establish proposed limitations relating to taking, possession, transportation, exportation, processing, sale, offering for sale, or shipment of particular wildlife species.

The Commission is charged with the responsibility to establish programs necessary for the management of non-game and endangered wildlife. The programs may include research, census taking, law enforcement, education, and acquisition of land or aquatic habitats. The Endangered Species Program is coordinated closely with the Heritage Trust Program which allows donations of land or easements.

The Commission must issue a list of State endangered species, including the United States List of Endangered Native Fish and Wildlife and the United States List of Endangered Foreign Fish and Wildlife. The list will be reviewed and updated at least every two years. It is unlawful to take, possess, transport, export, process, sell, offer for sale, ship, or receive any of the identified species. The South Carolina Wildlife and Marine Resources Department (WMRD) is directed to enforce the Act and may issue special permits for scientific, educational, or other purposes.

The State lists current endangered species and, where appropriate, may designate critical habitat areas, according to the Federal Endangered Species Act. The State Heritage Trust Program and Endangered Species Program work in close coordination in assessing, acquiring and managing sites that constitute endangered

species habitat. If a critical area is formally designated, the effects of any Federally funded program in that area must be more carefully considered. This review by the State clearinghouse is an indirect extension of State management authority effectuated under the Federal Endangered Species Act of 1973. The Secretary of Interior makes the final conflict resolution in such a situation.

The Federal Endangered Species Act of 1973 (PL 92-205, December, 1973, amended by PL 94-32, June, 1976, and PL 94-359, July, 1976) was passed with the purpose of providing

> "...a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved to provide a program for the conservation of such endangered species and threatened species (Sec. 2, (b))."

The national policy is stated as follows:

> "...all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

The Secretary of Interior is authorized to publish a listing of endangered and threatened species based on the best available scientific data and, thereafter, to establish rules and regulations regarding the control of taking, sale, import, export, or other disruption of each species. Endangered species are those in danger of extinction throughout all or a significant portion of their range. Threatened species are defined as those likely to become endangered within the forseeable future. The bases of the South Carolina and national programs are parallel, and the protective mechanisms similar in that impact on endangered species is considered.

The South Carolina Coastal Council is mandated to consider impacts on wildlife species in granting of permits for activities in critical areas of the coastal zone. The Council will also review and comment on other permits, applications, environmental impact statements and Federally-funded projects (A-95 process) throughout the coastal zone. The Council comments will include an evaluation of the potential impacts on any designated critical habitats for threatened or endangered species.

Criteria for Designation

South Carolina Endangered Species are any species of wildlife whose prospect for survival or recruitment within the State are in jeopardy or likely to become so in the foreseeable future. The causes may be: 1) destruction or modification of habitat; 2) species over-utilization for scientific, commercial, or sporting purposes; and 3) other natural or man-made factors. Species on the Federal endangered species lists for native or foreign fish and wildlife are included.

Inventory

An initial Endangered Species Symposium was held in Charleston in November, 1976, at which time committees of knowledgeable experts and concerned individuals were established. A list of endangered species and "species of special concern" was developed with the aid of these communities. These communities and the ongoing endangered species programs constitute the inventory required for periodic update of the State listing. The South Carolina Endangered Species list is in Appendix F.

Priority of Uses

The following are the uses of priority for all areas identified or designated as critical habitats for threatened and endangered species, beginning with the use of highest priority:

1) Uses which are compatible with all regulations and management programs developed to protect any designated habitat area under the Federal or State Endangered Species Acts;
2) Uses which maintain the natural functions of areas identified or designated as critical habitat areas of species listed on the State or Federal threatened or endangered species lists;

3) Non-structural, non-intensive uses which do not create irretrievable damage to any species listed as a threatened species.

Within an area officially designated as a critical area habitat under the State or Federal Endangered Species Acts, uses are prohibited which violate the integrity of the State or Federal legislation.

Designated Sites

Certain critical habitat areas have been identified but no formal designations have been made to date since most of these areas are already a part of Federal or State preserves or refuges on the coast. At such time as specific habitat areas are designated and management guidelines or rules and regulations are promulgated, these will be adopted as GAPC's.

b. Activities or Facilities Dependent on Coastal Location

This category includes those activities which are dependent on their proximity to coastal waters, in terms of use or access; or on proximity to specific coastal resources, such as minerals or other raw materials.(For initial purposes, port facilities and actively operating mining sites have been identified.)

Industrial and commercial uses are crucial to the economy of the South Carolina coastal zone. In addition to preservation and protection of natural areas, the State's coastal zone management program must address the development of coastal resources. It must provide the citizens of the State with guidance on the best manner in which to capitalize on development opportunties while minimizing negative environmental effects, disruption of other coastal resources, or infringement on the rights of other coastal property owners.

Uses and facilities dependent on coastal location, for water access or proximity to other coastal resources, are recognized as Geographic Areas of Particular Concern due to their unique independence on coastal location and because of the economic importance and possible environmental impacts of these activities.

Criteria for Designation

To qualify as a GAPC under this category, an activity or facility must meet one or more of the following criteria:

1) Significant quantities of water, such that it can only be obtained in a coastal location, are an absolutely necessary component of the process for a particular industrial or commercial activity;
2) Access to coastal waters, primarily for transportation purposes, not only enhances but is fundamental to the given activity; or
3) Minerals, energy-related resources, or other coastal resources occuring in the coastal zone are the primary purpose of an activity which is the major source of income for a given individual or company, and proximity to that resource is vital to success of the operation.

1) State Ports

Economists at the University of South Carolina estimate that the State Ports have an impact throughout the State of almost $600 million per year, representing direct and indirect employment of about 35,000 jobs. State Ports facilities are a major attraction of industrial investments, and also play an important role for South Carolina agriculture, which exports 29 percent of its total production value.

These valuable economic assets are, by definition, dependent on their coastal location for access to the transportation corridor provided by coastal waters. While their maintenance and further development are vital to the South Carolina economy, these activities can have significant environmental impacts and also secondary development effects, particularly on other industrial and commercial uses and on public services, such as transportation.

Because of their importance as an economic resource and their dependence on a coastal location, the port facilities in South Carolina have been recognized as Geographic Areas of Particular Concern.

Management Authority

The South Carolina State Ports Authority (SPA) was created by Act 626 of the 1942 South Carolina General Assembly (Sections 54-1, -12, -15, and -20, S.C. Code of Laws, 1976). Under direction of a seven member board appointed by the governor, the SPA has the responsibility for development, construction, operation, and promotion of the State's ports. The SPA has jurisdiction over waters, shores, and tidal tributaries of the harbor at Charleston, Georgetown and Port Royal. It has the power to sue and be sued; the power of eminent domain; the power to acquire and dispose of property, and to take State property not otherwise in use; and the authority to issue revenue bonds.

Section II of the South Carolina Coastal Management Act (Act 123 of the 1977 South Carolina General Assembly) has mandated another requirement for the SPA. It reads as follows:

> The South Carolina State Ports Authority shall prepare and submit to the Council a management plan for port and harbor facilities and navigation channels. Upon approval by the Council of such management plan it shall become part of the comprehensive coastal management program developed by the Council. The South Carolina State Ports Authority shall include in the management plan a designation of the geographical area appropriate for use by public and private port and harbor facilities and military and naval facilities and submit this to the Council for approval.

Joint development of this required port and harbor management plan, coupled with the Coastal Council's permit authority in the critical areas, including coastal waters and wetlands that might be part of a harbor area, will result in coordinated efforts between the SPA and the Coastal Council. And it will ensure that port modifications or expansion activities and management of the ports system remain consistent with the goals of coastal zone planning.

Inventory

Information on existing SPA properties and facilities was obtained through consultation with SPA staff and the publications which were made available. When submitted, the required ports plan will provide extensive data on existing port facilities and on likely, potential sites for future ports development which will be considered in identifying and designating additional port-related GAPCs.

Priority of Uses

The following are the uses of priority for all state ports created and operated by the South Carolina State Ports Authority (SPA) beginning with the use of highest priority:

1) Uses which require water access or uses for which the water orientation is the central purpose of the activity, such as maritime shipping, fishing, marine industry, and recreational boating. Included in the uses of highest priority for state ports are provisions to assure safety within the ports. These water-dependent uses should have no prudent or feasible alternative;
2) Water-related uses which do not reduce or degrade the natural value or resources within the port;
3) Nonwater-dependent or nonwater-related uses which retain future flexibility of the port for water-dependent needs.

Designated Sites

The South Carolina Ports Authority owns and manages the following facilities, which are designated as GAPCs: Beaufort County: Port Royal-State Pier 21; Charleston County: Port of Charleston; Georgetown County: State Piers 31 and 32.

2) **Navigation Channels**

Navigation channels are closely related to the preceeding category in that they enable travel to and from

major ports, facilitate industrial and commercial activities and allow for recreational and commercial boating. Thus, channel maintenance and development are vital to the economy of the coastal zone and the state and the nation as a whole. Like port development, channel maintenance and development may have secondary effects of an environmental or developmental nature.

Because navigation channels depend upon a coastal location and are vital to the State's economy, they have been recognized as Geographic Areas of Particular Concern.

Management Authority

The provisions of Chapter 1, Title 49 of the 1976 South Carolina Code of Laws declare that "(A)11 streams which have been rendered or can be rendered capable of being navigated by rafts of lumber or timber by the removal of accidental obstructions and all navigable water courses and cuts are hereby declared navigable streams and such streams shall be common highways and forever free..." The section also prohibits the obstruction of waterways and provides for condemnation of land for rights-of-way and outlets for inland waterways.

Enforcement of this statute rests jointly with the Budget and Control Board and the Attorney General's office.

Section 15 of South Carolina's Coastal Management Act requires that the Coastal Council consider navigation channels in its permitting process. Permit applications for activities "in a waterway used for commercial navigation or shipping" must be reviewed by the South Carolina State Ports Authority prior to permit issuance for certification that the proposed project will not "unreasonably interfere with commercial navigation and shipping."

The Act also requires the Coastal Council to consider "the extent to which the activity would harmfully obstruct the natural flow of navigable water" and "the extent to which the activity could cause erosion (and) shoaling of channels."

Inventory

Information on existing navigation channels was obtained from the SPA staff and the draft SPA Ports Plan.

Priority of Uses

Existing navigation channels should be maintained and utilized, while at the same time conserving the natural environment. The following are the uses of priority for navigation channels in the coastal zone, beginning with the use of highest priority:

1) Beneficial uses which require water access or uses for which the water orientation is the central purpose of the activity, such as maritime shipping, fishing, and recreational boating, providing these uses are conducted in such a way as to minimize adverse environmental impacts;
2) Water-related uses which do not reduce or degrade the environmental quality of the waterway;
3) Nonwater-dependent or nonwater-related uses which do not obstruct navigation and do not impair the natural surroundings.

Designated Sites

All waterways within the coastal zone which meet the legal standards for navigability are designated as GAPCs.

3) Mining Operations

There are over 344 active mines in South Carolina, which in 1974 had an estimated mineral commodity value of $120,000,000. Extraction of minerals by mining is a basic and essential activity, making an important contribution to the economic welfare of this State and the Nation.

While it is not practical to extract minerals required by society without disturbing the earth's surface and

The public policy stated within the Act is:

To secure for the people, both present and future generations, the benefits of an enduring resource of natural and cultural areas and features by establishing a system of Heritage Preserves and Sites.

This program provides for dedication of areas or sites by the owner to the Trust through transfer of fee simple title or lesser forms of ownership interest, such as open space easements. The Advisory Board and Wildlife and Marine Resources Commission review the proposed areas, which are nominated by the staff of the S.C. Wildlife and Marine Resources Department, other State agencies, and citizens of the State.

A major requirement of the program is provision of management criteria, rules and regulations, and "allowable use" guidelines for Heritage Preserves. A management plan must be developed for each property in the Heritage Trust. These management mechanisms are intended "to preserve the primary natural character of such areas or features and to provide the maximum public usage thereof which is compatible and consistent with the character of the area." (Section 4 (7))

Inventory

Staff of the Division of Natural Area Acquisition and Resource Planning of the South Carolina Wildlife and Marine Resources Department, with support from other experts in the field, have been actively engaged in thorough investigative surveys of the natural areas of the State. The objectives of this search are identifying "significant elements of the natural environment such as unique and outstanding features, rare and endangered plant and animal species, and natural areas representing the range of biological diversity found in the State." These data have been made available to the Office of Coastal Planning. As the Heritage Trust Program identifies priority areas for preservation or acquisition efforts, this information will also be reviewed by Coastal Council staff and considered for designation as GAPCs, or as future or potential GAPCs.

Priority of Uses

The following are the uses of priority for areas deeded into the Heritage Trust Program, beginning with the use of highest priority:

1) Uses which are consistent with the management plan developed for each property;
2) Uses which allow public enjoyment of the area as long as the primary natural character of the area is not disrupted;
3) Uses which are compatible with the area's wildlife and wildlife management.

Prohibited uses are any which jeopardize the integrity of the Heritage Trust Program.

Designated Sites

Because of their unique value as wildlife habitats and natural areas, Heritage Trust lands have been designated as Geographic Areas of Particular Concern.

Capers Island is the only site in the coastal zone which has been deeded into the Heritage Trust Program to date.

2) State Wildlife Preserves

The extensive system of wildlife preserves and game management areas owned or leased by South Carolina Wildlife and Marine Resources Department are irreplaceable resources, as both protected wildlife habitats and recreational hunting and fishing areas. Because of their value to residents and visitors of the South Carolina coastal area, they have been identified as Geographic Areas of Particular Concern.

Management Authority

The South Carolina Wildlife and Marine Resources Department (WMRD) is empowered to acquire land areas and enter into agreements with landowners and with the Federal government for purposes of managing wildlife species and establishing specific sanctuaries and game management areas (§ 50-3-100, Code of Laws of South Carolina, 1976). The areas owned and managed by WMRD are vital resources of the coastal zone, for

conservation of the State's wildlife and also for recreational hunting and fishing opportunities. As part of this management responsibility, a full management plan is prepared for each preserve, identifying short and long-term uses and guidelines for protection and use of the area.

Where critical areas, as defined in the South Carolina Coastal Management Act (Act 123 of 1977), occ within these preserves, additional control is afforded, since Coastal Council permits would be required for an alterations within the critical areas of these preserves.

Inventory

A complete listing of the wildlife and game management areas under ownership and/or management authority of the WMRD in the eight coastal counties was obtained through consultation with WMRD and by reference to **S.C. Public Land Ownership Inventory** (S.C. Land Resources Conservation Commission, 1977). These areas have been mapped into the Coastal Council's overlay mapping system.

Priority of Uses

The following are the uses of priority for areas designated as State Wildlife Preserves, beginning with the highest priority:

1) Uses which are consistent with the wildlife management plan for each preserve;
2) Uses which are compatible with the preserve's wildlife, wildlife habitats and wildlife management and simultaneously provide public recreational opportunities, such as hunting and fishing.

Designated Sites

Because of their significance as natural habitats and their inclusion under ownership and/or management authority of WMRD, the following areas are designated as GAPCs.

1) Turtle Island - Jasper County
2) Bear Island Game Management Area - Colleton County
3) Alexander Sprunt, Jr. Wildlife Sanctuary (Deveaux Bank) - Charleston County
4) Santee Coastal Reserve - Charleston County
5) Hatchery Game Management Area - Berkeley County
6) Moultrie Game Management Area - Berkeley County
7) Santee Delta Game Management Area - Georgetown County
8) North Island & South Island Plantation - Georgetown County
9) Samworth Game Management Area - Georgetown County
10) State-owned segment - Francis Marion Game Management Area (Santee-Cooper)

As new acquisitions are made into the State system of wildlife preserves and game management areas, these will be designated as GAPCs in the South Carolina coastal zone.

3) State Parks

State park facilities in the coastal zone are valuable resources for the recreational, scenic and educational enrichment of residents and visitors alike. Because of this significance, major existing parks have been recognized as Geographic Areas of Particular Concern.

Management Authority

The South Carolina Department of Parks, Recreation and Tourism (PRT) is mandated to control and maintain the State parks system, and can accept or purchase lands for this purpose, with approval of the State Budget and Control Board (§51-71, S.C. Code of Laws, 1976). PRT must prepare a master plan for each major park facility, identifying plans for development of facilities, and the preservation and use guidelines for the park.

On a more long-range basis, PRT is developing an update to the South Carolina State Comprehensive Outdoor Recreation Plan (SCORP). The function of SCORP is to provide a guide for statewide recreation planning and development, and to maintain eligibility for Land and Water Conservation funds from the Federa Heritage Conservation & Recreation Service.

Where critical areas form part or all of State park facilities, the Coastal Council will also have regulatory control. Any alterations within critical areas will require a Coastal permit. This authority will aid in assuring that the use and development of these cherished recreational resources remain consistent with policies and guidelines of the State's coastal zone program.

Inventory

The organization of studies for SCORP centers on six volumes, covering public and private outdoor and indoor recreation systems. Volume I of this planning process was a complete inventory of the State's physical characteristics, natural resources, and existing recreation facilities. This information has been made available to the Coastal Council. Consultation with staff of PRT has helped to identify the existing major parks in the eight county coastal zone (roadside parks, small neighborhood parks and the like have been exempted), and these have been mapped on 7½" U.S.G.S. quadrangle overlays.

Priority of Uses

The following are the uses of priority for State Parks, beginning with the use of highest priority:

1) Varied recreational activities open to the public;
2) Non-intensive uses which require minimal feasible alteration and maintain the natural functions of the area;
3) Provision of educational opportunities to visitors of the parks.

Designated Sites

The following existing State parks are designated GAPCs and are shown in the map index.

1. Hunting Island State Park - Beaufort County
2. Givhan's Ferry State Park - Colleton & Dorchester Counties
3. Old Ft. Dorchester State Park - Dorchester County
4. Edisto Beach State Park - Colleton County
5. Charlestowne Landing - Charleston County
6. Drayton Hall - Charleston County
7. Hampton Plantation - Charleston County
8. Huntington Beach State Park - Georgetown County
9. Myrtle Beach State Park - Horry County

As PRT and the Coastal Council identify other recreational resources which warrant particular State concern in the coastal program, these will be reviewed for designation. Proposed park sites should be included as priority or potential GAPCs. When new sites are added to the State parks system, these will be designated automatically.

4) Scenic Rivers

South Carolina is fortunate to have many river segments that still remain in a natural or near natural state. As such, these areas represent an important historical, cultural, and recreational resource. Rivers were the primary transportation system for early America, both for Indians and the later explorers and settlers. Consequently, archeological sites are found at waterfront locations.

Bounded by large expanses of swamp, several Lowcountry river segments have witnessed little development pressure and remain in primarily wilderness conditions. Other segments are good representatives of natural areas with wide species diversity.

As recreational resources, the rivers serve as a "one-way water trail," offering boaters a unique sense of adventure. The silent movement of a canoe affords the opportunity to observe numerous wildlife species which it would not be possible to approach in other modes of transportation. The recreational potential of South Carolina's coastal rivers is both impressive and unique.

In recognition of this tremendous resource, the Coastal Council recognizes river segments which have been designated as Scenic Rivers as Geographic Areas of Particular Concern.

Management Authority

In an effort to preserve and protect South Carolina's rivers, the 1974 South Carolina General Assembly passed the Scenic Rivers Act (Act 1106), which authorized the Water Resources Commission to designate scenic rivers. Proposals for designation may be made by State agencies, local governments, or citizens groups. To qualify, a river must possess unique and outstanding scenic, recreational, geologic, fish and wildlife, historic or cultural values, in addition to relatively unpolluted waters.

The Water Resources Commission is mandated to develop a comprehensive water and related use plan for designated rivers, with emphasis on protecting the significant resources of these scenic rivers. The Wildlife and Marine Resources Department assists the Commission in formulating and enforcing these plans and regulations.

The management plans for each river segment must address the following:

Class I — Maintenance of the wilderness character, with camping and river access allowed only at designated public access areas. Prohibiting new roads or buildings, mining and commercial timber harvesting.

Class II — Preservation of the scenic values, with riparian landowners allowed customary agricultural activities, silviculture, and construction of compatible farm-use buildings. Mining and construction of roads paralleling the river are prohibited.

Class III — Preservation of the scenic values, with landowners allowed agricultural, residential, recreational, commercial, and light industrial activities. Mining and construction of new roads paralleling the river are prohibited.

Where all or portions of a designated scenic river is located in the critical areas of the coastal zone, the South Carolina Coastal Council will also have management authority. A permit would be required for any activities or alterations in such a river segment.

The Federal Wild and Scenic Rivers Act (P.L. 90-542) was enacted in 1968. The three basic river classifications in that Act are 1) wild, 2) scenic, and 3) recreational. These classifications generally parallel the three categories in the South Carolina Act; however, rules for management in the Federal law are more rigorous.

There are presently no national wild and scenic rivers in the coastal zone of South Carolina. However, the Federal Heritage Conservation & Recreation Service has inventoried numerous rivers in the coastal zone of South Carolina.

Criteria for Designation

The following criteria are those established for a river segment to qualify under the South Carolina Scenic Rivers program:

Class I — Natural river

i) it must be free-flowing (no impoundments or diversions)
ii) the shorelines and scenic vistas must be essentially unchanged by man
iii) there must be no extensive paralleling roads closer than one mile
iv) in river gorges, there must be no extensive paralleling roads within one-quarter of the rim
v) there must be only a limited number of road crossings and spur roads

Class II — Pastoral river

May be partially or predominately used for agriculture, silviculture and other dispersed human activities which do not substantially interfere with public use and enjoyment of rivers and the shores.

Class III — Partially developed

The adjacent areas may be affected by works of man, but still possess actual or potential scenic, recreational or historic values.

Inventory

The Water Resources Commission has inventoried several rivers in the eight coastal counties. They are: the Little Pee Dee, Black, Edisto, Combahee, Salkehatchie, and Ashley Rivers. These same rivers have been inventoried by the Federal Heritage Conservation & Recreation Service and are being considered as potential designations under the Federal program. Information collected by the Commission includes flow characteristics, water quality, vegetation and wildlife data, and recreational amenities.

Priority of Uses

The following are the uses of priority for Scenic Rivers, beginning with the use of highest priority:

1) Uses which are consistent with the management plans developed by the Water Resources Commission with the assistance of WMRD. Each plan will be a comprehensive water and related use plan designed to protect the significant resources of each river section designated;

2) Uses which maintain long-term natural functions of the river while affording public recreational activities, especially those of a passive nature.

The lowest priority uses would be those not related to the goals of the Scenic Rivers Program but which do not alter, reduce, or degrade the river resources or the integrity of the Scenic Rivers Program.

Designated Sites

To date, there are no Scenic River segments in the coastal zone. When designations are made and easements or titles donated, these rivers automatically will be considered to qualify as GAPCs.

NOTE: The Ashley River, in Dorchester and Charleston Counties, has been named as eligible for designation. It appears to meet the Class II qualifications, but various segments may be given different classifications. If and when donations are made, individual plans will be formulated for each donation. Since this river segment is particularly rich in historical resources, the South Carolina Department of Archives and History is assisting the Commission in assessing the intentions of adjacent landowners regarding donation.

3) Marine and Estuarine Sanctuaries

The coastal waters and wetlands of the State are valuable natural resources which have yet to be spoiled by development or real estate speculation. The preservation and protection of these resources is paramount in determining the growth of the seafood as well as the tourist industries. There are many citizen groups active in pursuing these goals; and State governmental agencies, in particular the South Carolina Wildlife & Marine Resources Department, have instituted research programs to document and inventory the marine environment. On this basis, the Coastal Council feels that any area designated by the State of South Carolina, in conjunction with the U.S. Department of Commerce, as a marine or estuarine sanctuary will be a Geographic Area of Particular Concern (GAPC).

a) Marine Sanctuaries

Management Authority

Title III of the Marine Protection, Research, and Sanctuaries Act of 1972 (P.L. 92-532, 86 Stat. 1061), provides the Secretary of Commerce, with approval from the President, the power to designate those areas of ocean waters as far seaward as the outer edge of the Continental Shelf and all other coastal waters where the tide ebbs and flows, as marine sanctuaries. These sanctuaries are intended to preserve or restore such areas for their conservation, recreational, ecological or aesthetic values. The Secretary of Commerce, prior to designating a marine sanctuary, must consult with the Secretaries of State, Defense, Interior, and Transportation and give due consideration to the views of the responsible officials of the affected state. The designation becomes effective sixty days after it is published, unless the governor of the state involved certifies to the Secretary of Commerce that the designation, or a specified portion, is unacceptable to his/her state. In this

case the designated sanctuary will not include the certified unacceptable areas or become final until such time as the governor withdraws his certification of unacceptability.

On March 13, 1974, the Secretary of Commerce authorized the Administrator of the National Oceanic and Atmospheric Administration to exercise the authority granted under Title III. With this authority, NOAA has to develop proposed objectives, guidelines, criteria and procedures for designation of marine sanctuaries.

Potential marine sanctuary sites, where development seems imminent, are screened by the Federal Office of Coastal Zone Management (OCZM) and the National Marine Fisheries Service. Development includes potential offshore as well as onshore sites, and is considered "imminent" if it is likely to occur within 18 months, or if actions to be taken within 18 months will establish the likelihood of development. OCZM offers the opportunity for state coastal zone management offices, commercial fishing organizations, development interests, environmental groups and the public-at-large to submit recommendations for marine sanctuary sites.

If any marine sanctuary areas are designated by the Secretary of Commerce, the S.C. Coastal Council is mandated under the State coastal zone management law (Sec. 5(J), Act 123 of 1977) "to manage estuarine and marine sanctuaries and regulate all activities therein, including the regulation of the use of coastal waters located within the boundary of such sanctuary." The primary management authority would rest with the S.C. Coastal Council. Its regulatory authority would also apply since any marine sanctuary would be located within the State's critical areas.

To date, the general management principles for marine sanctuaries mainly address regulation of development to be harmonious with the overlying principles of preservation and protection of the sanctuary. The classification of these areas will not affect multiple use which may be permitted to the extent the uses are compatible with the primary(s) for which each sanctuary is established. The establishment of marine sanctuaries may be to complement public or private, local, State or Federal government lands which have been set aside for similar purposes. The overall management of the sanctuary must include an initial and comprehensive environmental assessment. (This should complete the original EIS which must be submitted upon nomination.) A continued monitoring program and guidelines to enforce the policies also must be formulated.

Criteria for Designation

The program objectives for marine sanctuaries emphasize the idea of preserving, restoring or enhancing these areas for their conservational, recreational, ecological, research or aesthetic values. Examples of coastal waters which might meet designation status include:

(a) Areas necessary to protect valuable, unique or endangered marine life, geological features, and oceanographic features;
(b) Areas to complement and enhance public areas such as parks, national or state monuments and other preserved areas;
(c) Areas important to the survival and preservation of the nation's fisheries and other ocean resources;
(d) Areas to advance and promote research which will lead to a more thorough understanding of the marine ecosystem and the impact of man's activities.

b) Estuarine Sanctuaries

Management Authority

Section 315 of the Federal Coastal Zone Management Act of 1972 addresses the subject of estuarine sanctuaries and states that the Secretary may "make grants to any coastal state for the purpose of acquiring, developing, or operating estuarine sanctuaries..." Thus, the initiative for participating in the estuarine sanctuary program lies with the state, whereas nominations for marine sanctuaries can come from local, state or federal agencies or any interested persons.

The term "estuarine sanctuary," as defined in the Act, means "a research area which may include any part or all of an estuary and island, transitional area, and upland in, adjoining, or adjacent to such estuary, and which constitutes to the extent feasible a natural unit..." The purpose of establishing an estuarine sanctuary is to set aside an area which would serve as a natural field laboratory where studies of "natural and human processes occurring within the estuaries of the coastal zone" can be made by scientists and students. (**Federal**

Register, Vol. 39, No. 108, Part IV, June 4, 1974)

These sanctuaries would be areas which are relatively undisturbed by man at the time of acquisition and, therefore, could be used to make baseline ecological measurements. The designation of these areas would provide them with long term protection, and multiple use of the sanctuaries would be allowed to the extent that such use or uses are compatible with the primary uses of research and education.

The estuarine sanctuary program is intended to provide research data which would assist in coastal zone management decision-making. The State's coastal zone management program must be designed to protect the estuarine sanctuary. Management of estuarine sanctuary and land and water use regulations and planning considerations must be applied to adjacent lands. Management of estuarine sanctuaries is the responsibility of the applicant state, and the sanctuaries are intended to be incorporated into the state coastal zone management program. However, designation does not have to await the development and approval of a state's management program where operation of the sanctuary would aid in program development.

In South Carolina, the Coastal Council and the management program, which is its responsibility, would have authority for estuarine sanctuary planning and implementation of the necessary management policies and techniques. At this time, there are no designated estuarine sanctuaries in the South Carolina coastal zone.

Criteria for Designation

State applications for grants to establish estuarine sanctuaries are carefully reviewed and judged on the following criteria:

1. Benefit to the coastal zone management program;
2. The ecological characteristics of the ecosystem, including its biological productivity, diversity and representativeness;
3. Size and choice of boundaries (should approximate a natural ecological unit);
4. Cost (Federal share of the cost for each sanctuary is limited to $2,000,000.);
5. Enhancement of non-competitive uses;
6. Proximity and access to existing research facilities;
7. Availability of suitable alternative sites already protected which might be capable of providing the same use or benefit;
8. Conflict with existing or potential competing uses;
9. Compatibility with existing or proposed land and water use in contiguous areas.

Inventory (1 and 2)

Inventories and studies have been accomplished, or are in the process of being completed, for most of the natural resources present in the coastal zone. Presently, "An Environmental Base Line Study of South Carolina Estuaries" is underway. Begun in February, 1973, by the S.C. Wildlife & Marine Resources Department (WMRD), this research is to determine basic biological, chemical and physical characteristics, and their interactions over a several year period. This study is funded by the Coastal Plains Regional Commission, WMRD and the U.S. Army Corps of Engineers. An inventory of South Carolina's coastal marshes has recently been completed by WMRD personnel, and research to determine major wetland plant species productivity is nearing completion. Both of these studies were funded, in part, by the S.C. Coastal Council.

Additionally, WMRD is funding studies dealing with recreational fishing, over-wintering shrimp management, shellfish resources and anadromous and ground fish stock assessments. The College of Charleston, under a grant from the U.S. Environmental Protection Agency, is beginning a study to document food webs, populations and productivity in a southeast coastal marsh. The University of South Carolina has recently finished and published a report through the Environmental Protection Agency entitled "The Dynamics of an Estuary as a Natural Ecosystem." The National Marine Fisheries Service has published a recent investigation by staff from WMRD and the College of Charleston entitled: "The Macrofauna of the Surf Zone off Folly Beach, South Carolina." The S.C. Water Resources Commission has funded many past studies including the "Port Royal Sound Environmental Study," "Wando River Environmental Quality Study," "The Cooper River Environmental Study," "The Tidelands Report," "Lower Santee River Environmental Quality Study,"

"Wando River Aerial Imagery and Marsh Productivity Study," "Volumetric and Related Characteristics of the Black River Reservoir near Charleston, S.C." Finally, the U.S. Fish & Wildlife Service is funding a 21 month study to characterize the sea islands of the South Carolina and Georgia coasts through WMRD.

Priority of Uses

Priority of uses will be determined for each sanctuary as it may be designated in the future. The priority of uses would be developed in accord with the Federal guidelines and monitoring program affecting the sanctuary and the Coastal Council's regulatory authority over sanctuaries.

6) Shellfish Areas

a) Commercial Leases

Commercial harvesting of oysters and clams produced approximately one million dollars of direct revenue to the State of South Carolina in 1976. The annual catch of oysters was over 1,100,000 pounds of meat, and the clam harvest for the year totalled 172,000 pounds of meat. These constitute extremely important economic resources of the coastal zone, and as such, the areas suitable for shellfish production in the coastal waters of the State are very significant. The Coastal Council recognizes those bottom areas leased for commercial shellfishing as Geographic Areas of Particular Concern.

Management Authority

Section 28-811 of the Code of Laws of South Carolina, governing the Marine Fisheries Laws for the State, authorizes the Wildlife and Marine Resources Department to lease portions of the water bottoms owned or controlled by the State, for the purposes of commercial shellfishing. Any State resident licensed to do business and who makes his/her livelihood primarily or largely through the commercial shell-fishing industry may lease shell-fish bottoms, in areas totalling not more than 1,000 acres to any one individual. (Leases for other than commercial uses may be made to State residents for areas totalling as many as two acres. The adjacent upland landowner has preference for a two acre lease in adjoining tidewaters, if this application is made before other leases are granted.) These lease agreements are valid for a five year period. Once an application has been made and the Division of Marine Resources has determined the area capable of producing shellfish, the boundaries are surveyed and established within the terms of the lease. No other leases for gathering shellfish can be granted within the perimeter boundaries.

Each lessee is required to plant 65 bushels of shell or seed oysters for each acre, in an effort to prevent over-harvesting and depletion of this valuable resource. "Each lease or portion of a lease from which oysters are harvested must be replanted during the following planting season." (Section 28-822, S.C. Code of Laws, 1976)

State permits for activities affecting State-owned bottoms are issued by the S.C. Budget and Control Board. For proposed activities within 1,000 feet of productive shellfish lease areas, lessees are given an opportunity to comment on permit applications. And through memoranda of agreement between the Budget and Control Board and the Department of Health and Environmental Control (DHEC), all activities such as discharges or dredging and fill within 1,000 feet of lease areas are carefully controlled. (DHEC determines water quality criteria and health standards for shellfishing, and the 1,000 feet criterion is a generally accepted standard.)

The South Carolina Coastal Council has authority over coastal waters and tidelands to mean high water, and above mean high water where wetlands are contiguous to coastal waters and integrally a part of estuarine systems. A Council permit is required for all activities or alterations in these "critical areas," as defined in Section 3 of Act 123 of 1977. In assessing permit applications, the Council must consider "The extent to which the applicant's completed project would affect the production of fish, shrimp, oysters, crabs or clams or any marine life or wildlife, or other natural resources in a particular area." (Section 15 (3)) The Interim Rules and Regulations for the Permit Process (Chapter 28, r. 32-1 through 32-11, **State Register**), state specifically that consideration will be given to the rights of the lessee when permits are being evaluated for construction of docks or piers over shellfish lease areas.

b) **Recreational Shellfish Grounds**

Recreational shellfishing is a popular outdoor activity along the coast of South Carolina. Gathering oysters and clams is not only a unique form of recreation, but a source of fresh seafood for families of the area. As a valuable coastal resource and habitat of a significant living marine resource, recreational shellfish grounds are recognized as Geographic Areas of Particular Concern.

Public oyster grounds are areas along the South Carolina coast where State residents may gather shellfish for their personal use, and these areas must be designated with metal signposts. State shellfish grounds, also marked with signs, are open to all recreational shellfishermen, and by permit to commercial shellfishermen (who may obtain their shells or seed oysters from these State-owned beds).

Management Authority

The Division of Marine Resources is mandated to keep open shellfishing areas for the personal use of South Carolina residents, with approval by the County legislative delegations. These public shellfish beds are not to exceed 50 acres in any one county, and their maintenance and adequate marking is the responsibility of the Division. (Section 28-792. S.C. Code of Laws, 1976)

The regulations for shellfishing, Section 28-761 of S.C. Code of Laws, apply to recreational shellfishing, and establish the season and the limits for gathering. The Marine Resources Division, Office of Conservation & Management of the S.C. Wildlife and Marine Resources Department (WMRD) has jurisdiction over these areas and conducts numerous management activities, including maintenance of markers; planting of shell and seed oysters, and thinning of over-crowded beds; and periodic surveying of additional productive areas.

The same management authorities of the Budget and Control Board, Department of Health and Environmental Control, and the South Carolina Coastal Council apply to public and State shellfish grounds as are applicable in commercial lease areas. A detailed discussion is offered in Part 1 of **F. Shellfish Areas.**

c) **Other State-managed Shellfish Grounds (Seed beds)**

Certain especially productive submerged bottoms in the Wando River, North and South Santee Rivers and North Santee Bay have been designated by the Marine Resources Division of the South Carolina Wildlife and Marine Resources Department as seed bed areas. These vital resource areas serve as one of the major sources of seed oysters and, in the case of the Santee River, seed clams, for transport to other coastal waters, in order to restore and enhance shellfish resources.

Management Authority

The Marine Resources Division of the Wildlife and Marine Resources Department (SCWMRD) manages these seed bed areas. There is no specific legislation dealing with seed beds; however, SCWMRD is mandated generally to 1) manage the State's fishery resources, 2) protect and develop shellfish resources, and 3) manage State-owned submerged bottoms. (Sections 50-5-20, 50-17-1250 and 50-17-1210 of South Carolina Code of Laws, 1976, as amended).

A special permit is required for commercial taking of clams or oysters in these areas. The public is allowed the same rights of use as on other public shellfish grounds.

Inventory

Shellfish areas have been included on the Coastal Council's 7½" U.S.G.S. quadrangle overlay map system, and the information can be computerized readily. This data was made available partly through cooperation with the Division of Marine Resources. In addition, commercial leases must be recorded with the Clerk of the Court in the county of jurisdiction, and this was another source of detailed inventory information. As new areas are leased or assigned for public use, or as shellfish grounds are removed from production or closed to shellfishing, these changes can be made in the mapped data.

Priority of Uses

The following are the uses of priority for all commercial and recreational shellfish areas beginning with the use of highest priority:

1) Water-dependent uses which do not reduce or degrade the quality of shellfish lease area or

limit access to the area;

2) Water-enhanced activities or nonwater-dependent uses which do not reduce or degrade the quality of the shellfish lease area or limit access to the area.

Designated Sites

There are sixty-four commercial shellfish leases, totalling approximately 5,500 acres in the South Carolina coastal zone. There are nine State shellfish grounds and another sixteen public grounds along the coast. In addition, there are state-managed subtidal seed oyster beds in the Wando River, and clam beds in the North and South Santee Rivers and North Santee Bay which are not leased, but are managed on an open and closed season basis. The map appendix in Volume II depicts these shellfish areas. Commercial leases, public shellfish grounds, State grounds, and other shellfish grounds (seed beds) are listed in Volume II, Appendix F.

7) **Groundwater Resources**

Groundwater is an abundant resource in the coastal zone of South Carolina; however, there are potential problems of quality and quantity. Proper management can ensure the continuing productivity of groundwater resources, but data collection and extensive study are necessary because this is a complex resource. Groundwater can flow vertically as well as horizontally, and vertical wells can pass through several aquifers. The water in each aquifer is likely to vary in quantity and quality. In such a case, it is difficult to determine which aquifer(s) might be responsible for the poor water quality or if the capacity of one of the aquifers might be exceeded, at the expected pumpage, to the detriment of other wells in the area.

Because groundwater serves as the vital water supply source for many coastal communities, and the resource may suffer from over-use or waste disposal problems (i.e., septic tanks and seepage from landfills), it is an extremely significant resource of the coastal zone. Those regions which have been identified as potential problem areas, requiring special regulation and coordination of groundwater use, are recognized as Geographic Areas of Particular Concern.

Management Authority

The Groundwater Use Act of 1969 (Section 70-31, S.C. Code of Laws, 1976) authorizes the Water Resources Commission to designate "capacity use areas" (CUA). The South Carolina Coastal Council supports the implementation of this act and designation of CUAs by Water Resources as significantly important. The designation process is as follows: A county, municipality or sub-division of State government may request a review by the Commission if it is believed that a situation exists, or is emerging, where the use of groundwater may require coordination or regulation to protect the interests and rights of residents, property owners or the general public. The Executive Director will then conduct an investigation and submit the findings and recommendations to the Commission. Recommendations will include identification of area groundwater problems, appropriate conservation measures, and boundaries of CUA.

Based on the report, the Commission may adopt an order declaring a CUA, give public notice of the declaration, and hold at least one public hearing. After the public hearing, the Commission will take final action on the CUA designation and publish that action as part of its official regulations.

Once a CUA has been designated, the Commission instructs the Executive Director to prepare proposed regulations commensurate with the degree of control which is needed. The Commission must hold at least one public hearing on the proposed regulations and publish the final action as part of the official rules. These regulations may be modified or revoked, subject to a public hearing.

These regulations may include the following provisions:

1) provisions requiring water users to submit reports concerning quantity and source of waters withdrawn and nature of use;

2) provisions concerning timing of withdrawals, to abate unreasonable adverse effects and salt water encroachment; and

3) provisions concerning well depth, spacing controls, prescribed pumping levels, and maximum pumping rates.

When adopting or modifying the regulations and when reviewing permit applications, the Commission will consider the following:

1) number of persons using an aquifer and their respective withdrawals;
2) nature and size of the aquifer;
3) physical and chemical nature of any impairment;
4) probable severity and duration of such an impairment;
5) injury to public health, safety or welfare which may result if such impairment were not prevented or abated;
6) kinds of businesses or activities related to groundwater uses;
7) the importance and necessity of the uses claimed by permit applicants and the extent of any injury or detriment expected to be caused to other water users; and
8) diversion or reduction in flows in other water courses or aquifers.

The South Carolina Department of Health and Environmental Control (DHEC) also has legal authority to protect groundwater resources, with regard to surface pollution. This is accomplished through a statewide permitting system for septic tanks and waste disposal by earth burial. (Acts 1157, 1094, 203 and 1492; Sections 32-8, 1202 and 1251, S.C. Code of Laws, 1976; regulations PC-SW-1 and 2; SCPCA-SWG-1, 2 and 3)

Criteria for Designation

The decision to designate a capacity use area is based on the report of the Executive Director of the Water Resources Commission, which describes the groundwater situation and trends. If the situation is poor or deteriorating such that the public interest is in jeopardy, a CUA is likely to be declared. Once this happens, no person shall withdraw, obtain or utilize groundwater in excess of 100,000 gallons per day (gpd) without first obtaining a permit from the Water Resources Commission. All permits will be subject to the CUA regulations adopted by the Commission.

Inventory

Presently, the Water Resources Commission is undertaking two capacity use area investigations and one reconnaissance level investigation in the coastal zone.

CUA Investigations	**Counties**
Lowcountry Area	Colleton, Hampton, Jasper, Beaufort
Waccamaw Area	Horry, Georgetown, Marion
Regional Reconnaissance Investigation	**Counties**
Trident Area	Charleston, Berkeley, Dorchester

The CUA studies have been funded jointly by the Water Resources Commission, the U.S. Geological Survey, and the Coastal Plains Regional Commission. In December, 1977, capacity use reports were completed for the Waccamaw Area recommending that the area be declared a capacity use area (#129, Spigner, Report on the Ground-Water Resources of Horry and Georgetown Counties; #8, Zack, The Occurrence, Availability, and Chemical Quality of Ground Water, Grand Strand Area and Surrounding Parts of Horry and Georgetown Counties). The area was declared a CUA by the Commission in November, 1978.

Among several serious ground water problems cited in the Waccamaw capacity use reports are problems related to regional water level declines, salt water contamination, and poor water quality. Procedures to implement capacity use regulations should be completed in early 1979.

Lowcountry capacity use reports are scheduled for completion in 1979 with the reconnaissance study of the Trident Area to be completed in 1980.

Priority of Uses

The Ground Water Use Act of 1969 is specific in the considerations which the Commission must make in determining whether and to what extent ground water use is permissable. Unreasonably adverse effects on the resource or on water users including public, potential and present users is not permitted. The Act provides that the water resources be put to beneficial use to the fullest extent capable to conserve and maintain conditions which are conducive to the development and use of the ground water resources.

In highest to lowest priority, the following priorities will apply to ground water uses in areas designated as capacity use areas within the coastal zone:

1) Ground water uses which are beneficial uses and are consistent with all provisions of the Ground Water Use Act and regulations promulgated by the Water Resources Commission.
2) Ground water uses which are wasteful, or not beneficial or are found to cause unreasonable adverse effects on other water users or the long-term condition of ground water resources in the coastal zone.

Designated Sites

Currently, only one area, the Waccamaw Area, has been declared a CUA. Several more steps, however, are required under the Ground Water Use Act, before capacity use regulations can be implemented. Investigations in other areas of the coastal zone may result in future CUA designations. As CUA regulations are adopted for specific problems within generally declared areas, all or a portion of declared CUAs in the coastal zone may be designated as GAPCs depending upon the relative extent of ground water use problems.

8. Threatened or Endangered Species Habitats

Policy has been affirmed by both the Federal government and State government in South Carolina that conservation of the natural ecosystem upon which endangered and threatened species depend is a high priority. Untempered economic growth and development can result in the depletion or extinction of various species of fish, wildlife and plants. These species of fish, wildlife and plants are of esthetic, ecological, educational, historical, recreational, and scientific value to our people, our Nation, and to the international community.

The United States has committed itself through numerous treaties with other countries to a pledge of conservation involving migratory birds, fisheries and wildlife preservation, for example. The scope of our responsibility as people and a Nation to protect the delicate balance of the natural ecosystem is demonstrated by these treaties of Federal and State legislation. As a result, the South Carolina Coastal Council will recognize all designated threatened and endangered species habitats as Geographic Areas of Particular Concern.

Management Authority

In view of the National and State concern for endangered species, the South Carolina legislature passed the Non-game and Endangered Species Act in 1974 (Chapter 15, Section 50-15-10 through 50-15-90, S.C. Code of Laws, 1976) The Act instructs the Wildlife and Marine Resources Commission to conduct investigations on non-game wildlife to determine population distribution, habitat needs, limiting factors, and management measures necessary for their continued existence. Based on such investigations, the Commission must issue appropriate regulations and develop management programs. The regulations may establish proposed limitations relating to taking, possession, transportation, exportation, processing, sale, offering for sale, or shipment of particular wildlife species.

The Commission is charged with the responsibility to establish programs necessary for the management of non-game and endangered wildlife. The programs may include research, census taking, law enforcement, education, and acquisition of land or aquatic habitats. The Endangered Species Program is coordinated closely with the Heritage Trust Program which allows donations of land or easements.

The Commission must issue a list of State endangered species, including the United States List of Endangered Native Fish and Wildlife and the United States List of Endangered Foreign Fish and Wildlife. The list will be reviewed and updated at least every two years. It is unlawful to take, possess, transport, export, process, sell, offer for sale, ship, or receive any of the identified species. The South Carolina Wildlife and Marine Resources Department (WMRD) is directed to enforce the Act and may issue special permits for scientific, educational, or other purposes.

The State lists current endangered species and, where appropriate, may designate critical habitat areas, according to the Federal Endangered Species Act. The State Heritage Trust Program and Endangered Species Program work in close coordination in assessing, acquiring and managing sites that constitute endangered

species habitat. If a critical area is formally designated, the effects of any Federally funded program in that area must be more carefully considered. This review by the State clearinghouse is an indirect extension of State management authority effectuated under the Federal Endangered Species Act of 1973. The Secretary of Interior makes the final conflict resolution in such a situation.

The Federal Endangered Species Act of 1973 (PL 92-205, December, 1973, amended by PL 94-32, June, 1976, and PL 94-359, July, 1976) was passed with the purpose of providing

> "...a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved to provide a program for the conservation of such endangered species and threatened species (Sec. 2, (b))."

The national policy is stated as follows:

> "...all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

The Secretary of Interior is authorized to publish a listing of endangered and threatened species based on the best available scientific data and, thereafter, to establish rules and regulations regarding the control of taking, sale, import, export, or other disruption of each species. Endangered species are those in danger of extinction throughout all or a significant portion of their range. Threatened species are defined as those likely to become endangered within the forseeable future. The bases of the South Carolina and national programs are parallel, and the protective mechanisms similar in that impact on endangered species is considered.

The South Carolina Coastal Council is mandated to consider impacts on wildlife species in granting of permits for activities in critical areas of the coastal zone. The Council will also review and comment on other permits, applications, environmental impact statements and Federally-funded projects (A-95 process) throughout the coastal zone. The Council comments will include an evaluation of the potential impacts on any designated critical habitats for threatened or endangered species.

Criteria for Designation

South Carolina Endangered Species are any species of wildlife whose prospect for survival or recruitment within the State are in jeopardy or likely to become so in the foreseeable future. The causes may be: 1) destruction or modification of habitat; 2) species over-utilization for scientific, commercial, or sporting purposes; and 3) other natural or man-made factors. Species on the Federal endangered species lists for native or foreign fish and wildlife are included.

Inventory

An initial Endangered Species Symposium was held in Charleston in November, 1976, at which time committees of knowledgeable experts and concerned individuals were established. A list of endangered species and "species of special concern" was developed with the aid of these communities. These communities and the ongoing endangered species programs constitute the inventory required for periodic update of the State listing. The South Carolina Endangered Species list is in Appendix F.

Priority of Uses

The following are the uses of priority for all areas identified or designated as critical habitats for threatened and endangered species, beginning with the use of highest priority:

1) Uses which are compatible with all regulations and management programs developed to protect any designated habitat area under the Federal or State Endangered Species Acts;
2) Uses which maintain the natural functions of areas identified or designated as critical habitat areas of species listed on the State or Federal threatened or endangered species lists;

3) Non-structural, non-intensive uses which do not create irretrievable damage to any species listed as a threatened species.

Within an area officially designated as a critical area habitat under the State or Federal Endangered Species Acts, uses are prohibited which violate the integrity of the State or Federal legislation.

Designated Sites

Certain critical habitat areas have been identified but no formal designations have been made to date since most of these areas are already a part of Federal or State preserves or refuges on the coast. At such time as specific habitat areas are designated and management guidelines or rules and regulations are promulgated, these will be adopted as GAPC's.

b. Activities or Facilities Dependent on Coastal Location

This category includes those activities which are dependent on their proximity to coastal waters, in terms of use or access; or on proximity to specific coastal resources, such as minerals or other raw materials.(For initial purposes, port facilities and actively operating mining sites have been identified.)

Industrial and commercial uses are crucial to the economy of the South Carolina coastal zone. In addition to preservation and protection of natural areas, the State's coastal zone management program must address the development of coastal resources. It must provide the citizens of the State with guidance on the best manner in which to capitalize on development opportunties while minimizing negative environmental effects, disruption of other coastal resources, or infringement on the rights of other coastal property owners.

Uses and facilities dependent on coastal location, for water access or proximity to other coastal resources, are recognized as Geographic Areas of Particular Concern due to their unique independence on coastal location and because of the economic importance and possible environmental impacts of these activities.

Criteria for Designation

To qualify as a GAPC under this category, an activity or facility must meet one or more of the following criteria:

1) Significant quantities of water, such that it can only be obtained in a coastal location, are an absolutely necessary component of the process for a particular industrial or commercial activity;
2) Access to coastal waters, primarily for transportation purposes, not only enhances but is fundamental to the given activity; or
3) Minerals, energy-related resources, or other coastal resources occuring in the coastal zone are the primary purpose of an activity which is the major source of income for a given individual or company, and proximity to that resource is vital to success of the operation.

1) **State Ports**

Economists at the University of South Carolina estimate that the State Ports have an impact throughout the State of almost $600 million per year, representing direct and indirect employment of about 35,000 jobs. State Ports facilities are a major attraction of industrial investments, and also play an important role for South Carolina agriculture, which exports 29 percent of its total production value.

These valuable economic assets are, by definition, dependent on their coastal location for access to the transportation corridor provided by coastal waters. While their maintenance and further development are vital to the South Carolina economy, these activities can have significant environmental impacts and also secondary development effects, particularly on other industrial and commercial uses and on public services, such as transportation.

Because of their importance as an economic resource and their dependence on a coastal location, the port facilities in South Carolina have been recognized as Geographic Areas of Particular Concern.

Management Authority

The South Carolina State Ports Authority (SPA) was created by Act 626 of the 1942 South Carolina General Assembly (Sections 54-1, -12, -15, and -20, S.C. Code of Laws, 1976). Under direction of a seven member board appointed by the governor, the SPA has the responsibility for development, construction, operation, and promotion of the State's ports. The SPA has jurisdiction over waters, shores, and tidal tributaries of the harbor at Charleston, Georgetown and Port Royal. It has the power to sue and be sued; the power of eminent domain; the power to acquire and dispose of property, and to take State property not otherwise in use; and the authority to issue revenue bonds.

Section II of the South Carolina Coastal Management Act (Act 123 of the 1977 South Carolina General Assembly) has mandated another requirement for the SPA. It reads as follows:

> The South Carolina State Ports Authority shall prepare and submit to the Council a management plan for port and harbor facilities and navigation channels. Upon approval by the Council of such management plan it shall become part of the comprehensive coastal management program developed by the Council. The South Carolina State Ports Authority shall include in the management plan a designation of the geographical area appropriate for use by public and private port and harbor facilities and military and naval facilities and submit this to the Council for approval.

Joint development of this required port and harbor management plan, coupled with the Coastal Council's permit authority in the critical areas, including coastal waters and wetlands that might be part of a harbor area, will result in coordinated efforts between the SPA and the Coastal Council. And it will ensure that port modifications or expansion activities and management of the ports system remain consistent with the goals of coastal zone planning.

Inventory

Information on existing SPA properties and facilities was obtained through consultation with SPA staff and the publications which were made available. When submitted, the required ports plan will provide extensive data on existing port facilities and on likely, potential sites for future ports development which will be considered in identifying and designating additional port-related GAPCs.

Priority of Uses

The following are the uses of priority for all state ports created and operated by the South Carolina State Ports Authority (SPA) beginning with the use of highest priority:

1) Uses which require water access or uses for which the water orientation is the central purpose of the activity, such as maritime shipping, fishing, marine industry, and recreational boating. Included in the uses of highest priority for state ports are provisions to assure safety within the ports. These water-dependent uses should have no prudent or feasible alternative;
2) Water-related uses which do not reduce or degrade the natural value or resources within the port;
3) Nonwater-dependent or nonwater-related uses which retain future flexibility of the port for water-dependent needs.

Designated Sites

The South Carolina Ports Authority owns and manages the following facilities, which are designated as GAPCs: Beaufort County: Port Royal-State Pier 21; Charleston County: Port of Charleston; Georgetown County: State Piers 31 and 32.

2) Navigation Channels

Navigation channels are closely related to the preceeding category in that they enable travel to and from

major ports, facilitate industrial and commercial activities and allow for recreational and commercial boating. Thus, channel maintenance and development are vital to the economy of the coastal zone and the state and the nation as a whole. Like port development, channel maintenance and development may have secondary effects of an environmental or developmental nature.

Because navigation channels depend upon a coastal location and are vital to the State's economy, they have been recognized as Geographic Areas of Particular Concern.

Management Authority

The provisions of Chapter 1, Title 49 of the 1976 South Carolina Code of Laws declare that "(A)11 streams which have been rendered or can be rendered capable of being navigated by rafts of lumber or timber by the removal of accidental obstructions and all navigable water courses and cuts are hereby declared navigable streams and such streams shall be common highways and forever free..." The section also prohibits the obstruction of waterways and provides for condemnation of land for rights-of-way and outlets for inland waterways.

Enforcement of this statute rests jointly with the Budget and Control Board and the Attorney General's office.

Section 15 of South Carolina's Coastal Management Act requires that the Coastal Council consider navigation channels in its permitting process. Permit applications for activities "in a waterway used for commercial navigation or shipping" must be reviewed by the South Carolina State Ports Authority prior to permit issuance for certification that the proposed project will not "unreasonably interfere with commercial navigation and shipping."

The Act also requires the Coastal Council to consider "the extent to which the activity would harmfully obstruct the natural flow of navigable water" and "the extent to which the activity could cause erosion (and) shoaling of channels."

Inventory

Information on existing navigation channels was obtained from the SPA staff and the draft SPA Ports Plan.

Priority of Uses

Existing navigation channels should be maintained and utilized, while at the same time conserving the natural environment. The following are the uses of priority for navigation channels in the coastal zone, beginning with the use of highest priority:

1) Beneficial uses which require water access or uses for which the water orientation is the central purpose of the activity, such as maritime shipping, fishing, and recreational boating, providing these uses are conducted in such a way as to minimize adverse environmental impacts;
2) Water-related uses which do not reduce or degrade the environmental quality of the waterway;
3) Nonwater-dependent or nonwater-related uses which do not obstruct navigation and do not impair the natural surroundings.

Designated Sites

All waterways within the coastal zone which meet the legal standards for navigability are designated as GAPCs.

3) Mining Operations

There are over 344 active mines in South Carolina, which in 1974 had an estimated mineral commodity value of $120,000,000. Extraction of minerals by mining is a basic and essential activity, making an important contribution to the economic welfare of this State and the Nation.

While it is not practical to extract minerals required by society without disturbing the earth's surface and

producing waste materials, it is possible to conduct mining in such a way as to minimize its effects on the surrounding environment. Proper reclamation of mined land is necessary to prevent undesirable land and water conditions that would be detrimental to the environment and to the general health, safety, and welfare, and property rights of the citizens of the State.

As such, areas of ongoing mining operations qualify as Geographic Areas of Particular Concern (GAPCs), due to their geologic, economic, and environmental significance, and their dependence on a coastal location for access to particular mineral resources.

Management Authority

The provisions of Act 274 of the 1972 General Assembly are intended to allow the mining of valuable minerals and provide for the protection of the State's environment with the subsequent beneficial use of the mine and reclaimed land. The expressed purposes of the South Carolina Mining Act are as follows:

a) That the usefulness, productivity, and scenic values of all lands and waters involved in mining within the State will receive the greatest practical degree of protection and restoration.

b) That from the effective date of the Act, no mining shall be carried on in the State unless plans for such mining include reasonable provisions for protection of the surrounding environment and for reclamation of the area of land affected by mining.

The Act states that after January 1, 1975, mine operators must obtain an operating permit from the Land Resources Conservation Commission (LRCC). The permit application must be accompanied by a reclamation plan which must be approved by the LRCC, and the permit applicant must file a performance bond to ensure compliance with this reclamation plan.

As an advisory body to the LRCC, the South Carolina Mining Council serves to promulgate rules and regulations necessary to implement the S.C. Mining Act, and also serves as an appeal body for any LRCC decisions. Also serving in an advisory capacity are:

a) the State Technical Advisory Committee which is composed of State and Federal agencies, universities, and mining industry representatives; and

b) the County Technical Advisory Committee, which is composed of local members of the Soil and Water Conservation Districts, Soil Conservation Service, Clemson University, the S.C. Forestry Commission, and local government officials.

Assistance from these committees helps insure that the administration of the Mining Act is effective, reasonable, and technically sound.

The required reclamation plans must include:

1. practices to protect adjacent surface resources;
2. specifications for surface gradient restoration;
3. manner and type of re-vegetation;
4. method to prevent conditions hazardous to fish or animal life;
5. method of compliance with State air and water pollution laws;
6. method of rehabilitating settling ponds;
7. method of control of contaminants and mining refuse;
8. method of restoring stream channels and banks to minimize erosion, siltation and pollution;
9. maps as required; and
10. time schedule to be followed.

The LRCC shall deny a permit application if:

1. the operator violates the Act or regulations;
2. the operation has unduly adverse effects on wildlife or freshwater, estuarine, or marine fisheries;
3. the operation violates air quality, surface water quality, or ground water quality standards;

4. the operation constitutes a substantial physical hazard;
5. the operation has a significant adverse effect on a public-owned park, forest, or recreation area; or
6. the operator has violated commitments under the permit.

The LRCC may approve a permit application only when it meets the following minimum standards:

1. the final slopes have been minimized;
2. safety provisions to adjoining property are avoided;
3. placement of soil complies with accepted conservation practices;
4. no noxious, odious, or foul pools of water remain;
5. methods of re-vegetation and reforestation conform to practices established by the Agricultural Experiment Station of Clemson University and the South Carolina Forestry Commission.

The operator shall file an annual report with the LRCC that describes the reclamation carried out and estimates the acreage to be actively mined in the next twelve months.

The basic idea of the reclamation plan is to develop a strategy for mining a resource and returning the land to an economically useful, environmentally sound, and aesthetically pleasing form. In the coastal zone, ponds or lakes are the main reclamation practice. This is because of availability of water from streams or a high water table. These water bodies must have certain shoreline construction for long-term safety and stability, a certain percentage of shallow area for spawning, and certain minimum depths to control vegetation. The potential exists for a mining company to turn this reclamation process into a profitable real estate enterprise.

Inventory

Presently all mining operations in the coastal zone of South Carolina are required to have a mining permit and a reclamation plan filed with the Land Resources Conservation Commission. These mining operations have been located on aerial photos by the Coastal Council staff with assistance from LRCC personnel and the U.S. Bureau of Mines. The mine locations have been plotted on U.S.G.S. 7½ minute quadrangle map overlays. As new deposits are discovered or as new mining operations are proposed, the inventory file can be updated.

Priority of Uses

The following are the uses of priority for all active mining sites within the coastal zone in South Carolina, beginning with the use of highest priority:

1) The extraction of minerals in a manner consistent with all permit conditions and reclamation plans pertaining to the mining site;
2) Uses which do not interfere with the extraction of minerals for which mining permits have been acquired or with the reclamation plans for the site.

Specific Sites

Currently there are five minerals that are mined in significant amounts in the South Carolina Coastal zone. They are sand, gravel, limestone, peat, and clay.

A listing of mining operations presently permitted in coastal counties are found in the Appendix F.

c. Areas of Special Historic, Archeological or Cultural Significance

The coastal zone of South Carolina is rich in historic, archeological, and cultural features. The coastal area was the location of early colonial settlements and, prior to this, the territory of various Indian tribes. Both residents and visitors, alike, perceive these resources as valuable assets and their preservation and protection as an important issue in the growth and development of the Lowcountry. Historic societies are very active

throughout the area, and the value placed on the South Carolina heritage by its citizens cannot be overemphasized. On this basis, areas of specific historic, archeological and cultural significance are felt to be important as Geographic Areas of Particular Concern (GAPCs) in the coastal zone.

Management Authority

To date, there is no specific legislation for historic preservation in South Carolina. However, since 1960 the State, through its Historic Preservation Officer, has developed "a program recognized nationally as an innovative and exemplary type of state-federal partnership in preservation and implementation." (**South Carolina Historic Preservation Plan**, Vol. III, 1977). Through 1975, this State led all others in an annual amount of federal funds received for preservation programs.

The National Historic Preservation Act of 1966 as amended, states that:

> The Secretary of the Interior is authorized to expend and maintain a national register of districts, sites, buildings, structures and objects significant in American history, architecture, archeology and culture, hereinafter referred to as the National Register...

Executive Order 11593 of May 13, 1971, further emphasized the leadership of the Federal government in historic preservation efforts.

The National Register program is implemented and administered by State Historic Preservation Officers (SHPOs) who are responsible for the survey and nomination process, in conjunction with a review board of professionals in the field. Also, the SHPO and the State review board are responsible for preparation and review of the State's historic preservation plan, which includes background information on the State (Volume III).

Properties and sites listed on or eligible for listing on the National Register receive full consideration of their historic or archeological values through OMB Circular A-95 review process, whereby Federal, State, and local agencies comment on proposed Federal activities or funding. Section 106 of the National Historic Preservation Act of 1966, as amended, provides that:

> The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally-assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation...a reasonable opportunity to comment with regard to such undertaking.

In South Carolina the Department of Archives and History, Historic Preservation Division, and the Institute for Archeology and Anthropology as well as the South Carolina Coastal Council are involved in the State Clearinghouse process for project proposals subject to A-95 review and also review Environmental Impact Statements (EIS), pursuant to the National Environmental Policy Act of 1969. The Historic Preservation Division estimated that they annually review over 500 A-95 project clearances, project notifications, and environmental impact statements for possible impact on the historic environment. While the review and comment process for Federal, federally-assisted, or federally-licensed projects affecting properties on or eligible for the National Register does not provide a veto power, it does ensure that historic values are thoroughly considered. Experience with the process has shown ample regard is given to relevant comments or objections by State agencies.

The S.C. Coastal Council is mandated to consider historic and archeological resources in implementation of its permitting authority in critical areas of the coastal zone. In evaluating applications for alterations in the critical areas, the Council must consider, among other factors, "the extent to which the development could affect....irreplaceable historic and archeological sites of South Carolina's coastal zone" (§15 (6), Act 123 of 1977).

Historic and archeological sites which have been to the National Register and sites selected from those which have been determined eligible to be named to the National Register will be designated GAPC's. The Department of Archives and History's on-going inventory will provide the Coastal Council's staff with complete information on all known historic and archeological sites for permit assessments and project evaluations. The Coastal Council may, in consultation with the State Historic Preservation Officer, apply the National Register Criteria to properties which may be eligible for inclusion in the National Register. If a property appears to meet the criteria, an opinion may be requested from the Keeper of the National Register who will determine the property's eligibility for inclusion in the National Register. As sites are listed, they will automatically be designated as GAPC's. As sites are determined to be eligible for listing, they may be designed as GAPC's.

Inventory

The State of South Carolina has had an active Statewide Historic Preservation Program since 1969, based on the National Historic Preservation Act of 1966, as amended. One of the major functions of the Historic Preservation Division of the Department of Archives and History has been an inventory identifying more than 6,000 sites in the State, reflecting 300 years of State history and over a thousand years of prehistory. Under contract with the Department of Archives and History as well as the Coastal Council, the regional Councils of Government also have been contributing to this inventory and research effort.

The University of South Carolina Institute of Archeology and Anthropology has an on-going statewide survey and mapping program for identification of both archeological and historic sites. (The Institute operates under contract to the Interagency Archeological Program, as mandated by the Federal Archeological and Historic Preservation Act of 1960, amended in 1974. This program under responsibility of the Department of the Interior contracts with qualified state and private educational and scientific institutions to perform necessary research and surveys to meet program needs identified by work with other federal agencies.)

All of this data for the eight coastal counties has been made available to the Coastal Council, and the historic and archeological sites have been added to the coastal map overlay system on U.S.G.S. 7½" quadrangle maps. For reasons of confidentiality to protect unmanaged sites from looting or destruction, the majority of this information will be limited to in-house use for review and evaluation of permits and project proposals. From this on-going inventory, sites which have been included in the National Register will be designated as GAPCs. Sites which are eligible for inclusion, may be designated as GAPC's.

Criteria for Designation

The following criteria are those adopted by the Secretary of the Interior and are used in nominating sites to or determining eligibility for the National Register. These evaluation criteria are recognized by the Coastal Council for designating GAPCs under this category.

The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. that are associated with events that have been made a significant contribution to the broad patterns of our history; or

B. that are associated with the lives of persons significant in our past; or

C. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory or history.

Ordinarily cemeteries, birthplaces, or graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the

following categories:

A. a religious property deriving primary significance from architectural or artistic distinction or historical importance; or

B. a building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

C. a birthplace or grave of a historical figure of outstanding importance if there is no other appropriate site or building directly associated with his productive life; or

D. a cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

E. a reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

F. a property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own historical significance; or

G. a property achieving significance within the past 50 years if it is of exceptional importance.

Priority of Uses

The following are the uses of priority for areas of special historic, archeological, or cultural significance which have been named to the National Register, beginning with the use of highest priority.

1) Uses which preserve the historical or cultural values for which the site was placed on the National Register;
2) Educational opportunities for the public regarding the historical, archeological or cultural significance of the sights as long as the site is not disturbed.

Designated Sites

The following historic and archeological sites in the South Carolina coastal zone are on the National Register of Historic Places. They are designated as Geographic Areas of Particular Concern and are shown in the map appendix. A brief description of each site appears in Appendix F.

Jasper County:	A1	Robertville Baptist Church
	A2	Gillisonville Baptist Church
Beaufort County:	B1	Sea Pines Shell Ring
	B2	Green's Shell Enclosure
	B3	Hilton Head Shell Ring
	B4	Church of the Cross
	B5	Charles Forte
	B6	Tombee Plantation
	B7	Hassell Point Shell Ring
	B8	Hunting Island Light House
	B9	Fort Frederick
	B10	Chester Field Shell Ring
	B11	Penn Center
	B12	Indian Hill
	B13	Beaufort Historic District
	B14	Tabby Manse
	B15	John Mark Verdier House
	B16	Barnwell-Gough House
	B17	The Marshlands
	B18	Robert Smalls House
	B19	John A. Cuthbert House

	B20	William and Elizabeth Barnwell House
	B21	The Anchorage
	B22	Coffin Point Plantation
	B23	Little Barnwell Island Shell Ring
	B24	Sheldon Church
	B25	Auldbrass Plantation
Colleton County:	C1	Isaac Haynes Hall
	C2	Pon Pon Chapel
	C3	Colleton County Courthouse
	C4	Walterboro Jail
	C5	Walterboro Little Library
Dorchester County:	D1	Middleton Place
	D2	Old Fort Dorchester
	D3	Summerville Historic District
	D4	Cypress Methodist Campground
	D5	Carroll Place
	D6	Indian Fields Methodist Church Campground
Charleston County:	E1	Middleton's Plantation
	E2	The Presbyterian Manse
	E3	Trinity Episcopal Church
	E4	Fig Island Shell Ring
	E5	Horse Island Shell Ring
	E6	Brick House Ruins
	E7	William Seabrook House (Dodge Plantation)
	E8	Village of Rockville Historic District
	E9	Hanckel Mound Shell Ring
	E10	John Seabrook Plantation Bridge (Adm. George Palmer Bridge)
	E11	Arnoldus Vander Horst House
	E12	Willtown Bluff
	E13	Johns Island Presbyterian Church
	E14	Fenwick Hall Plantation
	E15	Marshlands Plantation House
	E16	Fort Johnson/Powder Magazine
	E17	Stiles-Hinson-Thompson House
	E18	Fort Sumter
	E19	U.S. Coast Guard Historic District
	E20	Fort Moultrie
	E21	Battery Gadsden
	E22	Battery Thomson
	E23	McLeod Plantation
	E24	Castle Pinckney
	E25	Charleston Historic District
	E26	Bethel Methodist Church
	E27	William Blalock House
	E28	Daniel Blake House
	E29	Branford-Horry House
	E30	Miles Brewton House
	E31	Robert Brewton House
	E32	Charleston's French Quarter District
	E33	C & S National Bank of S. C. Building
	E34	College of Charleston
	E35	Dock Street Theatre

E36 The Exchange & Provost
E37 Farmers' and Exchange Bank
E38 Fireproof Building
E39 William Gibbs House
E40 DuBose Heyward House
E41 Heyward—Washington House
E42 Hibernian Hall
E43 Huguenot Church
E44 McCrady's Tavern and Long Room
E45 Joseph Manigault House
E46 Market Hall and Sheds
E47 Clark Mills Studio
E48 James Nicholson House
E49 Old Marine Hospital
E50 The Circular Congressional Church
E51 Powder Magazine
E52 Robert Barnwell Rhett House
E53 Robert William Roper House
E54 Thomas Rose House
E55 Nathaniel Russell House
E56 Edward Rutledge House
E57 Governor John Rutledge House
E58 St. Michael's Church
E59 St. Philip's Church
E60 Simmons—Edwards House
E61 S.C.N. Bank of Charelston
E62 S.C. State Arsenal
E63 Col. John Stuart House
E64 Sword Gates House
E65 Unitarian Church
E66 U.S. Customhouse
E67 U.S. Post Office and Court House
E68 Central Baptist Church
E69 St. Mary's Roman Catholic Church
E70 Old Bethel United Methodist Church
E71 Kahal Kadosh Beth Elohim Synagogue
E72 Mount Pleasant Historic District
E73 St. Andrews Parish Church
E74 Old Court House
E75 William Aiken House and Associated Railroad Structures
E76 Site of Old Charles Towne
E77 Magnolia Cemetery
E78 Paul Pritchard Shipyard
E79 Snee Farm
E80 Christ Church
E81 Auld Mound
E82 Buzzard's Island Shell Ring
E83 Oakland Plantation
E84 Stono River Slave Rebellion Site
E85 Ashley Hall Plantation
E86 John Drayton House
E87 Magnolia Gardens

	E88	Sewee Shell Ring
	E89	Harrietta Plantation
	E90	St. James Santee Episcopal Church
	E91	Fairfield Plantation
	E92	Hampton Plantation
	E93	Fort Pemberton
	E94	Bleak Hall Plantation Outbuildings
	E95	Edisto Island Presbyterian Church
	E96	Old House Plantation
	E97	Peter's Point Plantation
	E98	Windsor Plantation
Berkeley County:	F1	St. James Goose Creek Church
	F2	St. Thomas Episcopal Church
	F3	Medway Plantation
	F4	Middleburg Plantation
	F5	Pompion Hill Chapel
	F6	Strawberry Chapel
	F7	Calais Mile Stone
	F8	Tavon Church
	F9	Thomas Broughton (Mulberry) Plantation
	F10	Lewisfield Plantation
	F11	Lack Dhu Plantation
	F12	St. Stephen's Episcopal Church
Georgetown County:	G1	Hopsewee Plantation
	G2	Annandale Plantation
	G3	Georgetown Lighthouse
	G4	Georgetown Historic District
	G5	Prince George, Winyah, Episcopal Church House
	G6	Old Market Building
	G7	Arcadia Plantation
	G8	Pawleys Island Historic District
	G9	Mansfield Plantation
	G10	Prince Frederick's Chapel
	G11	Brookgreen Gardens
	G12	Chicora Wood Plantation
Horry County:	H1	Hebron Church
	H2	Old Horry County Jail

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ENERGY FACILITY PLANNING PROCESS

1. Introduction

The Federal Coastal Zone Management Act, as amended in July, 1976, requires in Section 305 (b)(8) that each state's management program must include:

> A planning process for energy facilities likely to be located in, or which may significantly affect, the coastal zone, including, but not limited to a process for anticipating and managing the impacts from such facilities.

The South Carolina Coastal Management Act (Act 123 of the 1977 South Carolina General Assembly) (the Act) (Appendix B) states in Section 8 (B)(6) that in the development of the State's coastal management program the Council shall:

> Provide for adequate consideration of the local, regional, state and national interest involved in the siting of facilities for the development, generation, transmission and distribution of energy, adequate transportation facilities and other public services necessary to meet requirements which are other than local in nautre.

Therefore, the South Carolina Coastal Council has the Federal and State mandate to include in its management program a planning process to incorporate the siting of energy facilities in the coastal zone in a manner which is consistent with the other necessary uses of the coast. In addition, the Council is mandated to consider the national interest when making these decisions.

Section 923.13 of the coastal zone management development and approval regulations (**Federal Register**, Vol. 44, No. 61, March 1979) outlines the minimum requirements which the energy planning process must contain.

> (1) Identification of energy facilities which are likely to locate in, or which may significantly affect a State's coastal zone;
> (2) Procedures for assessing the suitability of sites for such facilities....;
> (3) Articulation and identification of enforceable State policies, authorities and techniques for managing energy facilities and their impacts;
> (4) Identification of how interested and affected public and private parties will be involved in the planning process.

The energy planning element of South Carolina's coastal management program will begin with a look at the existing energy demands in the State and the pattern of supply, followed by an explanation of the future alternatives for South Carolina to meet its energy needs over the next ten years. The various mechanisms for providing the necessary energy planning to the State will be presented and explained. Furthermore, some suggestions for consolidated forecasting efforts during implementation of the coastal management program will be made.

A brief description of the relationship between the use of coastal resources to provide for energy needs and the other vital demands for coastal resources will place the importance of siting decisions into a meaningful perspective. A legal analysis of the regulatory authority governing energy siting decisions, a look at the Coastal Council's participation in the decision making and the policies which will guide the Council's evaluations will demonstrate the consolidated, comprehensive approach which South Carolina is developing in order to accommodate growth while maintaining its precious heritage.

2. Overview

The South Carolina Division of Research and Statistical Services predicts that energy consumption in the State will increase at a faster rate than the national average. While the increase will slow somewhat during the

next decade, the rate will continue to outdistance the national average because South Carolina's economy is expected to continue to grow at a faster rate than that of the nation as a whole. Most of this demand has been met by coal and nuclear power. Oil and natural gas have become progressively displaced by nuclear power as fuel sources in South Carolina in recent years (Chart 1).

a. Existing Energy Demands

The most accurate figures available are, of course, those for current energy demands. In 1975, the last year for which accurate data are available, total residential energy consumption in South Carolina was 73.1 trillion BTU's. This figure can be further divided into energy supplied by natural gas (18.6 trillion BTU's), electricity (33.1 trillion BTU's) and petroleum (15.1 trillion BTU's as distillate heating fuel, .9 trillion BTU's as residual heating fuel and 5.4 trillion BTU's as kerosene).

Commercial energy demands are not as systematically articulated as residential demands. The total consumption in South Carolina in 1975 was 37.4 trillion BTU's. Of this total, 15.6 trillion BTU's were provided by natural gas and 21.8 trillion BTU's by electricity.

In 1975, total industrial consumption was 145.2 trillion BTU's, which can be further subdivided into demands for natural gas, (79.2 trillion BTU's), electricity (46.2 trillion BTU's), and oil (19.8 trillion BTU's). It is interesting that the demand for oil dropped from 25.4 trillion BTU's in 1974, presumably as a result of the energy crisis, yet immediately began to rise again in 1978.

Transportation sector energy demands for 1975 were 1,471 million gallons of motor fuel.

The electric utility sector's demand for fossil fuels in 1975 totaled 152.8 trillion BTU's. Of this, 100.6 trillion BTU's were supplied by coal, 30.1 by oil, and 22.1 by natural gas.

b. Energy Supplies

Figure 1 shows the relative importance of the various sources of energy production in South Carolina. Coal presently supplies the greatest proportion of the energy used in the State, with nuclear energy a very close competitor. Hydro-power is also a more important energy source than either oil or gas, but the production of hydro-power is primarily concentrated outside of the coastal zone, as is nuclear power.

As has been noted previously, the importance of oil and gas to the total energy balance of the State has declined dramatically in the past several years. This State trend is a result of declining national supplies coupled with rising national prices and the fact that there are no sources of oil or gas close to South Carolina. With the results of offshore Lease Sale 43 which took place in Savannah, Georgia, in March, 1978, this trend is even more likely to continue. Tracts off of the coast of South Carolina in the Southeast Georgia Embayment were included in the nominations for bids in Lease Sale 43. No actual bids, however, were made on the offshore lease blocks affecting South Carolina.

The next sale which could have affected South Carolina was Lease Sale 54. Sale 54 was scheduled to lease tracts in the Blake Plateau in November, 1979, but has been indefinitely delayed for a number of reasons including a lack of industry interest at the present time.

The only other sale planned at this time for tracts off South Carolina's coast is Lease Sale 56 presently scheduled for April, 1981. The tracts available for Lease Sale 56 are expected to be the same as those available in Lease Sale 43. Therefore, the likelihood of South Carolina experiencing any significant Outer Continental Shelf (OCS) related activity onshore in the immediate future seems slight. The exception would be in the case of pipelines across state or other OCS related facilities resuming from discoveries of oil or gas off of Georgia's coast or Florida's east coast.

CHART 1

SOUTH CAROLINA NUCLEAR POWER STATIONS

Current status of operation and construction dates
(Taken from August 1978 issue of **Nuclear News**.)

	Station (Power Unit)	Company	Date of Operation
In Operation	Robinson (2)*	CP&L	March 1971
	Oconee (1)	Duke	July 1973
	Oconee (2)	Duke	September 1974
	Oconee (3)	Duke	December 1974
Under Construction	Summer (1)	SCE&G	December 1980
	Catawba (1)	Duke	July 1981
	Catawba (2)	Duke	January 1983
	Cherokee (1)	Duke	January 1985
	Cherokee (2)	Duke	January 1987
	Cherokee (3)	Duke	January 1989

*Robinson (1) is fossil-fueled.

The ways in which a state's energy demands are met are determined as much by geological and geographical criteria as any other. For example, South Carolina's relatively large share of hydroelectric power generation may best be explained by the State's abundant water resources in manmade reservoirs. Likewise, the low utilization of oil and natural gas is explained in part by the absence of reserves and by the lack of oil refineries or other processing facilities in or near South Carolina at this time. While it is true that no coal is mined in the State, transportation networks and historical usage patterns make it the most important fuel source in South Carolina.

1) Electricity

As has been noted above, electricity is not only the most heavily utilized but also the fastest growing source of energy in the State. Per capital electricity consumption in South Carolina is 40 percent higher than the U.S. average, a fact which may be partially accounted for by the heavy use of air conditioners. The rapid growth in demands for energy, coupled with inflation and the high cost of environmentally acceptable technology, has led to rapidly increasing costs for electricity. The average annual bill for South Carolina residents has risen from $150.61 in 1968 to $454.88 in 1977, an increase of 200 percent.

Because of the projected increases in demand during the next decade, all four of the major electric utility companies serving the State are planning significant expansion of both generating facilities and transmission and distribution systems, with some of the expansion expected to take place outside the coastal zone.

Statistics from South Carolina Electric and Gas, Carolina Power and Light and Duke Power companies indicate that no new generating facilities are specifically planned for the coastal zone until at least the late 1980's. However, South Carolina Electric and Gas Company does plan to upgrade its Hagood (coal-fired, steam generating) station in Charleston County by 1984 and to construct three new facilities whose locations are as yet undetermined. The South Carolina Public Service Authority is currently expanding its steam generating facilities in Georgetown County, and further expansion within the coastal zone is likely during the next decade.

2) Natural Gas

As pointed out in the preceding discussion, natural gas usage has been declining in South Carolina and is likely to continue to do so in the years ahead. The decline may be traced to limited supplies of the resource, as there is no natural gas produced within the State, and allocations to South Carolina are controlled by the Federal government. Allocations to the State are handled by two major pipeline companies in the Piedmont region of the State which distribute gas to their own customers, gas authorities, and private and municipal distributors.

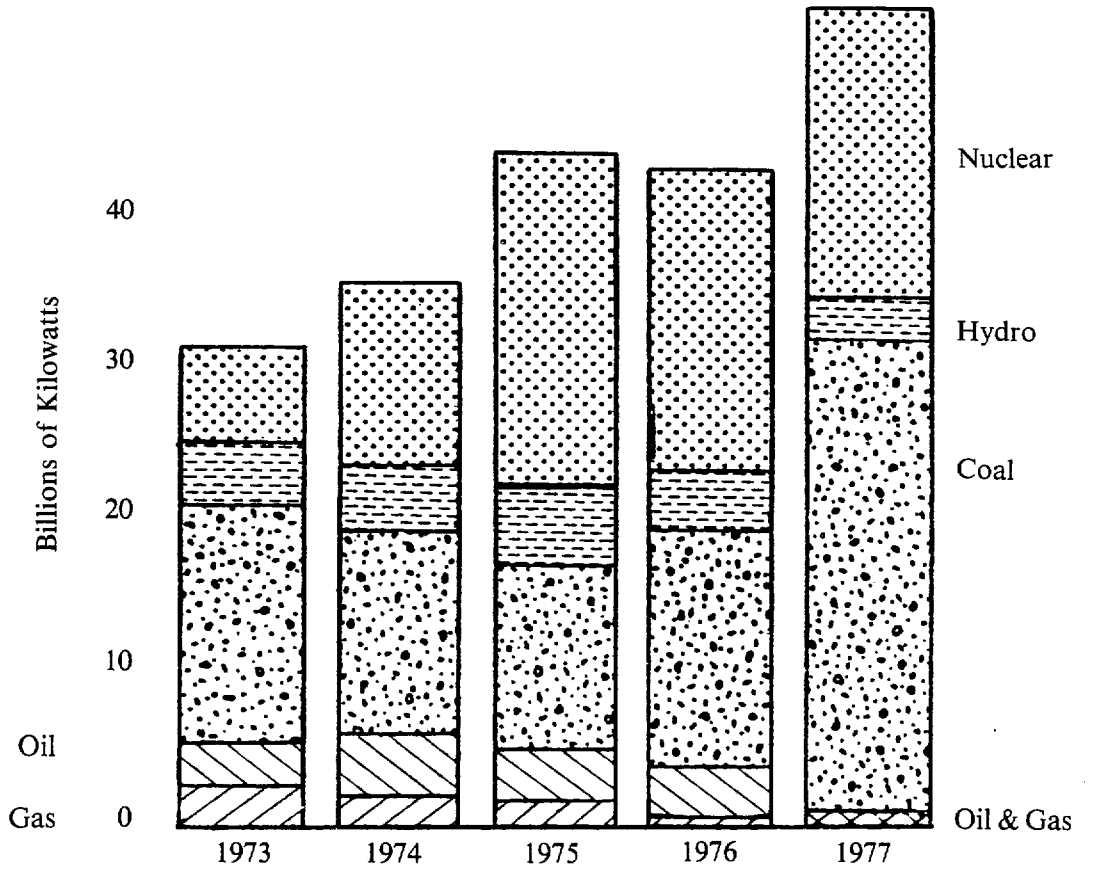
3) Nuclear Energy

Estimates of nuclear energy's share of South Carolina's total energy supply range from 45 percent to 56 percent (Figure 1). Nuclear energy has been a major contributor to South Carolina's economy through related industries as well as through the plants themselves. At the present time there are two nuclear power stations with a total of four reactors in operation in South Carolina, with an additional six reactor units under construction or on order and scheduled to begin operation by 1989. None of these stations is in the State's coastal zone. A study conducted during the past year by the Southern States Energy Board identified five possible sites for a nuclear energy center in South Carolina. Two of these five possible sites were located in the coastal zone; however, a site in the northwestern part of the State was selected as the most promising for further analysis. Robert Hirsch, Energy Advisor to the Governor, former Director of South Carolina's Energy Management Office, has stated that no plans for additional nuclear facilities in the coastal zone have come to his attention.

In addition to the power plants themselves, South Carolina has four service/manufacturing facilities. These are the Westinghouse nuclear fuel manufacturing plant in Columbia, the Allied General Nuclear Services reprocessing facility located (but not operating) in Barnwell, the Chem-Nuclear Systems low-level waste management facility at Snelling (near Barnwell), and the Savannah River Plant, which is a

FIGURE 1

SHARES OF ENERGY PRODUCTION



SOURCE: S.C. Division of Research and Statistical Services
1978 S.C. Economic Report, p. 63

government-owned facility operated by private industry under a Department of Energy contract. Of these four, the Savannah River Plant, which produces nuclear materials and performs related research, has the most potential to affect the coastal zone because of its proximity to Jasper and Beaufort counties.

c. Future Alternatives

At the present time, there are 26 energy facilities in operation or planned for the coastal zone. These range from hydro plants and combustion turbines to industry land holdings with no construction yet begun. (Tables 1 and 2).

Location of new facilities will depend in some measure on transportation and population centers, where the need for energy will be the greatest. Increases in industrial and commercial activity will also lead to additional energy demands.

The port facilities at Charleston, Georgetown, and Port Royal will require a great deal of energy. The Act (Appendix B) requires the South Carolina State Ports Authority to "prepare and submit to the Council a management plan for port and harbor facilities and navigation channels." Once the Coastal Council approves the Ports Authority plan, it will become a part of the coastal management program, thereby enabling the Coastal Council to assess and guide energy-related development in the State's port areas.

Forecasting energy supplies and demands is difficult, but forecasting alternative methods and sources of supply can be even more complex. Several points are well established: prices for all forms of energy will continue to increase, supplies of natural gas and, in all likelihood, oil will diminish steadily, as will deposits of low-sulfur coal. At the same time, South Carolina's population and industrial base will continue to expand, resulting in greater demands for energy.

Obviously, one alternative is to increase the State's reliance on nuclear power. However, in light of the environmental and safety questions currently surrounding nuclear energy, it is also prudent to consider other possible responses to the State's energy needs.

One alternative course of action, pursued on the national level, is substitution of fuels. The Department of Energy publication **Energy Supply Initiatives** suggests that as oil prices rise, substitution of synthetic liquid and solid fuels and oil shale derivatives for petroleum products will become economically attractive. Unconventional natural gas (i.e. from geopressurized sources or coal gasification processes) may also become economically feasible as current prices rise. Other sources of substitute fuel which may have a more direct impact on the State include the combustion of biomass — a technique currently utilized in the forest products industry; production of fuel from corn and other agricultural products; and possible local applications of geothermal energy from granitic rock beneath the Atlantic Coastal Plain (experimental geological/geophysical research under Department of Energy contract).

In addition to substitution of fuels, there are a number of new technologies with the potential to reduce demands on conventional resources. With the State's location, climate and forestry industry, renewable sources of energy and other soft energy technologies should be examined and developed in conjunction with historically important types of energy development and production. These include development of small hydroelectric generating facilties at existing dams, wind generated power, sea thermal power, geothermal, hydrogen as a fuel, photovoltaics, and passive solar heating and cooling. Photovoltaic cells convert sunlight directly into electricity, and can be used in either central or dispersed locations. Progress in this field has been made at the University of South Carolina College of Engineering, leading to the possibility that South Carolina may be in the vanguard of states utilizing this technology experimentally. Passive solar heating and cooling seem to hold the greatest promise for South Carolina, and are also being studied extensively by a number of researchers throughout the State, most notably members of the Clemson University faculty. Additional research is underway investigating the possibilities of numerous other energy alternatives.

What is perhaps most significant about these alternatives is that they lend themselves to decentralized application. The Department of Energy proposes to initiate a program to —

> Encourage individuals and small business to develop and prove the feasibility of a variety of small-scale technologies...Emphasis will be placed on technologies that may not be universally applicable, but which are appropriate to markets characterized by unique regional, institutional and end-use conditions. (Department of Energy, **Energy Supply Initiatives**, May 15, 1978.)

TABLE 1

			Peak Construction Employment	Peak Operating Employment	Date Commercial Operation Began
I.	South Carolina Public Service Authority				
1.	Winyah Generating Plants, Georgetown County	#1	445	92	March 25, 1975
		#2	428	92	July 1, 1977
2.	Jefferies Steam Plant, Berkeley County	#1	962	97	January 1, 1954
		#2	962	97	January 1, 1954
		#3	380	97	January 1, 1970
		#4	380	97	July 1, 1970
3.	Jefferies Hydro Plant, Berkeley County		12,670	17	December 1, 1942
4.	Spillway Hydro, Berkeley County		105	2	August 1, 1950
5.	Granger Station fossil fuel plants, Horry County	#1	411	55	June 1, 1966
		#2	411	55	June 1, 1966
6.	Combustion turbines, Myrtle Beach, Horry County	#1	38	1	May 1, 1962
		#2	38	1	May 1, 1962
		#3	38	1	August 1, 1972
		#4	38	1	August 1, 1972
		#5	38	1	June 1, 1976
7.	Combustion turbines, Hilton Head, Beaufort County	#1	38	2	August 1, 1973
		#2	38	2	August1, 1974
II.	Amoco facility, Berkeley County *(No permits required until operation begins)*		1,500	170	July, 1978
III.	Chicago Bridge and Iron, Beaufort County[a] (Corps of Engineers, S.C. Budget and Control Board, *and Beaufort County Building permit received. No other permits required.)*		100-150	600	1979 *(expected)*
IV.	Chevron owns land, Jasper County, facility is planned.				
V.	Cooper River Rediversion Hydro Plant, Berkeley County				
VI.	South Carolina Electric & Gas (See Table 8 for detailed analysis.)				

a Purpose as yet undefined.

TABLE 2

SOUTH CAROLINA ELECTRIC & GAS COMPANY
RESPONSE TO COASTAL PLANNING QUESTIONNAIRE

County	Peak Construction Employment	Peak Operating Employment	Station	Net Installed Capacity (MW)	Date When Station Became Operational	Status of Present Projects Under Construction or Proposed
Horry						None
Georgetown						None
Charleston		37	Hagood Steam	96	1947 (1st Unit)	None
Charleston	5	0	Faber Place IC	9	1961	
Beaufort	5	0	Burton IC	30	1961	None
Jasper	5	0	Hardeeville IC	15	1968	None
Colleton	550	78	Canadys Steam	422	1962 (1st Unit)	None
Colleton	5	0	Canadys IC	15	1968	
Dorchester						None
Berkeley	925	54	Williams Steam	580	1973	None
Berkeley	5	0	Williams IC	54	1972	

Because the South Carolina coastal zone contains a wide variety of economic, demographic, geologic and geographic conditions, such an approach to meeting the State's energy needs may prove to be workable.

A final future alternative is increased conservation of energy. Actions such as retrofiting insulation on buildings and car-pooling can do much to reduce the State's energy demands. The institution of user fees and tax credits may also lead to significant conservation of our energy resources. Industrial use of energy has become increasingly more efficient since the middle of the century (Figure 2), and further conservation measures are being investigated extensively within the State. Richard W. Barnes of the Dow Chemical Company has estimated that with "very strong incentives" (increasing real energy prices, economic incentives for conservation investments and "practical accommodation within environmental protection requirements") industry could reduce the intensity of its energy use (hence increasing energy conservation) by an average of 0.8 percent per year over approximately the next decade. Therefore, as Figure 2 indicates, industrial expansion is not necessarily detrimental to the State's energy balance. It is entirely possible to have economic growth within the State without excessive consumption of our energy resources.

d. Energy Planning

Energy planning in its most rudimentary form began at the State level in 1973 with an Executive Order creating the Energy Management Office. The Energy Management Office was charged with developing a program of energy conservation for the State, as well as with providing a clearinghouse function for all energy information passing through the State.

In the fall of 1978, the Energy Management Office was replaced by the Office of Energy Resources, directed by Dr. Lamar E. Priester, Jr. The Office of Energy Resources is designed to carry out all of the functions of the Energy Management Office as well as to conduct assessments and evaluations, economic analysis and collaboration with the newly-formed joint legislative committee on energy to develop energy-related legislation. In addition, the Office will promote use of diversified energy sources throughout the State.

The Office of Energy Resources will make policy recommendations, but does not yet have any regulatory authority or authority to require implementation of its recommendations. The Office could serve the State in the future as a mechanism for energy planning if it receives statutory authority.

On July 25, 1978, the Division of Consumer Advocacy within the S. C. Department of Consumer Affairs was created to provide legal representation of the consumer interest before State regulatory agencies, such as the Public Service Commission. The Consumer Advocate at his sole discretion acts as a representative for the public before the PSC and utility siting proceedings and rate cases. The S. C. Consumer Advocate may petition to become a party of record under its legislation in these proceedings.

The Public Service Commission (PSC), which is the primary regulatory authority for energy facilities in South Carolina, is beginning to develop a forecasting capability. The PSC received a grant from the National Regulatory Research Institute for the South Carolina and North Carolina Commissions to develop a methodology for regional forecasting within their respective states for energy consumption and peak energy demands for electricity. The methodology developed will assist in determining the type of plant and best plant mix (base, peak or intermediate) which will best meet the anticipated needs for electricity.

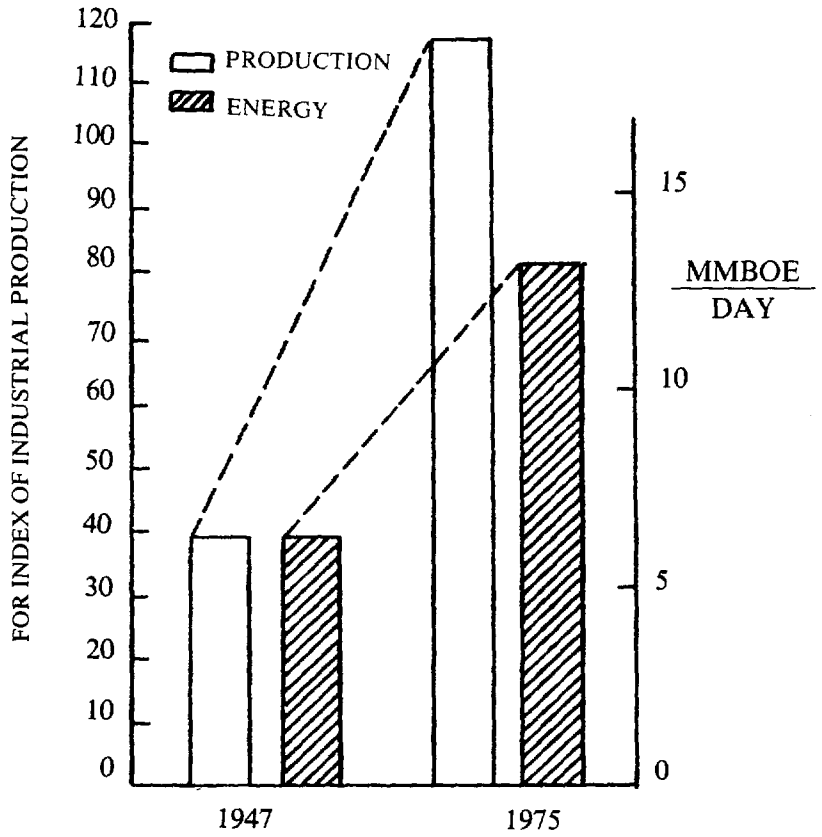
The PSC is attempting to obtain funding to develop a data base at the county level which would significantly increase their forecasting capability. Eventually the PSC would like to develop a State Energy Model to determine plant sites, types, and mixes. About a year and a half ago, the South Carolina Division of Research and Statistics prepared an energy demand study for the Energy Management Office. The data used in the study was accumulated on a statewide basis and has not been updated since that time. The usefulness of this for planning purposes may be significant if the data is accumulated at the county level and updated yearly.

A possible use for coastal zone management implementation funds could be to participate in the development of computerized energy forecasting for energy planning purposes for the coastal zone. If the data were available on the county level, it could also be extremely valuable to coastal governmental units.

It is logical to assume that local governments within the coastal zone will have to assess the impact of proposed energy facilities on their city, county or region. In many cases, local administrators will have little or no experience with such analysis, and consequently may require assistance. The Coastal Council office in Charleston has already compiled an annotated bibliography of materials which will be useful to the local planners responsible for energy impact analysis, and hopes to acquire many of these materials.

FIGURE 2

INDUSTRIAL GROWTH COMPARED TO ENERGY USE



Source: Testimony of Richard W. Barnes, Dow Chemical Company, before the Subcommittee on Advanced Energy Technologies and Energy Conservation RD&D of the Committee on Science and Technology, U.S. House of Representatives, April 4, 1977.

Local planners would then be able to utilize the Council library as needed.

The remaining sources of information available to the Coastal Council for energy planning will come from the A-95 process and from the individual energy suppliers. An Energy Facility Siting Advisory Committee has been organized by the South Carolina Coastal Council (Appendix J). All energy suppliers in the coastal zone, in addition to the State regulatory agencies and the Department of Energy, have representation on the Committee.

The energy planning process, because of its complexity, requires input from a variety of sources. Much of the necessary information is technical in nature, requiring the inclusion of experts in the planning process. Therefore, the Energy Facility Siting Advisory Committee met once before the first draft of the Energy Planning Process was written and has continued to meet throughout the various developmental writing stages. In this way the Committee members have participated in the formation of management program elements which most directly affect them.

It is likely that the Advisory Committee may be called upon regularly after the management program is approved in order to inform the Council of new energy developments, suggest areas requiring further research, and advise the Council on proposed amendments to the coastal program. Forecasting data from the PSC and Division of Research Statistics, and any additional energy prediction and demand studies, can significantly augment information available to the Coastal Council.

3. Demands For Coastal Resources

Among the General Assembly's findings in the Coastal Management Act of 1977 is that "basic state policy in the implementation of this act is to protect the quality of the coastal environment and to promote the economic and social improvement of the coastal zone and of all the people of the State." One of the specific State policies to be followed by the Coastal Council in implementation of the Act is:

> To promote economic and social improvement of the citizens of this State and to encourage development of coastal resources in order to achieve such improvement with due consideration for the environment and within the framework of a coastal planning program that is designed to protect the sensitive and fragile areas from inappropriate development and provide adequate safeguards with respect to the construction of facilities in the critical areas of the coastal zone;...

Consequently, decisions concerning the siting of energy facilities, as well as all other resource allocation decisions, must be made by balancing the need for development which is essential to the economy of the State with the safeguarding of fragile coastal resources. The increasing concentrations of people along the coast require both energy supplies to provide for their personal needs and energy supplies to run the industries in which they are employed. At the same time, increasingly large numbers of people living along the coast reduce the amount of open land available for sites for energy facilities.

The production and transmission of energy can potentially bring negative impacts if siting decisions are not made carefully. A poorly located energy facility can bring to an area problems which can outweigh the tax revenues and other benefits which the community receives. Prime sites for energy facilities should be available for development since the development of poorly chosen sites could result in misspent funds, upheaval to a community, and frequently permanent environmental damage.

Numerous conflicting demands are placed on coastal resources to support such diverse economic activities as manufacturing, tourism and fishing. In addition, the people who work in the coastal zone must have space to live and play, thus requiring housing, recreational facilities, and open space. Energy facilities may require such coastal resources as port facilities. Moreover, the natural regeneration of the coastal ecosystem should be accommodated.

South Carolina has a unique opportunity to learn from other states whose coastal resources have been strained by more intense development and higher population density than this State has yet experienced. Energy facility siting decisions yet to be made provide us with one opportunity to maintain the quality of life we now enjoy and ensure it for our children and succeeding generations.

4. Regulatory Authority

The existing regulatory authority pertaining to energy facilities, as it relates to the South Carolina Coastal Council, is entirely different from the State regulatory authority for other activities. Whereas the Coastal Council's authority for other activities is implemented along a geographical boundary, with direct permitting authority within the critical area and networking authority throughout the remainder of the coastal zone, the State authority over energy facilities follows essentially no geographical boundary. Instead, the authority is primarily determined by the entity which regulates the supplier of energy rather than where the facility is located. A series of exemptions in several State statutes pertaining to energy facility siting further contribute to the complexity of the authority.

In the coastal zone of South Carolina, the primary regulatory authority is the Public Service Commission (PSC) whose regulated utilities provide approximaty 89 percent of the electricity produced in South Carolina. The remainder is provided by either the South Carolina Public Service Authority (PSA), the rural electric cooperatives, or some combination of these. Chart 2 outlines the State agencies from which permits are required for major facilities.

An analysis of the PSC's authority and the role of the South Carolina Coastal Council in decisions by the PSC follows. Next, an analysis of the authority of the PSA and the rural electric cooperatives is given along with a description of the Coastal Council's networking authority in each case. Finally, a few general comments are presented regarding energy facility siting in the State.

a. Electric Facilities

1) Public Service Commission

Although the Coastal Council has direct permitting authority within the critical areas, the South Carolina Coastal Management Act (the Act) in Section 13 (D) (9) provides an exemption that a Coastal Council permit is not required for the "Construction or maintenance of a major utility facility where the utility has obtained a certificate for such facility under 'The Utility Facility Siting and Environmental Protection Act,' Sections 58-33-10 through 58-33-430 of the 1976 Code. Provided, however, that the South Carolina Public Service Commission shall make the Council a party to certification proceedings for utility facilities within the coastal zone." The Utility Facility Siting and Environmental Protection Act (the Siting Act) is the primary piece of environmental legislation under which the PSC operates, and it exempts the PSA from the requirement for a PSC permit. Thus, no Coastal Council permit is required within the critical area for an energy facility unless the facility is being built by the PSA or is otherwise specifically exempted from the Siting Act, such as a facility which is too small to be covered under the Siting Act.

The Public Service Commission (PSC) requires certificates for all major utility facilities which are defined as:

> (a) Electric generating plant and associated facilities designed for, or capable of, operation at a capacity of more than seventy-five megawatts.
> (b) An electric transmission line and associated facilities of a designed operating voltage of one hundred twenty-five kilovolts or more;...(§58-33-20, Code of Laws of South Carolina (1976)) (Code) (Appendix E(1))

The remainder of the section quoted above gives the exemption for any facilities leased to or operated by the South Carolina Public Service Authority in §58-33-20 (Code).

Two additional exemptions are granted in §58-33-110 (Code). In Section (4) an exemption for a PSC certificate is granted to any hydroelectric generating facility over which the Federal Energy Regulatory Commission has licensing jurisdiction. Because of the relatively low stream flow gradient hydroelectric generating plants will not typically be built within the coastal zone. Where hydroelectric generating facilities are built within the coastal zone, the Coastal Council will either directly permit the proejct or have the authority for review and certification through the South Carolina Budget and Control Board permit.

In Section (6) the PSC is given the authority to waive normal procedures and issue emergency certificates. However, because the type of facilities for which PSC certificates are issued are of such size

CHART 2

State Agencies From Which Permits/Certificates Are Required for Major Energy Facilities

Electric Generating Facilities provided by:	Facility (inside critical area)	Facility (outside critical area)
South Carolina Electric and Gas Company	PSC DHEC WR**	PSC B & CB* DHEC WR**
Carolina Power and Light	PSC DHEC WR**	PSC B & CB* DHEC WR**
Cooperatives	PSC DHEC WR**	PSC B & CB* DHEC WR**
Public Service Authority	SCCC DHEC WR**	B & CB* DHEC WR**
Oil and Gas Facilities	SCCC DHEC WR	B & CB* DHEC WR

* If below ordinary high water.
** In designated capacity use areas.

1) B & CB - Budget and Control Board
2) DHEC - Department of Health & Environmental Control
3) PSC - Public Service Commission
4) SCCC - South Carolina Coastal Council
5) WR — Water Resources

and significance to require long construction phases, this emergency certificate is not likely to be invoked.

The procedure which the PSC follows in consideration of applications is specified in the Siting Act. In brief, the application is submitted to the PSC; proof of service is issued to all municipalities, government agencies, and interested persons in the affected area; the application is forwarded to all "parties to the certification proceedings;" a hearing on the application is held; and the Commission makes a decision based on the record of the hearing proceeding.

The point of primary importance in this procedure, from the Council's point of view, is the definition and input of "parties to the certification proceedings." In §53-33-14D (Code) of the Siting Act, the various parties to the certification proceedings are identified as the Department of Health and Environmental Control; Wildlife and Marine Resources Department; Department of Parks, Recreation, and Tourism; and the Water Resources Commission. This act was passed in 1971 before establishment of the South Carolina Coastal Council; therefore, the Council is not mentioned as a party. However, assurance that the South Carolina Coastal Council is a party to the certification proceedings is confirmed in Sections 7(A), 8(B)(11), and 13(D)(9), of the Act (Appendix B).

Section 7(A) obligates State agencies to administer their powers in accordance with the Council's statute and rules and regulations. Section 8(B)(11) empowers the Council to develop a system of review for all State and Federal permit applications in the coastal zone and to certify that these do not contravene the coastal management program. Section 13(D)(9) specifically states, as already indicated, that facilities permitted by the PSC do not have to receive a Coastal Council permit provided "that the South Carolina Public Service Commission shall make the Council a party to certification proceedings for utility facilities within the coastal zone." The Memorandum of Agreement (Appendix D) between the South Carolina Coastal Council and the Public Service Commission affirms that the Coastal Council is a party to the certification proceedings of the Public Service Commission.

A practical affirmation that the SCCC is considered a party to the certification proceedings exists since the SCCC staff has already participated in a certification review. In early 1978, South Carolina Electric and Gas (SCE&G) Company submitted to the Council staff for review an application requesting a PSC certificate to build new transmission lines to Mt. Pleasant, S.C., in an area which would be outside the critical area. The application was received by the SCCC, and Council staff commented on the application. The PSC staff attorney, during the Commission hearing on the application, addressed specific questions to the applicant to assure that the SCCC's concerns would be addressed by SCE&G.

To carry out its statutory powers the SCCC plans to participate in the hearing directly whenever the pending application is of special significance to the Council. The Coastal Council's authority to condition a PSC certificate is affirmed in §58-33-160 (Code) of the Siting Act (Appendix E(1)).

Criteria to be used by the South Carolina Coastal Council for evaluating the Council's position on applications for PSC certificates are in this document. The criteria are an outgrowth of S. C. Coastal Council energy development policies and an outgrowth of the Council's rules and regulations pertaining to critical areas, including adequate provision for consideration of the national interest. In this manner an on-going procedure, compatible with the coastal management program, will evolve for the evaluation of energy facility siting.

2) Public Service Authority

The South Carolina Public Service Authority (PSA) was created in the 1930's. At that time, its primary function was to develop and maintain the Santee-Cooper hydroelectric project. The PSA is also empowered to manufacture, generate, transmit, distribute and sell electricity primarily in Berkeley, Georgetown and Horry Counties within the coastal zone. Section 58-31-10 (Code) defines the PSA as "a body corporate and politic." This description has been interpreted judicially to mean the PSA is, in fact, a State agency (Rice Hope Plantation v. S. C. Public Service Authority, 216 S.C. 500, 59 S.E. 2d 132 (1950).

Because the PSA is exempt from the Siting Act, the permitting exemption in Section 13(D)(9) of Act 123 of the 1977 South Carolina General Assembly does not apply. Therefore, any proposed alteration by the PSA within the critical areas would require a Coastal Council permit.

Outside of the critical areas, the PSA, as a State agency, is subject to Section 7(A) and 8(B)(11) of Act 123. It is anticipated that the criteria for review of PSA projects by the Council will be identical to those for review of PSC-regulated projects. Upon approval of the management program, Federal permits for all

energy projects will be subject to Federal Office of Management and Budget (OMB) Circular A-95 review, and frequently subject to EIS review under the National Environmental Policy Act.

3) Rural Electric Cooperatives

All electric cooperatives are separate corporate entities incorporated during the 1930's under the Rural Electric Cooperative Act of South Carolina (§58-27-10 - 58-27-230, 1976 Code). The South Carolina Electric Cooperative Association, Inc. represents the twenty-one electric cooperatives in this State on various issues. These cooperatives are enterprises set up to meet a common need and are owned and controlled by the people they serve. Cooperative leadership is provided by a board of trustees elected by the membership.

With rare exceptions, projects of the electric cooperatives are smaller in size than those projects covered by the Siting Act. Since the passage of the Siting Act in 1971, there has not been an electric cooperative project of a magnitude large enough to require a PSC certificate under the Siting Act, but large projects in the future would come under the Siting Act certification requirements. In addition, Rural Electrification Administration funds are expected to be used for any sizable projects and therefore come under the National Environmental Policy Act requirement for Environmental Impact Assessments and Statements. The Coastal Council would have the opportunity to evaluate such a project through the A-95 process and through Section 8(B)(11) of the Act to evaluate all State and Federal permit applications pertaining to the project.

4) Other Projects (not covered by the Siting Act)

Projects of less magnitude than those covered in the Siting Act are subject to normal State permitting requirements. If in a critical area, a Coastal Council permit is required. If outside of the critical area jurisdiction but below ordinary high water, a Budget and Control Board permit is necessary. Department of Health and Environmental Control (DHEC) water and air quality regulations also apply. The Council will use its certification powers with the Budget and Control Board and DHEC permit applications. If a project is not subject to the Siting Act and there are no State or Federal permit processes applicable, the potential impact on critical areas is thought to be slight. For example, if a transmission line below 125 KV were installed in a highland area, there might be no permit required nor would there be any significant impact of concern to the Council. In these cases the Council will not be evaluating the projects.

b. Oil and Gas Facilities

In addition to the supply of electricity, regulatory authority exists in South Carolina to manage the exploration and drilling for, transportation and production of oil and gas and their products. In June 1977, a bill, commonly referred to as the Oil and Gas Bill (Sections 48-43-10 et.seq., 1976 Code Supplement) (Appendix E(1)), passed the legislature, giving this regulatory authority to the Water Resources Commission (Commission) and DHEC.

The Commission is charged with permit jurisdiction over exploration and drilling operations within the State's legal jurisdiction and is to act as a leasing agent for the Budget and Control Board in the leasing of lands for drilling and producing oil and gas. The Commission is authorized to limit amounts that may be produced in each underground oil or gas reservoir (pool), establish spacing units within each pool and integrate separately-owned tracts embraced within a single spacing unit. The Department of Health and Environmental Control (DHEC) is responsible for controlling transfer of pollutants, registering terminal facilities and implementing plans and procedures to minimize and control spills (Sections 48-43-510 through 48-43-620 of the Code).

The Council will review and certify permit applications to the Commission for exploration and drilling and applications to DHEC for registration certificates. A DHEC certificate can be issued only if the applicant has shown that State and Federal plans and regulations for prevention, control and abatement of pollution discharges will be met. Any activity which would alter a critical area requires a Council permit in addition to clearances from the Commission and DHEC. Violations of the Oil and Gas Act carry both requires a Council permit in addition to clearances from the Commission and DHEC. Violations of the Oil and Gas Act carry both criminal and civil penalties (Sections 48-43-810 and 48-43-820 of the Code).

Other duties of the Council related to oil and gas development include directing, in coordination with DHEC, the development and implementation of an emergency contingency plan for oil discharged in the State's waters (Section 5(T) of the Act). Also, the Council is to monitor, in coordination

with the South Carolina Department of Wildlife and Marine Resources, the waters of the State for oil spills (Section 5(S) of the Act).

No regulations have as yet been promulgated but are presently being developed by the Water Resources Commission.

5. Energy Resource Policies

The policies which follow will be used by the South Carolina Coastal Council to evaluate proposed energy and energy-related facilities to ensure consistency with the coastal management program. Energy and energy-related facilities are defined in Section 304(5) of the Federal Coastal Zone Management Act as:

> any equipment or facility which will be used or expanded primarily (1) in the exploration for, or the development, production, conversion, storage, transfer, processing, or transportation of any energy resources, or (2) for the manufacture, production or assembly of equipment, machinery, products or devices which are involved in any activity described in (1). This includes (i) electric generating power plants, (ii) petroleum refineries and associated facilities, (iii) gasification plants, (iv) facilities used for the transportation, conversion, treatment, transfer or storage of liquefied natural gas, (v) uranium enrichment or nuclear fuel processing facilities, (vi) oil and gas facilities including platforms, assembly plants, storage depots, tank farms, crew and supply bases and refining complexes, (vii) facilities, including deepwater ports, for the transfer of petroleum, (viii) pipelines and transmission facilities, and (ix) terminals which are associated with the foregoing.

The mechanisms for the implementation of these policies are described in the preceding section on the legal analysis of the Council's participation in energy facility siting decisions.

Policies

Throughout the coastal zone, Council issuance of permits or review and certification of applications for permits for energy facilities and energy-related facilities will be based on the following policies:

a. Nonwater-dependent energy and energy-related facilities are prohibited from locating along the shorefront unless no feasible alternative is available or an overriding public interest can be demonstrated, and any substantial environmental impact can be minimized. (A water-dependent facility is one which can demonstrate that dependence on, use of, or access to coastal waters is vital to the successful functioning of its primary activity.) All water-dependent structures should be designed and constructed so as to minimize enroachment on the aquatic ecosystem and minimize destruction to the wetlands, beach areas, and dunes. Inland siting of all but water-dependent facilities is preferred to waterfront siting.

b. New water-dependent facilities should locate on already maintained channels or rivers to reduce the need for dredging of new channels. Where no presently maintained channel exists and one becomes necessary, the policies for dredging (VIII(A) of the Resource Policies) will apply.

c. Expansion of existing energy and energy-related facility sites by each energy supplier is preferred to the development of new energy sites by that supplier if applicable Federal and State air and water quality standards are not violated.

d. Energy and energy-related facilities must meet the applicable water quality and effluent limitation standards of the U.S. Environmental Protection Agency and the South Carolina Department of Health and Environmental Control, under the National Pollution Discharge Elimination System, Sections 401 and 402 of the Federal Water Pollution Control Act Amendments (Public Law 92-500). In some cases, pre-treatment of wastes may be required before introduction into public waste treatment systems, based on local 201 and 208 Waste Treatment Management Plans, as developed under the Federal Water Pollution Control Act.

e. Energy and energy-related facilities must meet applicable State and Federal air pollution standards and controls, as based on the National Clean Air Act, as amended (P.L. 91-604).

f. In instances where groundwater resources will be utilized either in the processing or effluent discharge stages of the production process, the project shall:

1) meet existing standards and/or management programs of the Water Resources Commission;
2) prevent saltwater intrusion and land subsidence, to the extent feasible;
3) wherever feasible, provide natural vegetated areas on the site where aquifer recharge or percolation can occur to mitigate the impacts of groundwater withdrawals.

g. The filling, dredging and/or drainage of productive fresh, brackish and saltwater wetland areas for energy and energy-related facilities will be prohibited, unless no feasible alternative exists or an overriding public interest can be demonstrated, and any substantial environmental damage can be minimized. These facilities should be directed away from ecologically sensitive areas such as marshes, forested wetlands, and pocosins.

h. Where other activities are associated with energy or energy-related activity sites, such as construction of navigation channels, docks and piers, parking, commercial buildings, or transportation access, the policies for that particular activity, found in the Resource Policies, shall apply.

i. Energy and energy-related facilities and sites should be designed and constructed to minimize erosion and sedimentation, and to limit the impacts from direct storm water discharge into adjacent water bodies and wetlands. Persons proposing to develop these sites are encouraged to contact and work closely with the local Soil and Water Conservation District in the county for assistance in developing site plans which reduce sedimentation and drainage problems. The following considerations shall be included in site location, construction and design whenever feasible:

1) provision of a buffer strip of natural vegetation between the facility and the water's edge. This vegetated area provides a visual screen, a purification system for storm water run-off, and a protective area for the more ecologically sensitive areas, especially fringing wetlands;
2) during site preparation, the controlling of storm run-off, soil erosion, and accidental placement of sediments in wetland areas;
3) the use of permeable surfaces in parking lots and bulk storage areas to provide water recharge areas and minimize the effects of storm water run-off;
4) retainment of open space or natural (undisturbed) areas around sites as buffer zones and recharge areas.

j. Unless a waterfront location is required for the operation of an energy or energy-related facility, major structures, such as electric generating facilities, should be located outside of flood prone areas. When energy and energy-related facilities must be located in flood prone areas, they must meet applicable flood management and construction requirements, as required by the Federal Flood Insurance Program. Inclusion of buffer areas and protection of salt, brackish and freshwater wetlands, which help absorb flood water surges, are strongly encouraged.

k. When electric generating facility applications are evaluated, the following considerations of need must be taken into account:

1) evaluation of forecasted need for the facility;
2) alternative means of meeting the energy demands, wherever feasible.

l. When the energy or energy-related facility applications are evaluated, the following considerations of available, alternative sites must be taken into account:

1) the extent and severity of environmental disruption at various sites;
2) short and long-range economic and social impacts on the community for various sites;
3) comparison of the degree to which the proposal could be modified at different sites if necessary to more fully meet environmental standards.

m. Permit applications for energy and energy-related facility proposals will consider the extent and significance of negative impacts on Geographic Areas of Particular Concern (GAPCs). Applications which will negatively impact GAPCs will not be approved or certified unless no feasible alternative exists or an overriding public interest can be demonstrated, and any substantial environmental damage can be minimized. The determination of significant negative impacts will be made in each case with reference to the specific priorities of use for each type of GAPC.

n. Prior to permitting and certification of energy and energy-related facilities, including oil refineries and petrochemical facilities, the extent and significance of negative impacts on the quantity or quality of these valuable coastal resources will be considered:

1) unique natural areas - destruction of endangered wildlife or vegetation or significant marine species (as identified in the Living Marine Resources segment), degradation of existing water quality in the area;
2) public recreational lands - conversion of these lands to other uses without adequate replacement or compensation, interruption of existing public assess, or degradation of environmental quality in these areas;
3) historic or archeological resources — irretrievable loss of sites identified as significant by the Department of Archives and History or the South Carolina Institute of Archeology and Anthropology, without reasonable opportunity for adequate professional examination and/or excavation, or preservation.

o. "Excavation activities in critical areas are sometimes required for the installation of submerged cables, pipelines, and transmission lines. Excavation and filling are sometimes required to construct foundation structures attendant to the installation of overhead transmission line crossings. These installations should be designed to minimize adverse environmental impacts." (R.30-12(D)(L)) Outside of the critical areas these installations should also be designed to minimize adverse environmental impacts.

p. The following standards will be applied both within and outside the critical areas. "In addition to standards for dredging and filling, the following standards are applicable (for the installation of cables, pipelines, and transmission lines):

1) creation of permanent open water canals to install pipelines are discouraged since such projects generally interfere with drainage patterns and may adversely affect water quality through accelerated bank erosion;
2) dimensions of excavated canals for cables and pipelines should be minimal. Silt curtains are recommended for all excavations;
3) all excavations in wetland areas should be backfilled with the excavated material after installation of the appropriate structure, while being careful to maintain the original marsh elevation;
4) the appropriate erosion control measures shall be employed during the crossing of wetland areas. Where appropriate, revegetation with suitable wetland species will be required;
5) alignments of new projects should be designed to utilize existing rights-of-way and topographic features wherever possible." (R.30-12(D)(2,a-e))

q. Locations for new pipelines shall avoid offshore munition areas, chemical and waste disposal areas, and geological faults, as determined significant by authoritative sources, and wherever possible shall avoid heavily used waterways and significant and productive fish and shellfish habitats.

r. All transmission facilities and pipelines should follow existing roadways and railways and be attached to bridges and crossovers where applicable, especially in wetland areas, to prevent unnecessary alteration or disruption of adjacent wetlands or waterways. The number of pipelines and new transmission lines shall be limited as much as possible. All pipelines through the coastal zone will be laid in pipeline corridors to be developed in coordination with the Council.

s. Siting of nuclear power plants or liquified natural gas (LNG) facilities is strongly discouraged in hazardous areas such as:

1) geological faults as determined significant by authoritative sources, or;
2) flood prone areas.

t. Siting of nuclear power plants or liquified natural gas facilities is prohibited in or near areas of significant population, except where no feasible alternative exists or an overriding public need can be demonstrated.

u. The plans for temporary and permanent disposal of all types of nuclear waste which will be associated with a proposed nuclear power plant will be considered as a vital part of the evaluation of the facility application in determining the overall safety and environmental impacts of the nuclear power plant.

v. Transportation patterns associated with proposed liquified natural gas facilities will be considered a vital part of evaluation of the facility application in determining the overall safety and environmental impacts of the LNG facility. LNG should be regasified and moved as a gas by pipeline unless no other feasible alternatives are available. Where absolutely necessary to transport LNG over land, safety precautions as strenuous as those required over water must be followed in order to avoid subjecting South Carolina residents to unacceptable safety hazards.

Recommended Policies

The Council also **recommends** that the following policies be considered:

a. The location of new energy and energy-related facilities is generally preferred in already developed areas which are capable of accommodating additional development without significant expenditure of public funds for infrastructure or in areas which the local government and the Coastal Council deem to be both environmentally and economically compatible with the type of energy development proposed. Thus, onshore development is preferred where adverse physical, economic, and institutional impacts will be less than those which are likely to be experienced in less developed areas such as those which are more dependent on tourism and the resort industry. (The exception to this siting policy would be the locating of liquefied natural gas (LNG) and nuclear facilities. Specific policies included on the preceding pages shall apply in these two instances.) Care should be taken that proposed new facilities be located, wherever possible, in areas where they will minimize disruption of existing land use of the area.

b. Renewable sources of energy such as solar, wind, tidal power, geothermal and biomass, including experimental and demonstration projects, will be encouraged to locate in the coastal zone to the extent that they meet all Federal and State air and water quality standards and are consistent with other Council policies.

c. The use of recoverable energy sources such as co-generation (combined industrial production of electricity and heat) is also encouraged.

d. Upgrading of old generating facilities operated by each energy supplier is preferred to construction of new facilities by that supplier.

e. Recommendations of the U.S. Department of Energy to encourage the development of small-scale, diversified, dispersed industrial systems are encouraged.

f. A coordinated effort in consumer, commercial, industrial, governmental and recreational energy conservation and support for the Department of Energy Extension Service Concept is encouraged.

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C. EROSION CONTROL PROGRAM

1. Introduction

The widespread concern for effects of coastal erosion is reflected in the coastal management legislation passed on both the Federal and State levels. The Federal Coastal Zone Management Act, as amended in July, 1976, provides in Section 305(a)(9) for:

> A planning process for (a) assessing the effects of shoreline erosion (however caused), and (b) studying and evaluating ways to control, or lessen the impact of, such erosion, and to restore areas adversely affected by such erosion.

In addition, the rules and regulations promulgated as a result of the Federal legislation by the Office of Coastal Zone Management, guiding program development and approval, require States to include in their coastal management programs an erosion planning process. Section 923.25, **Federal Register,** Vol. 44, No. 61, March, 1979, states that:

1) The management program must include a method for assessing the effects of shoreline erosion and evaluating techniques for mitigating, controlling or restoring areas adversely affected by erosion.
2) There must be an identification and description of enforceable policies, legal authorities, funding techniques and other techniques that will be used to manage the effects of erosion as the State's planning process indicates is necessary.

The South Carolina Coastal Management Act (Act 123 of the 1977 South Carolina General Assembly) mandates the Coastal Council to develop a comprehensive beach erosion control policy and gives authority to the Council for the implementation of the policy, including permitting powers for erosion control, authority to remove erosion control structures which have an adverse effect on the public interest, and the authority to accept and spend Federal and State erosion control funds in areas which provide full and complete access to the public. The Erosion Control Program is a close look at the existing South Carolina coast, the patterns of erosion and the interactive dynamics involved in those patterns, the policies which will guide the Council when evaluating alternative erosion control measures, the policies guiding the expenditure of public funds for erosion control, and the legal authority for implementation of the Program.

2. Process of Policy Development

Erosion is a result of the dynamics of the entire coastal region. Therefore, understanding the patterns of erosion and the most effective control has required thorough and comprehensive study.

The South Carolina Coastal Council contracted with two expert consultants to provide technical information specifically applicable to South Carolina's coastline, based on their extensive study and experience. The consultant reports are an integral part of the erosion inventory and policies contained in this document.

A Beach Erosion Technical Advisory Committee was formed by the Council. The members of the Committee represent varied expert approaches to erosion control—State agencies whose responsibilities are relevant to the subject; local, county, and State public officials from coastal communities; environmentalists; and Councils of Government from the coastal regions. To serve as a guide to the Council and staff the Committee met before and after the initial draft of the Erosion Control Program was written to discuss, from their unique perspective, erosion patterns, alternative control measures, and policies.

In addition, Citizens Working Groups were formed in each coastal county, and one inland group was formed composed of citizens outside of the coastal zone. Each group discussed the Erosion Control Program document, and their comments were considered to assure that the wealth of experience of citizens who live on and visit the coast was incorporated into the Program.

The Council and staff have had one full year of direct experience with implementation of the permit authority for all beach erosion structures for coastal South Carolina. This practical experience has been incor-

porated with the consultant reports and results of the Technical Advisory Committee and Citizens Working Group meetings. This process insures the validity, accuracy, and workability of the South Carolina Erosion Control Program.

3. Findings

a) Introduction

Erosion control on beaches must initially address not only the solution but clearly define the problem before any work or funds should be committed. Design of erosion control structures in the coastal zone should consider not only the materials to be employed and the forces they must withstand, but also the modification the works will cause in the natural sedimentation processes. Effective engineering for shore protection should include non-structural as well as structural alternatives. This type of approach depends on a clear understanding of the multiple interactive processes operating in the coastal zone. Objective information provided by good scientific data and engineering is a prime requirement for sound shoreline management, including erosion control.

The basic knowledge of long and short-term shoreline adjustment has been addressed in two comprehensive studies. [1,2] This knowledge can be applied in decisions on how or whether to develop certain segments of coastline; design and location of shore protection structures or setback limits; and estimates of the frequency, nature and cost of maintenance of shore protection structures.

Whenever public funds are spent for erosion control measures, added considerations must become a part of the decision-making. Therefore, the effects of any erosion control measure upon the public interest or other affected areas must always be assessed closely, as the responsibilities are increased whenever public money is to pay for the erosion control.

In South Carolina, the Coastal Council has a statutory directive to use public funds only in areas which provide full and complete access. The Appropriations Bill authorized $600,000 of revenue bonds to the South Carolina Coastal Council during 1978-79 to use for erosion control within the State in areas where public access is provided. This statutory directive is consistent with the overall coastal management program and the Council's sense of responsibility for using public funds with care.

b. The Erosion Problem

The South Carolina coast is fronted by approximately 158.5 miles of beaches comprising 10,701 acres. Studies of coastal morphology and physical processes in South Carolina have been few; however, Hubbard, et al. (1977) [3] offers a functional classification of coastal types based on overall geomorphology, nearshore bathymetry, beach profiles, beach processes, and erosional-depositional history. The four types identified in this study are: 1) arcuate strand, 2) cuspate delta, 3) beach-ridge barrier, and 4) transgressive barrier. The arcuate strand extends from Little River Inlet to Winyah Bay and is characterized by a stable, continuous beach interrupted by a few tidal inlets and swashes. The cuspate delta, located between Winyah Bay and Bulls Bay and including Cape Romain, was formed mainly by deltaic sediments of the Santee drainage and is characterized by an eroding headland, elongating spits on the flanks of the headland, and an overall erosional nature. Beach-ridge barrier islands extend southward from Bulls Bay to the Savannah River and are composed of vegetated beach ridges fronted by a thin eroding beach and backed by extensive salt marshes. Transgressive barrier islands are Morris Island, Eddingsville Beach and Bay Point. These areas are characterized by straight beaches which are rapidly retreating landward over salt marsh through a washover effect.

Conclusions of the Hubbard, et al. (1977) study are as follows: 1) erosion rates along the South Carolina coast range from 30 cm. to 1 m. per year; 2) the area north of Winyah Bay is relatively stable since the underlying formation, Myrtle Beach formation, formed 100,000 years before the Pleistocene (2.1 million years ago) and is in itself eroding slightly; 3) beach-ridge barriers longer than 3.7 miles are composed of unstable, rounded updrift ends, stable or accretional central portions, accreting downdrift ends (recurved spits), yielding a "drumstick-like" shape; beach-ridge barriers shorter than 3.7 miles show large and sporadic changes along their entire length in response to changes in adjacent tital inlets; and 4) the remainder of the coast exhibits varying degrees of instability directly dependent on the character of the backshore area and the size and frequency of tidal inlets. Beaches backed by well-developed beach ridges show lower short-term erosion rates than those where these ridges are absent.

Adding to the geologic erosional-depositional trends of the South Carolina beaches are four other factors,

several natural and several man-influenced. These factors are: 1) large annual rainfall - 46.61 in. annually,[4] 2) rising sea level (from 1833-1903 = 9 in. rise; 1930-1940 = 6 in. rise; 1940-1950 = 4.08 in.), [5] 3) interruption of the longshore (littoral drift) movement of sand due to jetty construction associated with inlet stabilization/navigation projects, and 4) loss of sediments which were originally transported by river systems now dammed for flood control of power generation, including the Santee River diversion project completed in 1941.

With consideration for all of these factors, some of the most highly eroding * beach areas in South Carolina can be identified. These areas are, proceeding from north to south: southern end of Waites Island; Garden City Beach; Magnolia Beach (Hunting Beach State Park); north and south ends of Pawleys Island; southern spit of Dubordieu Beach; north and south ends of North Island; all of South Island; eastern end of Murphy Island; central portion of Cape Island (Cape Romain); all of Raccoon Key; eastern end and central portion of Bulls Island; all of Capers Island; western end of Dewees Island; Sullivans Island side (western side) of Breach Inlet; all of Morris Island; eastern end and most all of the central portion of Folly Island; eastern end of Kiawah Island; western end of Seabrook Island; all of Eddingsville Beach; eastern and western ends of Edisto Island; all of Hunting Island; eastern and western ends of Fripp Island; eastern end of Pritchards Island; all of Capers Island (Beaufort County); all of Bay Point Island; western end and central portions of Hilton Head Island; and western end (Bloody Point) of Daufuskie Island.

Beach erosion can cause many problems in coastal areas. Primary among these is, of course, the destruction of coastal property and buildings. Large amounts of land (property) can be lost in a relatively short period of time, and beach-front property values have soared in recent years. In addition to the financial loss by private property owners, issues of public health, safety and welfare may arise with regard to beach erosion. In areas not served by centralized sewer systems, septic tank drain fields may be eroded, posing a health hazard on the public beach. The beach areas below mean high water are a public, recreational resource which may be lost. The erosion control methods or structures themselves may present obstacles to public access, and in some cases may involve physical hazards to swimmers or aesthetic nuisances. Finally, because public tax monies are often expanded for control projects, erosion and its management are a paramount importance as one aspect of any comprehensive coastal program.

c. **Alternative Control Measures**

In areas where the decision is made to proceed with erosion control, it will be basically one of two types — structural or non-structural. Shore protection in South Carolina has focused on use of seawalls, bulkheads, and revetments (structural methods). These structures serve to separate the land from the sea and are used where it is necessary to maintain the shore seaward of or at its present position in areas where there is little littoral sand supply in addition to little or no protected beach area. These structures afford protection only to the land immediately behind and none to adjacent up or down coast areas. These structures also interdict the path of sand renourishment from dunes, berms, or ridges.

Seawalls and bulkheads are solid vertical barricades built to protect shorefront property or to prevent inland flooding. Seawalls and bulkheads are very expensive, and since they reflect energy they may compound erosion problems. Essentially, these structures are designed to absorb and reflect wave energy as well as to hold fill in place and to raise the affected areas above flood elevations. However, vertical seawalls and bulkheads reflect wave energy downward, causing sand to erode away at the base of the seawall, possibly undermining the footings and eventually causing collapse. It has been estimated that storm forces with one foot of wave height have the potential to scour the beach to a depth of two feet.

A revetment armours the slope face of a dune or bluff with layers of rock (riprap) or concrete. This type of shore protection acts to dissipate wave energy, having a less adverse effect on the beach than a vertical seawall. Revetments are less expensive than seawalls; however, they are hazardous to swimmers and are, in some cases, unattractive since they have a tendency to accumulate debris.

Another example of structural design for shore protection is the groin. A groin is a dam for sand built at right angles to the beach to interrupt longshore sand movement (littoral drift) and trap sand in order to stabilize or widen a beach. However, this trapping of sand by a groin can have severe impacts on the adjacent shoreline down the beach. Groins can be used to stabilize a beach which is subject to intermittent periods of erosion and accretion and build or widen a beach by trapping littoral sand or reducing the rate of littoral

*"highly eroding" is defined in this instance as a short term change in excess of five meters per year.

transport out of an area. Groins act to stabilize this area by reorienting a section of beach to an alignment more nearly perpendicular to the prevailing wave direction.

Groins may be classified as permeable or impermeable, high or low, and fixed or adjustable. They may be constructed of timber, steel, stone, concrete, sand-filled nylon bags, or other materials, or combinations of these. Impermeable groins have a solid or nearly solid structure that prevents sand from passing through the structure. Permeable groins have openings through the structure of sufficient size to permit passage of appreciable quantities of sand (littoral drift). However, fouling by marine organisms may turn a permeable groin system.

When considering groins as a shore protection method, it is critical to assess several factors. These are: (1) availability of large volumes of sand via the littoral transport mechanism, (2) the extent to the downdrift beach will be damaged if groins are used, (3) economic justification for groins as compared to other alternatives, and (4) adequacy of shore anchorage of groins to prevent "flanking" as a result of shoreline erosion. The major factor determining groin use and placement is the supply of sand via littoral drift. If this supply is insufficient to permit the withdrawal from the littoral drift of enough material to fill the groin or groin system then damage will occur to downdrift areas. In some cases, artificial placement of fill with the groin can minimize the reduction of littoral drift to downdrift areas, but this can add substantially to the cost.

Finally, the last structural method of shore protection is the offshore breakwater. Offshore breakwaters have been constructed to provide safe passage through inlets and inhibit sand blockage. Breakwaters can have both beneficial and detrimental effects on the shore. When placed on the updrift side of a navigation opening, a breakwater may serve to impound sand, thereby preventing it from shoaling the navigation channel. The breakwater stops wave action and creates a quiet water area behind it, benefiting navigation. However, in the absence of wave action to move the sand stream, sand is deposited and builds up the shore, seaward toward the breakwater. This build-up actually serves as a barrier to littoral sand drift and deflects the sand stream seaward, depriving the downdrift beaches of sand.

In conclusion, there are many structural methods of shore protection; however, they may also have many complex secondary effects. Too often short-term erosion control solutions cause intensified long-term problems. Therefore, thorough and comprehensive study of an area to determine the best protection plan should be developed before structures are authorized.

Accompanying the many methods of structural shore protection are some non-structural alternatives. These non-structural alternatives involve use of native beach material or sand dune reconstruction. The most commonly used non-structural means of shore protection is beach nourishment. Artificial beach nourishment is a desirable method of beach protection in many situations and is very often preferable to structural methods. The reconstruction and restoration of beach slope through a beach renourishment effort will yield a beach much like the original beach prior to its erosion. The life-expectancy of a renourishment project is of primary concern in determination of the cost and feasibility of the project. Beach renourishment will generally be a temporary measure unless the causes of erosion in the area can be rectified. Estimates of the need for continued, periodic renourishment on a given stretch of beach which is subject to erosion must therefore be considered. A widened, resloped beach also has considerable value as a recreational resource.

Planning and design for establishment of beaches by artificial nourishment involves consideration of the following: (1) geometry of fill (beach berm elevation and width, adjusted foreshore slope, etc.), (2) determination of direction and volume of littoral transport, (3) determination of grain-size of native material in the active littoral zone, both temporarily and spatially, (4) identification of borrow material for initial and subsequent nourishment, (5) availability of borrow material (quality, quantity, location and cost), and (6) recreational function of the beach so as to allow a minimum of 100 square feet per bather, as determined by the U.S. Army Corps of Engineers. The cost of beach fill varies and depends on the exposure, proximity of suitable borrow areas, length of beach and degree of restoration required.

Possible sources of sand for beach nourishment are: bays, lagoons, estuaries, and nearshore areas. Since most sediments available in coastal bays, lagoons and estuaries contain large amounts of silts and clay and are very fine in texture, dredging in these highly productive areas may be ecologically harmful. These areas are usually not considered available for beach nourishment borrow areas. In the past, dune sands have been used as beach nourishment borrow areas. However, since the grain size of dune sand is extremely

small (fine) this material is unsuitable for beach nourishment. Also, dune removal threatens existing beach profile due to the reduction in storage capacity and subjects the adjoining upland area to a flood hazard. Sand taken from adjacent beaches, longshore bars, or nearshore submerged bottoms also ultimately will affect the existing beach profile, since these areas act in much the same way as dunes, that is, as sand storage areas.

Since dunes, nearshore areas, longshore bars, adjacent beaches, and estuaries may not be suitable to be used as borrow areas for beach nourishment, then one must consider the use of offshore deposits (beyond a depth of 30-50 ft.) or areas of accretion, such as inlets, where the supply of sand is constantly replenished by natural forces. Inlet sand removal for nourishment usually can be done in concert with navigation dredging. Selection of offshore sites should be done carefully so as to avoid vital habitat areas and prevent excess siltation of the water.

Finally, the beach's natural sand depository, the sand dune, can be a secondary non-structural method of shore protection. Dunes are mounds of drifting sand; their height and movement depend on the direction and intensity of the wind. The dunes that are located directly behind the berm are the most susceptible to the stress of wind and deterioration from airborne salt. (This is the primary dune, identified by the South Carolina Coastal Management Act as a critical area.) Mild summer waves add sand to the berm, and prevailing offshore winds move sand from the berm to the dunes. This berm moderates winter losses by providing a reservoir of sand available to either dunes or beaches as needed. During storms the berm may be completely eroded away by the ocean, at which time the dunes slump onto the beach, replenishing the lost sand.

The initial stress of storms is usually sustained by a broad beach. However, strong storms may succeed in eroding the beach face and primary dunes, whereupon the secondary dune will bear the brunt of the wave energy.

The fragile network of vegetation covering most dunes is adapted to withstanding wind, sand, high temperatures and salt. However, pedestrian and vehicular traffic as well as animal grazing will have detrimental effects on these dune areas. When the dune vegetation is lost, dune movement accelerates to a point where plant growth cannot keep pace with the shifting sand. The result is a chain reaction that leads to erosion and eventual loss of the dune.

In summary, dunes are very dynamic, valuable and fragile resources which man should not alter. Not only should they be protected and preserved but where possible buffer areas should be established to allow for their natural movement and growth.

Sand dunes can be constructed and/or stabilized to form a non-structural shore protection device. The proper use and placement of snow-type sand fences can stimulate dune formation. These sand fences can act as wind breaks, thereby slowing down offshore sand-bearing winds and causing these breezes to release some of their sand supply. The placement of old Christmas trees between sand fences increases the wind-breaking resistance, and the decaying trees add vital nutrients to the sand, promoting the eventual and necessary stabilizing plant growth. In all cases, dune construction should take place above the natural beach berm or in line with existing dunes, and the dunes should be stabilized by revegetation with appropriate native plant species.

Dunes should never be constructed with any other materials than sand, since materials other than sand will not erode at the same rate or offer proper beach renourishment as will sand. In fact, these non-sand dunes may eventually act as a seawall, reflecting wave energy and thereby accelerating erosion.

Related to the non-structural alternative erosion controls are "institutional" means for management of erosion problems. These are preventative measures which do not reduce the effects of erosion but seek to manage local growth and development so that hazards are not created or new property threatened. Of primary importance is the implementation of construction setback-lines in all ocean-front areas, particularly those prone to erosion. This mechanism is available as an option for local governments along the coast as well as private developers or land-owners and lends itself well to inclusion within local subdivision regulations as well as zoning and building codes. Another institutional-type mechanism is that of public expenditures and funding. Public construction monies should be expended and improved services provided only in stable or accreting beach areas, or in areas with adequate setback ordinances both to set an example for private development and to influence the extent and location of growth. Institutional issues are addressed as Recommended Policies in the following section.

4. **Policies**

a. **FUNDING POLICIES**

Regarding the expenditure of public funds for beach and shore erosion control measures throughout the coastal zone, it is Council policy that:

1) Public funds can be expended for beach or shore erosion control only in areas, communities, or on barrier islands to which the public has full and complete access (as defined in the shoreline access segment of the program).

2) Public funds can be expended only for beach erosion control measures which are deemed by the Council to be consistent with the Beach Erosion Control Policies in this section and any applicable rules and regulations promulgated pursuant to the Act.

3) Public funds can be expended only for erosion control measures which are consistent with the overall coastal management program.

4) Funding for particular erosion projects shall be approved by the Coastal Council only after adequate consideration has been given to the erosion control problems and needs of each coastal county and the relative benefits of the particular project.

5) Consideration will be given to the extent to which the proposal will maximize the protection of public health, safety, and welfare.

6) For expenditure of public funds, the full range of alternative erosion control measures which are possible, including no action, must be studied. Before decisions are made, consideration must be given to the long and short-range costs and benefits of the various alternatives.

7) Removal or modification of existing publicly-funded control structures will be authorized by the Council based on the applicable policies in this section and determination that the structure has an adverse impact on the public interest, as mandated by Section 12(C) of the Act.

b. **GENERAL CONSIDERATIONS**

The Coastal Council will consider the following before any erosion control projects are approved:

1) The type of materials employed, their useful life expectancy along with anticipated maintenance and replacement costs;

2) The economic justification of the proposed project in comparison with available erosion control alternatives including consideration of the anticipated damage and economic loss due to failure;

3) Rate of rise or fall of sea level at the location;

4) Sediment transport and sand budget in the project area;

5) Extent of up or downdrift damage due to installation or lack of installation of the erosion control structure;

6) The extent to which the project fits into a comprehensive shore protection program for that particular stretch of beach, aimed at preserving the beach profile in its present slope and configuration.

c. EROSION CONTROL POLICIES

The Coastal Council will apply the following policies in its review and evaluation of permits for the following erosion control activities:

Seawalls, Bulkheads and Revetments (Riprap)

1) Seawalls, bulkheads and revetments will be considered only as part of a comprehensive erosion control program to insure that these structures do not cause adverse effects to adjoining property owners or appreciably accelerate erosion in the general beach area.

2) These structures must not interfere with existing or planned public access unless other adequate access can be provided.

3) These structures shall not impede public use of beaches below the mean high water line (R.30-13(2)(C).

4) These structures should be sloped seaward or concave with riprap at their bases to reduce the adverse effects of scouring where appropriate.

5) Applications for construction of a seawall in the beach or dune critical areas for the purpose of filling behind these structures to create land for private development shall be denied unless the applicant can clearly demonstrate to the Council that no feasible alternatives exist, that the individual circumstances are extenuating such that they demand an exception to the general policy and that the project would otherwise be consistent with the coastal management program.

6) Except under special circumstances, such as critically eroding shorelines that have a direct measurable effect on the economic well-being of an applicant or are a threat to the public safety, the Council will promote the use of natural features of the dune and beach system rather than artificial protection (R.30-13(2)(a)).

7) Additionally, all other regulations covering bulkheads and seawalls will be applied in the critical areas (R.30-12(C)).

8) Riprap must consist of appropriate materials.

Groins

1) Significant volumes of sand via the littoral transport system should be available.

2) The extent to which the downdrift beach areas will be damaged must be determined before construction.

3) The adequacy of shore anchorage of groins to prevent "flanking" as a result of erosion must be demonstrated.

4) The positive effect and applicability of a groin system in a comprehensive shore protection program must be demonstrated.

5) Care must be taken to insure that groins do not interfere with public access (R.30-13,C(2)(c).

Offshore Breakers and Jetties

1) Since these structures tend to impound littoral drift on their updrift sides, provisions should be made so that sand is pumped at appropriate intervals to downdrift areas so as not to starve these areas of sand thereby creating or worsening an erosion problem.

2) Care must be taken to insure that jetties do not interfere with public access (R.-30-13, C(2)(C)).

3) Where appropriate, jetties should be designed to provide recreational fishing opportunities (R.30-13,C(2)(d)).

4) Construction activities should be scheduled so as not to interfere with nesting and brood-rearing activities of important seabird colonies or other wildlife species (R.-30-13,C(2)(3).

5) These structures should be consistent with other erosion measures being undertaken as part of any comprehensive shoreline protection projects.

Artificial Beach Nourishment

1) A thorough study of littoral transport mechanics as well as beach slope, grain size, and berm geometry should be done before artificial nourishment is attempted.

2) Sand for artificial nourishment should come from offshore deposits or areas of active accretion and from bars or spits only where it can be clearly demonstrated that no negative impacts will result in downshore areas. Fill material should not come from dune fields, adjoining beaches or nearshore bars.

3) Dredging in the borrow areas should not be in conflict with spawning seasons or migratory movements of significant estuarine-marine species.

4) Dredging offshore shall be done in locations and in such a manner so as not to create anoxic sumps or uncover toxic or anoxic deposits.

5) All other policies concerning dredging and filling (R.30-12,G) will be applied to beach nourishment proposals.

6) Careful study must be given to the type (size, quality, etc.) of fill material most suitable for use in a particular beach area.

7) Nourishment of beach areas should be scheduled so as not to interfere with nesting or brood-rearing activities of important seabird colonies or other wildlife species.

8) The recreational and public access requirement of the affected beach area will be a major concern when determining the width of the beach fill.

9) Where possible, inlet stabilization and/or navigation projects shall be done in concert with artificial nourishment projects.

10) Structural control measures should be used, where appropriate and feasible, to complement artificial nourishment projects.

Sand Dune Management

1) Private and public projects to restore and stabilize dunes through non-structural means are encouraged.

2) To the extent possible, the secondary dunes should be kept intact to insure protection of adjoining areas against flooding during storms.

3) Buffer areas should be established, where feasible, to allow for frontal dune growth and movement.

4) All plans for dune restoration, reconstruction or stabilization should be part of a comprehensive shoreline protection program.

5) Dune reconstruction should be done only above the existing berm line or in line with existing frontal dunes. Dunes should be constructed using only native material (sand) of the appropriate grain size and stabilized with native vegetation. Consultation is encouraged with Soil Conservation Service advisory services in determination of plant materials most suitable for dune stabilization.

6) Walkover structures are encouraged over all frontal dunes (R.30-13, B.) However, these walkover structures should not interfere with public access or extend below the mean high water line.

7) Seawalls, bulkheads or revetments should not be placed in front of frontal dunes, except where severe erosion is indicated and unless there are no feasible alternatives or there is an overriding public interest.

8) Public access should be provided either over frontal dunes via walkover structures or by using natural breaks through frontal dunes. In no case shall access be provided by bulldozing or cutting openings through frontal dunes.

9) In all cases, the primary front-row sand dune, as defined in R.30-10(B), should not be permanently altered.

Recommended Policies

1) The Council recommends that local governments in shoreline areas institute shorefront construction setback lines as part of their land-planning activities and/or local building codes, subdivision regulations, or zoning ordinances.

2) Private property owners and developers are encouraged to consult with the Council or with technical consultants to learn the erosion trends and shoreline dynamics in their particular area before initiating construction.

5. **Other Resource Policies Affecting Erosion**

In addition to the policies listed above, a number of resource policies for activities subject to management pertain to erosion control. Generally speaking, filling in the critical areas is prohibited and construction over primary dunes and beaches is discouraged in order to protect upland property and from erosion and storm damage.

More specific erosion control policies are directed toward minimizing damage from storm run-off. Policies in this category include Roads and Highways 1(d), 2(e) and (h); Airports 1(b); Railways 1(e), 2(e); Parking Facilities 1(b); Agriculture 1(c); Forestry 1(c); Mineral Extraction 1(c); Manufacturing 1(c); and Commercial Development 1(d). In some cases specific methods are suggested, and in others, cooperation with the county Soil and Water Conservation District offices and the State Forestry Commission is recommended.

A number of other resource policies address the problem of construction technique and drainage plan design. Included here are the following policies: Residential Development 1(a) and (d); Commercial Development 1(d); Parks 1(c)(iv); Commercial Recreation 1(c); Public/Quasi-Public Buildings 1(c); and Dunes (2). Once again, approved techniques are often suggested.

A third broad resource policy area affecting erosion control is that of channelization, drainage and sedimentation control. Policies in this category are Navigation Channels (2); Sewage Treatment 2(b)(i) and

(iv); and Water Supply 2(c)(i) and (iv) which recommend that water supply and sewage treatment construction not interfere with existing drainage patterns, discourage the building of permanent open ditches through wetlands, and require the use of erosion control methods when construction must cross wetlands. Dams and Reservoirs 1(c) requires that the existing sediment budget be preserved whenever possible so as to reduce erosion problems in beach and shoreline areas downstream.

Two final policy areas are those discovered by Dredge Material Disposal policies 1(b) and 2(d) which require the stabilization of spoil disposal sites and related dikes, and the policies for Areas of Special Resource Significance which require that development plans for dunes and barrier islands be evaluated in light of the possible increase in erosion or storm drainage they may produce.

6. **Management Authority**

The S.C. Coastal Management Act of 1977 explicitly states that the regulatory program developed to control beach erosion is for the purpose of promoting the public health, safety and welfare, and the protection of public and private property from beach and shore destruction.

The Coastal Council has been granted very broad authority to study and control erosion in the coastal zone. Besides the permit program for the alteration of critical areas, which would encompass most erosion control activities, the enabling legislation gives the Council responsbility to develop and implement a comprehensive beach erosion control program and permit jurisdiction over erosion control and water drainage structures not otherwise covered by law (§48-39-120; 1976 S.C. Code of Laws). The Council has also been designated as the State agency to accept Federal money for erosion control in areas to which the public has full and complete access. State funds, if available, may be spent by the Council to alleviate emergency erosion conditions, as declared by the Council, in areas to which the public has full and complete access. Public access is a pivotal requirement for the allocation of funds by the Council under the erosion control segment of the coastal management program.

The specific policies for erosion (management control) are designed to accomplish this purpose. Through direct action, such as an order, or as a last resort, by seeking court intervention, the Coastal Council may enforce these policies and insure the implementation of this segment of the program.

Footnotes

[1] Stephen, M. F., P. J. Brown, D. M. Fitzgerald, D. K. Hubbard and M. O. Hayes, 1975. "Beach Erosion Inventory of Charelston County, South Carolina: A Preliminary Report." S. C. Sea Grant, Tech. Rept. No. 4 (SG-SG-75-4), 79 p.

[2] Hubbard, D. K., J. H. Barwis, F. Lesesne, M. F. Stephen and M. O. Hayes, 1977. "Beach Erosion Inventory of Horry, Georgetown, and Beaufort Counties, South Carolina." S. C. Sea Grant, Tech. Rept. No. 8 (SC-SG-77-8), 58 p.

[3] Hubbard, D. K., M. O. Hayes, P. J. Brown, 1977. "Beach Erosion Trends Along the South Carolina Coast," pp. 797-814. **Coastal Sediments 1977,** ASCE Publ. NY. 1133 p.

[4] Landers, H., 1970. "Climate of South Carolina." **Climates of the States, South Carolina, Climatology of the United States,** No. 6038, ESSA Environmental Data Service.

[5] Kurz, H. and Wagner, K. 1957. "Tidal Marshes of the Gulf and Atlantic Coasts of Northern Florida and Charleston, South Carolina." Florida State University Studies. No. 24. 168 p.

[6] "Highly eroding" is defined in this instance as a short-term change in excess of five meters per year.

D. BEACH AND SHORELINE ACCESS

1. Introduction

The South Carolina coastal zone boasts 158 miles of Atlantic Ocean shoreline — this wealth of beaches is an invaluable and irreplacable resource for the State. The General Assembly recognized the increasing demands on **all** coastal resources in the passage of the South Carolina Coastal Management Act of 1977, which mandates development of a comprehensive coastal management program. Among the many findings and concerns expressed in the State legislation are those of protecting public access and preserving and expanding recreational resources. The following beach and shoreline access policies and existing management authority address these issues.

In order to receive Federal approval and thereby continued funding through the Department of Commerce, the State must also meet Federal requirements for shoreline access in its coastal management program. The rules and regulations from the Office of Coastal Zone Management for program development and approval read as follows:

> (1) The management program must contain a procedure for assessing public beaches and other public areas, including State owned lands, tidelands and bottom lands, which require access or protection, and a description of appropriate types of access and protection.
> (2) There must be a definition of the term "beach" that is the broadest definition allowable under state law or constitutional provisions, and an identification of public areas meeting that definition.
> (3) There must be an identification and description of enforceable policies, legal authorities, funding programs and other techniques that will be used to provide such shorefront access and protection that the State's planning process indicates is necessary.
>
> (Section 923.24, **Federal Register**, Vol. 44, No. 61, March, 1979)

2. Definitions

a. Beach

The South Carolina Coastal Management Act (Act 123 of the 1977 South Carolina General Assembly) defines "beaches" as "those lands subject to periodic inundation by tidal and wave action so that non-littoral vegetation is established". (Section 3(H). This definition includes that area of sand between mean low and spring high water, in other words, the foreshore and the dry sand beach up to the line of vegetation. Beaches are included in the management program as "critical areas", subject to the Coastal Council's direct permitting authority.

b. Public Beach and Public Access

According to the Federal Regulations "public beach" must be defined within each management program. In South Carolina it is defined in terms of State ownership or of demonstrated public use sufficient to create public rights in the land. In South Carolina there is no specific statutory right for public use of the beaches. However, the doctrine of the public trust forms the basis for the public's right to use the foreshore or wet-sand beach seaward or below the mean high water mark. Under this doctrine, title to the foreshore (below mean high water) is presumed to be held by the State in trust for her citizens unless title has been expressly granted to an owner out to the low-water mark.

Based on traditional concepts of law, or common law, the public has rights to use the foreshore for navigation and fishing. In recent years, this traditional interpretation has been expanding in other jurisdictions. In South Carolina, statutory expression in State legislation for coastal management and oil spill monitoring and control, and opinions of the S. C. Attorney General reflecting strong public interest in recreation, have to some degree broadened the common laws basis to include recreational uses within the public trust.

Upland access across to the wet-sand beach below mean high water is another important factor in identify-

ing public beach access. Unless the property landward of the wet-sand beach is owned outright by the State — through acquisition, express dedication from developers and owners, or through an express trust — assurance of public rights for use of the "dry-sand beach" or shoreline property adjoining the traditional public beach area below MHW can be made only on the basis of a case-by-case determination.

In South Carolina, confirmation through the courts of these so called "acquired" public rights for access-ways on shoreline property will probably be based on the legal theories of (1) prescriptive easement and (2) implied dedication. A prescriptive easement requires a clear showing of continuous and uninterrupted public use without permission of the owner, for a 20-year period. Implied dedication requires evidence of the land-owner's intent to dedicate the property for public use and of the public's acceptance by using the land. Under either theory, evidence supporting the extent of public use must be clear and convincing.

Litigation involving particular parcels of shoreline property is clearly an expensive, time-consuming, and cumbersome means for determining "public" versus "private" rights in a particular area. But in some instances where ownership is in question, it can be the only means for such determination. The S. C. Attorney General has brought several claims on behalf of public rights in the past; however, there is no clear statutory authorization for this role and no explicit duty for that office to undertake such an action. The viability of this course of action depends to a large degree on the ability or willingness of the Attorney General or of some concerned private party to initiate a public claim.

c. Existing Public Access (Full and Complete Access)

The South Carolina Coastal Council will use the following definition for "existing public access" for 1) determination of those areas eligible for public funds for erosion control and 2) as a basis for every permitting decision requiring consideration of public access. In addition, this definition fulfills the federal requirement that a definition of full and complete access be included in the State management plan.

The Council will find that a stretch of beach is accessible to the public if: (1) Reasonable provision is made for transportation facilities, including automobile parking, boat landings, bicycle racks and/or public mass transit. Facilities must be available on a year-round basis, and fees, if charged, must be nominal and serve only to offset actual costs. (2) Public walk-ways or access-points to the beach and lateral access to the dry-sand beach are open and readily apparent. (3) Access to the area is actually sought by members of the general public with reasonable frequency.

A "stretch of beach" may be delineated by such factors as physical or geographical boundaries (an inlet or marsh, for example) as well as by jurisdiction borders (municipal limits, for instance).

What constitutes "reasonable" for purposes of the preceding definition will be determined in part by the size and population of the surrounding area, the size of the stretch of beach itself, and the availability and nature of upland or marine rights-of-way to the general area of the beach.

3. Policies for Public Shoreline Access

a. Process of Policy Development

The South Carolina Coastal Council and its staff have worked throughout the period since their creation on July 1, 1977 on the background and study efforts for development of the shoreline access segment of the program. Prior to passage of the legislation which created the present Council, staff and gubernatorially-appointed Coastal Council members were working toward writing the various parts of the program. In 1976, an extensive study financed and coordinated through the coastal program and the S. C. Department of Parks, Recreation and Tourism was undertaken. This study on beaches and beach access, which formed the basis of the beach inventory presented at the end of this chapter, is entitled **Public Beach Access and Recreation in South Carolina** and was conducted by Hartzog, Lader & Richards. A special legal consultant to the Council has worked closely with the staff to fully explore the possibilities and problems regarding provision and protection of public beach access.

The Management Committee of the Coastal Council is one means for improved policy development. This sub-group of the full 18-member Council, which represents a wide range of interests and geographic areas, received draft material from the staff and gave it careful, in-depth examination and review.

A more technical form of input to the policy formulation process has been a Beach Access Advisory Com-

mittee. This working group of experts from the recreation field, local and State government representatives, and citizens who personally encounter or deal with beach access issues, met several times to assist staff of the Council in drafting this segment of the program.

In addition, a group of citizens in each of the eight coastal counties and one in the inland area met on a monthly basis during the latter stages of development of the program to carefully study draft segments of the document, including beach and shoreline access. The input from these County Working Groups, which consisted of both general and specific, detailed comments, proved invaluable in assuring that the real issues and concerns of coastal residents **and** others in the State have been addressed by the program.

b. Findings

South Carolina has a unique opportunity at the present time for preserving valuable coastal resources and for realizing great social and economic benefits from these areas. The relative wealth of beaches and other shorelines of the coast are an asset for residents of the coastal zone and the State as well as for the Nation in terms of the many visitors to the area.

Provision of sufficient areas for public shoreline access, especially to the beach, which include adequate facilities and maintenance are important not only to recreational users — day visitors and tourists — but to residents and private property owners as well. The interests of this latter group are also met because pressure for use of or infringement upon private beachfront and the associated trespass or damage is reduced when properly designated public areas exist.

The inventory contained at the end of this section demonstrates the extent of existing public access to South Carolina beaches. The significant number of public boat landings and public shellfishing areas, which provide another form of public shoreline access, have also been identified.

Roughly 30% of the State's Atlantic Ocean shoreline or beach areas, including the adjacent dry-sand or upland shorefront, is owned by the State or Federal government. The need to preserve these beach areas in the public domain and insure their protection both as natural assets and for recreational opportunities is clear. Many of these beach areas have limited transportation access, often by private boat only with no boat landing facilities. Thus, a primary criteria for acquisition or expansion of new public beach areas is provision of ample means for transportation access. An additional criterion is availability of facilities related to beach activities, such as restrooms or changing areas.

In ocean-front areas with predominantly private ownership of the adjacent uplands, existing lateral public accessways across to the beach below mean high water also need preservation, enhancement and maintenance. In developed beach areas, especially those near urban centers where demand is greatest and is increasing, the provision of adequate parking for day-visitors is one concern of coastal management for improved public access. Efforts to encourage local governments and private developers to consider provision of public access-ways in future development plans, such as subdivision or resort proposals, is another focus of public access planning.

Recreational boating in South Carolina's coastal zone is a growing and important economic enterprise as well as a recreational pursuit. While there are currently a number of public boat ramps in the coastal zone, distribution is relatively poor in some areas. The need also exists for provision of new public ramps to meet growing demand; these should be constructed in an environmentally acceptable manner and offer improved facilities (lighting, trash receptacles, parking). (Other boating-related activities which provide shoreline access such as marinas and docks and piers are more often private or commercial endeavors rather than public, and are covered by the coastal management program under the resource policy section for the respective activity. (Section VI A-C of the Resource Policies, (Chapter III)).

Improved public access to riverine or estuarine areas for recreational purposes other than boating, such as swimming, picnicing or camping, can help reduce the extreme demand on Atlantic Ocean beaches by offering alternative water-front destinations. Recreational fishing and shellfishing are also significant pursuits for coastal residents and visitors. The limited public oyster grounds along the coast receive heavy use. (See Table 4 for locations.)

Several beaches, both recreational areas and wildlife preserves, have been designated as Geographic Areas of Particular Concern (GAPCs) in the coastal zone. These beaches have been categorized as Areas of Unique Natural Resource Value, and as designated GAPCs, receive special management attention.

Additional considerations are made based on the priorities of use of these areas and possible negative impacts when decisions are made by the Council on permit applications in the critical areas or review and certification procedures in the coastal zone.

c. **Policies**

1) The S.C. Coastal Council fully endorses and will support, further, and encourage the protection of and, wherever feasible, the expansion of public access to shoreline areas in the coastal zone.
2) The Council's evaluation to determine whether or not permit applications for alterations in the critical areas are approved will be guided by the policies specified in Sections 1 and 2 of the S.C. Coastal Management Act of 1977 and:

> The extent to which the development could affect existing access to tidal and submerged lands, navigable waters and beaches or other recreational coastal resources (Section 15(A)(5) S.C. Coastal Management Act of 1977).

3) The Council's review and certification of permit applications from other State agencies for projects in the coastal zone, including those outside the critical areas will consider:

> The extent of impact on the following aspects of quality or quantity of these valuable coastal resources:
>
> > Public recreational lands—conversion to other uses without adequate replacement, **interruption of existing public access,** or degradation of environmental quality in these areas (emphasis added). (See Chapter III, (C) Resource Policies.)

4) Public funds can only be expended for beach or shore erosion control in areas, communities or on barrier islands to which the public has full and complete access.
5) The highest priority for expenditure of public funds for acquisition of new parks and recreational areas along beaches or shorelines in the coastal zone will be given to areas which offer full and complete access to the public.
6) The Council encourages the extension of better access to existing publicly-owned recreation areas, particularly barrier islands, which currently only afford access by private boat and are appropriate for more intensive use. This should include access **to** the area, via ferry or provision of boat landings and other facilities; and also access **across** or through the area to the beach-front via paths or walkways. The type and extent of public access must be determined based on the human "carrying capacity" of the area in its natural state in order to protect natural beach features and other environmentally sensitive areas.
7) Lateral beach access-ways should be walk-over structures or staggered pathways at natural breaks in the dunes, to prevent disruption of sand dunes or vegetation. Although structures of this type are specifically exempted from direct permit authority, Coastal Council staff will be available at any time to assist in their planning and design so as to assure suitability to the environment.
8) The provision of additional parking space in upland areas adjacent to beaches should be a priority for recreational planning by both local and State agencies. Alternatives such as remote parking sites connected to the beach by public transportation, off-island parking, and authorized weekend and holiday use of private, commercial parking spaces should be explored. As mandated in Section 10 of the Act, Council staff will be available to provide technical assistance whenever needed.
9) Local governments in the coastal zone, particularly beachfront communities, are urged to incorporate considerations for provision of public access into their local ordinances and comprehensive plans, especially into subdivision regulations which can influence the location and design of new development that might affect public access.

10) Private developers in beach areas, in considering the benefits not only for the public but for protecting private property interests, are encouraged to include provision of reasonable public beach areas and access-ways in their plans for new developments.

11) Recreational planning by State and local governments should include consideration of alternatives to actual ocean-front areas in order to offer other options for recreation and to relieve growing pressure on ocean-front communities. An example of such an alternative is the acquisition and development of recreational areas along rivers which provide for activities such as fishing, swimming or picnicing. Estuaries could also be utilized as recreational areas, provided that their development and use are compatible with the fragile nature of these areas.

12) The Council advocates the provision of joint-use public docks, public boat ramps and landings throughout the coastal zone in environmentally suitable locations, to meet the needs of recreational boating.

13) The Council advocates the provision of pedestrian access and fishing catwalks on all new bridges and roadways in the coastal zone, and recommends their addition to existing structures where possible.

14) The provision of new public oyster grounds, as well as the preservation of existing public grounds will be sought by the Council. (Public shellfish grounds are designated as Geographic Areas of Particular Concern.)

15) The resource policies for park facilities, as well as marinas, boat ramps, docks and piers will apply where appropriate to shorefront areas with public access. (See Resource Policies pertaining to these activities.)

16) The Coastal Council will coordinate planning and acquisition efforts very closely with the SCORP Exchange Council, as well as with State and Federal agencies concerned with public beach recreation.

17) The Council recognizes the overriding importance of good water quality as a recreational resource, and will strive to maintain and, where possible, improve existing standards. Chapter V, (D) details the procedure by which the Federal Water Quality Standards are incorported into South Carolina's coastal planning process.

Recommended Practices

1) The Coastal Council recommends that legislation be introduced to limit the liability of property owners and municipalities in case of injury or accident associated with public access to the beach.

2) The Coastal Council strongly supports the proposal generated by the S. C. Department of Parks, Recreation and Tourism to alter the structure of the State Recreational Land Trust Fund (which may now only be used for State parks) to permit local governments to use the Fund for the purpose of developing land for any recreational purpose. Use of the Fund would enable State and local governments to provide more high quality public access to the beaches.

3) It is recommended that abandoned bridges and railroad trestles be left standing to serve as fishing piers when safety considerations permit. Costs of maintenance may be offset by leasing the structures to a county or local government. It has been suggested in the Resources Policies section that railroad rights-of-way be allowed to serve as access points whenever possible. (II (D) of the Resource Policies)

4) In the planning and design of all public access areas, full consideration be given to assure access opportunities to elderly and handicapped visitors.

4. Legal Basis for Management Authority/Legislative Mandate

a. Permitting Authority in the Critical Areas

Three means of protection for access and use of public shoreline areas are afforded by the Council's permitting authority in the critical areas as granted under the S. C. Coastal Management Act. (1) Existing public access and any disruption or negative impacts of this access must be considered by the Council in granting or denying permits for alterations in the critical area. (Section 15) (2) Where local ordinances affecting critical areas are not as stringent as those in the Act, these are augmented by provisions of the Act. Both local and State permits must be obtained, in other words. (3) Critical areas, including beaches and primary sand dunes, are regulated with particular care through the existence of the permitting authority.

coastal resources". (Section 15(5)) The Council is further required to hold a public hearing on any permit application at the request of twenty affected citizens, and it may condition a permit "upon the applicant's amending the proposal to take whatever measures the Council feels are necessary to protect the public interest".

The Act requires that a party seeking a permit provide evidence of his interests in the affected property. When public rights of access are claimed on property for which a private owner seeks a permit, the State Attorney General is able to take appropriate administrative or judicial action to prevent the Council from issuing a permit for the activity until the rights in the property are determined. In the event that a permit is granted which does interfere with existing access rights in affected property, Section 15 allows persons adversely affected by the granting of a permit to appeal the initial decision to the Council. In addition, Section 18 of the Act provided that any person adversely affected by the permit may petition in the State circuit court having jurisdiction for review of the Council decision.

Another means of protecting and assuring public access rights in shoreline areas is the Council's authority to evaluate local ordinances affecting critical areas as part of the overall management program. (Section 10) In the critical areas, both local and State (Coastal Council) regulations apply. Where the requirements of the Act and the Permitting Rules and Regulations of the Council are more stringent than the local ordinance, the Council authority will augment the local ordinances, although all local requirements, including permit procedures, must be met as well. The Council also has a duty to cooperate with local governments and to make "(r)ecommendations to local and regional governmental units as to needed modification or alteration in local ordinances". (Section 10 (A)(4))

Finally, protection of the beach (as a critical area) from most construction activities can have the bonus effect of preserving dry-sand areas for customary recreational use. All Atlantic ocean-front beaches along South Carolina's coastline are, by definition, critical areas, and therefore subject to the direct permit jurisdiction of the Coastal Council. In most circumstances, only erosion control and similar structures will be considered as acceptable for permits in the beach critical area.

The primary ocean-front sand dunes adjacent to the Atlantic Ocean (within 200 feet of MHW) are also within the critical area. Development on this first row of sand dunes is subject to Council permit requirements, with consideration given to protecting against the destruction or disruption of these dunes which are fragile but important storm buffers and natural erosion controls.

The Council's policy for construction of nonwater-dependent structures on the beach or primary sand dunes is stated in R.30-13(D) of the Final Rules and Regulations for Permitting (Chapter 30, R.30-1-30-13, Code of Laws of South Carolina, 1976, as amended). It reads as follows:

> Nonwater-dependent structures such as commercial and residential buildings have been constructed on primary sand dunes or beach areas in the past. Such construction may seriously disrupt the dune/beach system and its vegetation, hampering their effectiveness as a storm and erosion buffer. The sitings of nonwater-dependent structures on the primary dunes or the beaches will be discouraged where other feasible alternatives exist. Design and construction options which minimize destruction of the dunes and dune vegetation will be encouraged.

The Council's direct permitting jurisdiction also considers public access to shoreline areas other than the actual beach-front. Shoreline areas up to spring high tide along the rivers, bays and inlets seaward of the critical area boundary are also included within the Coastal Council's permit authority, being designated under the category of "tidelands" and "coastal waters". (Section 3, S.C. Coastal Management Act). The final Rules and Regulations for Permitting apply to any alterations in these areas. In addition to the general considerations made on all permit applications for protecting public access, there are specific project guidelines for each type of activity, many of which encompass considerations of navigational and recreational access.

Enforcement authority and penalty provisions, as well as the previously mentioned permit appeals procedure, are available under the Coastal Management Act. Construction in violation of the Act can be restrained by a circuit court with jurisdiction "at the suit of the Council, the Attorney General, or any person adversely affected". (Section 16)

b. Erosion Control

The Authority of the Coastal Council to develop and institute erosion control policy, to issue permits for erosion control structures, and to expend public funds for shore erosion control in "areas where the public has full and complete access" also will have the effect of protecting existing access and of preserving beaches for public use.

1) **Erosion Control Policy in the Management Program**

Section 12 of the 1977 Coastal Management Act mandates that the South Carolina Coastal Council develop and institute a comprehensive beach erosion control policy.

Among the policy concerns addressed in this section of the Act are that the expenditure of public erosion control funds be made only in areas with full and complete public access (see (B)(3) below), that the Council has authority to remove...erosion control structures which are not in the public interest, and that ocean-front property which accretes beyond mean high water and beyond original private property boundaries will remain in trust for people of the State (See (C) below)

The Federal Coastal Zone Management Program guidelines also require that each state include a beach erosion segment in its management program. These requirements are met by Chapter IV (C) of the South Carolina Program document.

2) **Permitting**

Express policy in the Coastal Council's Final Rules and Regulations for Permitting for erosion control structures states clear preference for the "use of natural features of the dune and beach system rather than artificial protection". Among the criteria considered in permit applications for jetties and groins is that "care... be taken to insure that they do not interfere with public access". Recognizing the importance of the beach and dune system "to storage of sand and shoreline stability... (and) as a barrier which protects adjacent inland areas, the Statement of Policy finds that "enough room (should) be allotted between structures and the shoreline so that if natural erosion occurs, natural deposition can restore the beach..."

In the event of natural or artificial accretion, provisions in the S. C. Coastal Zone Management Act defining the Coastal Council's erosion control authority (Section 12) require that land seaward of the mean high-water mark that existed at the time of development remain undeveloped. These erosion policies and their application should ensure erosion control devices and other structures that are consistent with existing public use and access.

3) **Funding**

Section 12 (D) of the S. C. Coastal Zone Management Act provides the Coastal Council with the authorization to accept and spend Federal funds for beach or shore erosion control only in areas to which the public has "full and complete access". Section 12(E) of the Act makes Council expenditure of emergency State funding for erosion control also contingent on "full and complete access" to the beach in question. Most recently, the 1978 S. C. General Assembly enacted an amendment to Act 1377 of 1968 relating to the issuance of capital improvement bonds which provides that the "Coastal Council shall endeavor to maximize public access to the beaches of the coastal counties" and that none of the $600,000 bond revenue available for beach erosion or groin repair "shall be allocated to any project located in any beach not accessible to the public".

c. Networking Authority in the Coastal Zone

Section 8 of the South Carolina Coastal Zone Management Act of 1977 directs that in developing the management program, the Council must "consider all lands and waters in the coastal zone for planning purposes". Section 7(A) requires that "all other state and local agencies and commissions shall cooperate with the Council in the administration and enforcement of this act. All agencies currently exercising regulatory authority in the coastal zone shall administer such authority in accordance with the provisions of this Act and rules and regulations promulgated thereunder".

While the Council has no **direct** regulatory authority outside the critical areas, Section 8(B)(11) provides that the Council must "(d)evelop a system whereby the Council shall have the authority to review all state and federal permit applications in the coastal zone, and to certify that these do not contravene the management plan".

The Council has actual authority through this indirect system to regulate activity in the coastal zone which

has a "direct and significant impact on coastal waters". The particular activities designated for management in the coastal zone were selected on the basis of four criteria, including "disruption of existing public access to a coastal resource." These activities are listed in Chapter III (C).

The "performance standards approach" of dealing with the impacts of an activity and the governing policies and processes are discussed in Chapter III (C), and legal authorities and networking among State agencies are addressed in detail in Chapter V (A) of the program document.

d. Accretion Policy

As part of the erosion control policy of Section 12 of the South Carolina Coastal Management Act, the General Assembly declared that property from natural or artificially-induced accretion along the ocean-front beyond the mean high water shall be "held in trust for the people of the State". The effect of this section of the Act pertaining to beach access is to emphasize the importance of ocean-front beaches as a public recreational resource and recognize the public trust doctrine for beaches below MHW.

Section 12(B) reads as follows:

> No property rebuilt or accreted as a result of natural forces or as a result of a permitted structure shall exceed the original property line or boundary. **Provided,** further, that no person or governmental agency may develop ocean-front property accreted by natural forces or as the result of permitted or non-permitted structures beyond the mean high water mark as it existed at the time the ocean-front property was initially developed or subdivided, and such property shall remain the property of the State held in trust for the people of the State.

e. Legal Actions to Determine Ownership

A major provision of the South Carolina Coastal Management Act of 1977 is contained in Section 22, which allows persons claiming title to lands between mean high water and mean low water in the coastal zone for file suit against the State of South Carolina to establish their claims. Under Judicial process, determinations would then be made of any existing right, title or interest to such tidelands.

Of significance here is that this section specifically **excludes** beaches from the definition of such tidelands. The effect of prohibiting such actions against the State in the case of beaches is to reinforce the presumed public ownership of beaches below mean high waer.

f. The Role of Local Government

Local governments are another existing authority which can enhance abilities to secure existing access rights. Outside the critical areas, the Council has no direct regulatory authority; however, Section 10 of the S. C. Coastal Zone Management Act creates a duty in the Council to cooperate with local governments and to make recommendations regarding modifications of local ordinances.

The most powerful tool of municipalities is subdivision regulation. South Carolina enabling legislation provides that subdivision regulations under local governing authority may "provide for the harmonious development of the municipality and the county", permit "the dedication or reservation of land for streets, school sites and recreation areas", and encourage "a distribution of population and traffic which will tend to create conditions favorable to health, safety, convenience, prosperity, or general welfare". By considering beaches to be a necessary kind of open space and access-ways as essential to the enjoyment of that space, the Council will recommend that shorefront communities require developers to dedicate public easements to preserve rights-of-way to the ocean. The Council will suggest that municipalities encourage development plans that insure acquisition and maintenance of reasonable access routes, adequate dry-sand space, and adequate facilities, including parking.

In many cases these requirements will confirm existing rights in previously undeveloped property by incorporating frequently used beaches and pathways into development plats as dedicated public areas.

Through its recommendations, the Coastal Council can seek to influence the shape of local ordinances, not only to protect public rights, but to insure that private beachfront landowners and municipalities do not bear an unfair share of the costs of public use. Where beaches are especially popular and accessible so that traffic, trash, and safety become problems, the Council will recommend that local governments consider asessing

nominal fees to residents and visitors for parking or changing facilities. These additional funds should allow a community to provide better maintenance and necessary services where full and complete access is provided.

The preceeding sections (A-F) outline those sources of authority relevent to beach access which are specifically provided for in the enabling legislation. The Coastal Council recognizes that the beaches are a State and even a national resource, and consequently require State assistance to supplement and coordinate local efforts to provide and maintain access.

5. Other Resources Policies Affecting Public Access

Resource Policies for each of the identified activities subject to management can affect shoreline access in a number of ways. Activities which would adversely affect existing public recreational areas are discouraged, and activities which can increase public access to public shoreline areas are encouraged. Policies affecting critical areas are enforceable under the permitting authority of the South Carolina Coastal Council. Policies for the coastal zone outside the critical areas are enforceable under Section 8 of the South Carolina Coastal Management Act which gives the Council authority to review and certify State and Federal permits.

In critical areas, filling is prohibited in most circumstances, and construction over primary dunes and beaches is discouraged, to be permitted only where no feasible alternative exists. These regulations will work to preserve beaches for recreational uses as well as for the protection of upland property from erosion and storm damage.

Every kind of activity subject to management in the coastal zone — residential development, transportation, coastal industries, commercial development, recreation and tourism, dredging, public services and facilities, erosion control, and energy and energy-related facilities — is specifically discouraged if the project is in question would significantly impact "public recreational lands" by "conversion of these lands to other uses without adequate compensation or replacement, interruption of existing public access, or degradation of environment quality in these areas." Through its procedures for review and certification, the Council can refuse to certify any permit if the impact on existing public access to public recreational areas has not received adequate consideration.

Certain specific **enforceable** Resource Policies contained in the program will work to increase existing public access. For example, road and highway construction policy provides that "where appropriate, bridges and approaches should be designed to provide for the enhancement of public access by the utilization of fisherman catwalks, boat launching ramps and other structural features". In addition, the reuse of abandoned railway bridges as fishing piers or as other recreational facilities is encouraged.

Commercial development policy encourages development which includes public access: "Developers of commercial property on immediate beach or river-front are urged to provide some area for general public use in their plans." Boat ramp policy gives priority in justifying construction in critical areas or other environmentally sensitive areas to ramps intended for "public use, open to all citizens" over those ramps intended for restricted or private use.

Other **recommended** Resource Policies affecting access are articulated in regard to park, marina, boat ramp, and commercial recreation planning. Objectives of the State Outdoor Recreation Plan expressed by the S. C. Department of Parks Recreation and Tourism generally support increased recreational facilities and access to them. Recommended policy developed by the Council for parks in the coastal zone encourages the consideration of new scenic vistas to natural shoreline areas, the analysis of the recreational potential of surplus State and Federal lands, and the encouragement of park development along utility easements and abandoned rights-of-way.

Recommended policies for the siting of marinas and boat ramps encourage consideration of landward access, parking facilities, and comparable upland facilities to enhance recreational opportunities. Recommended policy for commercial recreation would increase accessibility and discourage remote strip development by locating tourist activities in areas convenient to population centers.

Both the Federal and S. C. Coastal Management Acts require the activities of regional benefit and concerns in the national interest be considered in the management program. Activities of Regional Benefit have been defined to include "Parks — recreational areas of State or regional significance".

The protection of public recreation areas and shoreline access as valuable coastal resources is considered to

be in the national intrerest. These designations provide an additional protection for existing public access. (See Chapter III(C)(2) and (3) for a complete discussion of the management of these activities.)

6. Funding Programs

In order to increase or upgrade existing public access, various funding programs can be used. The Council strongly supports the tapping of these funding sources for this purpose.

The Heritage Conservation and Recreation Service (HCRS) is the primary source of funds to be used for acquisition, improvement, development, and planning for public recreation areas. Funds from HCRS come to the State through the South Carolina Department of Parks, Recreation, and Tourism or to localities, counties, and recreational planning districts by applying to the Councils of Government.

Section 315 of the Federal Coastal Zone Management Act, as amended in July, 1976, states that:

> "The Secretary may, in accordance with this section and in accordance with such rules and regulations as the Secretary shall promulgate, make grants to any coastal state for the purpose of ... acquiring lands to provide for access to public beaches and other public coastal areas of environmental , recreational, historical, esthetic, ecological, or cultural value ..."

The legislation also specifies that any such grant may be made for no more than 50 percent of the cost of the project. These grants may be used for improving access to existing public areas by such means as acquiring easements and providing parking areas. However, no funds have been appropriated yet by Congress under Section 315.

An additional source of funds is the collection of nominal user fees for entrance, parking, and changing privileges. These funds can be used to cover the expenses of providing parking, life guards, restroom and changing facilities and clean-up for the public area. Shuttle bus services from remote parking areas can also charge user fees to cover their expenses in conjunction with any mass transit assistance grants available.

A final, although indirect, source of funds available for increasing or upgrading public access is the tax structure. Privately-owned land may be donated to a Federal, State, or local governing body, or to a charitable organization such as the Nature Conservancy. The donor may then deduct all or a portion of the appraised value of the land from his State and Federal income taxes. Although there is no provision for a carry-over at the State level, the tax advantage may be spread out over a period of years for Federal income tax purposes.

TABLE 1

SOUTH CAROLINA BEACH SURVEY

Beach Area	Length (Miles)	Approximate width above mean high tide (feet)	(Adjacent Land) Ownership	Public Access	Comments
Waites Island	2.3	93	Private	None	Only undeveloped maritime forest/dune area in Horry County.
North Myrtle Beach	9.3	125	Private	Excellent	Densely developed; good public access but limited parking; fishing pier.
Atlantic Beach	0.3	125	Private	Moderate	Limited parking facilities; fishing pier.
Myrtle Beach	15.7	70	Private	Moderate	Densely developed; active; active tourist economy, including numerous hotels, restaurants, attractions and 29 golf courses in the area; fishing pier.
Myrtle Beach State Park	1.2	100	State	Excellent	Camping, day use area, swimming pool and fishing pier, interpretive area.
Surfside Beach	2.1	50	Private	Moderate	Limited parking; beach access-ways not marked, some blocked by private structures. Community plans to improve situation in near future.
Garden City Beach	4.0	50	Private	Limited	Highly developed; fishing pier.
Hunnington Beach State Park	3.0	70	State	Excellent	Camping, nature observation, playground, arts center.
North Litchfield Beach	1.5	75	Private	Limited	Limited access obscured by unmarked easements and prominent "No Parking" sign at entrance to island.
Litchfield by the Sea	1.0	-	Private	None	International Paper co. developing a private residential community.
Litchfield Beach	1.5	75	Private	None	8 access-ways but only 1 visible and that is prominently marked "Private".
Pawleys Island	2.5	50	Private	Limited	No public parking except some on-street, only 8 ocean access-ways.
Dubordieu Beach	2.2	50	Private	None	Controlled by a major land holder; private development on portion fronting beach, remainder undeveloped at present.
Bell Baruch Beach	11,000 ft.	50	Private	None	Private foundation, with State cooperation and research facilities.
North Island	8.0	50	State	Supervised boat only	Wildlife preserve.
South Island	1.0	100	State	Supervised boat only	Wildlife preserve.
Cedar Island	2.5	50	State	Boat only	Part of Santee Coastal Reserve.
Murphy Island	4.2	50	State	Boat only	Part of Santee Coastal Reserve.
Cape Romain Wildlife Refuge			Federal	Boat only	One of the nation's most outstanding wildlife sanctuaries; some areas designated wilderness.
Cape Island	6.0	166			
Lighthouse Island	1.5	180			
Raccoon Key	6.0	150			
Bull Island	5.7	100		Boat only	
Capers Island	1.8	50	State	Boat only	Incorporated into Heritage Trust Program. Public access is encouraged.
Dewees Island	1.8	50	Private	None	Privately owned, but State holds a scenic easement over the island.

TABLE 1 (Continued)

Beach Area	Length (Miles)	Approximate width above mean high tide (feet)	(Adjacent Land) Ownership	Public Access	Comments
Isle of Palms	6.2	100	Private	Moderate	Municipal parking lot, some on-street parking, no formally dedicated easements, fishing pier.
Sullivans Island	2.6	138	Private	Excellent	On-street parking in certain areas; good easement provisions.
Folly Island	5.2	88	Private	Moderate	Severe erosion problems; very limited public parking; fishing pier.
Kiawah Island	8.0	150	Private	Limited but good facilities	Private resort - restricted entry beyond designated public access area, fee charged.
Seabrook Island	1.8	50	Private	None	Restricted access resort.
Eddingsville Island	2.0	120	Private	None	
Botany Island	1.5	150	Private	None	
Botany Bay Island	2.5	150	Private	None	
Edisto Beach	3.0	80	Private	Moderate	Limited parking, mostly on-street; fishing pier.
Edisto Beach State Park	1.5	80	State	Excellent	One of State's most popular parks; playground, picnicing, hiking and environmental observation areas.
Pine Island	1.5	25	Private	None	
Otter Island	2.0	75	Private	None	
Harbor Island	1.5	150	Private	None	
Hunting Island State Park	3.8	70	State	Excellent	Camping, boating facilities, wildlife observation areas, etc.
Fripp Island	2.3	75	Private	None	Restricted access resort.
Pritchards Island	2.5	75	Private	None	Undeveloped.
St. Phillips Island	1.0	75	Private	None	Undeveloped.
Hilton Head Island	11.4	150	Private	Extremely limited	Moderately developed, most areas restricted to residents or guests.
Daufuskie Island	2.0	-	Private	Boat only	Access to island at public boat launch, but access across island is limited to the few public roads.
Turtle Island	-	-	State	Boat only	Wildlife Management, very poor sand beach.

SOURCE: **Public Beach Access and Recreation in South Carolina**, 1976, Hartzog, Laders & Richards. Council staff update.

TABLE 2

AVAILABLE BEACH ACCESS IN SOUTH CAROLINA

Beach	Access Points
North Myrtle Beach	36 public streets end at beach; walkways clearly marked. 117 pedestrian easements, most of which are dedicated to city or recorded on plats.
Atlantic Beach	4 beach access-ways at street endings between 29th Avenue South and 32nd Avenue South.
Myrtle Beach	Access at some street endings, limited day-visitor parking.
Myrtle Beach State Park	Freely accessible, ample parking (400 spaces for day-visitors, space for each campsite).
Surfside Beach	34 public access-ways, but none marked as public, none dedicated as easements.
Garden City Beach	
Huntington Beach State Park	Freely accessible; paved parking for 275 cars.
North Litchfield Beach	Although 6 streets and 10 footpaths end at the beach, none are marked or even clearly visible. Entrance to the island marked by "Warning: No public parking on North Litchfield".
Litchfield Beach	7 walkways and one path are shown on a plat of the community; however only 1 accessway is readily visible, and it is marked "private". No designated public parking.
Pawleys Island	Eight ocean access-ways. Public parking limited to the shoulder of the main road.

Note: State-owned North, South, Cedar, Murphy, and Capers islands are accessible by private boat only with restrictions. Federally-owned beaches are "Federally excluded lands" for purposes of coastal management.

Isle of Palms	Relatively unrestricted access, although easements have never been formally dedicated except at pier where public parking is available for approximately 600 cars.
Sullivans Island	Access at the end of almost every block, public parking allowed on all streets.
Folly Island	Relatively unrestricted access. Parking in four privately owned lots and at metered spaces for approximately 275 vehicles.
Kiawah Island	Public access provided in designated area of the island only. Bath house facilities and parking for 160 cars available.
Edisto Island	Access between every 3 to 5 lots via unmarked footpaths. On-street parking available.
Edisto Beach State Park	Readily accessible. Parking facilities for 250 vehicles.
Hunting Island State Park	Readily accessible. Parking facilities for approximately 400 vehicles.
Hilton Head Island	Limited public access at some street ends.

SOURCE: **Public Beach Access and Recreation in South Carolina**, 1976, Hartzog, Lader and Richards.

TABLE 3

COASTAL BOAT LANDINGS

NAME	BODY OF WATER	PUBLIC	COMMERCIAL
A. Beaufort County			
Sugar Hill Boat Landing	Sugar Hill Creek	X	
Combahee Boat Ramp	Combahee River	X	
Wimbee Creek Boat Landing	North Wimbee Creek	X	
Beaufort County Boat Ramp	Whale Branch	X	
Beaufort Co. Boat Ramp	Broad River	X	
Beaufort Co. Boat Ramp	Battery Creek	X	
Beaufort Co. Boat	Battery Creek & Beaufort River	X	
Beaufort C. Boat Ramp	Brickyard Creek	X	
Sam's Point Boat Ramp	Lucy Point Creek	X	
Beaufort Co. Boat Ramp	Factory Creek	X	
Beaufort Marina	Factory Creek		X
St. Helena Is. Boat	Beaufort River	X	
Harbor Island Boat Landing	Harbor River	X	
St. Helena Boat Landing	Capers Creek	X	
Russ Point Boat	Fripp Inlet	X	
St. Helena Boat	Station Creek	X	
Fort Freemont	Beaufort River	X	
Chechessee River Boat Landing	Chechessee River	X	
New River Boat Dock and Float	New River	X	
Alljoy Ramp	May River	X	
Beaufort Co. Boat Ramp	Broad Creek	X	
Broad Creek Marina	Broad Creek		X
Bluffton Boat Ramp & Landing	May River	X	
Buckingham Landing	Mackay Creek	X	
Jenkins Island	Skull Creek	X	
Johnson Creek Boat Landing	Johnson Creek	X	
Butchers Island Boat Landing	Wards Creek	X	
Pigeon Point Boat Landing	Beaufort River	X	
Freedom Mall Boat Landing	Beaufort River	X	
Fort Frederick Boat Landing	Beaufort River	X	
Downtown Marina of Beaufort	Beaufort River		X
Daufuskie Island County Float & Dock	New River	X	
Paige Point Boat Landing	Huspah Creek	X	
Harbor Town Marina	Calibogue Sound		X
Hilton Head Harbor	Intracoastal Waterway		X
South Beach Marina	Calibogue Sound		X
Marsh Harbor Marina	Broomfield Creek		X
B. Berkeley County			
Somerset Point	Lake Moultrie		X
Camp Moultrie	Lake Moultrie		X
Wilsons Landing	Lake Marion		X
Bonneau Beach Resort	Cooper River		X
Lions Beach Recreation Park	Lake Moultrie	X	
Rembert Dennis Boat Landing		X	
Cypress Gardens	Cypress Gardens Canal	X	
Cypress Gardens Landing	Cypress Gardens Canal	X	
Biggens Ramp	Tailrace Canal	X	
Speres Landing	Lake Marion	X	
Jamestown Landing	Santee River	X	
Bushy Park Landing	Cooper River	X	
Quinby Landing	Cooper River	X	
Wando Boat Landing	Wando River	X	
C. Charleston County			
Robert E. Ashley	Jeremy Creek	X	
Buck Hall	Intracoastal Waterway	X	
Moore's Landing	Intracoastal Waterway	X	
Claude W. Blanchard	Wando River	X	
Wando Woods Boat Ramp	Ashley River	X	

TABLE 3(continued)

NAME	BODY OF WATER	PUBLIC	COMMERCIAL
C. Charleston County (continued)			
Isle of Palms Marina	Intracoastal Waterway		X
Sullivan's Island	Conch Creek		X
Fisherman's Place	Intracoastal Waterway		X
Shem Creek	Shem Creek	X	
J. Mitchell Graham	Cooper River	X	
Remley's Point Boat Landing	Cooper River	X	
Paradise Island Boat Ramp	Wando River	X	
Ralph N. Hendricks	Wando River	X	
Norton Bridge	Ashley River	X	
Municipal Yacht Basin	Ashley River	X	
Brittle Bank Park	Ashley River	X	
Pierpoint Boat Ramp	Church Creek	X	
Rantowles Boat Ramp (Bulow)	Rantowles Creek	X	
Lloyd Flemming (Plymouth Ave.)	Wappoo Creek	X	
R. E. Seabrook	Wappoo Creek	X	
Penny Creek	Penny Creek		X
Stono Marina	Stono River		X
Limehouse	Stono River		X
J. F. Seignious	Folly River	X	
Battery Island	Stono River	X	
Cherry Point	Bohicket Creek	X	
Dahoo Bridge	Dahoo River	X	
Fontains	Big Bay Creek		X
Flowers Sea Food	Big Bay Creek		X
Willtown Boat Ramp	Edisto River	X	
Edisto Island Boat Ramp	Edisto River	X	
Prison Farm Boat Ramp	Ashley River	X	
D. Colleton County			
Mars Old Field Boat Landing	Edisto River	X	
Good Hope Boat Landing	Edisto River	X	
Long Creek Boat Landing	Edisto River	X	
Sullivans Boat Landing	Edisto River	X	
Lowndes Boat Landing	Edisto River	X	
West Bank Boat Landing	Edisto River	X	
Public Boat Landing	Combahee River	X	
Cuckolds Creek Boat Landing	Cuckolds Creek	X	
Field Point Boat Landing	Combahee River	X	
Wiggins Boat Landing	Old Chechaw River	X	
Chessy Creek Boat Landing	Chessy Creek	X	
Price Bridge Boat Landing	Horsecreek Creek	X	
Brickyard Boat Landing	Ashepoo River	X	
Bennetts Point Boat Landing	Mosquito Creek	X	
Fee Farm Creek Boat Landing	Fee Farm Creek	X	
E. Dorchester County			
Ashley Fishing & Recreation	Ashley River		X
F. Georgetown County			
Staples Lake	Great Pee Dee	X	
Port Hill	Great Pee Dee	X	
Peters Field	Great Pee Dee	X	
Mingo Creek Bridge	Mingo Creek	X	
Cowhead	Mingo Creek	X	
Browns Ferry	Black River	X	
Rocky Point	Black River	X	
Peters Creek	Black River	X	
Shrine Club	Black River	X	

TABLE 3 (continued)

NAME	BODY OF WATER	PUBLIC	COMMERCIAL
F. Georgetown County (continued)			
Pringles	Black River	X	
Pump House	Black River	X	
Pee House	Black River	X	
Pole House	Santee River	X	
Collins Landing	Santee River	X	
South Island Ferry	Winyah Bay	X	
Belle Island Marina	Winyah Bay		X
Moultrie		X	
Boulevard	Winyah Bay	X	
Nautica Marina	Winyah Bay		X
Gulf Marina	Winyah Bay		X
Exxon Marina	Winyah Bay		X
Hazard's Dock	Winyah Bay		X
Dirleton	Pee Dee River	X	
Chapel Creek	Pee Dee River	X	
Hagley	Waccamaw River	X	
Altman's Chapel Creek	Waccamaw River	X	
Wacca Wache	Intracoastal Waterway	X	
Wacca Wache Marina	Intracoastal Waterway		X
Gulf Stream Marina	Murrells Inlet		X
Captain Dick's Marina	Murrells inlet		X
Captain Alex Marina	Murrells Inlet		X
Snug Harbor	Murrells Inlet		X
Anchor Marina	Murrells Inlet		X
Inlet Port Marina	Murrells Inlet		X
Pawley's Island (3)	Pawley's Inlet	X	
G. Horry County			
Lumber River Landing	Little Pee Dee River	X	
Punch Pole Landing	Little Pee Dee River	X	
Sandy Bluff Landing	Little Pee Dee River	X	
Gallivants Ferry Landing	Little Pee Dee River	X	
701 Bridge Landing	Little Pee Dee River	X	
Yanhannah Ferry	Great Pee Dee River	X	
S. C. 9 Landing	Waccamaw River	X	
Starr Bluff Landing	Waccamaw River	X	
Red Bluff Landing	Waccamaw River	X	
Hardees Ferry Landing	Waccamaw River	X	
Conway Marina	Waccamaw River	X	
Jackson Bluff Landing	Waccamaw River	X	
Cox's Ferry Landing	Waccamaw River	X	
Old Chimney Landing	Waccamaw River	X	
Horry Ramp	Waccamaw River	X	
Bucksport Marina	Intracoastal Waterway	X	
Socastee Bridge Landing	Intracoastal Waterway	X	
Hague Marina	Intracoastal Waterway		X
North Myrtle Beach Landing	Intracoastal Waterway	X	
Vereen Marina	Intracoastal Waterway		X
Palmetto Shores Marina	Intracoastal Waterway		X
Ron-Tom Marina	Intracoastal Waterway		X
Brainard Landing	Intracoastal Waterway		X
Campground & Marina	Intracoastal Waterway		X
Bernards	Intracoastal Waterway		X
Exxon Marina	Intracoastal Waterway		X
Gulf Stream Marina	Murrells inlet		X
H. Jasper County			
Bolan Hall Boat Landing	Bahaw Creek	X	
Dawson Landing	Coosawhatchie River	X	

TABLE 3 (continued)

NAME	BODY OF WATER	PUBLIC	COMMERCIAL
H. Jasper County (continued)			
B & C Landing	Savannah River	X	
Tutens Landing	Boyds Creek	X	
Mill-Stone Landing	Savannah River	X	
Becks Ferry Landing	Savannah River	X	
New River Boat Landing	New River	X	
Corner Lake Boat Landing	Coosawhatchie River	X	
Union Boat Landing	Union Creek	X	
Turnbridge Boat Landing	Salt Water Creek	X	
Cook Boat Landing	New River	X	
Clasglow Boat Landing	Wright River	X	
I. Beaufort County Suspended Fishing Platforms			
Mackay Creek Fishing Platform	Rt. 278 Bridge Hilton Head Island	X	
Chechessee River Fishing Platform	Rt. 170 Bridge at Chechessee River	X	
Broad River Fishing Platform	Rt. 120 Bridge at Broad River	X	
Beaufort River Fishing Platform	Hwy. 21 Bridge Lady's Island	X	
Chowan Creek Fishing Platform	Hwy. 21 Bridge at Chowan Creek	X	
Harbor River Fishing Platform	Hwy. 21 Bridge Hunting at Harbor River	X	
Johnson Creek Fishing Platform	Hwy. 21 Bridge Hunting at Johnson Creek	X	

SOURCES: South Carolina Wildlife & Marine Resources Department, **A Guide to Saltwater Recreational Fisheries in S. C., 1977.**

Waccamaw Council of Governments

Berkeley-Charleston-Dorchester Council of Governments

Lowcountry Council of Governments

E. LIVING MARINE RESOURCES

(The Living Marine Resources segment was based on an initial draft provided by the Marine Resources Division, South Carolina Wildlife and Marine Resources Department, whose contribution is appreciated.)

1. Introduction

The extensive living marine resources of the coastal zone of South Carolina are extremely important in terms of biological, economic, recreational and aesthetic values. Although some of these attributes may be evaluated in terms of dollar value or extent of utilization, many cannot, and figures currently available with respect to economic impact and numbers of people benefiting from these resources must be considered grossly inadequate to express their total worth. At present, the great majority of the State's living marine resources have not been seriously over-exploited or depleted, although public utilization and demand is increasing rapidly. The future of these resources will depend to a large extent on effective environmental management programs as well as adequate consideration of these living resources and their habitat during all stages of the state's coastal zone planning and management process.

2. Physical Environment

In order to gain a further understanding of the various relationships between the State's living marine resources and their environment, the physiography and hydrology of the coastal zone must be considered. In addition, the major ecosystems comprising the marine-estuarine system have to be examined. Brief descriptions of these physical parameters are presented below.

a. Physiography and Hydrology

The coastal plain of South Carolina extends from the sand hills in the central portion of the State to the Atlantic Ocean. It is characterized by low-lying, pine-covered sand ridges and terraces, traversed by numerous rivers. The largest of these rivers may discharge enough fresh water to significantly alter the salinity in the vicinity of the river mouth.

The South Carolina coast possesses a rich variety of habitat types, ranging from sea islands and marshlands (discussed in Chapter I) to extensive estuarine systems and the open ocean. Hydrological parameters such as salinity, turbidity (impaired water clarity due to the presence of suspended particles), and tidal range vary widely as well. Within major river systems, the effect of the tides may be noticed even beyond the range of salt water intrusion. The most dramatic effects on salinity and turbidity are produced by weather — heavy rains increase surface run-off, leading to an influx of fresh water and sediments into the estuaries. Recent examples of this phenomenon include the snows during February, 1973, and the heavy summer rains of the same year. Turbidity is also increased by the presence of extensive agriculture.

b. Ecosystem Types

Coastal environments may be divided into three ecosystem types, defined and delineated on the basis of salinity. These three are the marine, maritime and estuarine systems.

Coastal Marine Ecosystem

Physical Description

The marine ecosystem may be defined as the oceanic environment wherein salinities do not fall (or rarely fall, as in the case of areas adjacent to major river systems) below 30 parts per thousand. (This means that the quantity of dissolved salts in the sea water does not fall below 30 parts per thousand.) The boundary between the marine ecosystem and the more inland maritime ecosystem is the extreme front beach high water line measured at spring tides. The estuarine/marine boundary is determined by drawing a line from headland to headland across a river mouth, bay, lagoon, or other estuarine environment.

Flora and Fauna

Life within the deep ocean is sparse; in fact, the area is often characterized as a biological desert. In contrast, the waters of the territorial seas (lying within 3 miles of shore and covering the inner continental shelf) are teeming with plant and animal life. Habitats such as reefs, banks, dropoffs and areas where currents converge are particularly rich due to the high nutrient concentrations present there.

The coastal marine ecosystem is comprised of two major subsystems, the subtidal and the intertidal. The former extends from the lowest point of the spring tides to the edge of the continental shelf — in other words, the subtidal environment is strictly aquatic.

Plants occurring in this zone include a variety of forms of plankton (microscopic plants and animals which drift in the surface currents) as well as bacteria, fungi, benthic algae, and floating Sargassum, which gives its name to the famed Sargasso Sea. Planktonic plants are very important as primary producers, and bacteria and fungi play an important role as decomposers. Detritus is considered important in the food chain of nearshore areas but much less so further offshore.

Many different groups of animals are represented in the coastal marine ecosystem. The zooplankton (the animal component of the plankton) are quite diverse, and include the larvae of many commercially and recreationally important species of fish and shellfish — most notably, shrimp.

Invertebrates are another important faunal group in the marine environment. (See Table 1 for a description of common invertebrates.) Among the most prevalent are crustaceans such as crabs and shrimp, polychaetes (bristle worms), mollusks, and echinoderms such as starfish and sand dollars.

Hard bottom areas, often called reefs or live-bottom areas, host a particularly diverse collection of invertebrates, including sponges, jellyfish, bryozoans and a variety of worms.

Other important species in the marine environment are the sea turtles (especially the loggerhead, which is the only true resident species in the State), the Atlantic bottle-nosed dolphin, several species of whales, and a number of bird and fish species. Most significant among the latter are spot, croaker, stardrum, kingfishes, menhaden, anchovies, spotted hake, flounder, tonguefish, bluefish, sharks, and rays.

The intertidal subsystem is alternately exposed and flooded by the tides. It represents a high stress environment, with typically strong wave and current action, wide fluctuations in salinity and temperature, and heavy predation. The few species which can survive under these harsh conditions occur in large numbers.

Sandy beaches dominate the intertidal zone of the coastal marine ecosystem in South Carolina. Most of the macroinvertebrates found in this habitat are mobile, enabling them to move with the ebb and flow of the tide, and are adapted to dynamic beach processes. Key species inhabiting the intertidal beach include burrowing amphipods, coquina clams, worms, isopods, mole crabs and ghost crabs. Fishes inhabiting the surf zone include Gulf kingfish, pompano, mullet sharks, and red drum. Nesting of Atlantic loggerhead turtles occurs on South Carolina beaches from mid-May through mid-August. Because of their size, marine mammals normally do not venture into the intertidal zone except for periodic and largely unexplained strandings, but many land mammals such as opossums, raccoons, mice, rats, bobcats, feral hogs and deer frequent the beaches.

Maritime Ecosystem

The maritime ecosystem is often called the upland ecosystem — characterized by beaches, dunes, transition shrubs and maritime forests. (See Figure 1.) The barrier islands are a major component of the maritime ecosystem in South Carolina, as are bird keys and banks.

Bird Keys and Banks

Bird keys are small isolated islands usually found in somewhat sheltered areas such as tidal inlets or bays. Their size and shape change yearly in response to tidal currents, storm damage, etc., and they are subject to frequent overwash. Because of their isolation and their proximity to food sources, bird keys and banks are ideal nesting sites for large numbers of birds. (See Table 2.) Deveaux Bank, located in the mouth of the North Edisto River south of Charleston, supports the largest colony of birds in the State. Approximately 15,000 pairs of royal terns, 5,000 pairs of laughing gulls and 1,100 pairs of brown pelicans breed here annually. (Deveaux Bank is under lease to the National Audubon Society as the Alexander Sprunt, Jr. Sanctuary.)

The plant life on bird keys and banks is primarily limited to such pioneer beach species as sea oats, panic

TABLE 1
Common South Carolina Marine Invertebrates

1. (Phylum Porifera)
Sponges — Sponges of various types and sizes are found in the coastal waters of South Carolina. They are essentially loose aggregations of radially symmetrical cells which function more or less independently. Structural support is provided by spicules embedded in the tissue.

2. (Phylum Cnidaria)
Jellyfish — Jellyfish are generally translucent, globular, and possess tentacles. Like other members of this phylum, they have a relatively simple level of tissue organization, without true organs. Food is digested in a central gastric cavity, which also fulfills the functions of a circulatory system. Food organisms are killed or stunned by batteries of stinging cells, called nematocysts.

3. (Phylum Ctenophora)
Ctenophores — (Comb jellies) These are beautiful animals which superficially resemble jellyfish. They are transparent and often irridescent, making them a spectacular sight as they swim through the water.

4. (Phylum Annelida)
Polychaete worms — These are complex segmented worms which often burrow into mud or sand. As a group, they are commonly called "bristleworms" because of their numerous apendages.

5. (Phylum Mollusca)
Mollusks are the animals which originally inhabited the shells often found cast up on the beach. They are characterized by a soft body usually contained within a hard, calcereous shell. The shell may be in one piece (gastropods such as whelks, oyster drills and snails), in two pieces (bivalves such as clams and oysters), or absent entirely as is the case of Octopi and sea-slugs (nudibranches).

6. **Class Crustacea**
The crustaceans are highly specialized invertebrates, characterized by a hard chitinous exoskeleton. The presence of this exoskeleton in turn necessitates other behavioral or structural characteristics which are diagnostic, such as periodic molting to allow the animal to grow and to mate, and jointed limbs. Common crustaceans in South Carolina include:

Copepods — tiny organisms, often found in the zooplankton, which feed directly on the primary producers and are in turn a direct food source for some of the largest marine dwellers — notably the blue whale and the basking shark.
Barnacles — colonial animals whose hard white shells are often seen blanketing rocks, pilings and hulls of ships. Barnacles close their shells tightly when they are left exposed by the receeding tide, opening them again only when the incoming tide has covered them.
Amphipods and Isopods — These two groups are similar in that both are largely bottom scavengers which resemble miniature shrimp, yet are poor swimmers.
Decapod Crustaceans — This group includes the most familiar invertebrates — the crabs, shrimp, prawns, and lobsters.

7. (Phytlum Bryozoa)

Bryozoa—(Moss animals) Bryozoa are tiny animals with boxlike shells of hardened cuticle. They are colonial, and may encrust rocks, shells, etc. like barnacles or may form branching colonies resembling coral.

8 . (Phylum Brachiopoda)

Brachiopods — Brachiopods resemble clams or similar mollusks, in that they possess a bivalved shell. However, the animal which inhabits the shell is a member of a different phylum than the mollusks.

9 . (Phylum Echinodermata)

The echinoderms are characterized by radial symmetry based on five radiating arms or canals, and by rough or spiny coverings. (''Echinoderm'' means ''spiny-skinned.'') The echinoderms move by means of tube feet filled with water, which also carry food particles into the central oral cavity. Most common in South Carolina's waters are the starfish, sea urchins (which resemble green or purple pincushions) and sand dollars.

FIGURE 1

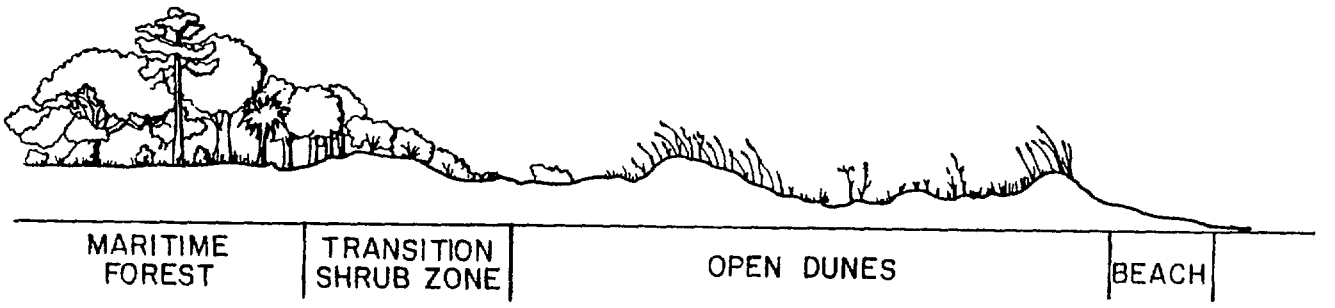


Figure 1. A profile of the maritime ecosystem.

Source: S. C. Wildlife & Marine Resources

TABLE 2

Species of colonial nesting birds which breed on South Carolina keys and banks.

DOMINANT		
Royal Tern	PR	
Laughing Gull	PR	
Brown Pelican	PR	
Louisiana Heron	PR	
Snowy Egret	PR	

MODERATE		
Black Skimmer	PR	
Gull-billed Tern	SR	mid-March - mid-Sept.
Sandwich Tern	SR	April - November
Oystercatcher	PR	
Common Egret	PR	

MINOR		
Least Tern	SR	mid-March - late Oct.
Common Tern	PR	
Caspian Tern	PR	
Wilson's Plover	SR	March - Oct.
Cattle Egret	PR	
Glossy Ibis	PR	
Little Blue Heron	PR	
Willet	PR	

KEY:
- U - Uncommon, small numbers irregularly
- PR - Permanent resident, present year round
- WR - Winter resident
- SR - Summer resident

SOURCES:
- Sprunt and Chamberlain, 1949 and 1970.
- Forsythe, In Press.
- **Audubon Field Notes**, 1967 - 1977.
- Chamberlain, 1968.

grass, and saltmeadow cordgrass (**Spartina patens**), although in some cases smooth cordgrass (**Spartina alterniflora**) or even wax myrtle may develop.

Upland and Barrier Island Flora and Fauna

The biota of upland areas is significantly different from more inland communities due to the influence of salt spray from the marine environment.

Dune communities most obviously exhibit the effects of intensive salt spray, being completely treeless. Plant zonation on maritime dunes is directly dependent on the intensity and angle at which salt spray strikes the dune face. Table 3 illustrates five easily discernable floristic zones found in South Carolina's maritime dunes. Zone 1 is commonly referred to as the strand line; here sea rocket, seabeach orach, beach elder, and Russian thistle are common. Zone 2, the foreslope of the foredune, is dominated by sea oats and other plants that can tolerate high intensities of salt spray. Zone 3 is the backslope of the foredune where the influence of salt spray is less intensive as indicated by the number of common species present. Zone 4, the dune field, is low enough to avoid intensive salt spray and exhibits the highest diversity of the dune zones. Salt spray intensity is again high on the foreslope of the rear dunes — Zone 5. Zone 6 marks the beginning of the transition shrub zone.

The transition shrub zone is dominated by woody plants, indicators of the decreasing intensity of salt spray. The structure of this community is characteristically sheared, sloping up to the canopy of the maritime forest. (See Figure 1.) Wax myrtle, live oak (dwarfed), French beautyberry, and yaupon holly are trees and shrubs commonly found in this community. Cat brier and pepper vine are vines that are found growing over the top of the transition shrub thickets. The salt spray limits the growth of the trees in the transition shrub zone. Although this zone has the appearance of a young community, it has been determined that dwarfed live oaks less than 6 inches in diameter may be as old as 120 years.

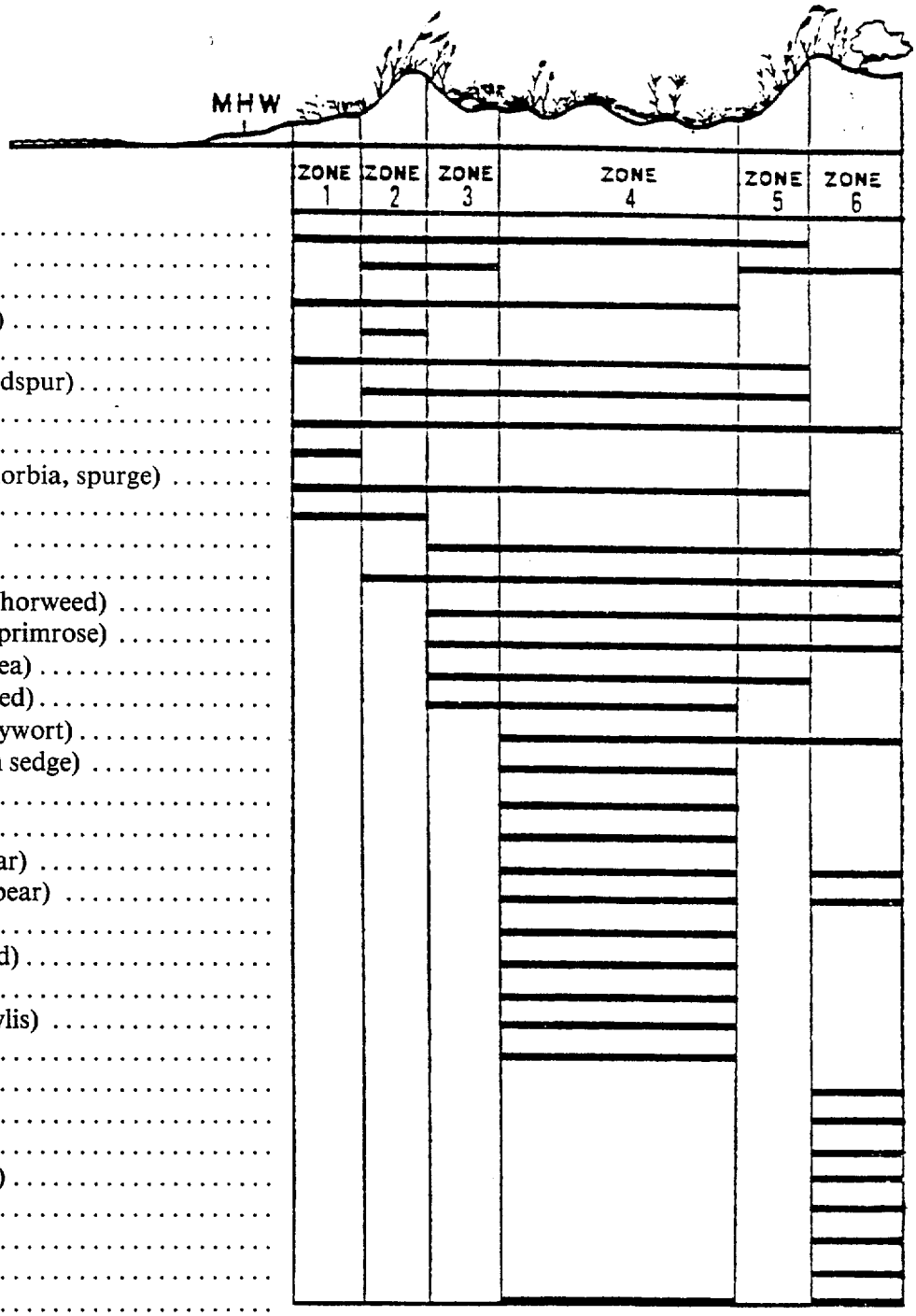
The maritime forest is the next floristic zone found as one moves inland from the dunes. Several communities are present within this zone, with the characteristic canopy species being: live oak, palmetto, laurel oak, loblolly pine, and magnolia. Red bay and yaupon holly are the most commonly-encountered understory species.

Along the rear of the barrier islands another transition zone often separates the maritime forest from the irregularly-flooded salt marsh. Many of the plants found in the dune-forest transition shrub community are found here, along with sea myrtle, southern red cedar, and marsh elder.

The fauna of dune communities is dominated by the ghost crab, the six-lined racerunner, the eastern mole, the Savannah Sparrow, the Ground dove, the Least tern, the Nighthawk, and the Tree swallow. Common Fauna of maritime forest and shrub communities include the Carolina Wren, the Boat-tailed Grackle, the Painted Bunting, the narrow-mouthed toad, the southern toad, the green treefrog, the eastern cottonmouth, the black racer, the mud turtle, the American alligator, the grey squirrel, the bobcat, the raccoon and the White-tailed deer.

TABLE 3

GENERALIZED ZONATION OF COMMON SOUTH CAROLINA DUNE PLANTS



MHW - Mean High Water

SOURCES: Coker (1905), Hosier (1975), Pinson (1973), and Stalter (1974).

Physical Description

The estuaries — the sheltered waters of the bays, lagoons and tidal rivers — are the richest of the coastal ecosystems, due to a combination of the following factors.

1. **Shelter** — wave action is subdued, and nutrients are retained, permitting plants and shellfish larvae to attach and flourish.

2. **Depth** — Shallow estuarine waters permit marsh plants to grow, improve water circulation and discourage entry by oceanic predators. They may allow greater light penetration and consequently increased photosynthesis. However, in many areas of South Carolina the turbidity found in shallow waters may negate this benefit.

3. **Salinity** — Fresh water flow from rivers dilutes the saltwater, leading to an especially diverse flora and fauna adapted to estuarine conditions.

4. **Circulation** — The combination of fresh water outflow, salinity gradients and tides creates conditions which are essential for suspended plant and animal life, which in turn support more advanced forms of animal life.

5. **Tide** — The tides bring in some nutrients, aid in exchange of dissolved gasses and transport suspended life into the estuaries, and in turn, carry other nutrients, often in the form of decaying plant and animal life (detritus) out into the open water.

6. **Nutrient storage and cycling** — Marsh grasses and other vegetation are highly effective nutrient storage mechanisms; the physical structure of an estuary also contributes to retention and rapid turnover of nutrients. (Clark, p. 29-30.)

Because of this unique combination of factors, estuaries are not only the most productive of coastal ecosystems, but the most vulnerable to outside disturbances. Consequently, special attention must be given to man's impacts on the delicate balance of factors present in the estuaries.

The estuarine ecosystem can be further subdivided into three major subsystems — (1) subtidal; (2) intertidal (comprised of flats, salt and brackish marshes); and (3) coastal impoundments. Each of these regions has its own characteristic plant and animal life. Zonation is further complicated by the presence of pronounced salinity gradients resulting from the mixture of salt and fresh water. Thus, certain species found in the lower reaches of an estuary may not be found in the uppermost areas and vice versa.

Subtidal Flora and Fauna

In spite of the often turbid waters in South Carolina's estuaries, plankton numbers and biomass may be high. Among the more abundant animals present in the zooplankton are copepods and the larvae of a number of other invertebrates, including barnacles, mollusks, polychaete worms, shrimp and crabs. The larval segment of the plankton is particularly important since over 85% of the landings (by weight) of commercial fisheries are either estuarine species or those which inhabit the estuaries at some stage of their life cycle.

Common macroinvertebrates include burrowing amphipods, polychaetes, and oysters, which occur both in large numbers and in a variety of species. Swimming (nektonic) invertebrates include crabs, shrimp and squid.

Fishes of the estuarine subtidal ecosystem include species such as star drum, bay anchovy, Atlantic croaker, spot, weakfish, silver perch, white catfish, hake, menhaden, hogchoker, striped mullet, striped bass, and white perch.

The diamondback terrapin is the only resident reptile of estuarine areas, although loggerhead turtles, alligators, and some snakes may also be encountered on occasion. The most common aquatic mammals frequenting estuarine waters include the bottlenosed dolphin and the river otter. Rarely, harbor seal and West Indian manatee are observed in estuarine waters of this State.

Intertidal Flora and Fauna

The estuarine intertidal environment is made up of sand and mud flats interspersed with broad expanses of salt and brackish marshes. Smooth cordgrass (**Spartina alterniflora**) dominates the regularly flooded "low marsh," while vegetation in the high marsh is a mixture of several grasses, forbs, and rushes. (See Figure 2.)

Giant cordgrass, bulrushes and cattails are very common in the brackish marshes, while giant

cutgrass and wild rice are frequently found along the transitional zone from brackish to freshwater marsh.

Estuarine intertidal environments are highly productive. Researchers have pointed out that in salt and brackish marshes, an intricate web of nutrients and energy holds together the ecosystem. Smooth cordgrass (living and decomposing), phytoplankton, and mud algae are all food producers in the estuarine intertidal environment. Herbivores (e.g. the salt marsh grasshoppers) and detritus-feeders (e.g. fiddler crabs) are consumers of these primary producers. In turn, the herbivores and detritus-feeders are themselves consumed by birds and mammals.

Common invertebrates in the intertidal region include grasshoppers and mosquitos, the marsh periwinkle, mud snails, oysters, ribbed mussels, polychaetes and fiddler crabs. Vertebrate life is dominated by the Carolina diamondback terrapin, the green heron, the common egret, the long-billed marsh wren, the great blue heron, the seaside sparrow, the clapper rail, the raccoon, the mink, the rice rat, the marsh rabbit, and the river otter.

Flora and Fauna of Impoundments

Impoundments with salinities that average greater than 0.5 o/oo are generally considered to be estuarine impoundments. Most impoundments are former rice fields in which dikes and water control structures have been maintained. Impoundment managers usually regulate water level and salinity to produce plant growth that will maximize waterfowl utilization, although salinity is regulated for maricultural purposes in some impoundments.

The dominant plants of carefully managed estuarine impoundments are: widgeon grass, salt marsh bulrush, and dwarf spikerush. Other common plants that are desirable for waterfowl management are: sago pondweed, dotted smartweed, muskgrasses, softstem bulrush, and common three square. Impoundment managers use several methods to produce dominance of the desired plant species. Cyclical fluctuations in water level favor dominance by salt marsh bulrush and dwarf spikerush; slow-rising water levels and permanent flooding both favor widgeon grass.

Birds, especially ducks and wading birds, dominate the fauna of estuarine impoundments. Table 4 lists the birds of South Carolina estuarine impoundments, giving the abundance and seasonal occurrence of each species.

Other fauna of estuarine impoundments include lower invertebrates and higher invertebrates such as oysters, the blue crabs, fiddler crabs, various species of shrimp, and mud crabs. Many species of fish are introduced into impoundments through flood gates (59 species of marine and estuarine fish have been identified in estuarine impoundments in South Carolina); however, the few that are year-round residents of impoundments include mummichog, sheepshead minnows, mosquitofish, sailfin molly, and silversides.

In estuarine impoundments with low salinities, the threatened American alligator is found. Raccoons and otters are the most common mammals of estuarine impoundments.

FIGURE 2

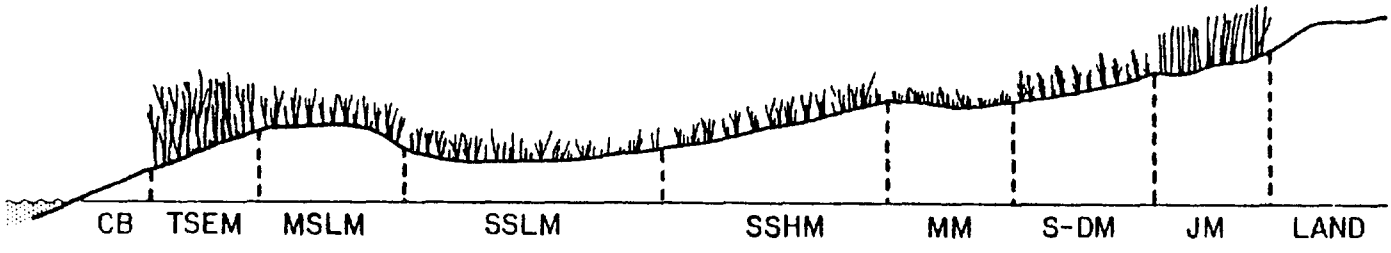


Figure 2. Diagram of salt marsh types. CB = Creek Bank, TSEM = Tall Spartina Edge marsh, MSLM = Medium Spartina Levee marsh, SSLM = Short Spartina low marsh, SSHM = Short Spartina High marsh, MM = Minax marsh, S-DM = Salicornia-Distichlis marsh, JM = Juncus marsh.

Source: S. C. Wildlife & Marine Resources Department

TABLE 4

Birds of Estuarine Impoundments in South Carolina

DOMINANT			MODERATE		
Pied-billed Grebe	PR		Horned Grebe	WR	
Great Blue Heron	PR		Green Heron	PR	
Louisiana Heron	PR		Little Blue Heron	PR	
Great Egret	PR		Black-crowned Night Heron	PR	
Snowy Egret	PR		Least Bittern	SR	March - September
White Ibis	PR		Glossy Ibis	PR	
Blue-winged Teal	WR	August - May	Mallard	WR	September - April
Balpate	WR	November - April	Black Duck	WR	September - April
Scaup	WR	October - April	Gadwall	WR	October - April
Buffle-Head	WR	November - April	Pintail	WR	September - April
Hooded Merganser	WR	November - April	Green-winged Teal	WR	October - April
Red-breasted Merganser	WR	October - April	Shoveler	WR	October - March
Clapper Rail	PR		Ring-necked Duck	WR	October - April
American Coot	PR		Ruddy Duck	WR	October - April
Spotted Sandpiper	PR		Virginia Rail	WR	August - March
Willet	PR		Sora	WR	August - April
Greater Yellowlegs	PR		Common Gallinule	PR	
Herring Gull	PR		Semipalmated Plover	PR	
Ring-billed Gull	PR		Lesser Yellowlegs	WR	July - May
Laughing Gull	PR		Least Sandpiper	PR	
Forster's Tern	PR		Dunlin	PR	
Least Tern	SR	March - October	Semipalmated Sandpiper	PR	
Belted Kingfisher	PR		Western Sandpiper	PR	
			Bonaparte's Gull	WR	October - May
			Royal Tern	PR	
			Black Tern	SR	May - October
			Black Skimmer	PR	

KEY:
- PR - Permanent resident, present year round
- WR - Winter resident
- SR - Summer resident
- T - Transient

3. **Environmental Perturbations and the Impact of Man**

a. **Natural Factors**

Living marine resources may be affected by both natural and man-induced disturbances in the environment. Natural impacts include factors such as river discharge, rainfall, temperature and storms, all of which are interrelated to one degree or another.

Unusually high or low temperatures will have an obvious effect life just as they do on terrestrial life. The most recent example of the harmful effects of cold has been the massive shrimp kill occasioned by the unusually cold winter of 1977. High temperatures cause dissolved gasses to be released into the air, making respiration more difficult for aquatic life.

Precipitation may sharply increase river discharge and lead to a decline in estuarine salinities. Likewise, drought conditions can reduce river outflow to the point that salinities increase significantly. An additional problem during droughts is that pollutants present in river outfalls may not be diluted as much as they would normally be, leading to stressful conditions for estuarine organisms. In addition, residence time is increased because there is less water to carry pollutants away.

Storms — particularly hurricanes — also have a serious effect on living marine resources. Storms bring high winds, heavy rainfall, flooding, and unusually high tides, all of which disturb vegetation and bottom-dwelling organisms, and alter the aquatic environment.

b. **Man-Induced Perturbations**

Natural disturbances may be quite severe in their effects on living marine resources, yet their impact is far less than that of man-induced perturbations. Natural disturbances have been present as long as there has been life in the marine environment. As a consequence, marine life has adapted to the changes in weather and climate, and has gradually altered its mode of existence to keep pace with changes in the natural environment.

The effects of man-induced perturbations are often much more long-lived and devastating. An influx of fresh water after heavy rains and flooding may harm or even kill some estuarine species. The salts of heavy metals, to choose only one class of industrial pollutants, will harm some aquatic species immediately, and will persist in the waters of the estuary for an extended period of time, causing slow, long-term damage as well.

Duration of effect is only one crucial difference between natural and man-induced perturbations. The ability of the ecosystem to absorb and adapt to the change is another. Natural disturbances such as flooding, heavy rainfall or severe storms are simply exaggerated cases of normal events in the marine environment, and organisms have evolved mechanisms to cope with these fluctuations. Artificial perturbations, on the other hand, often introduce a foreign element into the ecosystem. Materials such as oil and mercury are not found in the marine environment except as minute traces, and even then their chemical composition differs from the form commonly utilized by man. The plants and animals of the marine and estuarine environment have had no chance to adapt to the new substance, and consequently may suffer serious harm.

Finally, the rate and intensity of natural perturbation has remained relatively constant over millennia, while the rate and intensity of man-induced perturbations is increasing steadily. As the population increases, demands for space to live, work, and enjoy leisure time increase proportionally. With these demands comes a need to dispose of wastes, obtain ever-increasing amounts of food and other essentials, and provide jobs for the expanding population. All of these functions place heavy demands on the environment, particularly in the coastal region where the attractive environment leads to accelerated development and sharp conflicts of intrest.

The cause of man-induced perturbations can be categorized as follows: transportation and shoreline modification, commercial fisheries, agriculture and silviculture, mining, recreation, urbanization and housing, industrialization, water utilization and discharge. Each of these categories will be discussed in turn below, although they are inseparable in many cases.

Transportation and Shoreline Modification

Water transport has played an important part in the development of the coastal zone, since many of our cities were established as a result of commercial activity around a harbor or sheltered bay. As populations grew, more and better facilities were needed to keep up with the increasing demands. Often, meeting the needs of water transportation interests necessitates altering the natural environment in such a way as

to have an adverse effect on the resident marine life. These adverse effects may come from water transport activities themselves, or from shoreline alterations necessary to accommodate them.

The most obvious effect of transportation on marine life is pollution, which may range from gasoline spilled at a marine to a major oil spill of **Argo Merchant** proportions. In between are "environmental insults" and as the release of human wastes from pleasure craft, non-petroleum spills (for example, detergents which may be washed from the deck of a ship into the harbor) and pollution which results from the release of cargo hold washings into the harbor.

Toxic wastes, both organic and inorganic, affect marine life in a number of ways. Plants and animals may be poisoned by foreign substances which impair or prevent respiration. The presence of petroleum may also affect animal life indirectly by blocking sunlight, poisoning or smothering the plankton in the upper layers of the water. Substantial reductions in plankton numbers may jeopardize the marine environment.

The physical presence of marine transportation also has deleterious effects on living marine resources, in that valuable living space is preempted, noise and other disturbances drive animal life away, and excessive wave action may damage plants and erode the banks upon which they live.

Of greatest concern, however, is the shoreline alteration which accompanies marine transportation. Harbors and channels must be artificially deepened and widened in order to accommodate most modern commercial vessels; jetties are often constructed in order to preserve existing channels; and completely new channels are often created.

Jetties are structures of steel, concrete or rock which are built to control the formation of sand bars in navigation channels. They extend outward from shore to a depth equal to the desired channel depth and block the passage of sand to beach areas downstream. As a result, erosion may be severe, causing a loss of plant and animal habitat and concomitant loss in ecosystem productivity. Jetties alter the flow of currents to a certain degree and change beach communities in their vicinity. On the other hand, there are several beneficial effects associated with jetties: they attract sport fish, provide a substrate for various invertebrates and enhance the movement of fish and crustaceans into estuaries.

Another class of shoreline alterations is found in the upland areas, yet has dramatic effects on the coast. These include dams and flow diversion projects. Such projects disrupt the normal flow of fresh water, sediments and nutrients into an estuary and alter the mixing and deposition patterns. Salinity may be sharply increased or decreased, changing the species composition of an estuary significantly. In the case of a dam, release of fresh water may be irregular, causing wildly fluctuating salinities. Dams restrict sediment flow, leading to beach erosion and loss of habitat, while diversion projects may increase sedimentation, necessitating extensive dredging operations in order to maintain navigation channels.

In South Carolina, the most significant alteration of the coastline resulting from an upstream project is the Santee-Cooper diversion, completed by the Public Service Authority in 1942. Before the river was diverted, the annual freshwater inflow to Charleston Harbor was 72 cubic feet/second. There was essentially no salinity gradient from surface to bottom, and mixing throughout the estuary was good. After the project was completed, fresh water inflow increased to 15,000 cubic feet/second, resulting in a significant salinity gradient with a layer of essentially fresh water covering the surface. One source has estimated that sedimentation in the navigation channel has increased from 180,000 to 10,000,000 cubic yards per year, and density currents have developed which trap solid domestic and industrial wastes. (Ketchum, p. 141.)

Species composition in the harbor and estuary has been altered over the years, due to pollution and changes in the salinity regime, from both diversion and impacts of other growth and development. Migration patterns may also be altered by river diversion, since the element which stimulates entry into a river and subsequent spawning will be far less concentrated in the old river channel and highly concentrated in the new.

The subsequent change in vegetation in the Santee River due to increased salinities was a matter of concern to duck hunters, and in some cases financial settlements with landowners were necessary. (Bohlen, in Kjerfve.) These financial losses to the area have been somewhat mitigated by the very successful clam fisheries which have developed in the estuary. A final effect resulting from the Santee-Cooper project is the gradual erosion of the Santee Delta since only 15% of the river's flow now carries sediments into the Delta. (Kjerfve, p. 51.)

The Santee-Cooper Rediversion project is projected to have mixed effects on both the Santee and Cooper River estuaries. The decrease in fresh water inflow to Charleston Harbor will probably significantly slow

shoaling, and is projected to reduce the need to dredge. On the other hand, water quality in both the harbor and the Cooper River may be further lowered, due to less efficient flushing. There is also a possibility of salt water intrusion into the Bushy Park intake canal with increasing river salinities.

The Santee Delta may eventually revert to pre-diversion conditions, with a possible halt in erosion on Cape Romain, gradual succession of **Spartina** marshes by freshwater grasses, and loss of the valuable clam fisheries. This last is considered to be the most adverse effect of rediversion. (Kjerfve, p. 53.) Other potential effects are impacts on adjacent landowners along the Santee Cooper, due to increased water flow and salinity changes, and possible detriment to the world-renowned Santee-Cooper land-locked striped bass, due to loss of their food supply.

Dredging and channelization are often carried out simultaneously, and may have several adverse environmental impacts.

Channelization may lead to reduced levels of oxygen as a result of restricted circulation which occurs when the main part of the channel is significantly deeper than the tributary channels. (Water flowing into the navigation channel from shallower streams tends to remain near the surface and will not mix with the oxygen-depleted bottom waters.) When a channel is straightened, a formerly slow, meandering fresh water flow, entering a bay or estuary, becomes a swiftly flowing stream, increasing erosion and turbidity and leading to extremely high and low salinities. Finally, because salt water is more dense than fresh, it will flow into newly created depressions and will reach further up into an estuary than had previously been the case.

The Atlantic Intracoastal Waterway, completed in 1941, typifies the changes which may accompany channelization. Salt Water intrusion has led to depleted oyster populations since their primary preditor, the oyster drill (which is restricted to high salinities), is able to move further into newly saline estuaries and marshes.

The plant population has also been altered, favoring more salt-tolerant species. The problem of erosion along the waterway is exacerbated by wave action from passing boats, causing loss of valuable marshland and a reduction in the total productivity of the estuary. Finally, the channel of the waterway must be periodically dredged in order to maintain navigability.

Dredging is detrimental to marine life because it increases turbidity, thereby interfering with respiration, feeding and photosynthesis (by reducing light penetration). This, in turn, reduces the total productivity of the ecosystem. Dredging also physically disturbs plants and animals by uprooting some plants and sessile animals and by burying others when the dredge spoil is deposited elsewhere.

Spoil deposition is by far the most damaging aspect of a dredging operation. Spoil may be dumped at sea, pumped onto beaches, marshes or other open areas, or used to fill diked upland areas. Because of the importance of marshes as food sources and nurseries, productivity of the coastal zone is impaired. The filling of impounded shallow areas may also destroy important bird and mammal habitats. Bostwick Ketchum reports that "(I)n one area of Florida, dredge and fill operations in estuaries alone are estimated to result in biological productivity losses of $14 million annually." (Taylor, J.H. and Salomon, C.H., 1968, in Ketchum, p. 135.)

Because dredge spoil is of a finer texture than most sediments in spoil deposition areas, it fills in the tiny air spaces which are found between sand grains. This, in turn, leads to anaerobic (oxygen deficient) conditions that are harmful to marine life.

Dredge spoil from harbors or polluted areas near industrial complexes may contain heavy metals, pesticides or other toxic organic materials, which, when exposed to the leaching effects of weather, may recontaminate the water. Another problem results from the presence of high concentrations of organic wastes, which lead to reduced levels of dissolved oxygen as a result of bacterial action, and may cause suffocation for marine life.

Dredging and spoil disposal may have beneficial effects for living marine resources if the process is managed properly. Buried shell may be exposed by open-water dredging, enabling new oyster reefs to develop, while the creation of artificial islands from dredge spoil may provide additional wildlife habitats. (Ketchum p. 136.) If spoil is selectively disposed of in the open ocean it may in some cases enhance bottom conditions and improve sport and commercial fishing.

Commercial Fisheries

Commercial fishery activities affect living resources directly via capture of target species and coincidental capture of non-target species. Man has already decimated or hunted into extinction populations

of many marine species, including some which were native to South Carolina. In other cases, populations may simply have been depleted due to overfishing. When declining catches indicate overfishing, the usual response is to increase the fishing effort, either by improving the efficiency of gear or by spending more time on the water. Further research into fish population dynamics should lead to a better understanding of declining catches.

Commercial activities may have devastating effects on non-target species, as evidenced by the effect tuna fishing has had on porpoise populations. In South Carolina, the most damaging incidental catch comes from the shrimp trawls, which are relatively non-species-specific. Species captured along with the shrimp are generally discarded. Of the other important target invertebrate species in South Carolina — blue crabs, oysters, and clams — only clams tend to have a degree of environmental degradation associated with their harvesting. Crabs are harvested by pot, and oysters are selectively picked, causing little disturbance to other species. The hydraulic escalator dredges used to harvest subtidal clams in the Santee estuaries disrupt bottom communities; while the direct effect on the biotic communities is believed to be localized, the secondary effects caused by increased turbidity and sedimentation may be more widespread and longer lasting.

There are a number of indirect effects associated with commercial fishing operations. Commercial docking facilities concentrate boats and are point sources of petroleum, solid waste, and domestic waste. The effects of leached chemicals from treated pilings at piers and marinas also contribute to the chronic, low concentrations of dissolved foreign materials in estuarine waters. Fish processing plants discharge waste water high in organics and particulate matter to nearby waters, causing elevated oxygen demands and eutrophication. Thus, waters near processing facilities may experience temporary depletion of dissolved oxygen and subsequent fish kills. There is also a certain amount of pollution which can be directly traced to fishing vessels from such sources as garbage thrown overboard.

Agriculture and Silviculture

Agricultural and forestry practices can significantly decrease the quality of water flowing into coastal areas and cause drastic reactions in marine life. In addition, they may alter the water runoff cycle and, in the case of agriculture, contribute to the loss of coastal wetlands. Department of Agriculture statistics (1975) report that about one-fourth of United States cropland is excessively wet, leading to pressures for land drainage and resultant loss of marsh habitat.

Cultivation and improper forestry practices may also increase sedimentation loads in rivers running into marshes and estuaries. The increased turbidity impairs sight and smell in fish and other marine animals and may interfere with respiration and feeding in bottom dwelling invertebrates.

The sediment which erodes and flows into the estuaries carries with it many excess nutrients from fertilizers and toxins from various herbicides and pesticides. Any chemical substance which kills plants and animals on land will also kill aquatic life. Insecticides, for example, produce massive fish kills and also result in mortality to fish food organisms such as insects and other invertebrates. Pesticides and herbicides can be fatal in concentrations as low as several parts per million, and concentrations of parts per billion are known to cause behavioral and reproductive abnormalities. Pesticide residues may also be concentrated in marine animals and transmitted to higher levels in the food chain. Even the effects of fertilizers are not beneficial, for the excess nutrients encourage algae blooms which block sunlight from other plants and deprive animals of necessary oxygen.

Mining

Currently there are few extractive industries in coastal South Carolina, and those that are in operation (except coquina mining) have little adverse effect on living marine resources. Mining of peat, sand, and gravel are current activities, but these are primarily land-based operations, although peat is mined from wetland areas. Coquina is mined from marsh areas near Little River, and the resulting pits experience restricted water circulation which causes low dissolved oxygen. Drainage from these pits reduces the water quality of receiving waters. The potential exists for mining phosphate and washed oyster shell, but no such operations are underway at the present time. Runoff from phosphate mines could pose problems for water quality (as experienced on Florida's southwest coast), and mining oyster shell for use in chicken feed, pet foods, cement and as a building material may conflict with the oyster industry. Oil and gas operations have yet to be realized off the South

Carolina coast; routine petroleum-related activities, however, probably have greater impact on land rather than marine life.

Recreation

Recreation is one of the only uses of the coastal zone which consumes relatively low amounts of the natural resources upon which it depends. Even though resources are "used," they are generally left unimpaired. It has been said that:

> The product of tourism and recreation is the individual experience. As such, it is composed not so much of natural goods as a psychological impact. Therefore, what one experienced today may be replicated day after day by thousands more with virtually no decay in the resource. (Ketchum, p. 93.)

An obvious exception to this rationale is the "consumption" of beach front property by hotels, campgrounds and other recreational facilities. In addition, certain recreational uses, such as power boating, do impair the coastal environment. Noise pollution, harrassment of fauna and/or other people, and degradation of water quality as a result of necessary support facilities are all unfortunate side effects of the use of power boats.

The importance of water-oriented recreational activites to coastal communities cannot be overstated. Recreation and tourism often rank at least third in terms of income for even large, diversified, urban economies. In many of the non-industrialized areas of the coastal zone, they may be of even greater importance. However, every effort must be made to mitigate the effects of recreation and tourism on the marine environment, for if the living resources of the coastal zone are impaired, the recreational value of the area will be correspondingly degraded.

Urbanization and Housing

Population pressures on the coastal zone have increased dramatically during the preceeding decades, with even greater increases expected in the future. Figures for the entire United States show that while coastal (particularly estuarine) areas have only 15% of the land area, they now have about 33% of the population. Obviously, this creates a need for housing. In addition, land will be needed for commerce, industry, transportation terminals, recreation, and waste disposal facilities.

The U. S. Department of the Interior estimated that as of 1975 the leading cause of loss of estuarine areas was the construction of housing developments. (Ketchum, p. 104.) Marshland may be filled to increase land available for waterfront housing, causing a direct loss of habitat for marsh flora and fauna. In addition, pesticides used to make formerly swampy areas more pleasant for their human inhabitants inflict severe penalties on the original residents. Toxic run-off from driveways and streets contributes to the harmful impact of housing developments on living marine resources; paradoxically, it is the cessation of nutrient-rich run-off from the marshes which may have the most detrimental effect on the estuaries.

In addition to the direct effects brought on by population increases in the coastal zone, there are several secondary effects which will be discussed below. One of these is an increase in the extent and degree of industrial development, brought about in part by the need for goods and in part by the need for jobs near population centers. Another is the fact that waste disposal and water use problems increase at an even faster rate than housing and industrialization.

Industrialization

Industries tend to concentrate in the coastal zone because of readily available water. Although industries vary widely in their effect upon the environment, such problems as oil spills, pollution by toxic chemicals, air pollution and waste disposal are endemic to industrialized areas and affect water and air quality.

Oil, as has been noted elsewhere, is damaging to marine life not only because of its inherent toxicity but because it smothers both flora nad fauna and blocks sunlight necessary for plant photosynthesis. Air pollution is primarily damaging to marine plants, although air borne deposits may harm zooplankton as well. Industrial water use and discharge practices may, however, be the most detrimental to marine life.

Water Utilization and Discharge

As noted above, many industries locate in the coastal zone in order to take advantage of abundant water supplies. If water is used as a raw material (in other words, not returned to the ecosystem) the mixture of fresh and salt water in the estuary will be altered, causing a change in the species composition of the area. Of particular pertinence to coastal South Carolina has been the diversion of water from the Santee River to the Cooper River for hydroelectric power generation. This diversion resulted in reduced flow of fresh water into the Santee estuaries, causing salt-water intrusion. In the Cooper River, estuarine conditions were displaced seaward, reducing the area suitable for strictly marine organisms. The magnitude of these changes on the fauna and flora cannot be assessed, however, because no surveys of aquatic biota were conducted prior to diversion. Dead cypress trees standing on the banks of the North and South Santee Rivers are mute testimony to the effects of salt-water intrusion on this fresh-water species.

More common, however, is the return of altered water to the ecosystem. The use of coastal waters for cooling by industry and power-generating plants results in thermal pollution, especially when the power plant is a nuclear-fueled one. Thermal pollution results in lowered species diversity and subsequent loss of ecosystem stability. Temperature increases can also result in substantial alterations in the behavior of affected biota because water temperature may be a cue to organisms to migrate or to reproduce. Elevated water temperatures are known to cause developmental abnormalities in larval fish and to stress adult populations. Also, oxygen solubility decreases with increasing water temperature. In addition to physiological stresses, plankton, larvae, fish, and fish eggs may be killed directly by being drawn against intake screens or by drastic pressure changes once inside the cooling system. The loss of plankton is particularly detrimental since it may imperil the entire food web. The proposed offshore nuclear-fueled power generating plants may have drastic effects on nearshore biota as well.

Effluents from heavy industry result in acute as well as chronic sources of pollution. Such effluents often contain complex metallic and organic compounds which resist biodegradation and are highly toxic. These compounds may be discharged in dilute concentrations, but because of their nature they are assimilated into the food web and undergo biological amplification with each consumer level.

Increasing levels of water pollution in marine waters not only destroy the suitability of the habitat and kill marine life directly, but produce abnormalities. The abnormalities include reduction in weight, external lesions, exophthalmia, neoplasms, fin rot, jellied flesh, behavioral changes, morphological peculiarities, and reduced fertility.

Paper mills have been a primary source of industrial pollution in coastal areas. Effluents of paper mills can drastically alter the pH, dissolved oxygen, and turbidity of receiving waters and thus affect marine life directly and indirectly. Characteristically, pulp mill effluent exerts high demands on dissolved oxygen, and the suspended materials it contains reduce light, thereby inhibiting photosynthetic processes. Suspended materials may also settle out, forming sludge banks which render the bottom substrate unsuitable for benthic organisms. Finally, pulp-mill wastes have direct toxic effects upon the biota; especially damaging is the alkaline effluent which contains hydrogen sulfide, mercaptans, resin acids and soaps. The effluents may reduce surface tension of receiving waters and cause increased foaming although this has been alleviated by the use of settling ponds and aeration prior to discharge.

Nuclear reactors, fuel fabrication plants and reprocessing plants may cause water pollution in the form of radioactive materials released to the environment. There are two sources of radioactive contamination which may become problems in the coastal zone: tritium, which is released to the environment from reactor operation and fuel reprocessing, and plutonium. While tritium does not accumulate in living tissue, to any degree, and is of relatively low toxicity, plutonium is long-lived and extremely dangerous. Other sources of radioactive contamination include collisions of nuclear ships or submarines, collisions involving ships carrying nuclear wastes, and accidental releases from power plants. (Ketchum, p. 171.)

Radioactive materials released into coastal waters may produce four broad types of effects: physical damage or death among marine organisms, increasing rates of genetic mutation, increases in rate of growth and maximum size of organisms, and a reorientation of human uses of estuaries.

Urbanization is another cause of water pollution. In general, discharge of domestic sewage enriches the water's nutrient load not unlike fertilization from agricultural runoff, with one major difference. Whereas agricultural runoff predominates only during rainy periods, domestic discharge is relatively constant

(or increasing) regardless of water conditions. Urbanization of coastal areas results in greater discharge rates, and the estuary and nearshore waters may continue to be the ultimate jump of sewage and slump discharges in the foreseeable future. These discharges contain not only nutrients which encourage eutrophication but also coliform bacteria and pathogenic viruses. Pathogenic organisms disperse outward from the point of waste discharge and either die or are consumed by filter feeding animals such as oysters and clams. Many productive shellfish beds are closed to harvesting because of domestic pollution which may contain pathogens causing typhoid, dysentery, jaundice or intestinal viruses such as infectious hepatitis. Areas closed to shellfish harvesting exist around Myrtle Beach, Murrells Inlet, Charleston, Beaufort, and Savannah. (See Table 5.)

Urban run-off is also a source of water pollution. Drainage from streets, service stations, and residential areas contains many organic and inorganic compounds toxic to marine life. Fallout from industrial airborne emissions, automobile exhaust, tire particles on highways, and leached materials from solid waste disposal sites are a few of the sources of pollutants found in urban runoff.

4. Commercially Significant Living Marine Resources

The principal commercial contribution of living marine resources to the coastal economy comes from the fishing industry. The major marine fishery resources occuring within South Carolina's coastal zone can be classified into three major types: (1) molluscan shellfish (oysters and clams); (2) crustaceans (shrimp and crabs); and (3) coastal finfish. Table 6 presents data on the commercial landings and values of these resources during the past several years in South Carolina. The following sections summarize the life histories, commercial and recreational significance, and present condition of these major marine fishery resources.

a. Molluscan Shellfish Resources

1) Oysters

Biological Aspects:

The Eastern or American oyster, **Crassostrea virginica,** is found in the marine and estuarine areas of South Carolina. This popular bivalve is found primarily in the intertidal region (i.e., the zone between high and low tides) and usually reaches market size (over three inches in length) in two years.

In late spring, when the water temperature reaches about 70° F., the oyster begins to spawn. Both sperm and eggs are released directly into the water. Usually each oyster functions as a male during its first two spawning seasons; afterwards, it may function as a female and may even alternate sexes. Fertilization is a chance union between sperm and eggs in sea water. A single female may produce a hundred million eggs in spawning, but many millions of these eggs are never fertilized. One or two days after fertilization, each egg enters the larval stage. About two weeks later, the larva develops a pair of transparent shells called valves. At this stage, it is now ready to find a firm surface to which it will attach. If a place for attachment is not found, the larva soon sinks to the bottom and dies. When a suitable place is found, the larva, now called a "spot," ejects a sticky fluid that cements the left shell to the place where it will remain for the rest of its life. Old oyster shells appear to be preferred "cultch" or resting place for the larva.

Finding the correct spot is particularly important because the oyster is a filter feeder, obtaining its food by drawing water through its gills which retain the edible material and pass it into the animal's mouth.

South Carolina oysters have a wide variety of shapes and sizes, but the most common type in South Carolina is the "cluster oyster" which is formed by successive yearly sets on the older intertidal oysters. Historically, steam canneries have preferred these cluster oysters because they can be more economically harvested and processed.

Another type of growth pattern found in South Carolina is the subtidal or deep water oyster which, as the name implies,spends its entire life submerged in water. Due to the subtidal oyster's high meat yield and shape, it is considered highly desirable without processing (e.g. half shell servings). Unfortunately, due to adverse conditions such as predators and an unstable substrate, these oysters comprise only a fraction of South Carolina's oyster resource.

TABLE 5

SUMMARY OF FISCAL YEAR 1978 AND 1976 SANITARY SURVEY OF SOUTH CAROLINA'S COASTAL WATERS

Segment Name	Best Use Classification	1978 Sanitary Shellfish Harvest Status	1976 Sanitary Shellfish Harvest Status
Little River Inlet	SA	Restricted (Relaying Only)	Prohibited 1968
Cherry Grove/Log Inlet	SA	Approved	Approved
Singleton Swash	SA	Restricted	Approved
Whitepoint Swash	SA	Restricted	Approved
Withers Swash	SA	Prohibited	Approved
Murrells Inlet	SA	Conditional Approval	Approved
North and South end public shellfish grounds,		Restricted	Approved
Parsonage Creek, and all other waters adjacent		Restricted	Prohibited 1971
to mainland		Restricted	Approved
Midway Inlet	SA*	Prohibited	Prohibited 1968
North behind Litchfield Beach			
South behind Pawleys Island to Pawleys Inlet		Approved	Approved
North Inlet	SA*	Approved	Approved
Oyster Bay	SA*	Restricted	Restricted 1970
Sampit River	SC	Prohibited	Prohibited 1964
Winyah Bay	SB	Restricted	Restricted 1964
Mudd Bay	SB*	Restricted	Restricted
AIWW (Winyah Bay to South Santee River)	SA	Restricted	Restricted 1968
Santee Bay (North & South)			
from HWY 17 to 1000 ft. below the AIWW	SB	Restricted	Restricted 1968
Santee Bay (North & South)			
from 1000 ft. below AIWW to Atlantic Ocean	SA	Approved	Approved
Cape Romain and Bull Bay	SA	Approved	Approved
AIWW	SA	Approved	Approved
Jeremey Creek	SA*	Prohibited	Prohibited 1968
Awendaw Creek	SA*	Conditional	Approved
Tibwin Creek	SA*	Conditional	Approved
AIWW (Andersonville to Goat Island)	SA	Approved	Approved
AIWW (between Goat Is. & Isle of Palms)	SA	Prohibited	Prohibited 1970
Seque Bay	SA*	Approved	Approved
Bull Harbor	SA*	Approved	Approved
Mark Bay	SA*	Approved	Approved
Copahee Sound	SA	Approved	Approved
Bullyard Sound	SA*	Approved	Approved
Hamlin Sound	SA	Approved	Approved
Grays Bay Sound	SA	Approved	Approved
All creeks and marshes of			
Prices Inlet	SA*	Approved	Approved
Capers Inlet	SA*	Approved	Approved
Dewees Inlet	SA*	Approved	Approved

TABLE 5 (Continued)

Segment Name	Best Use Classification	1978 Sanitary Shellfish Harvest Status	1976 Sanitary Shellfish Harvest Status
All waters of Breach Inlet Estuary	SA*	Approved	Prohibited 1970
including: Hamlin Creek	SA*	Approved	Conditional
Swinton Creek	SA*	Approved	Conditional
Inlet Creek	SA*	Approved	Prohibited
Conch Creek	SA*	Approved	Prohibited
AIWW	SA	Approved	Conditional to Breach Inlet & prohibited to Ben Sawyer Bridge
to within 1000 ft. of Sullivans Island causeway and Ben Sawyer Bridge			
AIWW (1000 ft. above Ben Sawyer Bridge through Charleston Harbor)	SC	Prohibited	Prohibited 1970
"The Cove"	SC	Prohibited	Prohibited 1970
Wando River (headwaters to and including Duchman Cr. and Horlbeech Cr.)		Conditional Approval	Prohibited 1970
(from Duchman Cr. & Horlbeech Cr. to Cooper River Bridge)		Restricted	Prohibited 1970
Charleston Harbor & Cooper River	SC	Prohibited	Prohibited 1970
Shem Creek	SC	Prohibited	Prohibited 1970
Charleston Harbor & Ashley River	SC	Prohibited	Prohibited 1970
Schooner Cr. & bay between Fort Sumter & Cummings Point on Morris Island	SC*	Prohibited	Prohibited 1970
James Island Creek	SC*	Prohibited	Prohibited 1972
Wappoo/Elliott Cut	SC*	Prohibited	Prohibited 1972
AIWW (Charleston Harbor to SCL Railroad bridge over Stono River)	SC*	Prohibited	Prohibited 1975
Stono River (SCL Railroad bridge to Abbapoola Cr.)	SC	Prohibited	Prohibited 1975
Stono River (SCL Railroad bridge to Wadmalaw River)	SA	Approved	Approved
Stono River (Abbapoola Cr. to Folly River)	SA	Approved	Approved
Lighthouse Inlet Estuary	SA*	Approved	Conditional 1972
Clark Sound	SC	Restricted (1)	Prohibited 1972
(1) Clark Sound to be reappraised after upgrading and/or elimination of Westchester Subdivision's sewage discharge to Clark Sound new Seaside.			
Folly River Estuary	SA	Approved	Approved
Kiawah River and Sams Creek to and including Stono Inlet	SA*	Approved	Approved

TABLE 5 (Continued)

Segment Name	Best Use Classification	1978 Sanitary Shellfish Harvest Status	1976 Sanitary Shellfish Harvest Status
North Edisto River	SA	Approved	Approved
Wadmalaw River	SA	Approved	Approved
Wadmalaw Sound	SA	Approved	Approved
Bohicket Creek	SA	Approved	Approved
Church Creek	SA*	Prohibited	Prohibited 1973
South Edisto River	SA	Approved	Approved
All waters of Edisto Island	SA*	Approved	Approved
Fishing Creek	SA*	Approved (2)	Approved
(2) except from the "Neck to Freedman"		Restricted	Approved
St. Helena Sound	SA	Approved	Approved
Combahee River	SA	Approved	Approved
Ashepoo River	SA	Approved	Approved
Coosaw River	SA	Approved	Approved
Whale Branch	SA	Approved	Approved
Campbell Creek & 1000 ft. each side of junction with Whale Branch	SA*	Restricted	Approved
Huspa Creek (public shellfish grounds)	SA*	Approved	Approved
McCalleys Creek	SA*	Restricted	Approved
Whale Branch	SA	Approved	Approved
Middle Creek	SA*	Prohibited	Approved
Brickyard Creek	SA	Restricted	Approved
Albergottie Creek	SB*	Prohibited	Prohibited 1964
Beaufort River:			
(1) from Albergottie Creek to Ballast Cr. and Chowan Cr.	SB	Restricted	Prohibited 1964
(2) from Ballast Cr. to Chowan Cr. to Port Royal Sound	SB	Approved	Prohibited 1964
Chowan Creek	SA	Approved	Approved
Battery Creek	SB	Prohibited	Prohibited 1968
Archer Creek:			
(1) Port Royal to Parris Island Bridge	SB	Restricted	Prohibited 1970
(2) Parris Island Bridge to Port Royal Sound	SA	Approved	Prohibited 1970
St. Helena Sound		Approved	Approved
Morgan River Estuary	SA	Approved	Approved
Harbor River (St. Helena Sound to Fripp Inlet)	SA	Approved	Approved
Trenchards Inlet Estuary	SA	Approved	Approved
Station Creek	SA*	Approved	Approved
Port Royal Sound	SA	Approved	Approved
Lucy Point Creek	SA*	Approved (1)	Approved
(1) Rock Spring Cr. to its junction with Lucy Point Creek		Restricted	Prohibited 1975
Port Royal Sound	SA	Approved	Approved except for shore & marshes of Parris Island which were closed at USMC request in 1970

TABLE 5 (Continued)

Segment Name	Best Use Classification	1978 Sanitary Shellfish Harvest Status	1976 Sanitary Shellfish Harvest Status
Archers Creek from Parris Island bridge to Port Royal Sound	SA	Approved	Approved except for shore & marshes of Parris Island which were closed at USMC request in 1970
Broad River (1) except for 1000 ft. radius buffer zone at Laurel Bay S/D sewage treatment plant discharge	SA	Approved (1)	Approved
Chechessee River	SA*	Approved	Approved
Hazzard Cr./Euhaw Cr.			
Colleton River including Okatee River and Chechessee Creek	SA	Approved	Approved
May River	SA	Approved	Approved
Cooper River	SA	Approved	Approved
Bull Creek	SA*	Approved	Approved
Calibogue Sound	SA	Approved	Approved
New River	SB	Prohibited	Prohibited
Wright River	SB	Prohibited	Prohibited
Savannah River	SA	Prohibited	Prohibited
Calibogue Sound	SA	Approved	Approved
Mackay Creek	SA*	Approved	Approved
Skull Creek	SA*	Approved	Approved
Jarvis Creek	SA*	Approved	Approved
Broad Creek/Palmetto Bay	SA	Approved	Approved
Baynard Cove	SA*	Approved	Approved
Lawton Creek	SA*	Restricted	Approved
Note: Harbortown Marina Palmetto Bay Marina Baynard Cove Marina are closed for 1000 ft. radius each side and in front of the marina as a buffer zone.	SA*	Prohibited	Prohibited
Chechessee River	SA*	Approved	Approved

*tributary to listed class.

S.C. Department of Health and Environmental Control, 1978

TABLE 6

Volumes and values (in thousands of pounds and dollars) of seafoods landed in South Carolina during recent years.

	1975		1976		1977		January–July 1978	
	Pounds[a]	Dollars[b]	Pounds[a]	Dollars[b]	Pounds[a]	Dollars[b]	Pounds[a]	Dollars[b]
Shrimp[c] (Heads-off)	5,647	10,803	5,511	11,043	2,508	5,615	909	2,043
Oysters[d] (Meats)	1,036	617	1,187	759	1,592	1,092	1,011	716
Clams[e] (Meats)	176	203	172	209	199	258	152	266
Crabs (Whole)	6,565	865	5,740	976	7,765	1,778	4,141	808
Finfish (Whole)	3,594	630	5,714	1,079	3,180	1,100	1,695	1,208

a) Volumes should not be added due to differing units of measure.
b) Values are those to the fisherman or gatherer.
c) Rock shrimp are not included in Shrimp.
d) Oysters are 3.18 pounds of meat per U.S. Bushel.
e) Clams are 8.75 pounds of meat per U.S. Bushel.

Prepared by: Fisheries Statistics Section, South Carolina Wildlife and Marine Resources, September 26, 1978

Effects of Man-Induced Perturbations:

Obviously man's impacts on the marine environment may have a significant effect on the oyster in any one of a number of ways. For example, thermal pollution may give false cues to the spawning oyster, causing eggs and sperm to be released before the surrounding waters are warm enough to permit survival of larvae.

The larvae are much more susceptible to pollution than the adult oysters, and consequently may be harmed by even slight amounts of toxic effluent. Concentrations of toxins and pathogenic microorganisms in adult oysters may make them hazardous for human consumption, resulting in the closing of oyster beds. (See Table 5.) Of approximately 275,000 acres of coastal estuarine areas classified as shellfish growing waters by the South Carolina Department of Health and Environmental Control, approximately 28% of the acreage is closed ed due to fecal (coliform) pollution.

Pesticides are extremely harmful to marine life of all types. Organochlorine pesticides have been shown to "interfere with almost every level of biological function tested in marine life." (Lencer, in Clark, p. 743.) A significant reduction in oyster growth has been caused by levels of DDT as low as 0.001 ppm.

Oyster production may also be impaired by destruction or alteration of habitat, particularly the drainage of wetlands. Because the spat cannot settle without a suitably firm substrate, any activity which increases siltation or covers up old oyster shells or other clutch material is extremely harmful. Siltation also interferes with oyster feeding behavior, since the gills may become clogged with non-nutrient material. As noted elsewhere, large quantities of silt may also impair respiration.

Since empty oyster shell provides one of the most desirable substrates for oyster spat, the develoment and maintenance of South Carolina's oyster resources requires cultivation techniques dependent upon shell cultch. Consequently, the propagation of oysters, whether for recreational or commercial use, includes the responsibility of dispersing oyster shell capable of facilitating oyster larvae survival and subsequent growth. Those who lease oyster beds are required by statute to plant shell or seed oysters on the leased property. Public grounds intended for recreational use require similar cultivation techniques in order to remain in good condition.

Commercial and Economic Aspects:

Economically, the oyster is generally considered a very prolific organism in Georgia and South Carolina waters. However, despite the oyster's productivity, this resource is susceptible to over-harvesting. The over-harvesting in the leasing system has usually been associated with the lack of long-term oyster cultivation practices (discussed above) which will sustain commercial yields. The lack of significant cultivation effort has resulted in the cancellation of some leases by the South Carolina Wildlife and Marine Resources Department.

In contrast to some other seafoods, oyster consumption in the U.S. has not been very responsive to rising income levels. In addition, there has recently been a significant shortage of labor coupled with slow recruitment of new labor into the industry. Since 1968, the annual oyster landings have only been between 1 and 1.3 million pounds of shucked meat.

Before World War II, most oysters were harvested for steam canning, but today only one cannery in Beaufort County remains in the industry. This type of canning process uses large quantities of low yield cluster oysters for canning. About 50% of the total oyster landings in South Carolina are processed by this Beaufort cannery.

There are 60 commercial oyster leases in South Carolina (see Appendix F) accounting for over six thousand acres of oyster-growing bottoms. Harvesting techniques on the leases usually involve the use of grabs and other hand tools to dislodge oyster clusters. The picker's small boat is filled with oysters and then towed to the leasee's unloading dock. Conventional "box" or oyster scrapes are used in harvesting subtidal seed oysters from the Wando and Santee Rivers.

Recreational Aspects:

Public harvesting of shellfish (oysters and clams) for personal consumption is an increasingly significant recreational activity in South Carolina. Although the major portion of the State's productive shellfish growing areas is currently under lease to commercial oyster producers, there are a number of areas available for public harvesting. The State of South Carolina may provide up to 50 acres of oyster grounds in each coastal county for public recreational use.

These areas are designated under authoritzation of State legislation. At present, there are 15 public grounds (See Appendix D) throughout the coastal zone, ranging in size from a fraction of one acre to 10 acres. In addition, there are seven areas of State-owned bottoms which are not specifically designated as public oyster grounds, but which are marked for public utilization. The head of any household may, in person or by servant or employee, gather for private use not more than two bushels of oysters or one-half of one bushel of clams, or both, in any one day for not more than two days in any week from the public recreational oyster reefs or other State-owned bottoms not under lease.

Existing recreational shellfish areas are for the most part intertidal oyster reefs located along shorelines and on flats. In many cases, existing areas designated as public grounds are inadequate insofar as quality, acreage and accessibility are concerned. Since there are no license or permit requirements for gathering oysters or clams for personal use, no direct source of revenue exists for either maintaining public grounds or for obtaining data on the extent of this activity. The recreational harvest is known to be significant and to place heavy demands on the shellfish resource. However, the economic activity associated with recreational shellfishing along with participation rates and the magnitude of recreational harvest have never been defined.

Public recreational oyster and State shellfish grounds are for the most part in poor condition with few quality oysters remaining to be harvested. At present, neither State nor Federal funds are available to maintain these beds through a restocking program. With funding, nonutilizable oysters taken from polluted areas could be planted on public beds where, in a matter of weeks, they would become safe and suitable for harvest by the public. Such a program is desperately needed if South Carolina is going to continue to provide recreational shellfishing opportunities, since these marked public grounds are the only legal areas where individuals may recreationally harvest oysters and clams at this time.

2) Hard Clam (Quahog)

Biological Aspects:

The hard clam or quahog (**Mercenaria mercenaria**) is found in estuarine and shallow marine waters. Like the oyster and other bivalves, it is a filter feeder. In South Carolina, hard clam spawning usually begins in the late spring and continues to the fall. During a single release, millions of gametes are extruded by individual clams with fertilization occurring in the water. The fertilized eggs rapidly develop through several swimming larval stages lasting one to two weeks in all and then settle to the bottom. Once buried under the sediment, it generally takes two years for South Carolina hard clams to reach marketable size.

Effects of Man-Induced Perturbations:

Many of the factors harmful to oysters are also detrimental to clams. Water pollution is the greatest threat since pollutants and pathogens (agents of disease such as hepatitis and typhoid) may be contracted in the animal and subsequently transmitted to its human consumers.

Pesticides have wide-ranging adverse effects, ranging from immediate death to growth abnormalities. Pesticides and heavy metals are also dangerous because they slow larval growth dramatically. Since larvae are far more susceptible to disease and predation than adults, a prolonged larval stage significantly reduces the number of animals reaching reproductive age, with a subsequent loss in harvestable stocks. Thermal pollution is also a threat since it may compound the deleterious effects of other pollutants.

Siltation interferes with clam feeding behavior, just as it does with oyster and other bivalve feeding. Because the hard clams live only a few inches below the bottom sediments, dredge and fill operations which cover large areas of the underwater surface may bury clams so deeply that they are unable to feed. Likewise, dredging in areas populated by clams may kill the animals outright or redistribute them in areas unsuited to their growth.

Economic and Commercial Importance:

Historically, South Carolina fishermen have received lower prices for their hard clams than their counterparts in the Middle Atlantic or New England areas. Before 1974, clam harvesting was generally labor intensive and conducted incidental to oyster picking arrangements with the leassee. During the 1970-73 period, the average clam landings were 62,000 pounds (meat) with an average dockside value of $29,000. Most of these clams were harvested with simple hand tools and were sold for local consumption as well as shipped to other states.

During 1974, there was a transition to mechanized harvesting with the opening of the Santee Delta clam beds. Since habitat alteration was considered insignificant, several escalator harvesters were issued permits in 1974. The excalator harvester consists of a blade which is pushed along the bottom by the forward motion of the vesel. The combined forward motion of the vessel and water jets near the blade move the clam across the blade and deposit them on a conveyor belt which takes them to the surface. Marketable clams are picked from the conveyer, and undersized clams and extraneous materials go back overboard at the end of the conveyor. (This method of harvesting may be harmful to oysters, crabs, and other marine life since they may become buried.)

With the development of the Santee Delta clam fishery, South Carolina clam landings have exceeded 100,000 pounds since 1973 and have created winter income for McClellanville's commercial shrimpers. During the 1974-75 season, a record 73% of the State clam harvest came from the Santee, generating a $277,000 per year business. (Kjerfve p. 51.) In addition, the Santee clam fishery has probably improved the marketing situation for other clammers in the State.

Rotation of harvesting areas appears to be of primary importance to the continued success of the clam fisheries in South Carolina. Extensive harvesting of brood stocks may result in significant declines in future clam populations. That rotation is a viable means of stock control is borne out by statistics from the Santee Delta clam fishery. In 1974, about 59% (15,312 bushels) of the marketable clam population in South Santee River was harvested. In 1978, 64% (13,750 bushels) was harvested with less effort — in other words, lower cost. (Unfortunately, if the Santee River is diverted this highly productive resource may be destroyed. More will be said below regarding the proposed rediversion.)

b. Crustacean Resources

1) Blue Crab

Biological Aspects:

The blue crab, **Callinectes sapidus,** ranges from Cape Cod to northern South America. In South Carolina, it is a common inhabitant of creeks, rivers, sounds and inshore waters. Juvenile crabs inhabit the shallow, low-salinity estuarine areas and mature in 12 to 14 months in South Carolina.

After reaching sexual maturity, males tend to remain in brackish areas, while females move into deeper and/or more saline waters. In South Carolina the major commercial gear, crab traps, are generally set in waters away from high female concentrations. Consequently, crab trap catches average about 70% mature males.

Mating occurs between early May and October when females return to brackish water areas to molt. Females are inseminated during their post-molt, soft shell period, before the new, larger shell hardens, making mating impossible. After mating, the females return to deeper water.

Two months after mating the fertilized eggs are extruded onto the female's abdomen, forming a "sponge" approximately one third her size. The "sponge" contains 700,000 to 2,000,000 eggs which hatch in about two weeks. The larva, called a zoea, is about one mimllimeter wide and grows rapidly, molting every three to five days and increasing up to one third its size with each molt. There may be 25 to 27 molts between the first larval state and the adult, with adult size being attained in the nursery grounds of the estuary.

Very little is known about blue crab population dynamics. It is generally felt that the annual fluctuations in blue crab abundance are associated with climatic factors which influence the distribtution, growth and general survival of the larvae, rather than with the abundance of spawning adults. Blue crab survival, unlike that of some other crustaceans, does not seem to be severely affected by occasional low winter temperatures. Evidence for this is the fact that the 1977 blue crab catch was significantly higher than in previous years, despite the unusually low water temperatures of the 1976-77 winter. Recent interpretations of the decline in blue crab landings in the late 1960's indicate that there may be cyclical changes in annual blue crab abundance, although other theories suggest that pesticide pollution may have been the cause.

Effects of Man-Induced Perturbations:

As noted above, water pollution of various types may contribute to crab mortality. Death may occur during either adult or larval stages, although the larvae are more susceptible to small amounts of the toxic materia than fully developed crabs. Juvenile crabs died when exposed to only **one** particle of mirex bait (used to con-

trol fire ants). (Lincer in Clark, p. 743.)

Since blue crabs are mobile, they are affected less by some forms of environmental perturbations than the sessile molluscs, such as oysters and clams. Crabs are able to move away from areas of increased turbidity, siltation, or underwater deposition of dredge spoil. However, because they require brackish water for mating, they are sensitive to alterations in the mixture of fresh and salt water brought about by channelization, impoundment or destruction of marshlands. In addition, any reduction in marsh acreage deprives blue crabs (particularly males, which comprise 70% of the crab trap catch) of valuable habitat.

Impoundments, bridge crossings, or other forms of construction may prevent mating if they interfere with female migration back into the estuary from deep water. Mating behavior may also be affected by thermal pollution, since artificially high water temperatures in any location may induce female crabs to begin their spring migration before estuarine waters are warm enough to support the larvae.

Economic and Commercial Importance:

The blue crab catch in South Carolina has generally increased since World War II as the demand for fresh blue crabs and crab meat has increased. Today, the commercial blue crab fishery ranks second only to the shrimp fishery, with nearly 80% of the catches landed in Beaufort and Colleton Counties.

South Carolina's commercial catch constitutes a major supply for the State's three crab processors. These processors annually produce crab meat products with an estimated value of $4 million and employ nearly 200 residents during the summer months. The dockside value of blue crabs in 1977 ws $1.6 million for 7.3 million pounds of crabs.

Two methods are most commonly employed in commercial crabbing: trapping and trawling. Trapping, the most common technique, accounts for the majority of the catch, with 462 commercial crab trapping licenses sold in the 1977-78 fiscal year. Trap-caught blue crabs which are not sold to the processors are shipped to the Middle Atlantic States for restaurant (i.e. steamed crabs) and other fresh crab consumption. When crabs are shipped, they are sold according to size and/or sex.

In the 1950's, there was a small-scale soft-shell blue crab industry in South Carolina. Interest in developing a soft-shell crab fishery in South Carolina has recently been renewed. It has been estimated that such an industry could annually harvest 40,000 pounds of soft-shell crabs with wholesale prices ranging from $4.00 to $14.00 a dozen.

Recreational Aspects:

The extent of participation in recreational crabbing in South Carolina is currently undocumented, but all indications are that the number of individuals involved is substantial, as crabbing is a favorite family recreational activity along the coast. There is no closed season for recreational crabbing in the State, although crabs are caught primarily from April through November. A variety of methods are utilized, including baited drop nets, headline/dip nets and various crab traps. All reports have indicated that recreational crabbing is excellent, and has been over the past several years, with an abundance of blue crabs being available for recreational crabbers.

2) Shrimp

Biological Aspects:

There are two major species of shrimp caught in South Carolina: The white (**Panaeus setiferus**) which make up 70% of the catch and the brown (**Panaeus aztecus aztecus**) which account for 30% of the catch. Pink shrimp (**Panaeus duorarum duorarum**) are also found occasionally in South Carolina, but make up less than 1% of the catch.

White shrimp spawning generally takes place within two miles of the coastline, beginning in late March and continuing through the summer. The female lays 500,000 to 1,000,000 eggs directly into the water. The eggs (1/75 inch in diameter) hatch in 20 to 24 hours, and after 15 to 20 days, the surviving postlarval shrimp (about 1/5 inch long) drift into the brackish estuaries which serve as nursery grounds. From spring to early fall, growth is rapid. For example, a shrimp hatched on May 1 may measure over six inches by November. Growth is insignificant during the winter but resumes in the following spring.

Young white shrimp will move from the shallow estuarine waters into deep creeks, rivers and sounds dur-

ing June or July, when they are about two inches long. At this time, the young white shrimp are sought by cast netters and recreational seiners. In July and August they begin to migrate to inshore waters and are caught by commercial trawlers fishing for brown shrimp. In the fall, their commercially desirable size and concentration in the South Carolina sounds and bays usually result in the opening of these areas to commercial trawling. During October and November, a portion of the white shrimp population migrates parallel to the shoreline toward Georgia and Florida. Surviving white shrimp which have migrated will return during the early spring of the following year. Recent evidence also indicates that a portion of the white shrimp population overwinters in deep water coastal areas. This overwintering is important to commercial harvesting success in the following year.

Unlike white shrimp, brown shrimp do not overwinter in South Carolina. They spawn much further offshore than white shrimp, and much earlier in the year. Brown shrimp postlarvae usually begin drifting into the estuaries during February or March. Consequently, the young brown shrimp become available to recreational and commercial fishermen sooner than the white shrimp. Brown shrimp migrate from South Carolina waters during the fall and winter months.

Annual abundance of shrimp is dependent primarily upon various ecological factors and not significantly upon the previous year's population. Commercial shrimping has not been demonstrated to have had a significant effect upon the penaeid shrimp populations, although it might if an appreciable portion of the nursery grounds were destroyed.

White shrimp are often considered the most sensitive to temperature of the three species caught commercially in the South Atlantic states. There seems to be a positive correlation between the winter's severity and the spring and fall white shrimp catches. Low water temperatures (near 47°F) over an extended period of time can cause severe white shrimp mortality. The extended periods of low water temperature during the winters preceding the shrimp seasons of 1940, 1958, 1961, 1963, 1964, 1966, 1970 and, most recently, 1977, contributed to the relatively low abundance of white shrimp populations and the resulting poor commercial catches.

Effects of Man-Induced Perturbations:

Many factors other than climate contribute to shrimp mortality. Most important of these is the destruction of marsh and estuarine habitats which serve as nurseries for developing shrimp. Changes in salinity, turbidity and chemical composition of the water may all affect larval development. Water pollution of various types may have deleterious effects on shrimp, particularly during the juvenile stages when they are found closest to shore. Toxic materials such as heavy metals and pesticides may produce effects ranging from mortality to feeding abnormalities. Thermal pollution may cause larval growth to proceed faster than that of the necessary food organisms. If severe, it may also kill shrimp and shrimp larvae outright. Discharges of domestic sewage and fertilizer runoff from agricultural lands may produce algal blooms which deprive the shrimp of necessary oxygen and may kill the developing larvae. More importantly, oxygen depletion may discourage spawning or drive animals away from an area.

Shrimp, like blue crabs, are able to swim away from areas of high turbidity or dredge spoil deposition. However, the turbidity may destroy food sources by blocking light needed for plant phyotosynthesis. Adult shrimp also swim away from areas of lowered salinity. Thus shrimp production may be impaired by channelization or marsh destruction which allows a great deal of fresh water to enter an estuary.

Shrimp are also harmed by pesticides and other toxins released to the environment. Crustaceans are very susceptible to harm from insecticides since they are biologically closer to insects than are other marine invertebrates. A dose as low as one part per billion of a common insecticide, mirex, caused 100% shrimp mortality. (Lincer, in Clark, p. 743.)

Economic and Commercial Activities:

With the growth of world shrimp consumption after World War II, the commercial shrimpers have annually accounted for the highest total dockside value of all South Carolina commercial fisheries. In 1976 the South Carolina shrimp catch represented 51% of all fishery landings (8.7 million pounds) and over 78% of total dockside value ($110 million). The South Carolina shrimp catch represented 12% of the weight and 32% of the value of total South Atlantic states' landings that year. Commercial shrimping and associated services are

also a source of significant employment in South Carolina's coastal counties.

White shrimp comprise about 68% to 80% of the normal South Carolina catch, with most being landed during the fall months. Large one year old white shrimp which overwinter are caught during May and June, and in recent years have made significant contributions to the shrimper's income. Unfortunately, winter conditions in 1976 and 1977 reduced overwintering white shrimp stocks to extremely low levels, resulting in unusually poor white shrimp catches in the spring of 1977 and 1978.

The remainder of the South Carolina shrimp harvest is mostly brown shrimp which are caught during the summer months. Shrimp are caught primarily by a double-rig trawler. Since the 1973 shrimp season, channel nets, which are basically stationary shrimp otter trawl nets, have been permitted in estuarine waters, but their catches only constitute a small percent of the commercial shrimp landings.

The number of licensed shrimp trawlers has increased dramatically since 1970. During the 1971-1975 period the annual average number of shrimp trawlers licensed was 939, compared to an average of only 428 licenses in the 1960-70 period. Concurrent with this trend has been an increase in vessel horsepower, electronic equipment and net size.

Recreational Use:

A 1974 survey of recreational shrimping indicated that 16,780 South Carolina residents participated in this fishery on a total of 115,117 days and harvested approximately 815,000 pounds of shrimp (heads-on) that year. This recreational shrimp harvest was equal to 10% of that harvested commercially during the same period.

Practically all of the tidal creeks throughout the coastal area provide excellent shrimping with cast nets, seines or baited drop nets. Shrimping is carried on from bridges, smal boats and from the shore.

Unfortunately, because of the severe reductions in the South Carolina shrimp population in recent years, recreational shrimping has declined. Few catches have been reported during the past few years, although in the past several months recreational shrimpers have reported taking large numbers of small shrimp in the upper reaches of small creeks near Beaufort and Charleston.

c. Finfish

Finfish Resources:

More than 400 species of finfish inhabit the marine and estuarine waters of South Carolina. Many of these fish enter directly into the commercial and recreational fisheries while others serve primarily as forage (food) and are indirectly important to these fisheries. The South Carolina coastline contains many productive bays and estuaries. These shallow estuarine waters and the productive marshlands which border them are of primary importance for fishery resources. Several species, such as striped bass, grey and spotted sea trout and black sea bass spend at least a portion of their lives within these waters. However, many commercially and recreationally important species such as red drum (channel bass), Atlantic croaker, striped mullet, flounder, and American eel spawn offshore, and the larvae and juveniles are transported into shallow estuarine waters which serve as nursery grounds where these young fish feed and grow.

A 1968 survey of recreational fishing found that spotted sea trout, channel bass, spot, flounder, king whiting, Spanish mackerel, black sea bass, Atlantic croaker, bluefish, and drum were the preferred gamefish most often taken in South Carolina. These 10 fish along with menhaden, American eel, mullet, pigfish, grey sea trout, American shad and sturgeon were reported as part of the commercial landings in South Carolina during 1976 and 1977.

Biological Aspects:

The life histories of these fish generally fall within three categories — those which spawn offshore and utilize the coastal and estuarine waters as nursery and feeding grounds, those which migrate from offshore and nearshore waters into fresh water to spawn, and those which spend their entire life cycle predominantly within estuarine waters.

Of those species which spawn offshore, the American eel makes the longest migration, traveling to the Sargasso Sea area of the Atlantic Ocean off Bermuda to spawn. Spawning takes place in winter, and the larvae, called leptocephali, migrate to the coastal areas of North America during the following spring, traveling

up the estuaries and into fresh water. Here they remain to feed and grow. At maturity, they migrate back out of the estuaries during the fall and return to the Sargasso Sea.

Southern and summer flounder are the most common flounder species occuring in South Carolina. They spawn near the edge of the continental shelf during the winter months and during the following spring, migrate back to the coastal area to feed. Larval and juvenile flounder also move and are transported by water currents to the coastal estuarine waters which serve as a nursery ground for these small fish. White and striped mullet undergo a similar spawning migration each year, moving 5 and 20 miles offshore during spring and fall, respectively. The larvae and juveniles are pelagic and are abundant in the open waters of South Carolina's bays and estuaries throughout the summer. Adults move back into the marshes and mud flats and are more abundant in the shallow waters of the estuary. Juveniles and adults show a southward migration in fall and a northward migration in spring.

Bluefish, spots, northern and southern kingfish, Atlantic croakers and red drum also show a similar life history pattern. Each of these fish spawn offshore during the late fall and early winter months. The larvae and juveniles swim or are transported into the productive coastal estuarine waters the following spring, where they feed and grow. Following spawning, the adults overwinter in the deeper offshore waters and then also move back into the nearshore and estuarine waters to feed during the remainder of the year.

Spotted and grey trout spawn in the lower portion of estuaries or in shallow oceanic waters during the spring.The larvae and juvenile trout are transported to estuarine areas, and the adults move back into the estuary to feed the remainder of the year.

Several fish species undergo a reverse type of spawning migration with the adults moving from near and offshore waters into freshwater streams to spawn. These are called anadromous species, and include sturgeon, striped bass, American shad and blueback herring. Several of these species, such as sturgeon and American shad, undergo long oceanic migrations and spend several years at sea before returning to their natal(birth) streams to spawn.

Striped bass are thought to show different migratory habits in different parts of their range. Adult striped bass north of Cape Hateras, North Carolina, are known to undergo long oceanic migration, traveling a thousand or more miles along the Northern Atlantic coast. Adult striped bass south of Cape Hatteras are believed to remain within a particular river system, spawning in the upper fresh water reaches and overwintering in the lower estuaries near the river mouths.

Environmental Perturbations:

It is obvious from the life histories summarized above that marshes and estuaries are of vital importance to the finfish of the State. Not only do the highly productive salt marshes provide detrital food for fish living in the estuaries and coastal waters, but they also provide food and shelter for larvae and juvenile fish. Therefore, any destruction of marsh habitat will produce a corresponding reduction in the population of fish which survive to maturity.

In addition to outright destruction of habitat, alterations in the marsh or upland areas bordering an estuary may have deleterious effects on fish populations. Channelization and construction of impoundments may alter marsh and estuarine salinities, leading to juvenile fish mortality. In addition, natural migration patterns may be disrupted by the presence of obstruction. The introduction of pollutants may also kill or retard development of young fish. Excessive nutrients from agricultural run-off or domestic sewage may produce algal blooms which deprive the young fish of necessary oxygen. Finally, thermal pollution may speed up development so that the fish fry are ready to migrate before coastal waters are warm enough to support them. Fish metabolism may also be altered, and the addition of excess heat may compound the effects of other pollutants. Finally, thermal pollution may provide miscues to adult fish ready to spawn.

Additional spawning miscues may be sent by altered salinities or chemical compositions in rivers. If pollution, heat, or new salinity gradients have made the natal river (the river in which the fish was hatched) unrecognizable to migrating fish such as sturgeon and striped bass, spawning may not occur. Physical barriers, such as bridge crossings and dams, may also prevent or interfere with spawning.

Predation by man may have a greater impact on fish than on other living marine resources. The 1976 Fishery Conservation and Management Act was designed to prevent overfishing and to ensure the continua-

tion of current fisheries under sound management.

Commercial and Economic Aspects:

The finfish fisheries in South Carolina are less significant than the shellfish fisheries. With the exception of mullet and spot, most marketed marine finfishes caught in South Carolina waters are captured incidental to shrimp trawling. This incidental catch includes croaker, flounder, king whiting, sea trout, shark and Spanish mackerel. Large quantities of spot and mullet are harvested by the beach haul seine fishery in Horry County. Other species like the red drum and sea trout are generally harvested by seasonal small-scale gill net operations in estuarine waters. These fisheries, compared to those in other Atlantic seaboard states, have generally been limited by marketing problems (e.g. undesirable product forms, seasonal availability, price differentials).

In contrast, harvesting of the anadromous species, shad and Atlantic sturgeon, have not been limted by serious marketing problems. Shad harvesting, whether by drift gill nets or fixed gill nets, has been regulated by localized statutes and represents a traditional fishery of South Carolina's coastal rivers. Demand for sturgeon roe (caviar) and smoked fish has perpetuated this gill net fishery. Both of these fisheries provide seasonal, supplementary income to residents of rural coastal areas.

Recent investigations of marine species (e.g. croaker, spot, flounder and king whiting) taken incidental to shrimp trawling activities show that these species are not being depleted. Similar studies in the Gulf of Mexico, where there has been a five-fold increase in fishing effort during the last 20 years, have indicated no decrease in these species groups.

Presently available data are not sufficient for assessment of the commercial anadromous fisheries for the Atlantic sturgeon and shad. Reported declines in catches for individual fishermen may be a function of increasing total fishing effort (more fishermen and gear) to annual fluctuations in the returning stocks.

Although information is insufficient to accurately assess the present status of eel stocks exploited in South Carolina, it is generally felt that the gradual expansion of the present fishery for elvers and subadults (yellow eels) would be commercially beneficial. Unfortunately, the environment in coastal rivers tends to exclude or inhibit the future development of such a fishery.

Recreational Aspects:

While current and complete information is not available on participation and the economic significance of all segments of the marine recreational finfish fishery, some data are available which provide an insight into the magnitude of saltwater sport fishing in South Carolina's coastal zone. During 1968, an estimated 174,000 South Carolina residents participated substantially in saltwater fishing. Of this number, 41,600 residents participated in the surf and bank fishery and 121,000 participated in the small boat fishery. If children under the age of 12 and occasional fishermen were included in this 1968 survey, the number of total participants would approach 250,000. A study conducted on South Carolina's fishing piers estimated that a total of 25,000 residents fished a total of 228,000 days from 13 piers during 1974, harvesting some 210,000 pounds of fish.

These estimates only take into consideration South Carolina residents. If one were to also count the number of non-residents who participate in this fishery, these figures would increase significantly. For example, a 1968 North Carolina survey indicated that 36,000 North Carolina residents fished in the marine recreational fishery in South Carolina during 1973-74. These figures indicate that the number of non-residents participating in the finfish segment of South Carolina's fishery is significant.

While data on the total recreational harvest of finfish for South Carolina are not currently available, there are data available which give some insight into the magnitude of this harvest for the South Atlantic region (Cape Hatteras to South Florida). This information, along with a comparison of the commercial harvest for the same area, is presented in Table 7.

The figures indicate that the recreational harvest represents a significant portion of the total finfish resource. (See Table 7.)

The economic impact of the marine recreational fisheries to South Carolina is considerable. The latest available (1970) published information on annual expenditures by saltwater anglers on the Atlantic coast gives a figure of $127 per angler. If this figure is adjusted for inflation, the current estimate would be $191 per angler. As mentioned previously, during 1968 there were an estimated 174,000 substantial resident anglers in

TABLE 7

The recreational and commercial harvests (in thousands of pounds) of selected species of saltwater fish for the South Atlantic region (Cape Hatteras to south Florida) during 1970.

Species	Recreational Catch (thousand pounds)	Domestic Commercial Catch (thousand pounds)
Sea trouts	25,063	3,872
Black drum	12,123	144
Whiting	14,533	2,095
Channel Bass	13,358	157
Spot	9,840	3,304
Croaker	5,947	866
Flounder	8,938	3,397
Pompano	153	248
Cobia	775	21
Bluefish	19,271	2,551
Spadefish	51	2
Spanish mackerel	14,623	3,639
King mackerel	34,942	4,351
Dolphin	27,806	21
Sharks	669	10
Snappers	26,580	1,090
Porgies	24,059	799
Grunts	25,962	51
Groupers	24,121	754
Sea Bass	12,381	2,024
	301,195	29,416
Grand Total (includes all finfish species harvested, not just sportfish cited above).	403,913	

Sources: Devel, D. G. (1973) **1970 Saltwater Angling Survey,** National Marine Fishery Service, Current Fisheries Statistics, #6,000,2000, 54 pages.

U.S. Department of Commerce, (1973) **Fishery Statistics of the U.S., 1970,** National Marine Fishery Service Statistical Digest, #64, 489 pages.

South Carolina. Published information for the South Atlantic region indicates an annual growth rate of four percent in the number of marine recreational anglers. Based on these data, the current estimated number of substantial resident anglers would be 248,000. If this figure is applied to the adjusted annual expenditure per angler, an estimated impact of $47 million is generated. This figure does not take into account non-resident anglers (whose numbers, from all indications at least equal that of resident anglers) or other segments of the recreational fishery (shrimping, crabbing and shellfishing).

There is at present no on-going creel census or sportfishing survey which could be utilized in determing present conditions or evaluating the abundance of South Carolina's gamefish. Most fish populations naturally undergo long-term fluctuations in abundance with dominant year classes occurring somewhat regularly every so many years. At present, South Carolina sport fishermen indicate that there has been a general decline in inshore fishing, particularly in the numbers of winter trout during the past two years. This may be a result of natural fluctuations in these populations or may be associated with the last two severe winters, which greatly reduced the shrimp population along South Carolina's coast, since shrimp serve as a major food item for many of these fish. Flounder fishing, however, has been reported as very good during the past two years.

5. **Summary**

The marine, maritime and estuarine ecosystems of the South Carolina coastal zone are extremely significant in terms of biological, economic and social values, especially those associated with living marine resources. The wetlands and subtidal areas of these ecosystems cover approximately 1,200,000 acres of the coastal zone, extending from the Little River southward to the Savannah River and from the upper limits of saltwater penetration in coastal rivers seaward to the three mile territorial limit in the Atlantic Ocean. Major habitats included within these ecosystems are: open ocean waters and bottoms (500,000 acres); beaches (10,700 acres); coastal marshes (430,000 acres); coastal impoundments (70,000 acres); and open estuarine waters and bottoms (242,000 acres).

These coastal waters and bottoms shelter many important species of fishes, invertebrates and other living marine resources, and support valuable commercial and recreational fisheries, research activities, and the interests of nature enthusiasts. Living marsh and dune vegetation not only accommodates fauna of the coastal marine-estuarine ecosystem, but serves man's interests as well. The marsh assimilates and purifies wastes from human activities, while both marsh and dune vegetation provide aesthetic beauty and protection from erosion and storm damage.

Biologically, the coastal marine-estuarine system is among the most productive areas known to man, both in terms of species diversity and biomass. This unique environment supports complex assemblages of plant animal life, including both resident and migratory forms.

The biological richness of the coastal marine-estuarine ecosystem is due in large part to the high concentrations of nutrients from upland sources. Marsh plants, algae and phytoplankton convert these nutrients into biomass which can then be consumed and utilized by higher levels of the food chain. Productivity is further increased by the decomposition of plant and animal matter into detritus and eventually into basic nutrients which repeat the cycle. Many of the organic materials and other nutrients from the near-shore environment are exported by currents to oceanic waters, and many species of fishes and invertebrates nurtured in estuarine areas migrate long distances, thereby increasing the biological productivity of areas outside of the coastal marine-estuarine ecosystem.

Coastal marshes, dominated in South Carolina by vast expanses of saltmarsh cordgrasss, play an important role themselves in providing habitat and cover for many estuarine fishes and invertebrates such as shrimp and blue crabs. In addition, coastal marshes are significant habitat type for numerous species of birds and mammals, including clapper rail, wading birds, raccoons, mink and otters. Diked marshlands, many of which are vegetated by brackish-water plant species, provide some of the most important habitats for waterfowl in the United States and may be important for other species of birds, mammals, reptiles and amphibians as well.

In addition to the great ecological significance of the living marine resources of the coastal zone, there are a number of functions performed by these resources which are of specific utility to man. These functions are primarily recreational, commercial, and physical. (Examples of the last category include erosion control provided by dune vegetation and waste assimilation provided by the marshes).

The major recreational values provided by the living marine resources of South Carolina are those

associated with saltwater sport fishing, including angling, shellfishing, shrimping and crabbing. It has recently been estimated that over 250,000 State residents currently participate in recreational fishing activities in the coastal zone, resulting in annual expenditures directly related to their sport of over $50,000,000. The total economic impact of saltwater sport fishing in the State is estimated to be over $100,000,000 annually, including indirect benefits related to retail sales and tourism.

Other recreational uses related to living marine resources of the coastal zone are nature photography, shell collecting, bird watching and the like. In addition, there is the enjoyment to be derived from aesthetically pleasing surroundings, which include, of course, the beauty of dune and marsh vegetaion as well as the fauna present in the marine environment. While not directly quantifiable, it is clear that such benefits are important, particularly as they pertain to tourism.

Commercial considerations are primarily tourist and fishery related, with the latter being of greater direct importance. Major commercial fisheries in South Carolina's coastal area are created around penaeid shrimp, molluscan shellfish (hard clam, eastern oyster), blue crab, and finfish (shad, spot, mullet and others). The annual dockside value of coastal commercial seafood landings ranges from $10,000,000 to $15,000,000. The total economic impact of commercial fishing in South Carolina is estimated to be approximately $30,000,000, taking into consideration the wholesale and retail seafood trade, seafood processing and other aspects.

The total economic impact of commercial and recreational fisheries in the coastal region of South Carolina is therefore conservatively estimated to be $130,000 annually. This includes values for commercial seafood landings and processed products, and estimated expenditures by recreational fishermen. As mentioned previously, many indirect economic benefits of the State's commercial and recreational fisheries are not known with certainty, since no comprehensive survey of the overall economic impact of these fisheries has been conducted.

There are other benefits provided by living marine resources for which there is no generally accepted economic equivalent. As noted above, these include such functions as erosion control and waste assimilation. In addition, there are social and aesthetic values associated with the living resources of the coastal region which are difficult or impossible to quantify. Such values include those related to natural beauty and a clean, healthy environment. The significance of the visual appearance of an undisturbed marsh, a dune vegetated by sea oats, bottlenose dolphins playfully surfacing near shore, a shorebird nesting colony, and the like, although unquestionably of considerable value to many coastal residents and tourists, cannot be expressed in economic or related terms. However, the trend in recent years toward increased protection of nongame, noncommercial species in living marine resources, especially more visible ones such as marsh and dune vegetation, sea turtles, marine mammals and eastern brown pelicans is an indication of the high value society places upon these resources.

In conclusion, two facts are apparent: South Carolina is blessed with living marine resources of exceptional diversity and abundance, and man's activities can severely threaten the continued existence of these resources. Evaluation of the impacts of man's activities should, therefore, take into account the immediate and long-term effects of his activities on **all** life in the coastal zone.

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NOTE:

The South Carolina Wildlife and Marine Resources Department Bibliography has been placed in the Appendix, Volume II, of the Management Program. The Appendix is not being reprinted at the time of the FEIS printing but will be included at the next printing of Volume II. The Bibliography remains unchanged from the printing of the DEIS, Volume I, pages IV-112 through IV-144.

chapter V

management authorities & governmental/public involvement

A. LEGAL AUTHORITIES AND NETWORKING

Purpose of South Carolina's Coastal Management Act

The chief purpose of South Carolina's Coastal Management Act (§48-39-10 et seq. of the 1976 S.C. Code) is the proper management of the natural, recreational, commercial and industrial resources of the State's coastal zone — resources of present and potential value to all citizens of the State. The Act acknowledges the growth of the human population and the resulting demands on the lands and waters of the coast for residential, recreational and economic developments as well as services such as transportation and waste disposal. A specific State policy contained in the Act is that of promoting the economic and social improvement of the State's citizens while protecting and, where possible, restoring or enhancing the rich variety of coastal resources.

S.C. Coastal Council — Coastal Management Program

To effectively achieve these goals for protection and development of coastal resources, the Act establishes the S.C. Coastal Council and directs it to develop and implement a comprehensive management program to achieve wise use of coastal resources. A part of this management program consists of the permitting authority of the Council over the "critical areas."

Critical Areas

Four areas of the coastal zone are very fragile and easily damaged or destroyed by man-made alterations. Those areas, designated "critical areas" by the Act, are the coastal waters, tidelands, beaches, and primary ocean front sand dunes. In order to protect them from inappropriate uses, the Council has been given the responsibility of permitting alterations of these resources (Section 13).

Permitting Authority

As stated in Section 21 of the Act, the Council is "the only state agency with authority to permit or deny any alteration or utilization within the critical area." The Act further states "no person shall utilize a critical area for a use other than the use the critical area was devoted to on such effective date (of the Act) unless he has first obtained a permit from the Council." (Section 13) Finally, Section 8(A) mandates the Coastal Council to develop a regulatory system to provide for "the orderly and beneficial use of the critical areas." This regulatory or permitting system, contained in the Rules and Regulations pursuant to the Coastal Management Act, is enforceable through the authority of the courts. (Section 5(E), (I))

Section 13 (D) of the Act lists activities which are exempted from the Council's permit process — activities such as hunting, fishing, erecting duckblinds, the discharging of treated effluent as permitted by law, and normal maintenance and repair of certain facilities. Also exempted are the accomplishment of emergency orders of any official of a state or local government, if the Council is notified of the emergency and the actions ordered. Management input from the coastal program in decisions on these activities is still ensured, however, through coordinated efforts with other state agencies and the authority of the Coastal Council to review, comment on, and certify the permits and actions of the other agencies in the critical areas. Section 7(A) of the Act provides that all other state and local agencies shall administer their authority in accordance with the Coastal Management Act and the policies and rules and regulations which are developed under the Act. In the event the coordination breaks down and resultant conflicts cannot be resolved, judicial relief may be sought.

Authority Outside Critical Areas

The scope of authority of the S.C. Coastal Council in the remaining portions of the coastal zone, i.e. those areas other than critical areas within the eight coastal counties, is established in Section 20 of the Act which states: "Notwithstanding any other provisions of this act, the Council shall have no direct regulatory authority over any area outside the critical areas in the coastal zone." However, through several provisions contained in the Act, the Council is clearly given authority of an indirect nature, which extends to the full coastal zone.

Section 8 directs the Council to develop a comprehensive coastal management program and provides that "the Council shall consider all lands and waters in the coastal zone for planning purposes." The significance of and authority for this coastal management program are emphasized through the language of

Section 9 (D), which reads: "Upon review and approval of the proposed management plan by the Governor and the General Assembly, the proposed plan shall become the final management plan for the State's coastal zone."

Section 7 (A) provides one measure of enforcement for the management objectives of the Coastal Council

> All other state and local agencies and commissions shall cooperate with the Council in the administration or enforcement of this Act. All agencies currently exercising regulatory authority in the coastal zone shall administer such authority in accordance with the provisions of this act and rules and regulations promulgated thereunder. (Section 7 (A))

The OMB Circular A-95 Review Process is a significant addition to the State's coastal management effort as outlined by the Act. Applications, comments and other material circulated in the A-95 process may be coordinated with specific policies through review and comment by State and Federal agencies involved in the process. Coastal management efforts will better encompass other applicable policies as other agency efforts are incorporated with coastal management policies through the A-95 Review Process.

Networking

The burden of implementing the South Carolina Coastal Management Program rests not only with the Coastal Council, but also with all other State and local agencies and commissions. (§7(A)) Even though such agencies are statutorily mandated to carry out their own policies, the effect of networking is to tie the implementation of these individual authorities into a comprehensive framework that addresses more than the individual responsibilities of each agency and that makes these authorities part of an overall, unified strategy for managing coastal resources. The Section 7 (A) mandate to the other state and local agencies broadens the scope of their legal responsibilities to include the implementation of the policies and rules and regulations of the Coastal Management Program. Section 7 (A), along with 9(D), 8 (B)(11) and other general provisions of the Act, binds all relevent agencies and commissions to the Coastal Management Program. Two methods of cooperation are needed between the Council and other State and local agencies in giving effect to the Act: 1) a cooperative process of permit review and certification; and 2) memoranda of agreement confirming the statutory duties of the respective agencies.

Certification

Seventeen (17) State agencies exercise authority over: (1) the use of coastal resources, (2) specific areas in the coastal zone, or (3) activities in the coastal zone. This authority is granted by the statutes of South Carolina, most of them enacted prior to the Coastal Management Act.

Some of the authority granted by these statutes is implemented through permit or license procedures. Through Section 8 (B) (11) of the Coastal Management Act, the Council is required to review and certify the compliance of these permit applications with the policies of the coastal management program. This section states that the Council shall "develop a system whereby the Council shall have the authority to review all state and federal permit applications in the coastal zone and to certify that these do not contravene the management plan."

Memoranda of Agreement

Memoranda of agreement are used to effectively coordinate all State agency activities with the Coastal Management Program. The specific authorities and activities of the agencies that are networked by Section 7 (A) are outlined in the memoranda along with the cooperative efforts of the agencies in implementing the program. Besides the general mandate of Section 7 (A), the Act specifically requires coordination with other State agencies in regard to: (1) beach and shoreline erosion, (2) oil spill monitoring and removal, (3) energy facility siting, (4) determination of water quality standards and (5) determination of port and navigational needs and standards. The memoranda between the Council and other agencies are based on the mandate of §7(A) and on §5(N) which grants the Council the duty "to encourage and promote the cooperation and assistance of state agencies, coastal regional councils of government, local governments, federal agencies and

other interested parties." Memoranda of agreement provide a convenient means for establishing the cooperative process necessary to fulfill the purposes of the Coastal Management Act.

There is no case law or statutory language in South Carolina concerning the enforceability of memoranda of agreement between units of government. However, in the case of these memoranda, the question of such enforceability **per se** does not arise, since the memoranda merely confirm statutory responsibilities and do not seek to expand these duties.

B. PROJECT EVALUATION PROCEDURE

Introduction

Within the eight-county coastal zone, the South Carolina Coastal Council is the State agency with responsibility for development **and** implementation of the resource policies and other provisions of the State's coastal management program. The legal basis for this authority, mandated by Act 123 of the 1977 South Carolina General Assembly (S.C. Coastal Management Act) is explained in detail in the preceding segment of the program document ("Legal Authorities and Networking," Chapter V(A)).

As part of its implementation, the Council must provide a system under which it reviews permit applications made to other State and Federal agencies to certify that issuance of these permits will not contravene the management program. The Council's review procedure for these projects is explained in the following section. (Federal permit reviews follow the procedures for Federal consistency determinations, as will be discussed in Chapter V (F)(3) of the program document.) This review system is the mechanism for Council management of activities throughout the coastal zone.

In addition, the Council has direct authority for the issuance of the State-level permit for any activity in certain "critical areas" of the coasts, as defined by the 1977 Act. The review process for Council permits is explained in detail in the Rules and Regulations for Permitting in the Critical Areas, Chapter 30, R.30-1 — 30-11, Code of Laws of South Carolina, 1976, as amended (which appears as Appendix K).

The following section outlines not only the steps for the review and certification procedure, but also the general guidelines or criteria which are used in initial review of project applications throughout the coastal zone. The resource policies for specific areas or types of activities, which are found in Chapter III above, are also applied by the Council in project reviews.

In-House Staff Review

For both the Review and Certification and Critical Area permit procedures outlined below ((B)(1) and (2)), as well as the Federal consistency procedures discussed in V (F)(3), the staff of the Coastal Council has a regular, established process for project review. Each staff member with review responsibility has an evaluation sheet which is filled out for each permit application and becomes part of the permit file. These evaluations are made by biological, planning, engineering, cartographic and legal staff. The evaluation sheets require that information be supplied and issues addressed which develop a comprehensive review of each project, including project description, environmental assessment of the site, applicable program policies or rules and regulations and possible impacts of the proposal. An on-site inspection is made by a staff biologist of all critical area project sites and those certification sites which are especially major or controversial projects, and photographs are taken which become a part of the file. Additional site visits are made by other staff members and Council members as needed.

At weekly staff permitting meetings, all permit applications at or near the end of their review period are again reviewed and discussed individually before permit or certification decisions are made or recommendations to the Council are formulated. In the case of critical area permits, the entire file, including all comments received from other State, Federal and local agencies, adjacent property owners and interested parties, is reviewed by each staff member at this meeting. The Coastal Council has delegated a portion of its critical area permit decision-making authority to the staff. (Council Resolution, September 21, 1977). For the majority of applications, the initial decision is rendered by the staff (the appeals process guarantees the applicant or other affected parties an opportunity to be heard before the full Council if desired in these instances). Based on the staff's judgement, major, significant or controversial permit applications may be brought before the Permit Committee of the Council, where either a decision or a recommendation to the full Council is made. The staff

is always present at Committee and Council meetings to supply explanations and information on specific projects, and is prepared to make professional/technical recommendations.

At the request of one Council member, any permit application will be brought before the Council for discussion and decision. All permit applications on which public hearings are held are also brought to the full Council.

The procedure for staff decisions versus Committee and Council consideration of applications for other State agency permits—review and certification—and for Federal consistency determinations is outlined under (B)(1) below.

1) Procedure for Review and Certification

Notification

Coastal Council review and certification of permits of other State agencies is mandated by Section 8(B)(11) of the South Carolina Coastal Management Act, and the cooperative efforts of these agencies in implementing the program is mandated by Section 7(A). There are two primary means by which the Council coordinates with these agencies and receives permit notifications. The first is direct communication between the Council and other State agencies, as outlined in the Memorandum of Agreement (MOA) with each agency. Upon approval and implementation of the management program, the process whereby the Council receives a copy of each permit application from an agency and responds with its comments and certification or non-certification within a specified time period will be officially established.

The second source of project notifications is the South Carolina Project Notification and Review System, a State-wide clearinghouse for comments, administered by the Division of Administration in accordance with Federal Office of Management and Budget Circular A-95. (This is the key mechanism for project notification of Federal activities, the procedure for which is detailed in the Federal consistency segment of the full program document, Chapter V, (F)(3)). At present, the Council staff informally reviews and comments on all A-95 notices in the coastal zone. This project review also will be formalized in the following procedure.

Table 1, on the following page, indicates the State permits which will be subject to review and certification by the Coastal Council.

The Environmental Impact Statement, as required for major Federal or Federally-funded projects under the National Environmental Policy Act of 1970, will be another source of notification to the Council for major new activities in the coastal zone.

Procedure

The Coastal Council will review and certify permit applications made to other State agencies (for projects outside the critical areas) on their individual merits for compliance with the Coastal Management Program. Upon receipt of notice of a permit application from another State agency, Council staff will enter the notice in a file or log system and circulate copies for review and evaluation by staff members, including planning, biological, engineering and legal personnel. Review and certification by the Coastal Council must in each instance be completed and returned to the respective agency within the specified time period. (This time limit will vary by agency and type of permit. In the case of A-95 review, the comment period is 30 days.)

At the discretion of the Council staff, specifically, the Executive Director or the Permit Administrator, permit notification will be forwarded to the Management Committee of the Council for discussion, input, or recommendations. In instances where there may be major policy issues or decisions involved in review and certification of a permit application, these notices may be brought before the full Coastal Council for its consideration.

On each permit application, the Council will submit a letter to the respective State agency, stating either certification (approval) or non-certification (objection). Letters of objection must include a statement of the basis for objection, citing applicable policies of the coastal management program.

Section 7(A) requires that each agency implement these resource policies through its respective permit processes. This implementation is accomplished through Council's certification or non-certification of the individual permit applications of each agency. Through Section 8(B)(11), however, the Council is designated as the final authority for determining compliance with the Coastal Program, of which the resource policies are of

Table 1

State Agency Permits Subject to Council Review and Certification

1. Aeronautics Commission	—Certificates of approval for airports and other air traffic facilities.
2. Budget and Control Board	—Permits for activities below the ordinary high water mark which are within the coastal zone but out of the critical areas.
3. Department of Health and Environmental Control	—State permits to construct wastewater treatment systems or septic tanks handling either more than 1500 gallons per day or other than domestic waste.
	—National Pollutant Discharge Elimination System (NPDES) permits (delegated by EPA).
	—Section 401 of the Federal Water Pollution Control Act certification.
	—Construction permits for air emmissions.
	—Water supply permits.
	—Sanitary Landfill Design, Construction and Operation permits.
	—Oil and Gas facilities registration certificates.
4. Land Resources Conservation Commission	—Mining operations permits.
5. Public Service Commission	—Certificates for major utility facilities.
6. Water Resources Commission	—Oil and gas facilities permits.
	—Groundwater capacity use area permits.

prime importance. If the Council issues a certification determination, the permitting agency is not precluded from denying the permit application based on its own independent statutory or regulatory criteria.

If Council non-certification would be the sole basis for the agency denying a permit application, the agency is urged to put the applicant in contact with the Council. The Council will then approach the applicant and the agency to discuss possible modifications to the proposed project. When the proposed activity cannot be modified to comply with the program, the permitting agency is bound by Section 7(A) to either deny the permit application or to seek a resolution of the conflict through the methods described in this chapter (Section C).

If the application is ultimately denied solely on the Council's non-certification, the Council will provide the applicant an opportunity to appeal the non-certification determination if the permitting agency consents to reopening the application. The Council would conduct the appeal in accord with R.30-6 of the Council's permitting rules and regulations.

2) **Procedure for Coastal Council Permits in the Critical Areas.**

The following procedure is taken from the Final Rules and Regulations for Permitting in Critical Areas of the Coastal Zone, Sections 30-2 through 30-4.

30-2 Applying for a Permit

A. Preliminary review: The Council encourages the submission of development plans for preliminary review. If a permit is necessary, the Council will make every effort to assist the applicant in expediting the filing of an application.

B. Permit application: Except for those exemptions as specified in Section 13(D) of the Act (see R.30-5 below), any person wishing to alter a critical area must receive a permit from the Coastal Council. Section 14(b) of the Act directs that certain information be included in the permit application submitted to the Council. The following minimum information shall be required:

(1) Name and address of the applicant;
(2) A plan or drawing showing the applicant's proposal and the manner or method by which the proposal shall be accomplished;
(3) A plat or a copy of a plat of the area in which the proposed work will take place;
(4) A certified copy of the deed, lease or other instrument under which the applicant claims title, possession or permission from the owner of the property to carry out the proposal;
(5) A list of all adjoining landowners and their addresses or a sworn affidavit that with due diligence such information is not ascertainable;
(6) A brief description of the proposed alteration, its purpose and intended use, including a drawing of the type of structure, a description of the method of construction, and identification of materials and equipment to be used;
(7) A copy of the newspaper public notice.

a) Minor developments (see R.30-2(G)): In the case of applications for minor development permits, the applicant shall publish notice at least once in a newspaper of local circulation in the county of the proposed activity. The newspaper notice should be published within 15 days of the date of Public Notice (see R.30-2(C)). No permit shall be issued by the Council until at least 10 days following the date of newspaper publication. The following form shall be used for newspaper publication:

PUBLIC NOTICE
SOUTH CAROLINA COASTAL COUNCIL

(Name of applicant) will apply (has applied) to the South Carolina Coastal Council for a permit to (description of work) for (public/private) use, at/in (location and name of waterway). Comments will be received by the South Carolina Coastal Council, Suite 802, 19 Hagood Avenue, Charleston, South Carolina 29403 until (insert date, 10 days after date of this newspaper notice).

b) Other activities: In the case of applications for other than minor development permits, the applicant shall publish notice at least once in both a newspaper of general statewide circulation (**The State, News and Courier,** or **The Greenville News**) and a newspaper of local circulation in the county of the proposed activity. The newspaper notices should be published within 15 days of the date of Public Notice (see R.30-2(C)). No permit shall be issued by the Council until at least 15 days following the date of the last-published newspaper publication. The following form shall be used for newspaper publication:

PUBLIC NOTICE
SOUTH CAROLINA COASTAL COUNCIL

(Name of applicant) will apply (has applied) to the South Carolina Coastal Council for a permit to (description of work) for (public/private) use, at/in (location and name of waterway). Comments will be received by the South Carolina Coastal Council, Suite 802, 19 Hagood Avenue, Charleston, South Carolina 29403 until (insert date, 15 days after date of this newspaper notice).

(8) When considered appropriate by the Council or its staff, additional information may be required, such as impoundment management plans, and maintenance dredging schedules.*

C. Notification: The Council is directed in Section 14(C) of the Act and shall within thirty days of receiving either a Joint Public Notice or South Carolina Coastal Council permit application, notify, in writing, interested agencies, all adjoining landowners, local government units in which the land is located and other interested persons. This notice shall indicate the nature and extent of the applicant's proposal.

D. Permit processing: Permit processing shall commence immediately upon receipt of either a Joint Public Notice or a South Carolina Coastal Council permit application and shall proceed concurrently but separately from any Federal authorization.

E. Comments on application: Section 14(C) of the Act allows all interested Federal and State agencies, all adjoining landowners, local government units and other interested persons to have thirty days after the receipt of Public Notice of permit application from the Council to file written comments pertaining to the application. Only those comments received within the thirty day period must be considered in the Council's decision on a permit application. Any persons wishing to receive notice of the initial decision on a permit application shall notify the Council within this comment period. Exception: Comments on permit applications for minor development activities, as defined in Section 3 (N) of the Act, must be received within fifteen days after receipt of Public Notice of permit application.

F. Public information: The complete file on each permit application, including all comments received, will be available for inspection by any member of the general public during regular business hours at the principal Council offices.

G. Minor development activities: In determining whether a particular project is a minor development, as defined in Section 3(N) of the Act, a private pier shall be defined as a non-commercial, strictly private recreational facility that is not used for, or in support of, any industry or commercial operation. Any charge to members of the public or any person for use of the facility is prohibited for a structure qualifying as a minor development.

Minor dock or pier developments shall have the same specifications as furnished under the general permitting provisions with the Army Corps of Engineers. Erosion control structures means, in the case of minor developments, those structures commonly known as bulkheads which follow the existing shoreline, not fronting on the Atlantic Ocean, and the construction of which involves no direct effects on wetlands.

*By resolution of the South Carolina Coastal Council, additional information will be required as follows:

When the Council staff finds that there is reasonable question or doubt over private claim to ownership of tidelands below the mean high water line on major permit applications, the applicant will be required to provide a statement from the South Carolina Attorney General as to whether or not there is a dispute with the State regarding ownership of said tidelands before the full Council will consider the permit application complete. If the Attorney General fails to make a response within sixty (60) days of the date of proof of notification, the permit application will be processed.

H. State comment: Issuance or denial of the permit by the Coastal Council shall be the State comment on the corresponding Federal permit application.

I. Water quality certificate: If a water quality certificate, as required under §401 of P.L. 92-500, is not required by a Federal permitting agency, the Coastal Council may require a statement of water quality certification from the South Carolina Department of Health and Environmental Control.

30-3 Public Hearings

Section 14(C) of the Act directs the Council to hold public hearings on permit applications if it is deemed necessary. Section 15 (B) of the Act requires the Council to convene a public hearing before acting on an application if twenty or more citizens or residents of the affected county or counties request such a hearing. Each request must be in writing and on a separate sheet of paper and be received within thirty days after receipt of a Public Notice of the permit application. In all cases, the public hearing shall be held in the county where the land is located and if in more than one county, the Council shall determine in which county to hold the hearing or may hold hearings in more than one county. These hearings will be open to all citizens of the State. When applicable and practical, joint public hearings will be held with the U.S. Army Corps of Engineers and other agencies.

30-4 Decisions on a Permit

A. Permit approval: The Council is allowed, under section 15(B) of the Act, to issue a conditional permit approval. Under this provision, the Council may direct the applicant to amend his proposal to take specific measures necessary to protect the public interest. If the Council has approved an application, Section 15 (B) of the Act also allows the Council, at its discretion, to support the applicant in a Federal permitting process.

B. Permit denial: A Permit denial shall cite facts upon which the denial was based and the criteria or reasons for which the denial was issued.

C. Action upon a permit: The Council, according to Section 15(C) of the Act, shall act upon an application tor a permit within ninety days. This ninety day period shall begin when the application is complete and filed in approved form. Exceptions to the 90 day deadline are applications for minor developments on which action must be taken in thirty days.

D. Licensing of equipment: Upon issuance of a permit, if the alteration authorized requires the use of a dragline, dredge, bulldozer or similar equipment, the permit holder shall be required to register the equipment, and the identification number assigned by the Council shall be prominently displayed. Equipment in use within critical areas for activities not requiring a Council permit must also be registered. The persons responsible for this equipment must register it with the Council before use.

E. Completion of work: Section 15(F) of the Act requires a permit holder to complete work within three years from the date of permit issuance. The Council may extend this three-year period upon a showing of good cause indicating that due diligence toward completion of the work has been made, evidenced by significant work progress. Work shall be continuous and expeditious whenever possible.

F. Property rights not affected, no state liability, other permit requirements: No permit shall convey, nor be interpreted to convey, a property right in the land or water in which the permitted activity is located. No permit shall be construed as alienating public property for private use or as alienating private property for public use. In no way shall the State be liable for any damage as a result of the erection of permitted works. A South Carolina Coastal Council permit in no way relieves the holder from responsibility for compliance with other applicable Federal, State or local permit requirements.

G. Legally commenced a use: Section 13(C) of the Act reads as follows:

> Ninety days after the effective date of this act no person shall fill, remove, dredge, drain or erect any strucutre on or in any way alter any critical area without first obtaining a permit from the Council. **Provided,** however, that a person who has legally commenced a use such as those evidenced by a state permit, as issued by the Budget and Control Board, or a project loan approved by the rural electrification administration or a local building permit or has received a United States Corps of Engineers or Coast Guard permit, where applicable, may continue such use without obtaining a permit. Any person may request the Council to review any project or activity to determine if he is exempt under this section from the provisions of the act. The Council shall make such determinations within forty-

five days from the receipt of any such request.

C. RESOLUTION OF CONFLICTS

If either method of coordination fails and a conflict between the Coastal Council and another agency occurs over the issuance of a permit (by the other agency) or adequacy of conformance with the Coastal Management Program, the Council may take several actions to resolve the conflict. The Council could (1) attempt to set a meeting of executive directors or other staff members of both agencies at a convenient location to discuss, outline and attempt to resolve the conflict; (2) attempt to set a meeting between the Council and the governing body of the other agency to solve the conflict through their direct negotiation; or (3) petition for an injunction and declaratory judgement under §15-53-10 **et seq.** (Declaratory Judgement Act) of the 1976 S.C. Code. Section 5 (I) of the Coastal Management Act and §15-53-30 of the Declaratory Judgement Act allow the Council to seek resolution of the conflict in court. Section 5(O) allows the Council to attempt the other actions of direct mediation and grants the Council the power to exercise all incidental powers necessary to carry out the provisions of the act. If the Council ultimately sought a court resolution of a conflict, the court's judgement would be binding on all of the parties. This analysis of the Council's ability to resolve conflicts applies to all of the networked agencies discussed in Appendix C.

D. EVALUATION AND AMENDMENT PROCEDURE

Because of the changing nature of the coastal zone, both politically and physically speaking, even a very flexible management program will require periodic updating. In order to have a basis for revision, some means of evaluating the effects of current management policies must be devised. Therefore, evaluation procedures will be employed whenever possible, in order to facilitate periodic policy analysis and review, and, where necessary, revision.

In a broader sense, evaluation procedures are necessary in order to assure the citizens of South Carolina that the Coastal Council is carrying out those functions for which it was created. Gerald Swanson, writing about the San Francisco Bay Conservation and Development Commission, has rather forcefully expressed the reasoning underlying evaluation procedures:

> In the private sector, organizational effectiveness is measured by the ability to market products successfully in a competitive environment. In the public sector, however, there is no single measure of success. All too often a logrolling budgetary process substitutes for critical scrutiny of organizational performance. We have passed the point in public administration where we can just throw money at a problem and assume it has gone away. Serious attempts at critical assessment must now be made to assure that a solution has really been delivered and not just paid for. If coastal management is to succeed in the long run, we must sharpen the tools of administrative analysis so that we can really assess organizational effectiveness. Effectiveness measures will assure that solutions as well as programs are a reality.[1]

Approach

In keeping with the performance standard approach utilized throughout the management program, evaluation effects will focus on the outcomes and impacts of activities, rather than on procedures and processes. Initially, only several of the most significant areas of possible impact will be monitored. These will include beach access, beach erosion control, tidelands protection and marine and estuarine pollution. For each of these areas, a body of baseline data will be assembled, reflecting, insofar as is possible, conditions before the permitting process was instituted. A number of indicators of change will be identified for each of the areas of concern, and methods will be devised whereby these indicators can be periodically monitored. Such monitoring

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[1]Swanson, Gerald C., Coastal Zone Management from an Administrative Perspective: A case study of the San Francisco Bay Conservation and Development Commission, **Coastal Zone Management Journal** 2(2): 81-102, 1975.

may take place monthly, semi-annually or annually, depending upon the nature of the data being examined.

During the initial implementation stages, some attempt will be made to set forth criteria for "adequacy" — in other words, how much improvement is enough, or how much deterioration can be tolerated. However, recognizing both the lack of basic scientific knowledge and the infancy of the program, efforts will be concentrated on determining the desired direction of change, rather than the absolute level of desirable change.

Examples of possible sources of baseline data and indicators of change for each of the four areas to be evaluated follow:

Beach access baseline data will include a map and list of present public access points along the South Carolina coast, a list of recreational access facilities (parks, boat ramps, marinas, etc.), and an assessment of current parking facilities near access points. Indicators of change may include new public access points as provided by permitted activities or developments related to erosion control funding. (Conditions under which a permit is granted or erosion control funds are released may specify that certain types of public access be provided:) Other indicators of change are the number of new parking facilities built, increases in the availability of public transportation (i.e., bus or ferry service) and increases in the number of boat ramps, marinas, etc. available to the public. Some attention should also be paid to qualitative aspects of public access, although this is an admittedly arbitrary procedure. Criteria to be employed might include the presence or absence of such amenities as dressing rooms and showers available for public use.

Beach erosion control baseline data will be provided primarily by several studies currently underway under the direction of outside consultants. In addition, erosion control funding will be monitored in order to ascertain spending patterns. Indicators of change will be the change in the rate of erosion and deposition, the longevity of improvements brought about by beach renourishment projects, and the frequency with which funds are spent on projects in the same locations as earlier expenditures. The success of management program policies may also be measured by the number of municipalities passing erosion control ordinances and by the percentage of new developments incorporating mandatory set-backs or other erosion control mechanisms.

Tidelands protection and marine and estuarine pollution control will both rely on the same data base with regards to water quality. Sources of data will include the Department of Health and Environmental Control, Water Quality Control Annual Assessment, readings from monitoring stations in the coastal zone, data from shellfish area monitoring stations, reports from the South Carolina Wildlife & Marine Resources monitoring stations and Audubon Christmas bird count data for marsh and estuarine species. Each of these data sources will be monitored in order to determine the degree to which environmental conditions have improved or deteriorated within the coastal zone. An additional measure of the effectiveness of tidelands protection policies will be the annual rate of fill of the wetlands, based on long-term analysis of acreage filled by permit each year.

Evaluation procedures may reveal that certain management policies, rules or regulations require some alteration in order to be more effective. In addition, changes in public priorities, expectations, or issues of concern will necessitate changes in the original plan. These changes may take the form of modifications or refinements depending upon the extent of the proposed alteration. Amendments of either type are dealt with in Subsection 306 (g) of the Federal Coastal Zone Management Act, which states that "Any coastal state may amend or modify the management program which it has submitted and which has been approved by the Secretary ..."

Proposals for a change in the management program may originate within the Coastal Council or its staff, within a Federal, State or local government unit, or with members of the general public. In the last instance — that is, changes proposed by members of the general public — a suggestion will be acted upon by the Council if twenty or more people so request in writing. In all cases, the Council will consider the proposal for a period of at least 30 days, before determining whether modification procedures should be initiated.

If taken, Council action must begin with a determination of the nature and extent of the proposed change. Procedures to be followed will vary depending upon whether the change is classified as an amendment or as a refinement.

Section 923.81 (**Federal Register** Vol. 44, No. 61, March 28, 1979) states that amendments or modifications to an approved management program will represent one of the following cases:

(1) Changes in basic program goals, objectives or policies;

(2) Changes in techniques (for achieving goals, objectives or policies) that result in an environmental impact significantly different from previously approved techniques; or
(3) Changes in techniques (for achieving goals, objectives or policies) that result in significantly altered intergovernmental relationships not reviewed by and concurred with by affected agencies or units of government at the time of the proposed modification.

South Carolina's Coastal Management Act of 1977 (Act 123), Section 9, states that "any change in or amendment to the final management plan shall be implemented by following the procedures established in Subsections (A), (B), (C) and (D) of this section and upon the review and approval of the Governor and the General Assembly." Accordingly, the same notice, public hearing, and review and comment procedures employed during initial approval of the management program shall be followed in the case of amendments thereto.

Once the amendment has been approved by the Governor and General Assembly, a formal request for its adoption shall be made to the Assistant Administrator by the Chairman of the Coastal Council. The request shall include a description of and justification for the change, evidence of adequate public notice and the degree and nature of public interest, and an environmental impact assessment (unless it has been determined that there will be no significant departure from the impacts of the previously approved management program).

The Assistant Administrator will evaluate the proposed change according to the requirements of Subsection 306(g) of the Federal Coastal Zone Management Act, and will determine the need for an Environmental Impact Statement. If the Environmental Impact Statement is deemed necessary, normal review/approval procedures (See Section 923.72, **Federal Register** Vol. 44, No. 61, March 28, 1979) will be followed. If an EIS is not necessary, the proposal will be forwarded to relevant Federal agencies for review and comment. Notice of the Assistant Administrator's decision will be published in the **Federal Register.** In the case of amendment disapproval, the State will be advised in writing of the reasons for the decision.

In addition to amendments, a number of minor adjustments may have to be made during the implementation of the management program. It is assumed that these changes will not require formal amendment proceedings but can be made after consultation with and approval by the Assistant Administrator.

Refinements are defined in Section 923.82 (b) (**Federal Register** Vol. 44, No. 61, March 28, 1979) as "changes relating to programs or techniques for attaining particular goals or objectives or for implementing particular policies (but not changes in these goals, objectives or policies themselves)." In addition, refinements cannot alter the environmental impact of the previously approved plan, nor can they alter intergovernmental relations.

Proposals for refinements to the management program may originate in any of the ways noted above. Depending upon the scope and effect of the changes, the Coastal Council may at its discretion hold public hearings on the proposed refinement, or may simply circulate copies of the proposal to all relevent agencies and interested parties after proper public notice. The Council will consider all comments and proceed if sufficient public support for the change is evident.

After consultation with the Assistant Administrator to determine that the proposed change is, indeed, a refinement and not an amendment, the Chairman of the Coastal Council shall submit a written request for the refinement. The request shall include a description of and justification for the change, an indication that the public has been informed of the proposal, a discussion of their reactions, and a determination that there will be no significant alteration of previously approved environmental impacts or intergovernmental relations. The Assistant Administrator will evaluate the materials submitted, consult with relevant Federal Agencies and interested parties as appropriate, and publish the decision in the **Federal Register.**

E. WATER AND AIR QUALITY STANDARDS

Section 307(f) of the Federal Coastal Zone Management Act requires States to incorporate all requirements established pursuant to the Federal Clean Water Act and the Clean Air Act into their management programs. The South Carolina Coastal Council has worked closely with the State Department of Health and Environmental Control (DHEC), where responsibility for implementing these two Acts is lodged. (See South Carolina's Pollution Control Act, Title 48, Chapter 1, 1976 Code of Laws.) DHEC has been delegated a portion of the Federal permit authority under the Clean Air Act and the Clean Water Act. Pursuant to Sections 7(A) and 8 (B)(11) of the S.C. Coastal Management Act of 1977, the Coastal Council will review and certify

the permit applications made to DHEC for both air emissions and waste water construction and discharge projects. DHEC is bound in its decision-making to the minimum air and water quality standards established by the US Environmental Protection Agency. The Council then reviews the project proposals for compliance with other policies of the Coastal Management Program. (See Chapter V(A) for a further discussion of the legal authorities and "networking" approach used in program implementation.)

South Carolina's management program incorporates the minimum air quality standards applicable to the coastal zone. Since the Department of Health and Environmental Control is charged with promulgating and enforcing such standards, close cooperation has been necessary between DHEC and the Coastal Council. A Memorandum of Agreement between the two agencies was signed soon after the Council was created. (See Appendix D.) Among the points contained therein were clauses governing the designation of official liaisons between the two agencies, review of Coastal Council (critical area) permits by DHEC personnel and review of DHEC permits by the Coastal Council. DHEC's permitting authority is broad:

> Any person...desiring to make any new outlet or source, or to increase the quantity of discharge from existing outlets or sources, for the discharges of sewage, industrial wastes or other wastes, or the effluent therefrom, or oil contaminants, into the waters or ambient air of the State, shall first make an application to the Department for a permit to construct and a permit to discharge from such outlet or source. (Section 48-1-100, 1976 South Carolina Code of Laws.)

The minimum water pollution control requirements applicable to the coastal zone are met by the South Carolina management program. These standards include the minimum established by the EPA for effluent limitations, new source performance standards, pre-treatment standards and toxic pollutant discharge standards, as well as the regulations established by DHEC, including water quality management plans developed by the COGs under Section 208 of the Federal Clean Water Act and approved by DHEC. The State Non-Point Source Pollution Plan is another useful tool for controlling water pollution in tidelands.

The same permitting procedures and review provisions applicable to air quality standards apply to water quality regulation. In addition, South Carolina's Coastal Management Act (Act 123 of 1977) requires that the Coastal Council:

> Consider, in conjunction with the Department of Health and Environmental Control the planning and review of existing water quality standards and classifications in the coastal zone. (Section 8(D))

This requirement has been addressed in the Memorandum of Agreement between the two agencies.

In addition to enforcing water quality standards, the two departments are working together to coordinate the prevention, control, removal, monitoring and reimbursement for oil spills in the coastal zone. Other agencies involved in this effort are the EPA and U.S. Coast Guard as well as a number of local commercial and industrial interests.

F. INTERGOVERNMENTAL COORDINATION

1. FEDERAL COORDINATION

Section 306(c)(1) of the Federal Coastal Zone Management Act requires States to develop their management programs "with the opportunity of full participation by relevant Federal agencies..." South Carolina's coastal zone legislation reiterates the need for State/Federal coordination in Section 8(B)(8) and Section 8(C). Without active participation by Federal agencies, coordination between the State's coastal zone management program and existing Federal programs and legislation would be impossible. The diversity of interests - many of which are conflicting - in the coastal zone makes coordination of Federal, State, and, of course, local programs an imperative if rational decisions regarding resource use and allocation are to be made. South Carolina's Coastal Council has endeavored to establish close ties with relevant Federal agencies in order to facilitate a mutual understanding of each others programs, goals, and procedures, and to develop workable arrangements which will accommodate the needs of all concerned.

Relevant Federal Agencies

The first step toward achieving Federal coordination is the identification of those agencies which are affected by, or have an influence on, coastal zone management in South Carolina. The following agencies have been identified as having an interest in South Carolina's coastal zone. With one exception (the Marine Mammal Commission), they are the agencies named in the Rules and Regulations pursuant to the Federal Coastal Zone Management Act of 1972.

1. Coastal Plains Regional Commission
2. Department of Agriculture
3. Department of the Army
4. Department of the Air Force
5. Department of Commerce
6. Department of Energy
   - FERC
7. Department of Health, Education and Welfare
8. Department of Housing and Urban Development
9. Department of the Interior
10. Department of Justice
11. Department of the Navy
12. Department of Transportation
13. Environmental Protection Agency
14. General Services Administration
15. Marine Mammal Commission
16. Nuclear Regulatory Commission
17. Veterans Administration

Information Dissemination

Section 923.51(d)(2) of the Rules and Regulations governing the Federal Coastal Zone Management Act states that "timely opportunities for relevant Federal agency participation and input" must be provided in order for the states to be in compliance with subsection 306(c)(1) of the Act. One of the most important aspects of "relevant participation" is knowledge of Coastal Council objectives and activities, for without an awareness of developments in coastal zone management, Federal agencies will be unable to define and evaluate their own role in coastal planning.

In order to ensure that Federal agencies with an interest in South Carolina's coastal zone are kept abreast of new developments, a contact has been designated within each agency. These Federal agency contacts have been added to the Coastal Council's mailing list, and thus receive notification of all council meetings, public meetings and public hearings, as well as minutes and summaries thereof. They also have received copies of all new segments of the management program, permitting rules and regulations, and other pertinent items as they have been completed. Contact names and addresses are listed in Appendix G, pp. 1-3.

Federal agency awareness of Coastal Council activities is further enhanced by **Carolina Currents**, a monthly newsletter designed to acquaint Federal agency contacts and other interested parties with relevant Council decisions and activities. Each issue contains minutes of the previous month's Council meeting, as well as brief discussions of recent developments of interest. Articles have included the results of the March 28, 1978, Outer Continental Shelf Lease Sale #43, which encompassed submerged lands off the South Carolina coast, a history and "state of the art" discussion of coastal impoundments, an explanation of the 1977 Clean Air Amendments, and developments in the public involvement program sponsored by the Council.

Interaction

In addition to listing and making initial contacts with relevant Federal agencies, states must "provide timely opportunities for relevant Federal agency participation and input" (Section 923.51(d)(2)) and advise "those agencies of public hearings on the management program" (Section 923.51(d)(3)).

Federal agency contacts are advised of all public hearings and public meetings. They are invited to make presentations at these events and to express their views during the review and comment period preceeding

adoption of any segment of the management program or Rules and Regulations. Once a final draft has been accepted, a copy is sent to each agency, along with a letter responding to the agency's comments on the document.

In an attempt to ascertain what Federal agencies perceive to be their own, as well as the national interest in the coastal zone, the Coastal Council sent Federal agency contacts a questionnaire. Contacts were asked to list activities and projects as well as their primary functions and responsibilities in the coastal zone. Responses were used to further the Council's understanding of national interest considerations as well as coordination needs.

By far the most important aspect of South Carolina's Federal coordination procedure is that of personal contact between the Council staff and Federal agency contacts. Direct interaction between the Coastal Council and various Federal agencies leads to informal resolution of conflicts as well as to a greater understanding of each other's needs, goals, and problems. A meeting of all Federal Regional Representatives and Coastal Council staff was held during the fall of 1978, in order to deal with questions arising from the management program discussion draft. Frequent communication by letter and phone augments the personal contact schedule.

Several special purpose coordination mechanisms are planned. Such a mechanism has been developed with the U.S. Army Corps of Engineers in order to simplify the permitting process for certain classes of piers and docks. As a result of this dialogue, one general permit may be obtained in many cases instead of the multiple permits required prior to April, 1978.

Special Needs

The South Carolina Coastal Council has identified several agencies or areas requiring special attention for one reason or another. These include, but are not limited to, the following:

1. The U.S. Air Force has been a significant contributor due to the location and operation of major air facilities in Charleston and Myrtle Beach.
2. The U.S. Army Corps of Engineers worked in close coordination with the Council as the permitting section of the management program was developed.
3. The U.S. Coast Guard and the Department of the Navy were closely involved due to the large volume of navigation along our coast and the location of Coast Guard and Navy bases.
4. U.S. Fish & Wildlife Service and National Marine Fisheries Service input was significant because of their interest in environmental protection.
5. The Fisheries Management Council was closely involved during their development of a fisheries management policy.
6. The Bureau of Land Management and other Federal agencies were able to contribute considerably due to expanded OCS activities.
7. Both the Soil Conservation Service and the Forest Service were important contributors due to the importance of forestry and agricultural practices in South Carolina's coastal zone.

Documentation

Section 923.51(b)(3) of the Federal Rules and Regulations pursuant to the Coastal Zone Management Act states that Coastal Zone Management offices must "summarize the nature, frequency, and timing of contacts with relevant Federal agencies, including attempts to resolve differences, if any." To that end, all Federal agency contacts have been logged and classified according to date, personnel involved, nature of the communication, and content. In addition, complete records of all correspondence with Federal agency contacts are maintained. Record keeping is facilitated by the use of contact sheets distributed to all staff members. The staff is asked to record the date, method of contact, name of the agency and person contacted, summary and/or purpose of the communication and any pertinent remarks.

2. FEDERALLY EXCLUDED LANDS

Subsection 923.33 of the Section 306 regulations regarding requirements for approval of a state's coastal management program, states the following:

> States must exclude from their coastal management zone those lands owned, leased, held in trust or whose use is otherwise by law subject solely to the discretion of the Federal Government, its officers or agents.

The regulations further state:

> The exclusion of Federal lands does not remove Federal agencies from the obligation of complying with the consistency provisions of Section 307 of the Act when Federal actions on these excluded lands have spillover impacts that significantly affect coastal zone areas, uses or resources within the purview of a state's management program.

Appendix M consists of a list of property within South Carolina's coastal zone which conforms to current Federal Regulations defining Federally excluded lands. Maps of these lands appear in Appendix N.

3. FEDERAL CONSISTENCY

Introduction

Federal agencies play a significant role in the coastal zone through such actions or activities as the following:

1) the issuance of licenses and permits for activities such as dredging and the siting of nuclear power plants,
2) the issuance of licenses and permits associated with exploration and development of the Outer Continental Shelf,
3) the provision of financial assistance such as grants for watershed protection and flood prevention, and
4) the undertaking of their own activities and development projects such as highway construction or the operation and management of national parks.

Subsections 307(c) and (d) of the Federal Coastal Zone Management Act of 1972, as amended, contain what is referred to as the "Federal Consistency" requirements of the law. Through these subsections and their accompanying rules and regulations, certain Federal actions are required to be consistent, to the maximum extent practicable, with approved state management programs.

Four types of actions have been identified in the Federal rules and regulations as requiring a Federal consistency determination:

(1) Direct Federal Activities/Development Projects,
(2) Federal Licenses and Permits,
(3) Outer Continental Shelf (OCS) Exploration, Development and Production Activities, and
(4) Federal Assistance.

Through the Federal consistency process, the relevant State agency (in South Carolina, the S.C. Coastal Council) is afforded an opportunity to review certain activities under these four categories based on the policies of its coastal management program. Except for Direct Federal Activities/Development Projects, the action cannot receive Federal approval unless first determined by the state to be consistent to the maximum extent practicable.

Federal consistency is intended to benefit both the coastal states and Federal agencies by maximizing communication and coordination on coastal land and water use decisions between the two levels of government. It serves a very important dual purpose in the overall national coastal zone management program. Under this requirement, national interests must be taken into consideration by coastal states, and in return for this concession, the states are allowed a greater say in the future of their coastal zones.

The following pages, which contain a Federal consistency matrix diagram and brief explanations of the four types of Federal actions with accompanying operational guidelines, serve to explain the way in which the consistency provisions of the Federal Coastal Zone Management Act will be accommodated in South Carolina's coastal management program. This information is to be used as an action guide by Federal agencies, applicants for Federal licenses and permits, persons submitting OCS plans and the State A-95 clearinghouse which receives State and local government applications for Federal assistance.

These comprehensive guidelines do not attempt to take the place of the Federal consistency regulations promulgated pursuant to the Federal Coastal Zone Management Act of 1972, as amended, and are intended to be used in conjunction with those regulations (Section 930, **Federal Register**, Vol. 44, No. 123, June 25, 1979).

I. DIRECT FEDERAL ACTIVITIES/DEVELOPMENT PROJECTS

Subsections 307(c) (1) and (2) of the Federal Coastal Zone Management Act address the subject of Federal Activities and Federal Development Projects in the coastal zone. Although these subjects are treated as a single class of Federal actions, "development projects" have been defined as being a subset of "activities."

Federal agencies are required to determine which of their activities directly affect the coastal zone of States with approved management programs. Once a Federal agency determines that an activity has a direct effect on the coastal zone, it is required to determine whether or not the activity is consistent to the maximum extent practicable with the State's management program and to give notice to the State of the proposed or ongoing activity along with the accompanying consistency determination.

The State agency is then required to inform the Federal agency of its agreement or disagreement with the consistency determination at the earliest practicable time. Should the State agency disagree with the Federal agency's determination, it must accompany its response with the reasons for disagreement as well as supporting information on which its decision is based. If the disagreement cannot be settled, the Federal agency should delay the implementation of its proposed activity until the disagreement is resolved, as specified on page V-22 (Conflict Resolution).

(NOTE: The operational guidelines below, which pertain to Federal Activities/Development Projects, explain the procedure by which Federal consistency requirements will be met.)

Operational Guidelines

(Direct Federal Activities/Development Projects)

I. **Definitions**

A. **Federal Activity** — A Federal activity is any function performed by or on behalf of a Federal agency in the exercise of its statutory responsibilities. Federal activities include Federal actions which are neither Federal development projects nor activities pertaining to Federal licenses, permits and Federal assistance.

B. **Development Project** — A Federal development project is a Federal activity involving the planning, construction, modification, or removal of public works, facilities, or other structures, and the acquisition, utilization, or disposal of land or water resources.

C. **Consistent to the Maximum Extent Practicable** - The term "consistent to the maximum extent practicable" describes the requirement for Federal activities including development projects directly affecting the coastal zone of States with approved management programs to be fully consistent with such programs unless compliance is prohibited based upon the requirements of existing law applicable to the Federal agency's operations.

D. **Coastal Zone** - The "coastal zone" means all coastal waters and submerged lands seaward to the State's jurisdictional limits and all lands and waters in the following counties: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown. (All lands which lie within this geographic area and which are owned, leased, held in trust or whose use is otherwise by law subject to the discretion of the Federal Government, its officers or agents are excluded from the coastal zone.)

II. Federal Activities/Development Projects Determined by the South Carolina Coastal Council as Likely to Have a Direct Effect on the Coastal Zone of South Carolina.

The South Carolina Coastal Council has determined that the following Federal activities directly affect the South Carolina coastal zone. The Coast .! Council reserves the right to make additions or deletions to this list after consultation with the pertinent Federal agency(ies).

The South Carolina Coastal Council also reserves the right to review for consistency Federal activities/development projects proposed for or occurring in areas outside the coastal zone which may have "spill-over" effects and thus would directly affect the State's coastal zone.

> NOTE:
> "Federal agencies shall consider all development projects within the coastal zone to be activities directly affecting the coastal zone. All other types of activities within the coastal zone are subject to Federal agency review to determine whether they directly affect the coastal zone." (Section 930.33(b), **Federal Register,** Vol. 44, No. 123, June 25, 1979.)
> "Federal activities outside of the coastal zone (e.g., on excluded Federal lands, on the Outer Continental Shelf, or landward of the coastal zone) are subject to Federal agency review to determine whether they directly affect the coastal zone." (Section 930.33(c), **Federal Register,** Vol. 44, No. 123, June 25, 1979.)

Federal agencies may apply the four criteria below to the following list of activities/development projects to assist them, where needed, in more narrowly defining or identifying their activities which are of concern to South Carolina's coastal management program.

The S.C. Coastal Council considers an activity to have a direct effect on the coastal zone and therefore is subject to the consistency requirements if it meets one or more of the following criteria:

1. is located in one or more of the four critical areas (coastal waters, wetlands, beaches and primary ocean-front sand dunes);
2. has a detrimental environmental impact upon a critical area (for example, water pollution upstream from an inland source which would then reach and result in degradation of the estuarine system);
3. has adverse effects on the quality or quantity of coastal resources - natural, economic, social or historical;
4. disrupts access to a public coastal resource.

DEPARTMENT OF DEFENSE (Army Corps of Engineers, Air Force, Army and Navy)

1. Navigation projects (including all ongoing maintenance and ancillary activities that are reviewed on a one-time basis as part of the project as a whole.)
2. Maintenance dredging (including all ongoing maintenance and ancillary activities that are reviewed on a one-time basis as part of the project as a whole.)
3. Shoreline protection projects.
4. Beach nourishment.
5. Other public works projects with the potential to impact coastal lands and waters.
6. Construction of docks, piers, bulkheads, mooring dolphins, etc.
7. Construction or maintenance of sewage or drainage ditches or canals located in coastal waters or wetlands.
8. Location, acquisition and design of new or enlarged defense installations.
9. Actions conducted on Federal lands with potential impact on coastal lands and waters.

DEPARTMENT OF THE INTERIOR

U.S. Fish & Wildlife Service

1. Construction and/or maintenance of waterfowl impoundments.
2. Construction and/or maintenance of docking facilities and navigation approaches.
3. Construction and/or maintenance of shoreline protection projects.
4. All other activities which are proposed on refuge lands that normally (i.e. within the coastal zone) would require a State or Federal permit or which would result in any direct impact on coastal waters.
5. Proposed acquisition of wildlife refuges.

National Park Service

1. Proposed acquisition of national parks and seashores and national park and seashore management activities which normally (i.e. within the coastal zone) would require a State or Federal permit or which would result in any direct impact on coastal waters.
2. Preservation of historic and cultural sites.

Bureau of Land Management

1. OCS Pre-lease sale activities (e.g. tract selection, stipulations) (The S.C. Coastal Council reserves the right to review proposed OCS Lease Sales when the question of whether lease sales are eligible for consistency has been resolved.)

DEPARTMENT OF TRANSPORTATION

Federal Highway Administration

1. Construction of roads, bridges or rights-of-way in the coastal zone. (Because of their limited scope and absence of a direct effect on the coastal zone, the following activities are exempted from the Federal consistency requirements of this section.)

Category 1: Modernization of an existing highway section including (but not limited to) such improvements as:

a) resurfacing, restoring and rehabilitation.
b) widening by less than a single lane width, unless in a wetland area.
c) adding shoulders and/or sidewalks, unless in a wetland area.
d) adding auxiliary lanes for localized purposes to provide weaving, speed changes and turn storage.
e) making intersection improvements that do not change existing traffic patterns.
f) improving railroad grade crossings, unless in a wetland area.

Category 2: Installation of lighting, signing, pavement marking, signalization, freeway surveillance and control systems, and railroad protective devices.

Category 3: Safety improvement projects such as pavement grooving, glare screens, safety barriers, energy attenuators , etc.

Category 4: Unless a wetland is impacted, improvement to existing crossroad or

railroad separations and stream crossings such as replacement of bridge decks and parapets, and closing open medians between dual bridges; grade-separated crossings of highways by railroads or by highways which do not require extensive approach relocations.

Category 5: Unless a wetland area is impacted, highway landscaping, safety rest areas, scenic overlooks, truck weigh stations, bus shelters and bays and fencing.

Category 6: Alterations to existing buildings to provide for noise attenuation and installation of noise barriers, berms, or any combination of devices.

Category 7: Temporary emergency replacement of a highway facility which is commenced immediately after the occurrence of a natural disaster or catastrophic failure. This work is usually required to restore the highway for the health, welfare, and safety of the public and does not involve work of the nature and extent which causes it to come under the purview of NEPA.

Category 8: Unless a wetland area is impacted, utility installations along or across a highway.

U.S. Coast Guard

1. Construction of docking facilities and navigation approaches with the exception of Coast Guard maintained or authorized aids to navigation.
2. Construction of Coast Guard bases, facilities and installations.
3. Any activity related to oil spill or other clean-up operations which involves permanent alteration of a critical area.

DEPARTMENT OF AGRICULTURE

Forest Service

1. Construction or silvicultural activities which normally (i.e. within the coastal zone) would require a State or Federal permit or which would result in any direct impact on coastal waters.

Soil Conservation Service

1. Planning and management activities that require either a State or Federal permit or which would result in any direct impact on coastal waters.

GENERAL SERVICES ADMINISTRATION

1. Location and design of proposed Federal government property acquisition and building construction.
2. Disposal of surplus Federal lands.

DEPARTMENT OF ENERGY

1. Demonstration projects for the production of energy.
2. The underwriting of the conversion of existing dams to small-scale hydroelectric projects.

III. **Consistency Determination**

A. **Decision Making Agency** — The Federal agency makes the consistency determination.

B. **Responsibilities of Federal Agency**

1. Determine consistency of activity/development project.
2. Notify South Carolina Coastal Council of determination. (Suggested method of notification is utilization of the OMB Circular A-95 process.) Federal regulations require that the consistency determination be provided to State agencies at least 90 days before final approval of the Federal activity unless both the Federal agency and the State agency agree to an alternative notification schedule.

   NOTE: This determination may be a negative one in which the Federal agency decides that a certain activity does not require a consistency determination. (See Section 930.35(d) **Federal Register**, Volume 44, Number 123, June 25, 1979.) Negative determination procedures are provided to assure State agencies an opportunity to review borderline cases. The South Carolina Coastal Council must be notified of all Federal agency negative determinations.

3. Respond to South Carolina Coastal Council requests for additional information.

C. Notification Procedures and Content of Consistency Determination

The **method of notification** is determined by the Federal agency. However, the South Carolina Coastal Council recommends that either the OMB Circular A-95 review process or appropriate environmental reviews, impact reports, Environmental Impact Statements, negative declarations, or related in-house agency reports as required by the National Environmental Policy Act of 1969, be adopted as the method of notification. The decision on method of notification will be made in each instance through agreement with each individual Federal agency and the South Carolina Coastal Council.

Content of Consistency Determination

1. The consistency determination made by the Federal agency should include **one of the following** statements:

(a) "This activity (or development project) is not subject to the consistency requirements of Section 307 of the Coastal Zone Management Act of 1972, as amended."
(b) "This activity (or development project) is consistent with the South Carolina Coastal Management Program."
(c) "This activity (or development project) is not consistent in all respects with the South Carolina Coastal Management Program, but it is consistent to the maximum extent practicable. Please refer to the supplementary information below."
(d) "This activity (or development project) is not consistent with the South Carolina Coastal Management Program, but no practicable alternative exists to carry out the legal purpose for which the activity (or development project) is designed."
(e) "This activity (or development project) is not consistent with the South Carolina Coastal Management Program, but no practicable alternative exists to meet the national security need filled by this activity."

2. **Date** by which Federal agency plans to make a final decision on whether or not to proceed with the activity/development project.

3. **Detailed description** of activity/development project, its associated facilities, and their coastal zone effects (including primary, secondary and cumulative coastal zone effects).

4. **Comprehensive data and information** sufficient to support consistency statement.

NOTE: Federal agencies are urged to obtain the views and assistance of the South Carolina Coastal Council regarding provisions of the South Carolina Coastal Management Program which are related to the proposed activity/development project and the information necessary to make a consistency determination. The activity/development project, its primary effects, its associated facilities and the primary effects of the associated facilities must all be consistent to the maximum extent practicable with the management program.

D. **Determinations for Proposed Activities/Development Projects**

1. **Federal Activities**

In determining whether or not proposed Federal activities which directly affect the coastal zone are consistent with the South Carolina Coastal Management Program, Federal agencies are urged to consult with the South Carolina Coastal Council.

A general consistency determination may be issued in cases where Federal agencies will be performing a repeated activity other than a development project (e.g., ongoing maintenance, waste disposal, etc.) which cumulatively has a substantial effect on the coastal zone. This general consistency determination may be used only in situations where the incremental actions are repetitive or periodic, substantially similar in nature, and cause only insignificant coastal zone effects when performed separately. Periodic (at least once every three months unless both the Federal agency and the S.C. Coastal Council agree to an alternative consultation schedule) consultation with the South Carolina Coastal Council is required to discuss the manner in which the incremental actions are being undertaken.

2. **Development Projects**

When a Federal agency has sufficient information to determine the consistency of a proposed development project from planning to completion, only one consistency determination is required. However, in cases where decisions involving planning, siting and design of a proposed development project will be made in phases, a consistency determination is required for each major decision.

E. **Determinations for Activities/Development Projects Initiated Prior to Management Program Approval**

1. **Federal Activities**

In instances in which ongoing Federal activities (e.g., waste disposal practices) initiated prior to management program approval and for which the Federal agency retains the discretion to reassess and modify the activity, a consistency determination is required. This determination must be made by the Federal agency at the earliest practicable time following the approval of South Carolina's management program.

For all ongoing Federal activities which the South Carolina Coastal Council identifies, through monitoring, as subject to consistency, Federal agencies must provide the Council with a consistency determination no later than 120 days after approval of South Carolina's coastal management program.

2. **Development Projects**

A consistency determination is required for major, phased Federal project decisions referred to in (D)(2) above which are made following management program approval and are related to development projects initiated prior to approval of South Carolina's coastal zone management program.

F. **Multiple Federal Agency Participation**

One consistency determination may be made whenever more than one Federal agency is involved in conducting or supporting a Federal activity/development project or its associated facilities directly affecting the coastal zone, or is involved in a group of Federal activities/development projects related to each other because of their geographic proximity.

The consistency determination must be sent to the South Carolina Coastal Council at least 90 days before final decisions are taken by any of the participating agencies. Each of the proposed activities must be addressed.

IV. **South Carolina Coastal Council Response**

A. **Review**

1. The South Carolina Coastal Council will review the activity/development project and the consistency determination and will seek the views of other State agencies, local governments and other appropriate sources. If the South Carolina Coastal Council has not developed and issued a final response within 45 days from receipt of the Federal agency notification, the Council will at that time inform the Federal agency of the status of the matter. The Federal agency shall approve one request for an extension period of 15 days. Should the S. C. Coastal Council fail to provide a response within 45 days from receipt of the Federal agency notification, the Federal agency may presume S. C. Coastal Council agreement.
2. **Affirmative Response** — If the Council agrees with the consistency determination, then the matter is resolved.
3. Negative Response — If the Council does not agree with the consistency determination, written notice, including the reasons for disagreement and supporting information, will be sent to the Federal agency.

V. **Conflict Resolution**

One or more of the following methods may be used for the mediation of conflicts arising between a Federal agency and the South Carolina Coastal Council regarding a Federal consistency determination.

1. **Informal discussion** among all parties involved.
2. **Mediation** by the Secretary of Commerce. Either the Federal agency or the South Carolina Coastal Council may request Secretarial Mediation.
3. **Judicial Review.** Either party may seek judicial review. Judicial review may be sought without first having exhausted the mediation process.

NOTE: Informal discussions and/or mediation are strongly encouraged.

II. FEDERAL LICENSES AND PERMITS

Subsection 307(c)(3)(A) of the Federal Coastal Zone Management Act addresses the subject of Federal licenses and permits for activities affecting land or water uses in the coastal zone. The subsection states:

> After final approval by the Secretary of a state's management program, any applicant for a required Federal license or permit to conduct an activity affecting land or water uses in the coastal zone of that state shall provide in the application to the licensing or permitting agency a certification that the proposed activity complies with the state's approved program and that such activity will be conducted in a manner consistent with the program.

In accordance with the Section 307 regulations, a coastal zone state must identify and develop a list of Federal license and permit activities which are likely to affect its coastal zone. (See Operational Guidelines, page 23, for South Carolina's list.) All such proposed license and permit activities will be reviewed by the state to determine whether or not they are consistent with the state's management program.

Upon approval of the management program, the state's list of Federal license and permit activities is forwarded to all relevant Federal agencies which must, in turn, make this information available to applicants. The applicant for a Federal license or permit is required to certify to the Federal agency that the proposed activity complies with the state's coastal management program and that it will be conducted in a manner consistent with the program. If the state determines that the activity is not consistent, the Federal permitting agency may not issue the license or permit until all disagreements have been resolved.

(NOTE: The operational guidelines below, which pertain to Federal Licenses and Permits, explain the procedure by which Federal consistency requirements will be met.)

Operational Guidelines
(Federal Licenses and Permits)

I. Definitions

A. **Federal Licenses and Permits** — A Federal license or permit includes any authorization, certification, approval, or other form of permission which any Federal agency is empowered to issue to an applicant. All Federal leases except those issued pursuant to the Outer Continental Shelf Lands Act are included within this definition as are renewals and major amendments which cause coastal zone effects. (See Section 930.51, **Federal Register,** Vol. 44, No. 123, June 25, 1979.)

B. **Applicant** — An applicant includes any individual, public or private corporation, partnership, association or other entity organized or existing under the laws of any state, or any state, regional, or local government, who, following management program approval, files an application for a Federal license or permit to conduct an activity affecting the coastal zone of South Carolina. The term "applicant" does not include Federal agencies applying for Federal licenses or permits. Federal agency "activities" requiring Federal licenses or permits are subject to the consistency requirements of the section on Direct Federal Activities/Development Projects, beginnings on page V-16.

II. Federal License and Permit Activities Likely to Affect South Carolina's Coastal Zone

The following is a list of Federal license and permit activities which are likely to affect the coastal zone of South Carolina. The S.C. Coastal Council reserves the right to make additions or deletions to this list after consultation with the pertinent Federal agency(ies). All such license or permit activities must be reviewed by the S.C. Coastal Council for consistency with the State's coastal management program.

When application is made for one of the permits or licenses listed below, the Federal agency will direct the applicant to consult with the S. C. Coastal Council in determining the consistency of the application. No Federal license or permit described in this list shall be issued until the requirements of this section (Federal Licenses and Permits) have been satisfied.

The South Carolina Coastal Council also reserves the right to review for consistency Federal license and permit activities proposed for areas outside the coastal zone which may have "spill-over" effects and thus would affect the State's coastal zone.

DEPARTMENT OF DEFENSE

Army Corps of Engineers — permits and/or licenses for:

1. Discharge of dredged or fill material in navigable waters pursuant to Section 404 of the Federal Clean Water Act as amended;
2. Obstructions or alterations in navigable waters pursuant to Sections 9, 10, 11 and 14 of the Rivers and Harbors Act of 1899.
3. Transportation of dredged material in navigable water pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972.

DEPARTMENT OF ENERGY — certificates, permits and licenses for:

1. Siting and operation of nuclear and fossil fuel power plants and transmission lines;
2. Construction and operation of facilities needed to import or export natural gas;
3. Construction and operation of facilities used in interstate gas transportation;
4. Construction and operation of interstate gas pipelines, both onshore and offshore;
5. Construction and operation of LNG import/export marine terminals pursuant to the Natural Gas Act;

6. Construction and opertion of natural gas pipelines, transportation and storage facilities pursuant to the Natural Gas Act;
7. Construction and operation of non-federal hydroelectric power projects.

Federal Energy Regulatory Commission - certificates, permits and licenses for:

1. Non-Federal hydroelectric projects and associated transmission lines under Sections 4(e) and 15 of the Federal Power Act (16 U.S.C. 797(e) and 808).
2. Interconnection of electric transmission facilities under Section 202(b) of the Federal Power Act (16 U.S.C. 824 a (b)).
3. Construction and operation of natural gas pipeline facilities, defined to include both interstate pipeline and terminal facilities under Section 7(c) of the Natural Gas Act (15 U.S.C. 717f(c)).
4. Abandonment of natural gas pipeline facilities under Section 7(b) of the Natural Gas Act (15 U.S.C. 717f(b)).

DEPARTMENT OF TRANSPORTATION

U.S. Coast Guard — permits for:

1. Construction and operation of deepwater ports under the Deepwater Port Act of 1972 (PL 93-627);
2. Construction of bridges under USC 401, 491-507 and 525-534.

Federal Aviation Administration — permits and/or licenses for:

1. Construction or alteration of airports.

Materials Transportation Bureau (Office of Pipeline Safety Operations) — permits for:

1. Transportation of liquids (other than petroleum products) by pipeline (Section 195.6 of the regulations for transportation of liquids by pipeline).

ENVIRONMENTAL PROTECTION AGENCY — permits for:

1. Dumping material other than dredged material in navigable waters pursuant to Section 102 of the Marine Protection, Research and Sanctuaries Act of 1972.

NUCLEAR REGULATORY COMMISSION — permits and licenses for:

1. Construction and operation of nuclear facilities and the possession and use of byproduct, source and special nuclear material pursuant to the Atomic Energy Act of 1954, as amended, Title II of the Energy Reorganization Act of 1974 and the National Environmental Policy Act of 1969.

THE FOLLOWING PERMITS ASSOCIATED WITH OCS ACTIVITIES

1. Permits related to geological and geophysical exploration;
2. Permits related to the siting, design and construction of common carrier pipelines required respectively by the Bureau of Land Management in the Department of Interior and the Materials Transportation Bureau in the Department of Transportation;
3. Permits related to drilling and the siting, design and construction of flow and gathering

lines required by the Geological Survey in the Department of the Interior (involve activities described in detail within OCS plans);
4. Permits related to discharges of pollutants from fixed platforms and structures and/or dumping of nondredged material required by the Environmental Protection Agency;
5. Permits related to the installation of platforms, pipelines, artificial islands, fixed structures, navigation and free floating structures required by the Corps of Engineers;
6. Permits related to the transportation and disposal of dredged or fill material required by the Corps of Engineers.

III. **Unlisted Federal License and Permit Activities**

The S. C. Coastal Council shall monitor unlisted license and permit activities through the use of OMB Circular A-95 review, review of NEPA environmental impact statements or negative declarations, Memoranda of Agreement, etc. Federal agencies shall cooperate with and assist the Council in its monitoring of these unlisted activities.

The S. C. Coastal Council will, within 30 days from notice of the license or permit application, notify Federal agencies, applicants and the Assistant Administrator of unlisted activities judged by it to affect the coastal zone of South Carolina. No Federal license or permit may be issued until the requirements of this section have been satisfied unless the Assistant Administrator disapproves the Council's decision to review the activity.

Whenever any disagreement occurs between a Federal agency and the S.C. Coastal Council regarding whether a listed or unlisted Federal license or permit activity is subject to consistency review, either party may request Secretarial mediation as provided in the **Federal Register**, Vol. 44, No. 123, Subpart G, p. 37158, June 25, 1979.

IV. **Consistency Certifications**

A. **Responsibilities of Federal Agency**

1. Inform applicants of their responsibilities to the S. C. Coastal Council in the determination of the consistency of their applications.

B. **Responsibilities of S. C. Coastal Council**

1. Make copies of the management program document available for public inspection.
2. Assist applicants in development of means for ensuring that the proposed activity complies with and will be conducted in a manner which is consistent with South Carolina's management program.
3. Assist applicants in developing the assessment and findings required in D below.
4. Where applicable, provide applicants with a "one-stop" multiple permit review for consolidated permits to minimize duplication of effort and to avoid unnecessary delays.

C. **Responsibilities of Applicant**

1. Meet with S. C. Coastal Council to discuss the Federal license and permit application(s) and to obtain assistance from the Coastal Council regarding the means for ensuring that the proposed activity will be conducted in a manner which is consistent with South Carolina's management program.
2. Furnish the S.C. Coastal Council with the information required by Section 930.58 of the **Federal Register**, Vol. 44, No. 123, p. 37152, June 25, 1979, as well as any additional information requested by the Council. (See Necessary Data & Information below)
3. Consolidate, where applicable, related Federal license and permit activities affecting the coastal zone for Coastal Council review.

D. **Necessary Data and Information** (To be furnished by applicant to S.C. Coastal Council)

The applicant shall furnish the S.C. Coastal Council with the following data and information along with the consistency certification:

1. Detailed description of the proposed activity and its associated facilities. The description should contain sufficient detail to permit an assessment of the probable coastal zone effects of the activity and its associated facilities. ("Coastal zone effects" means primary, secondary and cumulative effects, and includes nonassociated facilities. However, the applicant is not responsible for assessing the consistency of any nonassociated facilities.)

   When necessary for an adequate description and understanding of the activity and its associated facilities, maps, diagrams, technical data and other relevant material must be submitted.
2. A brief assessment relating the probable coastal zone effects of the proposal and its associated facilities to the relevant elements of the management program.
3. A brief set of findings, derived from the assessment, indicating that the proposed activity (e.g., project siting and construction), its associated facilities (e.g., access road, support buildings), and their effects (e.g., air, water, waste discharges, erosion, wetlands, beach access impacts) are all consistent with the provisions of the management program.
   Appropriate weight must be given to the various types of provisions within the management program.
4. All relevant State and/or local government permits which are required in addition to the Federal license or permit.

E. **The Certification Statement**

The applicant, upon determining that the proposed activity meets the Federal consistency requirements, shall include with the application a certification statement. This statement will read as follows: "The proposed activity complies with South Carolina's approved coastal management program and will be conducted in a manner consistent with such program."

V. S.C. Coastal Council Review

The S. C. Coastal Council will begin review of an applicant's consistency certification after receipt of the consistency statement and all data and information required in Section D above.

A. **Public Notice**

Within ten days after receipt of the consistency certification (consistency statement, required data and information) the S.C. Coastal Council will publish notice of the proposed activity in a newspaper of statewide circulation as well as in a newspaper circulated in the area which is likely to be affected by the proposed activity. Where one newspaper meets both criteria, publication of the public notice in the single newspaper shall be sufficient. The public notice shall include a summary of the proposed activity, an announcement that information on the activity is available for public inspection at the Coastal Council office, and a request that comments be submitted to the Coastal Council by a specified date.

The Federal agency and the S.C. Coastal Council should issue a joint public notice when applicable to avoid duplication of effort and unnecessary delays.

B. **Public Hearings**

At its discretion, the S.C. Coastal Council may hold a public hearing on the proposed activity. Announcement of the hearing may be included in the public notice discussed in (A) above. A public hearing may not be held until at least 30 days after publication of the hearing announcement. Federal agencies and the S.C. Coastal Council should publish joint public hearing announcements and should hold joint public hearings when both agencies determine that a hearing is necessary. All interested parties will be given a sufficient amount of time after the date of the hearing in which to submit comments to the Coastal Council.

C. **S.C. Coastal Council Review**

Upon receipt of comments from other State agencies, Federal agencies and other interested parties, the S.C. Coastal Council shall make a decision to either concur or not concur with the applicant's consistency certification. Whenever possible, the Coastal Council will make its determination within three months following commencement of its review. (Federal regulations allow a period of six months for State agency review and comment. State agency concurrence is presumed in the absence of an objection within six months following commencement of State review.) If unable to issue a determination at the end of three months after commencement of its review, the S.C. Coastal Council will notify the applicant and the Federal agency of the status of the matter.

1. **S.C. Coastal Council Concurrence**

When the S.C. Coastal Council concurs with an applicant's consistency certification, it shall notify the applicant and the Federal agency in writing at the earliest practicable time. Upon receipt of Coastal Council concurrence or when concurrence is presumed (in the absence of an objection at 6 months from commencement of Coastal Council review), the Federal agency may approve the license or permit application.

NOTE: Should the Federal agency determine that an application will not receive its (Federal) approval, it shall immediately notify the applicant and the S. C. Coastal Council. This notification will preclude the need for further State agency review.

2. **S.C. Coastal Council Objection**

In the event of an objection, the S.C. Coastal Council will notify in writing the applicant, the Federal agency and the Assistant Administrator. The objection must describe how the proposed activity is inconsistent with the management program as well as suggest alternative measures (if they exist) which would permit the activity to be consistent. A statement informing the applicant of a right of appeal to the Secretary of Commerce will be included in the objection.

Following receipt of a S.C. Coastal Council objection to a consistency certification, the Federal agency shall not issue the license or permit except as provided in **Conflict Resolution** below.

VI. **Conflict Resolution**

Several avenues exist for the resolution of conflicts.

A. **Informal Discussion**

The S.C. Coastal Council, the applicant, and the Federal agency should meet informally in an attempt to resolve the matter rather than appealing the issue to the Secretary of Commerce.

B. **Appeals to the Secretary**

If informal discussion fails to resolve the matter, the applicant may, within 30 days of receipt of the Coastal Council's objection, file a notice of appeal with the Secretary of Commerce. The notice must be accompanied by supporting information, and copies of the notice and supporting information must be sent to the Federal agency and the S.C. Coastal Council.

Following public notice by the Secretary of Commerce, receipt of comments and, in some cases, a hearing, the Secretary shall determine whether the proposed activity is consistent with the objectives or purposes of the Federal Coastal Zone Management Act or is necessary in the interest of national security.

If the Secretary finds that the proposal meets either of these two criteria, the Federal agency may approve the activity and issue the license or permit. (For complete details as

to Secretarial Review, see the **Federal Register**,.Vol. 44, No. 123, June 25, 1979, pp. 37158-37160.)

III. OUTER CONTINENTAL SHELF (OCS) ACTIVITIES

Subsection 307(c)(3)(B) of the Federal Coastal Zone Management Act addresses the subject of Outer Continental Shelf exploration, development and production activities. This subsection and its accompanying rules and regulations require that after the management program of any coastal state has been approved, any person submitting to the Interior Department any OCS plan for the exploration or development of, or production from any area which has been leased under the Outer Continental Shelf Lands Act must provide Interior with a consistency certification, attached to the OCS plan, and must furnish the State agency with the same information. The consistency certification must state that the activities comply with and will be conducted in a manner consistent with the State's management program.

At the earliest practicable time, the State agency must notify the person as to whether it concurs with or objects to the consistency certification. Should the State agency object to the certification, it must accompany its objection with reasons and supporting information. Following receipt of a State agency objection, Federal agencies may not issue any of the licenses or permits for activities until all conflicts have been resolved.

(NOTE: The operational guidelines below, which pertain to OCS Activities, explain the procedure by which Federal consistency requirements will be met.)

OPERATIONAL GUIDELINES

OUTER CONTINENTAL SHELF ACTIVITIES

I. Definitions

A. Federal License or Permit Activity Described in Detail

This term means any activity requiring a Federal license or permit which the Secretary of the Interior determines must be described in detail within an OCS plan. (See No. 3 under "The Following Permits Associated with OCS Activities," p. V-24.)

B. Person

The term "person" means any individual, corporation, partnership, association, or other entity organized or existing under the laws of any state, the Federal government, any State, regional or local government, or any entity of such Federal, State, regional or local government, who submits to the Secretary of the Interior, following management program approval, an OCS plan which describes in detail Federal license or permit activities.

C. OCS Plan

The term "OCS plan" means any plan for the exploration or development of, or production from any area which has been leased under the Outer Continental Shelf Lands Act and the regulations under that Act, which is submitted to the Secretary of the Interior following management program approval and which describes in detail Federal license or permit activities.

II. Federal License or Permit Activities Described in Detail Within an OCS Plan

(See "The Following Permits Associated with OCS Activities," No. 3, page V-24.)

III. **Consistency Certifications**

A. **Responsibilities of S.C. Coastal Council**

1. Make copies of the management program document available for public inspection.
2. Assist persons regarding the means for ensuring that the proposed activities will be conducted in a manner which is consistent with South Carolina's management program.

B. **Responsibilities of Person**

1. Meet with S.C. Coastal Council to discuss the OCS plan and activities and to obtain assistance from the Coastal Council regarding the means for ensuring that the proposed activities will be conducted in a manner which is consistent with South Carolina's management program.
2. Furnish the S.C. Coastal Council with the information required by Section 930.58 of the **Federal Register**, Vol. 44, No. 123, p. 37152, June 25, 1979, as well as any additional information requested by the Council. (See Necessary Data & Information below)
3. Consolidate related Federal license and permit activities affecting the coastal zone for Coastal Council review.

C. **Necessary Data and Information** (To be furnished by person to the S.C. Coastal Council)
The person shall furnish the S.C. Coastal Council with the following data and information along with consistency certifications:

1. Detailed description of the proposed activities and their associated facilities. The description should contain sufficient detail to permit an assessment of the probable coastal zone effects of the activities and their associated facilities. ("Coastal zone effects" means primary, secondary and cumulative effects and includes nonassociated facilities. However, the person is not responsible for assessing the consistency of any nonassociated facilities.)
When necessary for an adequate description and understanding of the activities and their associated facilities, maps, diagrams, technical data and other relevant material must be submitted.
2. A brief assessment relating the probable coastal zone effects of the activities and their associated facilities to the relevant elements of the management program.
3. A brief set of findings, derived from the assessment, indicating that each of the proposed activities (e.g., drilling, platform placement) and their associated facilities (e.g., onshore support structures, offshore pipelines), and their effects (e.g., air, water, waste discharge, erosion, wetlands, beach access impacts) are all consistent with the provisions of the management program. Appropriate weight must be given to the various types of provisions within the management program.
4. All relevant State and/or local government permits which are required in addition to the Federal license or permit.

D. **The Certification Statement**

The person, upon determining that the proposed activities meet the Federal consistency requirements, shall include with the OCS plan a certification statement. This statement shall read as follows: "The proposed activities described in detail in this plan comply with South Carolina's approved coastal management program and will be conducted in a manner consistent with such program."

IV. **S.C. Coastal Council Review**

The S.C. Coastal Council will begin review of a person's consistency certification after receipt of the consistency certification statement and all data and information required in Section III(C) above.

A. **Public Notice**

Within 10 days after receipt of the consistency certification (consistency statement, required data and information) the S.C. Coastal Council will publish public notice of the proposed activity in a newspaper of statewide circulation as well as in a newspaper circulated in the area which is likely to be affected by the proposed activity. Where one newspaper meets both criteria, publication of the public notice in the single newspaper shall be sufficient. The public notice shall include a summary of the proposed activities, an announcement that information on the activities is available for public inspection at the Coastal Council office, and a request that comments be submitted to the Coastal Council by a specified date.

B. **Public Hearings**

At its discretion, the S.C. Coastal Council may hold a public hearing on the proposed activities. Announcement of the hearing may be included in the public notice discussed in (A) above. A public hearing may not be held until at least 30 days after publication of the hearing announcement. All interested parties will be given a sufficient amount of time from the date of the hearing in which to submit comments to the Coastal Council.

C. **Council Review**

Upon receipt of comments from other State agencies, Federal agencies and other interested parties, the S.C. Coastal Council shall make a decision to either concur or not concur with the person's consistency certification. Whenever possible, the Coastal Council will make its determination within three months following commencement of its review. (Federal regulations allow a period of six months for State agency review and comment. State agency concurrence is presumed in the absence of an objection within six months following commencement of State review.) If unable to issue a determination at the end of three months after commencement of its review, the S.C. Coastal Council will notify the person and the Department of the Interior of the status of the matter.

1. **S.C. Coastal Council Concurrence**

When the S.C. Coastal Council concurs with a person's consistency certification, it shall notify the person and the Department of the Interior in writing at the earliest practicable time. Upon receipt of Coastal Council concurrence or when concurrence is presumed (in the absence of an objection at 6 months from commencement of Coastal Council review), the Department of the Interior may approve the OCS plan.

2. **S.C. Coastal Council Objections**

In the event of an objection, the S.C. Coastal Council will notify in writing the person, the Department of the Interior, and the Assistant Administrator. The objection must describe how the proposed activities are inconsistent with the management program as well as suggest alternative measures (if they exist) which would permit the activities to be consistent. A statement informing the person of a right of appeal to the Secretary of Commerce will be included in the objection.

Following receipt of a S.C. Coastal Council objection to a consistency certification, the Federal agency shall not issue any relevant licenses or permits except as provided in **Conflict Resolution** below.

V. **Conflict Resolution**

Several avenues exist for the resolution of conflicts.

A. **Informal Discussion**

The S.C. Coastal Council, the person, and representatives of the Department of the In-

terior should meet informally in an attempt to resolve the matter rather than appealing the issue to the Secretary of Commerce.

B. **Appeals to the Secretary**

If informal discussion fails to resolve the matter, the person may, within 30 days of receipt of the Coastal Council's objection, file a notice of appeal with the Secretary of Commerce. The notice must be accompanied by supporting information, and copies of the notice and supporting information must be sent to the Department of the Interior and the S.C. Coastal Council.

Following public notice by the Secretary of Commerce, receipt of comments and, in some cases, a hearing, the Secretary shall determine whether each of the objected to OCS activities is consistent with the objectives or purposes of the Federal Coastal Zone Management Act or is necessary in the interest of national security.

If the Secretary finds that all of the objected to OCS activities meet either of these two criteria, the Department of the Interior may approve the OCS plan and issue permits. If the Secretary does not make either of these two findings, the Department of the Interior may not approve the OCS plan and the person must submit an amended or new OCS plan to the Department of the Interior and to the S.C. Coastal Council, along with a new consistency certification and supporting information. State review will begin again. The applicable time period for purposes of concurrence by conclusive presumption shall be three months instead of six months.

VI. FEDERAL ASSISTANCE (TO STATE AND LOCAL GOVERNMENTS)

Section 307(d) of the Federal Coastal Zone Management Act addresses the subject of Federal assistance to state and local governments under other Federal programs affecting the coastal zone. The subsection states:

> Federal agencies shall not approve proposed projects that are inconsistent with a coastal state's management program, except upon a finding by the Secretary that such project is consistent with the purposes of this title or necessary in the interest of national security.

The State agency is notified of Federal assistance applications by means of the Office of Management and Budget (OMB) A-95 process, which provides for the evaluation, review and coordination of Federally assisted programs. In the event the State agency objects to the applicant agency's proposal, it must accompany its objections with reasons and supporting information and must describe alternative measures (if they exist) which would permit the proposed project to be conducted in a manner consistent with the management program. Following receipt of a State agency objection, the Federal agency may not grant the Federal assistance until all disagreements have been resolved.

(NOTE: The operational guidelines below, which pertain to Federal Assistance, explain the procedure by which Federal consistency requirements will be met.)

OPERATIONAL GUIDELINES

Federal Assistance (to State and Local Governments)

I. Definitions

A. Federal Assistance

The term "Federal Assistance" means assistance provided under a Federal program to an

applicant agency through grant or contractual arrangements, loans, subsidies, guarantees, insurance, or other form of financial aid.

B. **Applicant Agency**
The term "applicant agency" means any unit of State or local government, or any related public entity such as a special purpose district, which, following management program approval, submits an application for Federal assistance.

II. **Types of Federal Assistance Programs Subject to Consistency Review**

The S.C. Coastal Council has identified the following as being subject to consistency review within the coastal zone of South Carolina. The South Carolina Coastal Council reserves the right to make additions or deletions to this list after consultation with the pertinent Federal agency(ies). The Coastal Council also reserves the right to review for consistency Federal assistance activities proposed for areas outside the coastal zone which may have "spill-over" effects and thus would affect the State's coastal zone.

Federal Assistance for the Construction of:

1. Power generating plants;
2. Desalination plants;
3. Chemical processing, transfer or storage facilities;
4. Petroleum processing, transfer or storage facilities;
5. Mineral extraction facilities;
6. Sewage treatment and disposal facilities;
7. Solid waste disposal facilities;
8. Water control structures or waterway easements serving agricultural lands;
9. Federal financing of public or subsidized housing units, or private residential developments;
10. Transportation facilities (including airports, highways and railroads).

In addition, the S. C. Coastal Council will monitor Federal assistance applications affecting the coastal zone, including but not limited to the following programs.

DEPARTMENT OF AGRICULTURE
Soil Conservation Service — Watershed protection and flood protection.

DEPARTMENT OF COMMERCE
Economic Development Administration — Economic Development Planning Grants; Economic Development Grants for Public Works and Development Facilities.

DEPARTMENT OF ENERGY — State Energy Conservation Program.

DEPARTMENT OF HOUSING & URBAN DEVELOPMENT/FHA — Housing Assistance, Mortgage Insurance, Community Development Block Grants, and Section 701 Planning Assistance Grants.

DEPARTMENT OF THE INTERIOR
Heritage Conservation and Recreation Service — Land and Water Conservation Fund.
Fish & Wildlife Service — Endangered Species Act of 1973.

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration — Airport Development Aid Program.
Federal Highway Administration — Federal Aid Highway Program. (Exemptions p. V-17 apply here.)
Urban Mass Transportation Administration — Urban Mass Transportation Grants.

ENVIRONMENTAL PROTECTION AGENCY — Air Pollution Control Program Grants, Construction

Grants for Wastewater Treatment Works, and State and Interstate Program Grants for Water Pollution Control.

III. **Consistency Determination**

A. **Decision Making Agency**

The S. C. Coastal Council makes the consistency determination.

B. **Notification Procedure**

When applying for Federal assistance for an activity located in the coastal zone, the applicant agency shall, pursuant to the OMB A-95 process, notify the appropriate State clearinghouse of its intentions. When applicable in order to ensure timely and complete notification to the S.C. Coastal Council, applicant agencies may submit to the Council, in addition to the A-95 process, appropriate environmental reviews, impact reports, Environmental Impact Statements, or related in-house agency reports as required by the National Environmental Policy Act of 1969 as the method of notification to the Council. (The applicant agency shall utilize the OMB A-95 process and any other applicable notification processes for every major funding phase of the Federal assistance activity which entails the consideration of new information not previously reviewed or which results in substantial modifications to previously reviewed phases.)

The State clearinghouse shall notify the S.C. Coastal Council of the application for Federal assistance by means of the OMB A-95 process.

C. **S. C. Coastal Council Review**

1 . **Approval**

If the S.C. Coastal Council does not object to the proposed activity, the Federal agency may grant assistance to the applicant agency.

2 . **Objection**

If the S.C. Coastal Council objects to the proposed project, it shall notify the State clearinghouse of its objection. The State clearinghouse shall in turn notify the applicant agency, the Federal agency and the Assistant Administrator of the objection.

The objection must: (1) describe how the proposed project is inconsistent with South Carolina's Management Program and (2) suggest alternative measures (if they exist) which would permit the proposed project to be conducted in a manner consistent with the management program.

The objection shall include a statement informing the applicant agency of its right of appeal to the Secretary of Commerce on the grounds described in Subpart H of the **Federal Register**, Vol. 44, No. 123, June 25, 1979, pp. 37158-37160.

IV. **Responsibility of Federal Assisting Agency**

When notified of a S.C. Coastal Council objection to a proposed project, the Federal agency shall not approve assistance for the project except as provided in Subpart H of the **Federal Register**, Vol. 44, No. 123, June 25, 1979, pp. 37158-37160.

V. **Conflict Resolution**

Several avenues exist for the resolution of conflicts.

1. **Informal Discussion**

The S.C. Coastal Council, the applicant agency, and the Federal assisting agency should

meet informally in an attempt to resolve the matter rather than seeking Secretarial mediation.

2. **Mediation by the Secretary of Commerce**

   Either the Federal assisting agency or the S.C. Coastal Council may request secretarial mediation.

3. **Judicial Review**

   Either the S.C. Coastal Council or the Federal assisting agency may seek judicial review. Judicial review may be sought without first having exhausted the mediation process.

NOTE: Informal discussions and/or mediation are strongly encouraged.

4. **Secretarial Review**

   The applicant agency may within 30 days of receipt of the S.C. Coastal Council's objection, file a notice of appeal with the Secretary of Commerce. The notice must be accompanied by supporting information, and copies of the notice and supporting information must be sent to the Federal agency and the S.C. Coastal Council.

Following public notice by the Secretary of Commerce, receipt of comments, and, in some cases, a hearing, the secretary shall determine whether the proposed activity is consistent with the objectives or purposes of the Federal Coastal Zone Management Act or is necessary in the interest of National security.

If the Secretary finds that the proposal meets either of these two criteria, the Federal agency may approve the activity. If the Secretary does not make either of the two findings, the Federal agency may not approve the activity. (For complete details as to Secretarial Review, see the **Federal Register**, Vol. 44, No. 123, June 25, 1979, pp. 37158-37160.)

FEDERAL CONSISTENCY MATRIX DIAGRAM

CZMA Section	307(c)(1) & (2) (Subpart C)	307(c)(3)(A) (Subpart D)	307(c)(3)(B) (Subpart E)	307(d) (Subpart F)
Federal Action	Direct Federal activities including development projects	Federally licensed and permitted activities	Federally licensed and permitted activities described in detail in OCS plans	Federal assistance to State and local governments
Coastal Zone Impact	Directly affecting the coastal zone	Affecting the coastal zone	Affecting the coastal zone	Affecting the coastal zone
Responsibility to notify State agency	Federal agency proposing the action	Applicant for Federal license or permit	Person submitting OCS plan	A-95 Clearinghouse receiving State or local government application for Federal assistance
Notification procedure	Alternatives chosen by Federal agency (subject to NOAA regulations)	Consistency certification	Consistency certification	OMB Circular A-95 notification procedure
Consistency requirement	Consistent to the maximum extent practicable with CZM Program	Consistent with the CZM Program	Consistent with the CZM Program	Consistent with the CZM Program
Consistency determination	Made by Federal agency (Review by State agency)	Made by State agency	Made by State agency	Made by State agency
Federal agency responsibility following a disagreement	Federal agency not required to disapprove action following State agency disagreement (unless judicially impelled to do so)	Federal agency may not approve license or permit following State agency objection	Federal agency may not approve Federal licenses or permits described in detail in the OCS Plan following State agency objection	Federal agency may not grant assistance following State agency objection
Administrative Conflict resolution	Mediation by the Secretary	Appeal to the Secretary by applicant or independent Secretarial review	Appeal to the Secretary by person or independent Secretarial review	Appeal to the Secretary by applicant agency or independent Secretarial review
	(Subpart G)	(Subpart H)	(Subpart H)	(Subpart H)

Legislative Requirements

Subsection 306(c)(1) of the Federal Coastal Zone Management Act of 1972, as amended, mandates the development and adoption of each state's management program with the opportunity of full participation by relevant Federal agencies, State agencies, local governments, regional organizations, port authorities, and other interested parties. Section 923.55 of the development and approval regulations (**Federal Register**, Vol. 44, No. 61, March 28, 1979) further outlines the requirements for coordination with state agencies.

To meet this requirement with respect to governmental entities (other than Federal) and other public or private parties, States shall:

(1) Develop and make available general information regarding the program design; its content and its status throughout program development;
(2) Provide a listing as comprehensive as possible, of all governmental agencies, regional organizations, port authorities and public and private organizations likely to be affected by or have a direct interest in the development and implementation of the management program.
(3) Indicate the nature of major comments received from interested or affected parties as identified in (2) above, and the nature of the State's response...
(4) Establish a mechanism to provide for continuing coordination with affected parties after program approval...

These processes have provided valuable information to the South Carolina Coastal Council in the development of its management program, further assuring that the coastal management program can be implemented effectively within the existing governmental framework of the State. In addition, they are serving as a mechanism of communication for State agencies to learn about the coastal management program.

The South Carolina General Assembly also affirmed in the South Carolina Coastal Management Act of 1977 (Act 123) the importance of the development and coordination of the coastal management program with State agencies. In Section 2(B)(5) of the Act one of the policies to be implemented is "to encourage and assist state agencies...to exercise their responsibilities and powers in the coastal zone through the development and implementation of comprehensive programs to achieve wise use of coastal resources..." In Section 5(N) of the Act the Coastal Council is given the statutory power and duty "to encourage and promote the cooperation and assistance of state agencies, coastal regional councils of government, local governments, federal agencies and other interested parties." The Act gives the Coastal Council specific authority to become a party to certification proceedings of the South Carolina Public Service Commission for utility facilities within the coastal zone and coordinate particular activities with the South Carolina Department of Wildlife and Marine Resources and the Department of Health and Environmental Control.

The key to state coordination efforts is in Sections 7(A) and 8(B)(11) of the Act, which state that all State agencies with regulatory authority will administer their authority in accordance with the South Carolina Coastal Management Act and develop a system of coordination and review of all State permit applications in the coastal zone. Detailed explanations of these sections are found in the Legal Analysis (Appendix C).

Participation in Program Development

Since the inception of the South Carolina Coastal Council in July, 1977, and in the preparation for implementation of the Council's permitting authority which began September 28, 1977, one of the Council's highest priorities has been state coordination. From a legal point of view, the coordination with state agencies with which the Council will network its authority is of basic importance. From a practical point of view, close communication and coordination with state agencies has been tremendously helpful and productive in the development of the coastal management program. The following list summarizes the various state coordination efforts which are detailed in the specified Appendices.

(1) Appendix H, Table 1 shows the complete mailing list of State agencies which receive notices of Council meetings and copies of all management program information, including draft copies of program document segments for review and comment. All Council meetings are open and attended by representatives of numerous State agencies. State agency comments have been and will continue to be given careful attention and are incorporated into the management program wherever feasible.

(2) The Coastal Council staff has held coordination meetings with State agencies both on an individual basis and with groups of agencies on various topics relevant to elements of the management program. Appendix H, Table 2 lists the dates, locations and agency(ies) involved in the coordination meetings.

(3) The first draft of the Legal Analysis section was distributed for comment to all State agencies and rewritten to incorporate agency comments and concerns. This legal analysis section was the basis for the development of Memoranda of Agreement (MOAs) with all State agencies with which the Coastal Council has overlapping or complementary authority. In each case MOAs have been developed through close communication with the State agency involved. Copies of the MOAs are found in Appendix D.

(4) Many State agency representatives serve on Technical Advisory Committees for Beach Access, Erosion Control, and Energy Planning. The lists of these participants are in Appendix J, pp.8-12.

(5) During the period of 305 program funding, several State agency grants were made to assist in inventory, mapping and research efforts contributing to the development of the management program. Appendix H, Table 3 lists these activities.

(6) Contacts with State agencies have been documented insofar as is possible, using log sheets.

(7) Personal contact is also an important aspect of State agency coordination. Several members of the Coastal Council Staff interact regularly with State agency personnel. In addition, copies of promotional materials and the draft management program were delivered to each State agency on the mailing list.

Program Implementation

South Carolina's coastal management program will be implemented and enforced following the guidelines of Section 923.42(d) (**Federal Register**, Vol. 44, No. 61, March 28, 1979) for Technique B — Direct State Control. This Federal program option has been selected because it parallels the basis of the South Carolina Coastal Management Act.

Technique B — State Control is the method of implementation and enforcement of coastal management programs which establishes the networking concept. Following this approach, the Coastal Council will network its authority with every State agency which exercises relevant statutory authority within the coastal zone. (The concept is explained in detail in the Legal Authorities chapter.) Therefore, the implementation and enforcement of the management program in South Carolina is based upon extensive state coordination. The mechanisms which were used for state coordination during the development stage, such as mailing lists, review and comment, meetings with State agencies, MOAs, and Technical Advisory Committees, will continue to serve the Coastal Council during implementation of the coastal management program.

In addition, State agencies will be able to suggest modifications or amendments to the management program through the same mechanisms avialable to Federal, regional and local governments and to the general public. The amendment procedure is outlined in Chapter V(C).

Special projects of interest to State agencies may be undertaken during the implementation phase of coastal zone management. Such projects may include studies of marine recreation, oil spill clean-up procedures, marine pollution, and acceptable sites for dredge spoil disposal. In addition, some attempt will be made to coordinate State agency data banks and research efforts with those of the Coastal Council.

5. LOCAL GOVERNMENT COORDINATION

Legislative Requirements

Subsection 306(c)(2)(A) of the Federal Coastal Zone Management Act of 1972, as amended, mandates the coordination of each state's management program with local, areawide or interstate plans applicable to the area. Section 923.56 of the development and approval regulations (**Federal Register**, Vol. 44, No. 61, March 28, 1979) further outlines the requirements for coordination with local governments in the coastal zone.

Evidence of coordination shall be documented in the management program by:

(1) Identifying local governments, areawide agencies designated pursuant to regulations established under Section 204 of the Demonstration Cities and Metropolitan Development Act of 1966, regional agencies or interstate agencies which have plans affecting the coastal zone in effect on January 1 of the year in which management program is submitted;

(2) Listing or providing a general summary of substantive contacts with these entities to coordinate the management program with their plans; and

(3) Identifying conflicts with those plans of a regulatory nature that are unresolved at the time of program submission and the means that will be used to resolve these conflicts.

These processes are intended to not only eliminate conflicts and duplication of efforts, but also to gain maximum benefit from the expertise and awareness of local governments and their agency personnel. These entities have a greater awareness of local issues and needs that should be addressed within the state coastal program.

The South Carolina General Assembly also recognized the need for and the value of extensive local government coordination in development and implementation of the State's coastal management program. Section 10 of the South Carolina Coastal Management Act of 1977 (Act 123) addresses the local government role in the following manner:

(A) The management program specified in Section 8 shall be developed in complete cooperation with affected local governments in the coastal zone. This cooperation shall include, but not be limited to:

(1) Involvement of local governments or their designees in the management program.

(2) Provision of technical assistance and grants to aid local governments in carrying out their responsibilities under this act.

(3) Dissemination of improved informational data on coastal resources to local and regional governmental units.

(4) Recommendations to local and regional governmental units as to needed modifications or alterations in local ordinances that become apparent as a result of the generation of improved and more comprehensive information.

Subsection (B) provides the mechanism for cities or counties in the coastal zone to submit their existing or proposed zoning ordinances, subdivision regulations and/or building codes (especially those affecting the critical areas) to the Coastal Council for review and a determination of whether or not they meet the provisions of the State's Coastal Management Act. Upon such determination and approval by the Council, these local ordinances and regulations are to be considered by the Council in its decisions on permit applications in the critical areas, and integrated into the coastal management program.

Participation in Program Development

The Coastal Council has been active with local government cooperation and coordination efforts since its inception in July, 1977. As early as 1973 (prior to the establishment of the Coastal Council), the coastal zone planning program and its two gubernatorially-appointed commissions also worked closely with local governments in initiation of the program, and in establishment and passage of State legislation.

The South Carolina Coastal Council has among its members one representative from each of the eight

coastal counties. The Council member, selected by the local governing body in that county, insures a first level of direct participation by local interests in development of the coastal management program.

In addition, soliciting direct input from and disseminating information to local elected officials and government agencies has been on-going throughout preparation of the program document. A number of mechanisms have been employed to carry out this effort, including the assignment of one Coastal Council staff person, full time, to serve as the Local Government Liaison. The following list summarizes the local participation efforts, which are detailed, as indicated, in Appendix I.

(1) The Local Government Liaison personally visited every local government in the coastal zone, discussing the coastal management program with administrators and officials and distributing a specially prepared packet of information about the overall program and the Coastal Council's regulatory authority in the critical areas. Appendix I, pp. 1-2 lists those individuals and/or local governments with whom the liaison made contact.

(2) Three introductory conferences with local governments were co-sponsored by the Coastal Council and the coastal regional planning agencies — Waccamaw Regional Planning and Development Council, Berkeley-Charleston-Dorchester Regional Planning Council, and Lowcountry Regional Planning Council (in conjunction with the League of Women Voters). These informational sessions concentrated on the Coastal Energy Impact Program, the overall coastal management program and the critical area permitting process. Appendix I details the dates and participants in these meetings.

(3) Appendix I, pp. 1-2 shows the complete local and regional government mailing lists, which identify those agencies and individuals who receive meeting notices and general management program information, including draft copies of program document segments for review and comment.

(4) Several local government officials or representatives serve on County Citizen Working Groups. (See Appendix J, pp. 3-8 for membership lists.)

(5) Several regional and local government representatives serve on the Technical Advisory Committees for Beach Access, Erosion Control and Energy Planning. (Membership lists appear in Appendix J.)

(6) During the period of 305 program development funding, a number of regional and local government grants were made for assistance to the State in inventory, mapping and research efforts. This directly involved local planning agencies in development of the coastal program. Appendix I, p. 7 lists these activities.

Program Implementation

South Carolina's coastal management program will be implemented and enforced following the guidelines of Section 923.42 (d) (**Federal Register**, Vol. 44, No. 61, March 28, 1979) for Technique B — Direct State Control. This Federal program option has been selected because it parallels the basis of the South Carolina Coastal Management Act. The chapter on legal authorities details this aspect of the program, which mandates coordination and cooperation with local and regional units of government.

Affected regional and local governments are notified of each permit application to the Coastal Council for a proposed alteration to the critical areas within their jurisdiction. Conflict with local regulatory authority is not an issue since local permit requirements are considered separately from State requirements. Nothing in the issuance of a Coastal Council permit relieves the applicant from the obligation to obtain other necessary Federal, State, **or** local permits. However, the Council actively solicits local comments on permit applications and considers these in rendering a permit decision. (Section 15 (B), South Carolina Coastal Management Act)

Local governments are expected to play a significant role in achieving the goals, objectives and policies of the coastal management program for the coastal zone as a whole, as well as for the critical areas. By conducting local planning, permitting, and administrative functions in a manner which supports and enhances mutual goals, protection and development of coastal resources will be furthered. The Council suggests that many of the recommended policies for Activities Subject to Management be adopted and implemented at the local level. As noted in Section 10 of the South Carolina Coastal Management Act, staff assistance will be available as needed to draw up local ordinances and plans.

Beginning on p. 7, Appendix I lists the local governments in the coastal zone and indicates those with current regulatory authority and/or existing land use plans. The Coastal Council encourages the development of local capabilities for managing growth and development. Pursuant to Section 10 of the Coastal Management Act, Council review and comment on local regulations and plans will be available, as will technical assistance

in their development. This will be an on-going process in the implementation (or 306) stage of the management program. Pass-through funding to local county governments to assist in the costs of project proposals to address specific local coastal needs or problems will be provided on a limited basis, as available, by the Coastal Council.

Local governments are insured an opportunity to participate in any future amendments or modifications to the management program through the same mechanism for coordination provided to Federal and State agencies and interested citizens. This process for update and modification is set forth in Chapter V(C).

Once the implementation phase of coastal zone management begins, a number of special projects will be undertaken by the Coastal Council staff in cooperation with regional and local governments. Possible projects might include an analysis of alternate means of controlling parking lot and pavement runoff onto the beaches, suggested ways of improving the aesthetics of coastal development and a study of appropriate ways to incorporate coastal safety principles into local and regional ordinances. (For example, building and zoning codes should be instituted or updated so as to minimize dangers from hurricanes.)

The Coastal Council library will be available as a source of technical references as well as a general information source for local and regional government personnel. A reference bibliography is currently being completed to aid local governments in dealing with energy facility location problems. Other special-purpose bibliographies may be developed as the need arises.

G. PUBLIC PARTICIPATION

Coastal zone management cannot be effective without the cooperation and support of Federal, State and local government entities as well as that of the general public. Interaction with private citizens is of particular importance, as this is the best means of incorporating widely held values into management policy development. The Coastal Council relies heavily on input from interested citizens who are most familiar with individual locales or specific local problems. In addition, the Council realizes that without public participation at every stage of the planning and implementation processes, the coastal management program will not accurately reflect the needs and concerns of all citizens of the state. Although made up of individuals with diverse interests, the Coastal Council cannot represent all possible points of view. Therefore, every effort has been made to encourage public involvement in coastal zone management, beginning even before South Carolina had a coastal zone management Act.

Early Public Involvement

South Carolina's official response to passage of the Federal Coastal Zone Management Act began in 1973 with the creation of the South Carolina Coastal Zone Planning and Management Council, established by an executive order of then Governor John West. One of the most important tasks of the newly-formed Council was to establish a public involvement program, in keeping with the specifications of Section 923.55 of the Rules and Regulations pertaining to the Federal Coastal Zone Management Act. According to Section 923.55(a)(1), States shall "develop and make available general information regarding the program design, its content and its status throughout program development."

The aims of the public information program were, first and foremost, to acquaint the public with the concept of coastal zone management. In addition, the Council hoped to obtain necessary support for the pending South Carolina Tidelands legislation and to generate suggestions and information essential to the creation of a sound management plan.

A brochure, entitled **Coastal Zone Management in South Carolina,** was widely distributed in an attempt to familiarize the people of the state with the basic premises of coastal zone management. The brochure was also intended to dispel a number of popular misconceptions regarding the proposed legislation. The need for public input was outlined and additional sources of information were identified.

These sources included a slide presentation and an Information Center which citizens could call (collect) to express opinions, request specific information, make suggestions, or schedule the slide presentation. All interested groups and organizations were encouraged to make use of the presentation, which outlined the major problems and issues involved in coastal zone management in South Carolina and described the efforts underway to deal with them. Staff members attended the presentations and were available to answer questions and distribute printed materials. A variety of interested groups took advantage of this opportunity, including civic, service and environmental organizations, business associations and local governing bodies.

Other public involvement activities included a 90 minute debate regarding the merits of coastal zone management televised on South Carolina ETV in an open-circuit format (in which viewers could all in with questions or comments), several workshops sponsored by the S. C. League of Women Voters in various areas of the state, and a number of news releases and radio interviews by Council staff members. A small booklet was prepared which described the new Federal Coastal Zone Management law and the proposed South Carolina legislation in some detail.

After South Carolina's Coastal Zone Management Act was signed into law by Governor James Edwards in May of 1977, the public involvement program was intensified. The newly-formed Coastal Council worked toward gaining an increased understanding of public opinion regarding coastal zone planning and acquainting the public with the goals and objectives of the Council itself. Activities leading to a mutual understanding among all concerned parties have facilitated the creation of a sound management program based upon compromise and accommodation of widely shared values.

Communication

At the most basic level, certain means of communicating with the public are mandated by the Federal Coastal Zone Management Act (Section 923.55 of the **Federal Register**, Vol. 44, No. 61, March 28, 1979) as well as by South Carolina's legislation. These include public notice of meetings and hearings (see Section 14(c) of South Carolina's Act) as well as public hearings themselves. Section 9 (a) of South Carolina's Coastal Zone Management Act states that:

> The Council, on thirty days' notice, shall hold statewide public hearings on the proposed coastal zone management plan to obtain the views of all interested parties...

Public hearings were held in various areas of the State on both the discussion draft of the management program and the draft environmental impact statement. Public hearings were also held before the Permitting Rules and Regulations received final approval. Section 15(B) of the South Carolina Act states that "at the request of twenty citizens or residents of the county or counties affected, the Council shall hold a public hearing on any application which has an effect on a critical area, prior to issuing a permit." Proceedings of public hearings are available, as mandated in 923.55(b)(3) of the **Federal Register**, Vol. 44, No. 61, March 28, 1979. (Dates and locations of public hearings are listed in Appendix J, p.1.)

Section 923.55(b)(2) of the **Federal Register** directs states to:

> provide a listing, as comprehensive as possible, of all governmental regional organizations, port authorities and public and private organizations likely to be affected by or have a direct interest in the development and implementation of the management program.

Therefore, in addition to formal public notices, the Coastal Council maintains a sophisticated system for direct mail communication with the interested public as well as affected governmental and private entities. Notification of upcoming Coastal Council meetings and public hearings, minutes and agendas of meetings, and completed segments of the management program are mailed to approximately 250 groups or individuals. Separate files are maintained for each of the following categories: Colleges and Universities, Federal Agency Contacts, Other Federal Agencies, Interested Citizens, Local governments, National Interest Groups, Regional Governments, S. C. Legislators, S. C. Special Interest Groups, Special Purpose Districts, S. C. State Government, State Government — other states, and the U. S. Congressional Delegation. Of these, the "Interested Citizen" and "S. C. Special Interest" categories are the largest. In addition, this information is sent to 120 libraries across the State and to approximately 50 radio stations, T. V. stations, daily and weekly newspapers. An additional 90 individuals or groups receive only permitting information.

Special Projects

Public notification and mailing list procedures are effective in dealing with those citizens who are already aware of South Carolina's coastal zone management program and are able to contribute to the development of a management program. However, the Coastal Council and staff realize that special efforts must be made to reach those people who are not yet cognizant of the program. With this in mind, the following activities have been undertaken:

1. **General Information Packet:** This selection of written material and maps is designed to clarify various facets of the management program and permitting procedures. It addresses specific local government concerns, and has been distributed to all municipal and county government officials.

2. **South Carolina Coastal Council Informational Package:** Unlike the "General Information Packet" described above, the Coastal Council Informational Package is designed for distribution to a wide audience. It consists of a large folder containing information on the South Carolina coast and the need for wise management. Three small inserts, dealing with the Council itself, the permitting process, and the management program can be added as needed, as can any additional information deemed appropriate for the specific audience. Such flexibility in design increases the usefulness of the packet and reduces its cost. The packet is

sent to all mailing list entries and to the general public upon request. It has also been personally distributed to a number of State and local government offices.

3. **Slide Presentation** — With a grant from the S. C. Committee for the Humanities, the Coastal Council staff prepared a fifteen minute slide presentation entiled **The South Carolina Coast: A Sense of Place.** The presentation has been shown to adult, out-of-school community groups throughout the State, with the intent of stimulating objective discussions of coastal problems and issues among individuals with little or no prior knowledge of the situation. The opinions voiced in these meetings were relayed to the Coastal Council and staff and incorporated into the planning process. A brochure was designed to serve as pre-program publicity for the slide presentation. In addition, availability of the presentation was publicized by appropriate media releases.

4. **Educational Television** — The grant from the S.C. Committee for the Humanities also enabled the Coastal Council to arrange for open-program ETV coverage in early December, 1978. The open-program format allows viewers throughout the State to phone in questions or comments which may be answered on the air. News releases and coverage in the ETV Guide provide pre-program publicity.

5. **Coastal Council Poster** — A color poster was printed and made available to any individual or group upon request. The poster serves to call attention to the Coastal Council and to the fact that South Carolina has beautiful coastal areas deserving of wise management.

6. **Public Display** — A three-dimensional graphic display is available for use in public-access buildings, such as libraries, hotel lobbies, government buildings, etc. (See Appendix J, p. 2.) In conjunction with handouts available at the same location, the display focuses attention on coastal zone management and initiates contact between the public and the Coastal Council staff. A number of requests for staff appearances at group meetings have been made as a result of the display.

7. **Newsletter — Carolina Currents,** a monthly newsletter, is distributed to Federal agency contacts and other interested parties upon request. The newsletter contains a synopsis of the previous month's Coastal Council meeting, updates on current Council activities and special-interest articles pertaining to South Carolina's coast as well as the national coastal zone management program.

8. **Radio Coverage** — Radio stations across the state receive a 30 second spot announcing all public meetings and public hearings held by the Coastal Council. Listeners are urged to attend the hearings and make their opinions known to the Council. A number of radio interviews have been held with members of the Coastal Council and staff. (See Appendix J, p. 1.) Frequent "spot" interviews and brief announcements complete the program's radio contact schedule.

9. **TV Talk Shows** — TV stations throughout the coastal zone have sponsored talk shows with various members of the Coastal Council and staff. (Dates and stations are listed in Appendix J, p. 1). In addition, brief interviews, quotes and spot coverage segments are provided by numerous local stations.

10. **Press Releases** — Press releases preceed and follow each Coastal Council meeting, and are made as needed when new developments occur in the program.

11. **Public meetings** — A number of public meetings and workshops were held, including a meeting to discuss permitting procedures arranged in Myrtle Beach for realtors and developers. (See Appendix J.) Workshops sponsored jointly with the three regional Councils of Government (Waccamaw, Berkeley-Charleston-Dorchester, and Lowcountry) in the coastal zone were held on the topics of permitting, the management program, and Outer Continental Shelf developments. (See Appendix I, pp. 3-6 for dates and participants.)

12. **Speakers Pool** — Members of the Coastal Council and staff are available to speak to interested groups on a variety of subjects. Dates and locations of some of these presentations are listed in Appendix J, p. 2. The public is urged to contact the Coastal Council offices to arrange for a speaker whenever a suitable occasion arises.

County Citizens Working Groups

In order to assure sufficient local input for the development of the management program as well as to provide a review process of the management program as mandated by Section 8(c) of the South Carolina Coastal Zone Management Act, Citizens Working Groups were established in each of the eight coastal counties.

Although the groups are small, consisting of from twenty to twenty-five people, every effort has been made to involve people with varied backgrounds. Representatives of such interests as the Chamber of Commerce, municipal and county government, local development boards, environmental and civic groups, associations of sportsmen, realtor/developer groups, industrialists, manufacturers, and special districts were invited to serve on the Working Groups. In addition, private citizens who expressed an interest in participating were asked to do so. Two staff members were assigned to each County Working Group and were assisted by the Coastal Council member from their assigned county. Complete membership lists are included in Appendix J.

Each County Working Group met once a month while the management program was being drafted. At their first meeting, the Working Groups learned of the history of Coastal Zone Management legislation and received an explanation of the management program. Copies of relevant materials (such as permitting rules and regulations and maps), were distributed, along with draft segments of the management program. At subsequent meetings members of the Working Groups reviewed and commented on segments of the management program as they were completed, while staff members made note of the recommended additions, deletions or alterations.

All County Citizens Working Group meetings are open to the public and are announced in advance through various media. Because segments of the management program were distributed to any interested party upon request, review and comment by the public as well as by official members of the working group was possible — and all outside comments were welcomed by the staff. Adequate press coverage served to make the activities of the County Working Groups known to a wider audience than might otherwise be the case, and may have helped to interest more of the general public in the process. Exact dates and locations of past Working Group Meetings are listed in Appendix J.

The structure employed by the County Working Groups has served several purposes. First and foremost, of course, is the contribution to the planning process which only local citizens can provide. Because members of Working Groups are familiar with local needs and concerns, they are well equipped to evaluate the impacts and ramifications of the management program for their county. Their familiarity with the area also enables members of Working Groups to anticipate problems which might arise and to locate areas of concern which are not adequately addressed by the management program. The diverse membership of each Working Group helps to guarantee that all important local needs and values are taken into account during the planning process.

In many ways, the County Working Groups complement public hearings. The Working Groups are designed to represent diverse interests, while representation at public hearings may be much greater for some interests than for others. It may be easier for some individuals to attend Working Group meetings than it is for them to attend public hearings, as the former are held in each county during the evening. Thus travel time is reduced and attendance is easier for those who are unable to leave their jobs during the day. Finally, the format of Working Group meetings is much less formal than that of public hearings, facilitating comment by citizens who may be uncomfortable making a presentation at a public hearing.

After approval of the management program, County Working Groups will continue to meet. They are expected to advise the staff regarding any necessary amendments, identify and offer solutions to problems which may arise as a result of implementing the management program in their particular areas, and assist in maintaining the Council's sensitivity to changing local values and concerns relating to old and new developments.

Advisory Committees

A very different contribution to the management program is provided by the technical Advisory Committees, formed to address the problems of beach erosion, public access to beaches and energy facility siting. Thus, the organization of the committees is substantive rather than geographic in nature. In forming the committees, an attempt was made to involve those who possess both familiarity with the problem and a degree of expertise applicable to its solution, rather than a diverse range of interests. Members include State, local and regional government officials, members of civic organizations such as the League of Women Voters, technical experts from industry and the academic community, and officials of relevant State agencies. Membership lists for each Advisory Committee are found in Appendix J. Because members are from all parts of the State rather than from a single county, committee meetings are generally held in Columbia, the State Capitol. The dates and locations of each Advisory Committee meeting are listed in Appendix J, p. 16.

At the initial meeting of each Committee, the goals and objectives of the Coastal Council were discussed, and the overall format of the management program was presented. The specific problem area was then discussed, and facets of the topic meriting particular consideration were called to the attention of the Coastal Council staff.

As each draft segment of the program was completed, it was forwarded to the appropriate Advisory Committee for review and comment. Subsequently, each Committee met to discuss the draft and make criticisms and suggestions for its improvement.

PART III

ENVIRONMENTAL IMPACT STATEMENT

Chapter 1:
Description of the Environment Affected

Chapter I of the South Carolina Coastal Program provides an in-depth discussion of the environment of South Carolina's coastal zone. Ecological features, such as the character of the salt marsh and barrier island systems and the distribution of flora and fauna within the coastal zone, are discussed in Section C, "The Natural Environment." Additional, detailed discussion of the marine and estuarine ecosystems, and the wildlife and shellfish and finfish resources which they support is contained in Chapter IV(E), "Living Marine Resources."

Chapter I also contains a synopsis of lowcountry history (Section B), the understanding of which is vital to a comprehensive view of the present coastal environment. In addition, economic (Section D), demographic (Section E) and land use patterns (Section F) of the region are discussed. In the following summaries are brief descriptions of (1) the natural environment and (2) the economic/social environment.

The governmental framework relative to coastal management in South Carolina is presented primarily in Chapter V(A), although that section focuses on the system to be employed during implementation, rather than the current situation. Below in (3) is a comparison of the current institutional environment and that which will be implemented by the coastal program.

(1) Natural Environment

The South Carolina coastal zone (out to the 3-mile limit) is approximately 8,116 square miles.

South Carolina's coast is as yet relatively unspoiled, due to two

important factors. The plantation system kept large tracts of coastal property under single ownership until the time of the Civil War, when much of the land was sold to hunt clubs or other private entities which have continued to maintain large tracts in non-commercial use. In addition, both population growth and industrial development in the State as a whole have proceeded relatively slowly, resulting in less pressure for growth in South Carolina's coastal zone than in some other areas of the nation.

South Carolina still contains roughly 500,000 acres of coastal marshes, of which some 335,000 acres are classified as salt marsh. The primary salt marsh vegetation is smooth cordgrass (Spartina alterniflora). A highly productive plant, it thrives in saltwater and, as it decomposes, serves as a vital year-round food source into the ecosystem, supplying numerous fish and shellfish species (including crabs, shrimp, and oysters). Salt marsh also serves as an erosion buffer for the shoreline, as a pollution filter for pesticides and other pollutants before they enter the stream systems, and an aesthetic asset. In addition, there are approximately 70,000 acres of impounded coastal marshes, many of which were formerly cultivated for rice.

There are roughly 35,000 acres of brackish-water and 65,000 acres of freshwater marsh along the coast. The brackish area is a transition zone between salt and freshwater. Both areas play important roles in contribution of nutrients to the ecosystem and habitat for land and aquatic species. Interspersed among the coastal streams and marshes are over 200 sea islands, areas of forested high ground in the estuaries.

The Atlantic Ocean coastline of South Carolina is approximately 159 miles in length. Along this shoreline stretch miles of sandy beaches of four basic profiles or geomorphological types (see Chapter IV(C) under

the heading "The Erosion Problem"). Many of these beaches are currently facing erosion problems as well as the pressures for development and recreational use. Erosion rates along the South Carolina coast range from 30 cm. to 1 m. per year.

Forty barrier islands parallel the South Carolina coastline, part of the extensive chain from Maine to Texas. These dynamic and important formations are generally thin and elongated in shape, fringed by salt marsh on the landward side and bordered by a beach and dune system on the ocean side. They bear the brunt of ocean waves and storms and flooding, thus buffering mainland areas and providing the proper conditions for existence of saltwater and brackish marshes.

The coastal zone also boasts over 3 million acres of forested lands (much of which makes a significant economic contribution in commercial timber production). The South Carolina coast has abundant wildlife resources, too numerous and varied for inclusion here, but discussed fully in Chapter I of the program document. Other significant and often unique natural areas include mud and sand flats and oyster reefs in the coastal water areas; and pocosins, Carolina bays, savannahs and forested bottomlands in upland and fresh-water areas. All these features are discussed in Chapter I.

South Carolina's coastal zone can be divided into three segments, based on both physical and sociological distinctions. The morphology of the coast represents a transition zone between the North Carolina and Georgia shorelines. From the North Carolina border to Winyah Bay, the coast forms a gentle crescent called an arcuate strand. The coast in this section is

characterized by broad sandy beaches, few tidal inlets, a well-developed dune system and generally sparse salt marshes. In contrast, the Southern section of the coast from Bulls Bay to the Georgia border is fronted by a series of barrier islands separated from the mainland by a wide zone of salt marsh. Tidal inlets are more numerous, and in some areas there is little or no dune development. Extending thirty kilometers along the shore between the northern and southern coastal segments lies the Santee River Delta, the largest deltaic complex on the east coast.

(2) Economic/Social Environment

The eight-county coastal zone of South Carolina represents about 23% of the total land area of the State. In 1975 this area was estimated to have about 21% of the State's population, 18% of the civilian labor force and 16% of the State's unemployment. The 1976 estimated population for the coastal zone was 603,200. The coast is characterized by an uneven distribution of population, with Charleston County having 45% of the total population.

The most significant economic sectors in the coastal zone are agriculture, forestry, fisheries, recreation and tourism, government, and limited industry. South Carolina's economy as a whole has maintained a steady recovery rate since the 1974-75 recession, and this trend is expected to continue. As in other "Sun Belt" states, a growth rate above that for the nation is predicted.

The physical characteristics of each section of the coast have been important in determining the economic and social character which developed over time. The sandy beaches of the arcuate strand in the northern counties

of Georgetown and Horry have nurtured a thriving tourist economy centered around Myrtle Beach. Approximately 33% of the visitors to the coastal zone head to the "Grand Strand" area and expend over 40% of the tourist dollars along the coast (over $1 billion in 1977).

Horry County had a 1976 population of approximately 86,000, or roughly 14% of the coastal population. One problem faced by planners in the relatively urban Myrtle Beach area (population - 10,370) is the extreme seasonal influx of additional populace which requires an infrastructure adequate to meet the necessary service levels.

Inland from the urban "Grand Strand," approximately 94% of Horry County is rural in character. This area led the coast in agricultural income, with over 11% of its income from farm sources. It also led the State in sales from tobacco, the State's leading cash crop. Conway (population - 9,845) is the county seat.

Along with Horry County, nearby Georgetown County leads the coast in acreage devoted to forestry - approximately 72% of the land area of this northern region. These abundant forests supply the raw materials for a thriving pulp mill industry in the City of Georgetown (county seat, with population - 11,200). Georgetown also boasts a major steel production facility - Georgetown Steel - and a State Ports Authority terminal, and is a significant historical area. The county population is 38,000 (1976).

Charleston County and the more inland coastal counties of Berkeley and Dorchester comprise the central portion of the coast (south of the Santee Delta area). This region is similar physically to the southern-most portion, although there are fewer river and wetland areas. This is the most highly developed section of the coast, with the urbanization centered

around the Greater Charleston area (Charleston County population - 260,200 (1976)).

Government-owned property accounts for approximately 22% of Charleston County. This property includes the Francis Marion National Forest (extending into Berkeley County, as well); Cape Romain National Wildlife Refuge; Capers Island and the Santee Coastal Reserve (State-managed); major military installations (Navy, Air Force and Coast Guard); and numerous educational facilities including the College of Charleston, the Citadel, and the Medical University of South Carolina.

Due to its fine natural harbor, the Charleston area has become a port of major importance and has attracted a number of industrial and manufacuturing concerns. The cities of Charleston and North Charleston are the primary population centers. The Greater Charleston area is also one of cultural and historical importance.

Development in nearby Dorchester County (population - 46,800) centers around Summerville and is mainly suburban in character. Almost 18% of the County is devoted to agricultural use, with primary products being tobacco, cotton, corn, soybeans and truck crops, livestock and dairy products, and timber.

Approximately 25% of the County is marsh or wetland and almost 50% undeveloped for urban uses (includes forested areas). The most rural areas are in the northern part of the County.

Berkeley County (population - 70,400), too, has development of a suburban character, centered around Moncks Corner and Goose Creek. A higher percentage of industrial development is present in Berkeley than either

Charleston or Dorchester Counties, comprising almost 10% of the developed land area. Over 20% of the total area of the County is within the boundaries of the Francis Marion National Forest. These latter two Counties are the fasted growing not only in this region, but in the coastal zone as a whole.

The natural history of the lower part of the coast - Jasper, Beaufort and Colleton counties - has had a great influence on the economic and social development of the area. Because of the extensive tracts of marsh and estuary and the numerous waterways, population and industrial growth have been constrained to some degree. Approximately 55% of the total land area of Beaufort County is wetlands. Almost three-fourths of the land area in the Lowcountry region is devoted to agricultural uses, with over 70% of Colleton and Jasper Counties as timberland. The population in the three-county area is as follows: Colleton - 29,200, Beaufort - 58,400 and Jasper 13,300 (1976 estimates). All but three of the numerous small municipalities in this region had 1970 populations below 2,500. These larger cities were Port Royal (2,365) and Beaufort (9,434) in Beaufort County and Walterboro (6,257) in Colleton County.

Major military installations in Beaufort County are the Parris Island Marine Base and U.S. Marine Corps Air Station, which combine to make the public sector a significant factor in the economy of the area. Industrial development is limited in the Lowcountry region.

The numerous sea islands and barrier islands, often isolated, have given rise to a culture all their own. The development of exclusive resort property on Hilton Head Island and Fripp Island has taken place in recent

years and contributed to the tourist economy. The historic district in the City of Beaufort represents a rich cultural asset and another tourist destination.

(3) Governmental/Administrative Setting

The governmental or institutional framework in South Carolina is oriented toward the General Assembly or state legislature. Administrative agencies in the State are directed by commissions or boards which are generally appointed by the General Assembly, and often include members of the General Assembly. Other than governor and lieutenant governor, there are limited Statewide Constitutional offices filled by popular election. These include Secretary of State, State Treasurer, Attorney General, Comptroller General, Superintendent of Education, Adjutant General, and Commissioner of Agriculture.

Development and implementation of a coastal management program in South Carolina has already impacted the governmental/administrative setting, specifically, the regulatory process at the State level. Because South Carolina's program is focused on direct State control, the impacts on local government functions will be minimal. It is hoped that through coordination and technical assistance, the Coastal Council can encourage further planning and resource management at the local level. At the Federal level, the impacts on government process will be felt only after full program approval when the Federal consistency provisions of the Federal Coastal Zone Management Act will be implemented.

The State level of government will be the most significantly impacted by implementation of the coastal program, specifically in terms of

the regulatory process for those activities which would have direct and significant impact on coastal waters. The situation in South Carolina is slightly different from most coastal states at this stage in the program approval process since a permit application and review procedure has already been instituted, pursuant to State statute.

As background, prior to passage of the South Carolina Coastal Management Act of 1977, the State regulatory authority for activities in coastal waters was limited to the area below the mean high water mark. These waters and submerged bottoms are presumed to be held in trust for the people of the State, and permits from the South Carolina Budget and Control Board were required prior to any alterations in these areas. The statutory authority for this permit requirement was implied only. The South Carolina Water Resources Commission handled the administrative process, functioning mainly as a clearinghouse for comments from other State agencies.

The South Carolina Coastal Management Act of 1977 established a new State agency, the South Carolina Coastal Council, an 18-member body with representatives from each of eight coastal zone counties, from each State congressional district, and from the State House and Senate. This Council was mandated to develop and implement a comprehensive coastal management program. A portion of this program is part of the regulatory or permit authority previously covered by the Budget and Control Board. The scope of this authority was expanded to encompass what the Act defined as the "critical areas" - coastal waters (from mean high water out to the 3-mile limit), tidelands (periodically inundated wetlands which are integrally part of the estuarine system), beaches (subject to periodic inundation so that no nonlittoral vegetation is established) and primary ocean-front sand dunes. This expanded permit authority includes areas

above mean high water, both in wetlands and on beaches and dunes.

The Coastal Council's regulatory authority in the "critical areas" went into effect on September 28, 1977, under Interim Rules and Regulations which were made final and enacted into law with legislative approval on June 7, 1978. In addition to guidelines or standards for specific types of projects, this permitting process includes definite time frames for review and decision-making, appeals procedures for any aggrieved party, provision for public notices of all permit applications, and provision for public hearings upon request of 20 or more citizens. The Coastal Council's "critical area" permitting process is explained in detail in Chapter V(A) and (B) and Appendices C and E of the Program.

The South Carolina Coastal Management Act delineated the coastal zone as those eight counties containing some "critical areas" within their boundaries. In addition to the direct regulatory authority in these critical areas, the Coastal Council was mandated to consider all lands and waters of the coastal zone for planning purposes. The Act established a framework for indirect authority by the Council in the remainder of the coastal zone. All permit applications of other State agencies in the coastal zone must be reviewed and certified by the Council (Section 8(B)(11)). This "networking" approach for management throughout the coastal zone is now in effect after approval (February 14, 1979) of the Proposed South Carolina Coastal Program by the South Carolina General Assembly and the Governor. Review and certification of permit applications by the Council will be based on the Resource Policies contained in the program, thus providing for the first time a comprehensive review of projects in the coastal zone which require a permit from a function-

or line agency. The management authorities are fully detailed in Chapter V(A) and (B) of the Program Document and Appendices C and E.

The additional step of approval at the Federal level, by the U.S. Department of Commerce, through the Office of Coastal Zone Management, will be vital for continued implementation of these regulatory and management procedures. The funding provided by the Federal coastal program will enable the State of South Carolina to maintain the level of staff and expertise necessary to best manage coastal resources. Also, individual projects or intensive studies can be made during implementation to provide improved information and identify areas of the program needing refinement or amendment.

Chapter 2:

Probable Impacts of the Proposed Action on the Environment

Introduction

The purpose of coastal management from both the State and Federal perspective is to promote the wisest use of the coast. Wise use requires striking a balance between the economic, social, and environmental concerns and resources of the coastal region. The South Carolina Coastal Program provides a significant step towards striking that necessary balance by establishing a process of rational decision-making affecting use of coastal resources.

Significant economic, social, and environmental impacts will therefore result from final approval and implementation of the South Carolina Coastal Program. In order to fully anticipate and understand the possible impacts associated with approval and implementation, the following evaluation has been made. The first section summarizes the implementation process and its overall impacts. Secondly, the impacts of major policy priorities are analyzed. Thirdly, impacts of policies which are specific to certain coastal activities are delineated, followed by consideration of the impacts of the three planning elements.

Summary of the Implementation Process and Its General Impacts

Coastal management in South Carolina encompasses both direct permitting authority in the critical areas and certification of other State permits for projects throughout the eight county coastal zone. The South Carolina Coastal Council was created by the State Coastal Management Act (the Act) passed in May, 1977. The Council was given the direct State permitting authority for the designated critical areas and charged with the responsibility of developing a comprehensive coastal management program.

The Council's direct permitting authority began on September 28, 1977, and extends to any alteration of a critical area which is defined as coastal waters, tidelands, beaches, and primary ocean front sand dunes seaward of the critical area boundary to the State's three mile limit. The Council's permitting authority is considered a vital instrument of the Coastal Management Program. The associated impacts are significant in that this type of authority has never before been centralized under one State agency in South Carolina with a clear time limit for permit decisions and with published rules and regulations which clearly spell out the criteria used in making these decisions.

While individuals who are denied permits may be negatively affected, the overall impacts of more predictable, timely, and conscientious decisions are immensely positive to the public and the coastal region. The economic impacts generally are not negative, except in instances of individual property owners, because all development is not prohibited. Development is, however, required to be environmentally responsible and is clearly allowed in appropriate locations. In addition, by giving decisions which are made within thirty days for minor permits and ninety days for major permits, the economic loss associated with project delays is avoided. Thus, the Council's rules and regulations for permitting will have the positive impacts of protecting the State's vital, renewable environmental resources as well as enabling a predictability which is economically beneficial.

The authority for the Council to review all State and Federal permits and to certify that they do not contravene the Coastal Program is given in the Act. In addition, the Act requires all State and local agencies to administer their regulatory authority in accordance with the Program and the permitting rules and regulations. The Resource Policies and the policies for the Energy, Erosion

and Public Beach and Shoreline Access elements of the Program clearly delineate the criteria which the Council and staff will use when making certification determinations. The Council will be required to make certification decisions within a time-frame agreed upon with the affected agency. The definitive, comprehensive, and long-range perspective provided by the permitting and certification processes can have tremendously positive effects on the economy and environmental resources of the State. In specific instances, however, the need to balance conflicting concerns may allow development which will negatively impact some environmental and economic resources in order to provide for vital current needs of the State.

Another element of the Program will be the attention given to Geographic Areas of Particular Concern. These areas have been singled out because of their unique economic, environmental or recreational value. The result of this attention will not be to protect them from any change, but to protect the primary purpose or use of the area.

The mechanism for protecting the primary purpose or use of the area will be through the Council's issuance of permits or its review and certification of permits in the coastal zone. The Coastal Program states that, "When a project overlaps with, is adjacent to, or significantly affects a GAPC, the Council will carefully evaluate the project based on the criteria specifically addressing each type of GAPC listed as the priority of uses." In practical terms this means if a project, either in or adjacent to a GAPC, requires a permit, the Council will evaluate the impact the project will have on the priority uses of the GAPC. If the project would permanently disrupt

a priority use, it would be prohibited. If a priority use would otherwise be significantly impacted, the project would be discouraged or the permit conditioned Thus, the Coastal Program will provide a careful analysis of activities which might infringe on the primary uses of these areas designated for their unique value. This implementation and the identification of priority uses is in Chapter IV (A) of the Program document.

General Policy Impacts

Several major policy priorities of the South Carolina Coastal Program will significantly affect the coastal region. Each of these policies is reiterated as applicable to many different activities determined to be subject to management.

One major policy is to prohibit the filling of wetlands for almost any activity regulated by the Program unless no feasible alternative can be found or there is an overriding public interest. A narrow interpretation of either of these considerations can be expected as they apply to the filling of wetlands. Specific policies for residential, commercial, and industrial development; transportation facilities such as ports, roads, airports, railways, and parking facilities; energy facilities; and solid waste disposal sites include this major policy on wetlands. The preservation of existing wetlands is a high priority of the program.

Another major policy is to reserve the State's limited amount of shoreline for water-dependent activities. The Coastal Program defines water-dependent facilities as those which can demonstrate that dependence on, use of, or access to coastal waters is vital to the successful functioning of their primary activity. Facilities for energy, manufacturing, industrial, parking,

commercial, or recreational purposes are prohibited from locating along the shoreline unless they are water-dependent.

The result of the implementation of this policy will be to assure that many types of shoreline development will occur less rapidly and to more nearly assure that shoreline areas will be available for facilities which require water access. However, because much residential development is outside of the jurisdiction of the Coastal Council, the policy will not generally affect residential shoreline development except for large-scale developments.

Another recurrent policy is to prohibit construction in wetland areas which unnecessarily shades vegetation or interrupts the natural water flow or movement of sand unless there is no feasible alternative. When construction encroaches on the vegetation, natural water flow, and in some cases the sand movement, it disrupts the natural equilibrium of the areas and can destroy natural purification systems, storm buffers, food supplies, etc.

This policy applies to transportation facilities such as roads, railways, and parking facilities; residential development; mining; manufacturing and industrial facilities; commercial and public buildings; and docks and piers. The primary impact of this policy will often be to either move the construction outside of the wetlands or condition the construction design to decrease the environmental, and often the resulting economic, damage. Only in isolated cases is it expected that construction costs would be significantly higher.

A related policy priority of the Program is to give careful consideration to drainage plans and construction measures to control erosion, sedimentation and water quality. The beneficial impacts of this policy, similar to the preceding one, are to reduce flood damage, reduce property loss, maintain

the natural purification systems, and maintain water quality of both surface water and aquifer recharge areas. The negative impacts of this policy are expected to be minimal because no specific design is mandated, and the design can be flexible according to the specific facility, often at little or no cost increase. The policy applies to residential development; transportation facilities such as roads, airports, and railways, agriculture; timber-related activities; mining; manufacturing, industrial, energy, and recreational facilities; and commercial and public buildings.

The South Carolina Coastal Program strongly encourages the multiple use of existing or future rights-of-way wherever possible to avoid unnecessary disruption. Rights-of-way are expensive, create disruption of people and their homes and property, can affect property values negatively and can significantly affect the existing ecosystem. Thus, where any combination of transmission lines, pipelines, fishing catwalks, bicycle and footpaths, railways, and bridges can be built along a right-of-way the economic, social, recreational, and environmental benefits are immense. This policy is expected to affect development more in wetland areas where the Council's authority is direct. However, it is hoped that other agencies, industry and individuals will follow the encouragement and lead of the Coastal Program throughout the coastal zone.

Throughout the Resource Policies of the Program various activities are prohibited unless no feasible alternative exists or, in some cases, if there is an overriding public interest. If the activity receives approval because of either of these stipulations, it must be conducted in such a way as to minimize any substantial environmental damage. "Feasibility" and the concept of "feasible alternatives" is carefully defined in the glossary.

Specific resource policies have also been written for residential development, transportation, coastal industries, commercial development, recreation and tourism, marine-related facilities, wildlife and fisheries management, dredging, public service and facilities, erosion control, energy and energy-related facilities, and activities in the following areas of special resource significance: barrier islands, dune areas (outside the critical areas), navigation channels, public open spaces and wetlands outside the critical areas. In all cases, the intent of the Coastal Council is to achieve a balance between developmental and environmental considerations. This is done by providing guidelines for new development.

Impacts on Specific Coastal Activities and Areas

The South Carolina Coastal Program has policies which apply to specific activities or areas which will have an impact on the coastal region. The primary difference between the policy priorities identified in this section and those in the preceding section is that the policies of this section apply to either a specific activity, such as the design and operation of a marina, or a specific type of area, such as barrier islands. Thus, the impacts are likely to manifest themselves in more localized ways than the impacts of policies which apply to multiple activities.

To begin with the case of marinas, one impact of the Coastal Program will be to allow marinas only in areas where minimal adverse impacts will occur. The adverse impacts on salt, brackish, or freshwater wetlands;

water quality; wildlife, and marine resources or their critical habitats will be of prime concern. Therefore, the program includes policies discouraging the location of marinas near shellfish harvesting areas; encouraging marinas to locate only where minimal or no dredging, excavating, and filling will be required; where disruption of currents is avoided or minimized; and where adequate circulation or tidal flushing will exist. In addition, policies are very specific requiring pumpout and sewage facilities, trash receptacles, and facilities for disposal of waste and noxious materials in order to protect water quality. Therefore, the overall impact will be that marinas will be located in more desirable natural areas and designated to operate in the least damaging manner.

Another specific priority of the Coastal Program is to protect both the stocks and habitats of wildlife and marine resources. The impact of this policy will be not only biological or environmental but also economic and social as well. Activities requiring any State permits which would interfere with the spawning or mating seasons or habitats would be timed or spaced or changed in other ways to eliminate or significantly minimize the impacts.

Barrier islands are recognized in the Coastal Program to be less stable and more prone to erosion and other hazard risks than most areas. They are recognized as having a close proximity to and strong relationship to the critical areas of the coastal zone. As a result, many barrier islands are considered unsuitable for intensive and high density development.

An impact of the Program thus will be to better preserve their integrity than would be the case without coastal management. For example, construction and development on the islands should not reduce their value as a natural storm buffer. Activity on the island should take precautions to avoid

negatively affecting the critical areas. Public funds will not be spent to provide road and bridge access unless there is an overwhelming public interest to be served. Any public funds spent to extend public services, such as sewer and water facilities, to barrier islands must not jeopardize the natural "carrying capacity" of this land and carefully consider the existing level of access to the island. Generally, the Coastal Program will encourage the protection and preservation of barrier islands as natural stabilizing forces and for public recreation.

Impacts of the Three Planning Element Policies

The three "new planning elements" of the Coastal Program address energy facilities, erosion control and public shoreline access. In the area of energy development, many of the policies for other coastal activities apply also to the location and design of energy facilities, such as water dependency requirements, the unlikely filling of wetlands, and the multiple use of rights-of-way.

In addition, there are policies which specifically address energy facilities. For example, the location of both nuclear and liquified natural gas (LNG) facilities, as a result of the Coastal Program, will be located away from populated areas and hazardous areas in the coastal zone as a safety precaution. Furthermore, a more comprehensive evaluation of both types of facilities will be an impact of the program. For example, when nuclear plant applications are considered, a vital part of the evaluation will be the plans for disposal of nuclear waste associated with operation of the plant. When a LNG facility application is evaluated, the transportation patterns associated with the facility are considered as a vital part of the application. This kind

of comprehensive evaluation of a project allows for all associated impacts of a project to be anticipated and provided for or avoided before the project is approved. Thus the impacts of the policies on nuclear and LNG facilities will be toward a more realistic initial evaluation.

Another prevailing policy of the Program is to maintain, at a minimum, existing public beach and shoreline access and to encourage additional public access in the future where possible. South Carolina still has large undeveloped areas and thus it is early enough for development to occur in such a way as to assure areas of public access for future generations. South Carolina's Coastal Program recognizes the value of shoreline recreation along its many rivers as well as ocean shoreline access.

In practical terms, the primary application of this policy will be as an incentive rather than as a restriction. For example, public erosion control funds can only be spent by the Coastal Council in areas to which the public has full and complete access. Additionally, in the consideration of permit applications and certifications, one criteria always used will be the extent to which development could affect existing public access. Disturbance of existing public access is strongly discouraged. Areas of public access which must be disrupted can be compensated for by additional public access areas provided elsewhere. A closer look will be taken at development in the future to assure that all citizens have access to recreational areas.

The Coastal Council is mandated by its State as well as Federal legislation to develop a comprehensive beach erosion control policy. Moreover, most erosion control structures will require a Council permit. The Program contains extensive policy language specific to all types of structural

and non-structural measures, requiring that decisions be made after consideration of their effects on other beach areas and on public access to and use of the beaches. The requirement for public access to be available where public erosion control funds are spent recognizes and supports the important interrelationship between these two planning elements.

Chapter 3:
Alternatives to the Proposed Action

Given the nature of the proposed action, which is approval of the South Carolina Coastal Program, all Federal alternatives involve a decision to delay or deny approval. To delay or deny approval could be based on failure of the South Carolina Program to meet any one of the requirements of the Federal Coastal Zone Management Act (CZMA) as amended. In approving a coastal management program affirmative findings must be made by the Assistant Administrator for the Office of Coastal Zone Management on more than twenty requirements.

The South Carolina General Assembly passed comprehensive coastal legislation in 1977 in response to the need for wise management of South Carolina's valuable coastal resources. The proposed South Carolina Coastal Program has been prepared to provide guidelines for further protection and development of the State's coastal zone. The South Carolina Coastal Management Act (SCCMA) establishes the South Carolina Coastal Council (SCCC) and directs it to develop and implement a comprehensive management program. The SCCC has sole permitting authority for activities occuring in identified "critical areas." These activities are permitted according to Rules and Regulations for Permitting promulgated by the (SCCC) pursuant to the SCCMA.

The SCCMA further provides that all State agencies shall administer their authority in accordance with the SCCMA as well as the (program) policies developed under the Act. This provides the SCCC with a certification authority over activities occurring throughout the eight-county coastal zone.

Therefore, the South Carolina Coastal Program is based upon comprehensive coastal legislation inside critical areas and relies on "networking" and SCCC certification of activities occurring throughout the remainder of the coastal zone.

In the Section 305(d) "Findings" made by the Assistant Administrator, in September 1978, program deficiencies were identified. These deficiencies have now been remedied by South Carolina, and the Assistant Administrator has made a preliminary determination that South Carolina meets the requirements for program approval under Section 306 of the CZMA, as amended.

In order to elicit public and agency comment and assure that the Assistant Administrator's initial determination is correct, this section identifies areas where there are possible deficiencies and considers alternatives of delay or denial based upon each. Before examining the alternatives, the following section identifies the generalized impacts that would result from delay or denial on any basis.

1. Loss of Federal funds to administer the program. Under Section 306, of the CZMA as amended, South Carolina would receive approximately $1.1 million per year to administer its coastal management program. Most basic to a loss of Federal funds will be the inability of the State to provide adequate staffing and administrative support to coordinate and evaluate coastal actions and permits, and to assure that government agencies operate consistently with coastal policies.

Additionally, problems identified by South Carolina may continue due to a lack of funds to address them. Local governments would also be

without the funds necessary to identify and resolve local coastal resource issues. To delay or deny approval of this program would also make it difficult for the State to give needed consideration to shorefront access, shoreline erosion, and energy facility siting.

2. Loss of consistency of Federal actions with South Carolina's Coastal Zone Management Program and its policies. Program approval would mean that Federal actions, in or affecting the South Carolina coastal zone, would have to be consistent with the State's program under Section 307(c) of the CZMA. This consistency provision would be of particular concern to the State of South Carolina as its coastal zone is heavily influenced by Federal activity. Loss of federal consistency in the State's coastal zone could have significant and adverse effects on the coastal resources.

3. Loss of adequate consideration of the national interest in the siting of facilities which are other than local in nature as required by Section 306(c)(8) of the CZMA. By delaying or denying program approval, State and local governments would be under no obligation to give adequate consideration to coastal resources and facilities that are of national interest. This could result in loss of public benefit that the use of such resources may provide. For example, failure to allow expansion of port facilities in the national interest to accommodate trans-shipment of local for energy production could result in the need for use of different energy sources. This may add to higher energy costs to the public. However, the national interest also encompasses a concern for the protection of resources

such as water, air, wetlands and wildlife. Consideration of the need for the national interest in facilities must take into account the impacts of facilities on these key resources.

Program approval would mean that the State could undertake increased technical assistance to local governments and improved implementation of existing state programs. This would give the State and local governments an opportunity to give balanced consideration to both facilities and resources in the national interest. Lacking program approval, these considerations affecting resources in the national interest might not be made.

FEDERAL ALTERNATIVES

Alternative I - The Assistant Administrator could delay or deny program approval if the policies of the program are not specific enough to ensure a sufficient degree of predictability in decision-making.

The South Carolina program relies on a "networking" approach in coastal areas outside of the identified "critical areas." Seventeen (17) state agencies exercise authority over coastal resources as well as specific areas and activities occurring within the eight (8)-county coastal zone. Most of the statutes granting these authorities were enacted prior to the South Carolina Coastal Management Act.

Through Section 8(B)(11) of the Coastal Management Act the South Carolina Coastal Council (SCCC) is required to review and certify the compliance of permit (and license) applications with the policies of the coastal management program. This "certification" authority in areas outside of "critical areas" is the prime method by which the South Carolina program manages upland uses and activities. OCZM considers this "certification" authority very important and therefore has continually stressed to South Carolina the importance of developing very specific and predictable management policies to use in certifying activities occurring in the coastal zone.

OCZM believed that many of the draft management policies originally submitted were not sufficiently predictable. In many instances OCZM felt that too much discretion had been left to the SCCC. Membership on the SCCC is subject to change as is the leadership of various State agencies and SCCC staff. OCZM felt that it was important that approved program policies not

be subject to major changes in interpretation and emphasis due to changes in SCCC membership, etc.

Additionally, OCZM reviewers have encouraged the State to produce more specific policies for activities occurring in the coastal zone and outside of "critical areas" so that developers, etc. will have a very clear idea of exactly what activities and uses can occur where and under what circumstances.

In response to concerns raised by both OCZM and commenters who reviewed the Draft Program document and the Draft Environmental Impact Statement, the SCCC has revised many of its program policies. These policy changes are generally categorized as follows:

1) changes in language from "should" to "shall" on many policies,
2) additional (new) policies under specific resource categories,
3) a more detailed definition of the phrase "no feasible alternative,"

The strengthening of language on various policies, from "should" to "shall" significantly increases the enforceability of these policies. In addition, the State developed new resource management policies in response to comments received during Draft Program review. Examples of these new policies are policies on septic systems in residential development, additional marine and wildlife protection policies, etc.

The State also made further revisions to its draft policies for energy facility siting. These policy changes reflect a much more specific definition

of the role the Council intends to have in planning and siting decisions for energy facilities locating in the coastal zone. Policies like "k" and "l" (Part II, Chapter IV, Energy Policies) reflect these changes while simultaneously addressing some of the comments received from utility companies and other energy interests.

Probably the most significant refinement made by the SCCC to its draft program policies is a broadened interpretation of "no feasible alternative." The resource management policies of South Carolina's proposed program rely heavily on the concept that certain uses and activities will not be permitted unless "no feasible alternative exists." OCZM has requested that this terminology be further defined and clarified. The final draft program has established specific criteria for determination of what "feasibility" means. These criteria include: legal feasibility, technical feasibility, environmental feasibility and economic feasibility.

In addition, the SCCC has stated that in making a determination of "no feasible alternative" they will consider that "no feasible alternative" applies to no feasible alternative site location as well as no feasible design or construction alternatives, etc. The program policies make the test for "feasibility" include consideration of "public need" and ability to minimize environmental damage. The concept of "feasibility" has been expanded to include consideration of the no action alternative. These policy changes have been submitted to and approved by the SCCC. The South Carolina General Assembly and the Governor, as part of the Final Draft Management Program approval process, have adopted the proposed program.

(The nature of the policy changes subsequent to the DEIS led to the determination that the General Assembly did not need to adopt these refinements.)

The Assistant Administrator believes that the policy changes made affect the significant management concerns identified by the program document and OCZM and provide increased predictability for the applicant.

However, because of concerns raised during Draft Program and Draft Environmental Impact Statement reviews, the Assistant Administrator could delay or deny program approval. In response to such action the State could:

1) make no additional policy changes,

2) revise specific program policies identified by OCZM as needing further refinement.

If the State determined to make no additional changes, the impacts of delay of program approval would be those generalized impacts identified above for delay or denial.

Under the second option, South Carolina would further modify or refine existing policies. These refinements would then be submitted to the Council for approval, and the nature and extent of policy changes would determine whether or not the General Assembly needed to adopt the new language.

Alternative II: The Assistant Administrator could delay or deny program approval if the definition of Uses of Regional Benefit (URB) is not sufficiently broad to meet the requirements and intent of the CZMA as amended.

During the development of the South Carolina program, the State considered a number of different uses for the inclusion within its definition of Uses of Regional Benefit (URB). At the time of preliminary program approval (October 1978), the State had not finally decided on its URB definition. In his Findings for Section 305(d)(Preliminary Approval) the Assistant Administrator of OCZM found the State responses to URB requirements to be deficient.

As a result of the OCZM's negative finding, South Carolina considered a number of different uses for definition as URBs. The first definition included parks, transportation facilities, and all energy facilities located in the State's coastal zone.

Subsequently, the State decided to limit its definition of URBs to include only parks and transportation facilities as those uses most clearly of regional benefit. The State decided to define URBs more narrowly because of its determination that energy facilities were more naturally in the national interest rather than of a regional nature and thus more appropriately covered under Section 306(b)(8) of the CZMA.

In accord with Section 923.12 of the CZMA Rules and Regulations, two criteria have been established for identifying URBS.

1) effect on more than one local unit of government,
2) direct and significant impact on coastal waters.

The uses cited by South Carolina clearly are in line with these criteria. Section 923.12 of the CZMA Rules and Regulations requires that a State identify URBs and identify those methods that will assure unreasonable local restrictions do not occur. The regulations do not instruct the states as to which uses they must list as URBs. However, based on the program approved to date by the Assistant Administrator and OCZM's interpretation of this requirement, the following uses may be important omissions: electrical generating facilities, regional waste treatment plants and water supply facilities; regional land-fill and/or garbage disposal sites.

The Assistant Administrator has made a preliminary determination that the proposed South Carolina Program meets the URBs requirement as stated. However, because of questions concerning the comprehensiveness of the two identified URBs, the Assistant Administrator could decide to delay or deny program approval. If such action were taken the State could:

1) determine not to make changes in its definition of URBs,
2) re-define its URBs more comprehensively, ensuring that unreasonable local restrictions do not occur, and submit these program changes to the SCCC for approval.

If the State determined to make no further changes, the impacts would be those generalized impacts identified above for delay or denial of a program.

ALTERNATIVE III: The Assistant Administrator could delay or deny program approval if the State has not clearly defined its Section 307 Federal Consistency procedures.

The State's consistency procedures, as identified in the final draft program document, do not appear to be specific enough to ensure that applicants and federal agencies know exactly how to proceed in getting a coastal program "consistency" determination.

State consistency procedures will continue to be refined after Section 306 program approval as the need arises. However, certain basic procedural questions have already been identified.

Additional information is needed in the following areas:

1) The State issuance of a license or permit constitutes its comment on the corresponding federal permit application. The State needs to more fully describe what happens with regard to Federal consistency if an amendment to the approved management program takes effect at the State level prior to Federal approval and incorporation into the State management program.
2) The State needs to indicate exactly what State and Federal permits are processed jointly at the present time? What are the differences in procedures for processing joint permit applications and individual State and Federal permit applications.
3) In the case of Federal licenses and permits the applicant is required to make a consistency determination to the SCCC. Exactly what materials should this "determination" include-specifically? What supporting information will be required.

Similarly, the State should provide, where possible, further guidance to applicants on how to evaluate their proposed programs and activities.

4) The Program document should be able to stand alone and not rely upon heavy reference to the Section 307 Federal Consistency Regulations. Federal agencies and other applicants for Federal and State licenses and permits should be able to understand what their responsibilities are in regard to "Federal consistency" without having to understand the Federal regulations.

Numerous refinements have been made subsequent to the DEIS in response to comments received on the Federal consistency section. In addition to answering specific comments, these changes have addressed the items listed above.

The Assistant Administrator has made a preliminary determination that the South Carolina program document meets OCZM requirements regarding Federal consistency; however, because of comments received during Draft Program and DEIS reviews there might be a determination to delay program approval pending further clarification(s).

The State has two options if OCZM decided to delay program approval:

1) the State could determine to make no further refinements,
2) the State could make further refinements and submit them to Federal agencies and all interested parties during the first 120-days after formal program approval.

If the State determined to make no further refinements, the impacts of delay of program approval would be those generalized impacts identified above for delay or denial.

Under the second option, South Carolina could rely on the specificity of its "operational guidelines" as stated in the program document and issue further guidance after program approval. This option would allow the State to operate under its currently defined procedures for the first 120-days of program approval and then issue, separate from the approved program document, its further refined procedures reflecting changes noted during the first period of implementation. If these consistency procedures are refined and i-sued separately after program approval, they will also be subject to full Federal agency review.

Chapter 4:
Probable Adverse Environmental Effects Which Cannot Be Avoided

Consistent with the Congressional legislative intent of coastal zone management, the most probable environmental effects of the South Carolina Coastal Management Program will be positive. However, as the Program strives to be flexible and strike a balance between competing needs, localized adverse environmental and socio-economic impacts will occur.

The most likely occasion for adverse environmental impacts will come with the necessary decisions to meet immediate vital needs of the people. Policies within the Program outline the parameters within which the Council will recognize the essential necessity for the defense of the nation, transportation, energy supplies, and concerns of national interest in general. Whenever one of these fundamental needs must be met, detrimental effects on the natural environment may occur. The program does, though, establish a process whereby rational evaluations can be made in each case in order to strike a balance among various needs and to minimize adverse impacts.

Adverse environmental effects can also occur as a result of the cumulative effects of numerous small projects beyond the purview of the Council. The most likely instance would be with individual homes built on highground adjacent to a sensitive area. Yet, even here the Council's point of access will occur when the density of homes requires a new or enlarged water supply, sewer system or utility lines, most of which would require permits. At this point the policies of the Coastal Management Program would apply.

Another possibility for adverse effects could come as a result of

a few policies of the Coastal Program which encourage the concentration of development in urban areas. Concentration of development can lead to increased congestion and concentration of pollutants. The South Carolina Program encourages concentration only in isolated cases, however, and there is an environmental trade-off to be gained where concentration is preferable.

Chapter 5:
Relationship Between Local, Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

One of the primary benefits of the South Carolina Coastal Program is to establish a rational process for balancing the short- and long-term uses of the coastal environment. The objective is to minimize or prohibit local, short-term uses, except where a critical public need must be met, if the short-term use precludes the long-term uses and productivity of the environment. In each permit and certification decision of the Coastal Council, this objective will be a major consideration. Water-dependent activities which support both the coastal and inland population are short-term uses of the environment which are generally consistent with the Coastal Program. These activities must, however, be conducted in such a way as to minimize any environmental losses which would threaten long-term ecological stability and minimize any losses which would require public investment for mitigation.

Overall, a high priority is to assure the long-term availability of the renewable resources of the coastal environment. These resources are essential to a stable economy and productive natural ecosystem and to the present quality of life. Rational growth will not be stopped by the Program as long as these essential resources are not jeopardized. Key policies in the Program which address the long-term equilibrium are those which protect the habitats for fisheries and marine life, discourage development in high erosion areas (the mitigation of which would require a major public investment), and those which would prohibit the filling of wetlands and the location of nonwater-dependent activities along the shoreline.

Chapter 6 :
Irrevocable or Irretrievable Commitments of Resources That Would Be Involved in Proposed Action

Without the Coastal Program in South Carolina, development and activities throughout the coastal region which result in the irrevocable and irretrievable commitment of resources definitely will occur. The objective of the Coastal Program is to assure that a process of evaluation is established whereby significant commitments of coastal resources are made only after full consideration of the economic and environmental consequences. The Program will additionally direct attention not only to the impacts of the specific activity but also to its part of the cumulative effects.

Specifically, priority is given to water-dependent activities which require the utilization of coastal resources and which can be damaging. The Program requires, however, that the environmental, economic, and social costs be minimized more significantly and directly than would be the case without the Program. Therefore, implementation will result in a more comprehensive review of resource commitments and reduce the irrevocable commitments.

Chapter 7:
Relationship of Proposed Action to Land and Water Use Plans, Policies, and Controls in the Area.

The South Carolina Coastal Management Act of 1977 established a new State agency with the mandate to develop and implement comprehensive coastal zone management. Within the framework provided by this State legislation, the South Carolina Coastal Program uses the approach of Direct State Control (Technique B, 15CFR Part 923) as described by Federal regulations from the Office of Coastal Zone Management, National Oceanic and Atmospheric Administration.

The means by which the Coastal Council will exercise the State-level authority over land and water uses of management concern (identified in Chapter III(C)) are two-fold: direct permitting in the critical areas, and review and certification of other State agency permits throughout the coastal zone. In addition, the policies set forth in the program, particularly the recommended or enhancement policies, will serve as guidelines for prudent coastal development. All of these methods are discussed fully in Chapter V(A). The agencies with which the Coastal Council "networks" the review and certification procedure and their respective statutory authorities are detailed in Appendices C and E, respectively.

Conflict resolution procedures, as discussed in Chapter V(B), apply to all of the agencies "networked" into the program, as discussed in Chapter V(A) and Appendix C. In addition, Memoranda of Agreement between the Coastal Council and other State agencies (See Appendix D) should preclude a number of possible conflicts.

Coordination with relevant State, local and Federal entities during program development is outlined in Chapter V(E) and Appendices G, H, and I. Routine consultation will be provided during implementation by the permit

issuance and review and certification procedures, and by various coordination meetings held as needed. Following are brief discussions of some of the more significant aspects of plan and policy coordination at the three levels.

As noted elsewhere, the requirements of the Federal Clean Water Act and the Clean Air Act are addressed in Chapter V(D), and are incorporated into the program. Coordination with the South Carolina Department of Health and Environmental Control will be particularly important in this regard.

On-going State and local efforts in Areawide Waste Treatment Management Planning, pursuant to Section 208 of P.L. 92-500 (Federal Water Pollution Control Act of 1972, as amended), have been coordinated with the coastal program through several mechanisms, including both informal contacts and coordination meetings to discuss issues of mutual concern to the two programs. These meetings involve representatives from the U.S. Environmental Protection Agency (Region IV), South Carolina Department of Health and Environmental Control, which has been delegated Statewide 208 authority, and the three regional agencies developing local plans (identified in Appendix G).

Various Resource Policies for activities subject to the management program have referenced and rely to some degree upon the policies and any subsequent regulations developed within the "208 plans". These policies are particularly those which address the impacts of various activities on water quality from associated non-point source and storm water runoff. (Chapter III (C)(3)).

During implementation phases coordination between the two programs will continue. The Coastal Council has established a Memorandum of Agreement with the

Department of Health and Environmental Control (Appendix D). More specifically, the Council will have jurisdiction for any projects proposed for implementation under the "208 plans" in the coastal zone - direct permit authority in the critical areas, and review and certification of State permit applications throughout the coastal zone. (Permit review procedures and legal authorities are detailed in Chapter V(A) and (B). Note: Actual effluent discharges from treatment facilities, as permitted by law, are exempt from the Council's critical area permit requirements, "provided, however, that the Council shall have the authority to review and comment on all proposed permits that would affect critical areas" (Section 13(D)(3), South Carolina Coastal Management Act).)

A second specific area of State planning and regulatory controls in the coastal zone which warrants particular discussion is that of oil and gas development activities, and oil spill monitoring and clean up. The South Carolina Water Resources Commission and the South Carolina Department of Health and Environmental Control were granted regulatory authority over the location and construction of oil and gas related facilities, and pollution and environmental damage, respectively. (South Carolina Oil and Gas Act of 1977, see Appendix E.) In addition, the Council will permit any oil and gas related facility in the critical area. The Coastal Council coordinates closely with these two State agencies, and they have had significant input into the coastal program. The Council will have opportunity to review and comment on any regulations promulgated pursuant to this Act, and will have authority to review and certify all oil and gas-related permit applications issued in the coastal zone by these two agencies. (Chapter IV(B), "Regulatory Authority")

South Carolina's Coastal Program addresses uses of regional benefit in

Chapter III(C)(2), which explains how the State of South Carolina has management authority sufficient to ensure that local ordinances do not unreasonably restrict or exclude land and water uses of regional benefit. Chapter V(E)(5) details provisions for Coastal Council review and consideration of local zoning ordinances, building codes and the like.

In development of the State's coastal program, the Coastal Council has identified several Federal agencies or management areas which warrant special concern. Coordination with these agencies has been significant during the planning stages and will be even more so in implementation of the program. These include, but are not limited to the following:

-The U.S. Army Corps of Engineers worked in close coordination with the Council during development of the "critical area" permitting section of the management program. Coordination with the Corps has resulted in a joint public notice procedure and the development of a general permit which simplifies the permitting procedure for construction of minor, private recreational docks. The Corps will continue to play a key role in administration of the permitting process.

-The U.S. Air Force has been a significant contributor due to the location and operation of major air facilities in Charleston and Myrtle Beach.

-The U.S. Fish and Wildlife Service and the National Marine Fisheries Service input is significant because of their interest in environmental protection and resource management. The Fish and Wildlife Service also manages two major refuges in the coastal zone.

-Recent revisions to Bureau of Land Management and U.S.G.S policies and regulations have enabled greater participation by State coastal programs in monitoring of OCS activities.

-Both the Soil Conservation Service and the Forest Service were important contributors due to the importance of forestry and agriculture in South Carolina's coastal zone. In addition, the Forest Service manages the Francis Marion National Forest, located in the coastal zone.

Chapter 8:
Consultation and Coordination with Others

Extensive consultation, coordination, and input has been received in developing the South Carolina Coastal Program. A number of mechanisms have been used for achieving this level of public and governmental input:

- exhaustive mailing lists of individuals, interest groups, and local, State and Federal agencies; also slide show presentations, information brochures, etc.;
- a newsletter to keep Federal agencies informed of progress in program development ("Carolina Currents", issued seven times since formation of the Coastal Council in July, 1977);
- Federal Regional Council meetings to reach Federal agencies at the regional offices (Atlanta, Region IV) (two held since formation of the Coastal Council); in addition, meetings were held with individual agencies at the regional level;
- citizen working groups in each of the eight coastal zone counties, as well as an inland-county group;
- Technical Advisory Committees for the three new planning elements - erosion, beach access and energy facility planning;
- a local government information packet, explaining various aspects of the program, distributed with personal contact by the local government liason;

- Memoranda of Agreement (MOA) developed with each of eleven State agencies, involving numerous formal and informal meetings;
- open and well-publicized regular monthly meetings of the South Carolina Coastal Council;
- four public hearings, throughout the coastal zone and in the State capital, on the proposed Rules and Regulations for Permitting, during January, 1978;
- workshops co-sponsored with the regional planning agencies to explain the program and the permitting process;
- circulation, and review and comment periods for each draft segment or chapter of the program, as well as the full program document;
- five public hearings on the completed draft program document, held across the State in November, 1978.

These activities and the continued emphasis on intergovernmental and public participation are documented in the following sections of the document:

Appendix A - History of Program and Legislation

Chapter V(F) - Intergovernmental Coordination

Chapter V(G) - Public Participation

Appendix D - Memoranda of Agreement

Appendix G - Federal Coordination

Appendix H - State Coordination

Appendix I - Local Coordination

Appendix J - Public Participation

Coordination will be an integral facet of the implementation of the South Carolina Coastal Program. It is a major goal of the Program (Chapter III(A).

The Coastal Council's direct regulatory authority in the critical areas incorporates significant agency and public input, through public notices issued for all permit applications, publication of notice of application in local newspapers, opportunity for an appeals procedure, and the fact that twenty or more citizens may request a public hearing on any application. Comments from relevant local, State and Federal agencies are solicited on all permit applications, and are considered in permit decisions. (Explained in detail in Chapter V(A), and (B), Appendix K.)

Throughout the coastal zone, the use of "networking" as the basis for management authority will demand considerable coordination efforts (Chapter V(A), Appendix D). Federal consistency provisions will guarantee consultation and coordination with Federal agencies in implementation of the program (Chapter V(F)(3)). Continued public involvement will be vital to the success of the program in meeting its goals of wise coastal resource management (Chapter V(G)). And finally, the evaluation and amendment procedure (Chapter V(D)) will ensure consultation and coordination in the future refining and modification of the program.