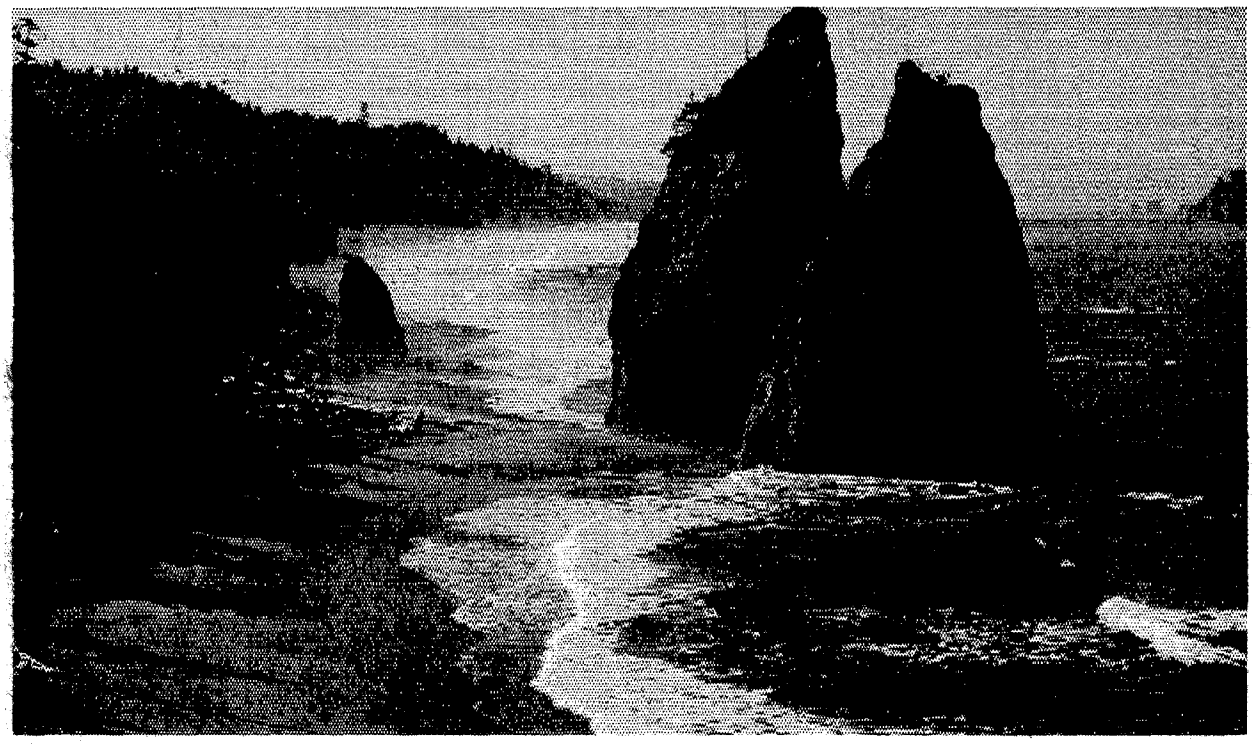
Olympic Coast National Marine Sanctuary

Final Environmental Impact Statement/Management Plan
Volume 2: Appendices



Sanctuaries and Reserves Division
1305 East-West Highway
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Washington, D.C. 20910

November 1993

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Sanctuaries and Reserves Division

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APPENDIX A: RESPONSES TO COMMENTS RAISED BY THE DEIS/MP

Introduction

This Appendix, Responses to Comments Raised by the DEIS/MP, summarizes the comments received on the Draft Environmental Impact Statement/Management Plan (DEIS/MP) prepared for the proposed Olympic Coast National Marine Sanctuary (OCNMS). This document also provides NOAA's responses to these comments in accordance with the National Environmental Policy Act (NEPA). NOAA's responses to comments are also provided via appropriate expansion, clarification, or revision of the DEIS/MP.

The Sanctuaries and Reserves Division (SRD) received 666 written comments during the comment period from September 20, and November 27, 1991 from individuals, organizations, business/industry and local, tribal, state and Federal government. In addition , 137 statements were presented at six public hearings that were held November 6-20, 1991.

These comments contributed to the evolution of NOAA's policies concerning the proposed Sanctuary. This volume clarifies the issues expressed by the commenters, and presents NOAA's final position on actions necessary for the long-term protection of the resources and qualities of the OCNMS.

All letters, documents, and scientific papers were read and divided into five categories: individuals, government, organizations, business/industry, and public hearing transcipts. Each comment was carefully analyzed and groupd into one of twelve issues. NOAA's response is printed following each comment.

Table 1 is a matrix that reflects issues raised by government officials and agencies, organizations, and business/industry. An X is placed next to the commenter's name or group for each issue they commented on.

Individuals who commented on the DEIS/MP and are not reflected in Table 1 are listed in Table 9. Copies of all written comments and public hearing transcipts are available for review during normal business hours at:

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Table 1. Issues Raised by Government Officials.

	Boundaries	Management	Administration	Alteration/Construction On Seabed	Cultural/Historical Resources	Discharges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	Informational Amendments	Oppose Sanctuary	Air Quality
Washington Governor Booth Gardner	x		x					x		x	x	x		x		
State Senator Phil Talmadge	x							x		x	x	x				
State Representative Bob Basich														x		
State Representative Nancy Rust	x							x			x					
U.S. Representative Al Swift		x	x					x								
U.S. Representative Jim McDermott	x							x		x						
U.S. Representative John Miller	x							x								
U.S. Representative Jolene Unsoeld								x		x						
U.S. Senator Brock Adams								x			x					
U.S. Senator Slade Gorton	x							x			x					
Vice Chairman Greig Arnold, Makah Indian Tribe	x	x	x		x	x	x	x	x		x	x	x	x		
Chairperson Mary Leitka, Hoh Indian Tribe	x	x		x			x	x		x	x		x			
Chairperson Carla Elofson, Lower Elwha Tribal Council	x	x									x					
Chairman Christian Penn, Quileute Indian Tribe	x	x						x			x		x			
President Joseph B. DeLaCruz, Quinault Indian Nation	x		x			x			x			x	x	x		
Fisheries Policy Rep. Jim Harp, Quinault Indian Nation						x						x	x	x		

Table 2. Issues Raised by Government Agencies

	Boundaries	Management	Administration	Alteration/Construction On Seabed	Cultural/Historical Resources	Discharges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	International Amendments	Oppose Sanctuary	Air Quality
City of Aberdeen	x							x				x		x		
City of Hoquiam	x	x				x		x		x	x			x		
City of Ocean Shores	x	x				x		x	x		x	x	x			
Clallam County	x	x						x	x		x					
Grays Harbor County	x					x		x						x		
National Marine Fisheries Service, Alaska Fisheries Science Center		x	x													
National Marine Fisheries Service, Northwest Region		x	x				x		x			x				
Olympic National Park-part of DOI?		x														
Pacific County								x			x					
Port of Grays Harbor	x	x	x	x		x			x		x	x		x		
Port of Port Angeles	x	x	x	x		x			x		x	x		x		
Port of Tacoma	x	x	x								x			x		
Port of Willapa Harbor	x		x					x	x					x		
U.S. Department of Agriculture, Soil Conservation Service																
U.S. Department of the Army, Corps of Engineers	x					x										
U.S. Department of the Interior, Office of the Secretary	x	x	x	x	x	x	x	x	x	x	x	x	x	x		
U.S. Department of the Interior, Bureau of Indian Affairs		x			x			x				x	x	x		
U.S. Department of Justice																
U.S. Department of Transportation, U.S. Coast Guard																
U.S. Environmental Protection Agency	x	x				x		x	x	x	x			x		
Washington Department of Agriculture	x			x				x				x				
Washington Department of Community Development					x											
Washington Department of Ecology						x		x		x				x		
Washington Department of Fisheries		x														
Washington Department of Natural Resources	x	x			x	x		x		x						
Washington Department of Wildlife	x	x	x				x	x	x	x	x					
Washington State Department of Treasury																
Washington State Energy Office								x								
Washington State Parks and Recreation	x	x				x		x	x		x					
Willapa Bay Water Resources Coordination Council								x			x				x	

Table 3. Issues Raised by Organizations.

	Boundaries	Management	Administratio	Alteration/Construction On Seabed	Cultural/Historical Resources	Discharges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	Informational Amendments	Oppose Sanctuary	Air Quality
Admiralty Audubon	X							X		X	X					
American Association of University Women	X			X				X		X	X					
American Fisheries Society	x							x								
American Ocean Campaign	X	X	x	X	X	X	X	X	X	X	X	X				
American Cetacean Society	X							X		X						
Arthur Farrell Marine Lab		X														
Bay Watchers	X	X	x					X		X	X	X				
Bullet Foundation	X							X			X					
Citizens Against Litter	X			X				X		X	X					X
Clean Air Now								X								
Center for Marine Conservation	X	X	x	X	X	X	X	X	X	X	X	X				
Coalition of Washington Ocean Fishermen		X		X	X		X	X			X					
Col-Pacific Resource Conserv. Develop. Council	X	X												X	X	
Columbia R iver Crab Fishermen's Association	x		x	X				X			X	X				
East Lake Washington Audubon Society	x							x		x	x					
Elma Chamber of Commerce	x			x							x			x		
Fisherman's Marketing Association	x		x	x							x	x				
Friends of the Earth	x			x	x	x	x	x	x	x	x	x		x		
Friends of the San Juans	x	x	x					x		x						
Grays Harbor Chamber of Commerce	x	x	x	x		x			x		x	x		x		
Grays Harbor Economic Development Council						x								x		
Grays Harbor Regional Planning Commission	x	x	x	x	x	x	x	x	x		x	x		x		
Greater Seattle Chamber of Commerce											x			x		x
Greenpeace	x	x		x	x	x	x	x	x	x	x			x		
Inland Waters Coalition	x							x			x					
Lake Sammish Community Association	x							x			x					
Mountaineers	x			x	x	x	x	x		x	x					
National Audubon Society	x									x	x					
National Campers and Hikers Association	x							x		x	x					
National Ocean Industries Association	x	x						x								
No Oilport!								x								

Table 3. Issues Raised by Organizations.

	Boundaries	Management	Administration	Alteration/Construction On Seabed	Cultural/Historical Resources	Discharges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	Informational Amendments	Oppose Sanctuary	Air Quality
North River Protection Association	x													x		
Northwest Indian Fisheries Commission		x		x		x						x	x			
Ocean Park Chamber of Commerce	x		x					x								
Olympic Environmental Council	x										x			x		
Olympic Park Association Board	x						x	x	x	x	x	x				
Olympic Penninsula Economic Research Assoc.															x	
Olympic Waters	x	x	x				x	x		x	x	x		x		
Pacific Conservation District	x													x	x	
Pacific Salmon Sportsfishing Council	x							x								
Pacific States Marine Fisheries Commission	x							x		x	x	x				
People for Puget Sound	x			x		x	x	x	x	x	x					
Port Townsend Marine Science Center	x	x		x		x	x	x	x	x	x	x				
Puget Sound Alliance	x							x	x	x	x					
Puget Sound Steamship Operators Assoc., Inc.	x										x			x		
Seattle Audubon								x								
Sierra Club - Cascade Chapter	x	x	x					x		x	x	x				
Sierra Club - Willapa Bay Chapter	x							x			x					
Southwest Washington Anglers			x			x										
Tahoma Audubon	x							x		x	x					
To Protect the Penninsula's Future		x						x			x					
Trout Unlimited								x		x	x					
Unknown (Turner)		x						x		x	x					
United States Naval Institute											x					
University of Washington Law Society		x	x	x	x	x		x	x	x	x	x				
Vancouver Audubon				x	x	x		x	x	x	x	x				
Washinton Contract Loggers Association						x				x	x			x		
Washington Dungeness Crab Fishermen's Assoc.				x							x			x		x
Washington Environmental Council	x							x			x					
Washington Public Ports						x					x					
Washington Trollers Association		x		x		x		x			x					
The Whale Museum								x		x	x					

Table 3. Issues Raised by Organizations.

	Boundaries	Management	Administration	Alteration/Construction On Seabed	Cultural/Historical Resources	Discharges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	Informational Amendments	Oppose Sanctuary	Air Quality
The Wilderness Society								x		x	x					
Yakima Audubon				x	x	x		x	x	x	x	x				

Table 4. Issues Raised by Business/Industry

	Boundaries	Management	Administration	Alteration/Construction On Seabed	Cultural/Historical Resources	Discahrges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	Informational Amendments	Oppose Sanctuary	Air Quality
Albert Johns	X							X								
ITT Rayonier, Inc.	X					X					X			X		
Jones Washington Stevadoring Co.	X			X		X					X			X		
Kenmore Air Harbor	X								X					X		
Nordic Nets/Diving Service												X			X	
Tree Farm Services	X	X	X	X		X			X		X	X		X		
Weyerhaeuser	X		X			X					X			X		
Transmountain Pipeline								X								
High Tide Seafoods	X							X			X	X				
Grays Harbor Bar Pilots	X		X			X					X			X	X	
Ellison Tree Farmer		X				X			X		X			X		
Moe Manufacturing Plant															X	

Table 5. Issues Raised By Educational Institutions.

	Boundaries	Management	Administration	Alteration/Construction On Seabed	Cultural/Historical Resources	Discharges	Mammals/ Seabirds	Oil/Gas	Overflights	Sea Lion Rock	Vessel Traffic	Living Resource Extraction	Treaty Rights	Informational Amendments	Oppose Sanctuary	Air Quality
Charles Wright Academy	x							x		x						
Grays Harbor College	x							x								

List of Acronyms

Acronym	Meaning
APA	Administrative Procedure Act
ATBA	Area To Be Avoided
BIA	Bureau of Indian Affairs
COE	Corps of Engineers
CVTMS	Cooperative Vessel Traffic Management System
DEIS/MP	Draft Environmental Impact Statement/Management Plan
DNR	Washington Department of Natural Resources
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
FEIS/MP	Final Environmental Impact Statement/Management Plan
FWPCA	Federal Water Pollution Control Act
IMO	International Maritime Organization
MARPOL	International Conference on Marine Pollution, 1973
MBTA	Migratory Bird Treaty Act
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MPRSA	Marine Protection Research and Sanctuaries Act
NEPA	National Environmental Policy Act
NERRS	National Estuarine Research Reserve System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
OCS	Outer Continental Shelf
OMS	Office of Marine Safety
OPA 90	Oil Pollution Act of 1990
PFMC	Pacific Fishery Management Council
SAC	Sanctuary Advisory Committee
SEL	Site Evaluation List
USFWS	United States Fish and Wildlife Service
UNCLOS III	Third United Nations Conference on the Law of the Sea
WDF	Washington Department of Fisheries
WDH	Washington Department of Health
WDOE	Washington Department of Ecology

ISSUE: BOUNDARIES
BOUNDARY ALTERNATIVE 1

Comment: NOAA should choose boundary alternative 1 because: 1) it contains most of the unique ecological features off the Washington Coast; 2) NOAA can offer greater protection to the coastal features than the resources further offshore in the event of a spill of hazardous materials; and 3) vessel traffic would be least affected, thereby ensuring safer seas.

Response: NOAA disagrees. Boundary alternative 1 contains most of the ecological features visible above the sea surface. However, a marine sanctuary should encompass a discrete ecological unit with definable boundaries (16 U.S.C. § 1433 (b)(1)(F)). The marine mammals and seabirds that transit the waters off the Olympic Peninsula and colonize the offshore rocks and islands forage in the rich waters and benthic communities over and on the continental shelf. The shelf is broad off the Strait of Juan de Fuca. The seaward extent of the shelf coupled with the upwelling produced from the Juan de Fuca Canyon are the physical parameters that support the food chain from the plankton to the marine mammals and seabirds. The offshore rocks and intertidal communities are only one habitat within the marine ecosystem off the Olympic Coast. Therefore, the marine sanctuary should encompass the ecologically significant offshore waters.

With respect to NOAA's ability to protect the offshore waters in the event of a spill, NOAA agrees that there is little that can be done once a spill has occurred. The high seas would most likely render response capabilities ineffective. However, NOAA will coordinate with the U.S. Coast Guard, the Washington State Office of Marine Safety, and the coastal tribes to ensure that there is an adequate response capability for the coastal waters, intertidal regions, and beaches along the sanctuary including seabird and marine mammal rescue capabilities.

Extension of the Sanctuary boundary to the shelf edge provides a buffer area for protecting the coastal resources. NOAA is working with the U.S. Coast Guard to develop a proposal for an Area to be Avoided (ATBA) from the shoreward boundary to 25 nautical miles offshore of the Olympic Peninsula. This ATBA is designed to provide sufficient time to respond to a vessel that loses power off the Olympic Peninsula. The ATBA is compatible with many of the existing voluntarily adhered to traffic patterns along the coast and thus adds only minimal time and distance to transits between the Strait of Juan de Fuca and destinations to the south.

BOUNDARY ALTERNATIVE 2

Comment: NOAA should choose boundary alternative 2 as the preferred alternative.

Response: NOAA disagrees for the same reasons stated in response to the previous comment. The seaward extent of boundary alternative 2, which approximates the 50 fathom isobath, has no relation to the seaward extent of the coastal ecosystem.

BOUNDARY ALTERNATIVE 3

Comment: NOAA should choose boundary alternative 3 as the preferred alternative.

Response: Boundary Alternative 3 excludes the Juan de Fuca Canyon, which is one of the richest regions of the offshore oceanic ecosystem. It also excludes some of the highest concentrations of human uses which threaten the health of the marine ecosystem off the Olympic Peninsula.

Comment: NOAA should not choose boundary alternative 3 as the preferred alternative because it will be too restrictive for vessel traffic.

Response: NOAA is proposing no regulations that will unduly restrict vessel traffic. (See response to comment on boundary alternative 1).

BOUNDARY ALTERNATIVE 4

Comment: NOAA should select boundary alternative 4 as the preferred alternative because: 1) many of the unique unspoiled ecological resources that might be significantly impacted by oil are located in the physically complex area north of Pt. Grenville including areas of submarine canyons, productive fishing grounds, and coastal features that are critical habitat; 2) Sanctuary status in the southern portion of the study area would conflict with state managed activities such as dredged material disposal, while most of the shoreline in the north has little commercial activity; and 3) NOAA can enlarge the boundary in the future.

Response: NOAA agrees. One of the most valuable qualities of the Olympic Peninsula is that it is undeveloped and relatively pristine. NOAA recognizes that the southern portion of the boundary is much more developed, especially with respect to the harbor maintenance activities in Grays Harbor. Further, the rocky intertidal habitats in the north are much more sensitive to pollution from oil and gas compared to the sandy beach environments in the southern

portion of the study area. In the event of a spill of hazardous materials, experts predict that it would take years for intertidal communities of rocky intertidal environments to become reestablished, whereas it would take an order of months for the sandy intertidal communities to recolonize. Lastly, NOAA can expand Sanctuary boundary 4 in the future, in accordance with the requirements of the Marine Protection, Research, and Sanctuaries Act (MPRSA), the National Environmental Policy Act (NEPA), and the Administrative Procedure Act (APA), if deemed necessary.

Comment: NOAA should not choose boundary alternative 4 because: 1) it is not scientifically defensible for it fails to protect the important and environmentally delicate estuaries along the southern coast; 2) it would render ineffective NOAA's resource monitoring and sanctuary enforcement mandates; and 3) it will be too restrictive for vessel traffic.

Response: The boundary of a marine sanctuary should approximate the most identifiable boundaries of a marine ecosystem. The Site Evaluation List (SEL), from which sites are selected for consideration as marine sanctuaries, identified the coastal offshore islands as the core of the proposed Olympic Coast National Marine Sanctuary (originally identified as the Western Washington Outer Coast). With this focus, NOAA has determined that the boundaries of the ecosystem are encompassed by boundary alternative 4. NOAA recognizes that the coastal estuaries are ecologically valuable and that many organisms that exist within, or transit through boundary alternative 4, depend on the estuaries. However, while the estuaries and outer coast are ecologically linked, the productivity of the two environments is a function of very distinct environmental processes.

NOAA believes that protection of the estuaries could be best achieved through possible inclusion of these areas in programs targeting estuarine management such as, the National Estuarine Research Reserve System, the National Estuary Program, or the Coastal Zone Management Program.

NOAA believes that the size of the sanctuary encompassed by boundary alternative 4 is manageable with respect to research and monitoring initiatives.

As discussed above, NOAA is working with the U.S. Coast Guard to develop a proposal for an ATBA off the northern Olympic Peninsula. It is designed to be as compatible with existing customary practices among mariners as possible. NOAA is not promulgating vessel traffic regulations with designation.

BOUNDARY ALTERNATIVE 5

Comment: NOAA should choose boundary alternative 5 because: 1) activities that are, or could occur, in the southern portion of the study area can affect the resources in the north; 2) the entire study area is ecologically connected; 3) the management needs are greatest in the south; 4) the sanctuary management regime would complement existing management initiatives (Willapa Bay watershed planning processes, Columbia and Snake River Salmon Recovery Planning, State National Heritage Plans); and 5) expansion of the Sanctuary boundary in the future will be too time-consuming.

Response: NOAA's preferred boundary alternative is based on an ecologically identifiable boundary. The northern and southern portions of the study area are distinct with respect to their coastal and offshore ecology. NOAA can protect Sanctuary resources from outside activities through the prohibition on discharges outside the Sanctuary boundary that enter and injure Sanctuary resources. NOAA will be involved in planning activities that could potentially threaten Sanctuary resources outside its boundary. The boundary can be expanded in the future if needed.

Comment: NOAA should not choose boundary alternative 5 because it is not necessary to encompass the entire Washington coastline as a marine sanctuary, and it would eliminate any future development of the coastal areas.

Response: NOAA agrees. See response to previous comment.

Comment: A more detailed analysis of the impacts of sanctuary designation must be undertaken before seriously considering boundary alternative 5.

Response: NOAA has undertaken an extensive analysis of the uses and ecology of the southern portion of the study area and believes that the ecologically sensitive estuarine environments are adequately protected.

ALTERNATIVE BOUNDARY SUGGESTIONS

Comment: NOAA should establish a series of smaller site-specific areas surrounding unique marine resources, such as ocean waters immediately adjacent to already protected terrestrial ecosystems such as wildlife refuges and the Olympic National Park. This alternative would afford sanctuary status to marine resources while maintaining provisions for compatible ocean uses.

Response: NOAA disagrees. Smaller site-specific areas would not encompass an ecosystem for the reasons stated above. Further, designation of the marine sanctuary would allow for the continuation of pre-existing and compatible uses.

Comment: NOAA's analysis of the resources within the study area identified the southern portion as highly important in terms of wildlife and fishery values, particularly the areas in and surrounding Willapa Bay. NOAA should consider modifying boundary alternative 4 by adding a satellite site encompassing the estuarine environment and the offshore waters of Willapa Bay.

Response: NOAA's analysis confirmed that the estuarine areas in the southern portion of the study area are significant natural resources and that many of the resources utilize the waters off the northern coast as well. However, NOAA has determined that the estuarine ecosystems are distinct from the higher energy marine environment of the northern portion of the study area. In addition, the activities in, and adjacent to Grays Harbor are managed pursuant to an existing estuarine management plan promulgated pursuant to the Washington State Shorelands Management Act. The residents living in the watersheds of Willapa Bay are currently preparing an estuarine management plan.

Comment: NOAA should consider the creation of a north and south Olympic Coast National Marine Sanctuary with separate but coordinated management regimes.

Response: The Act requires the designation of one sanctuary on the Western Washington Outer Coast with the offshore Islands and coastal areas of the northern Olympic Peninsula as the core area of the sanctuary. In carrying out this mandate, NOAA examined the seaward, northerly, southerly, and easterly extent of the ecosystem that has as its core the intertidal communities of the outer coast.

Comment: The boundary of the Sanctuary should be modified as further cetacean information is available.

Response: NOAA can modify the boundary in the future, in accordance with the requirements of the MPRSA, the NEPA and the APA, as more information becomes available.

MODIFICATION OF THE WESTERN BOUNDARY

Comment: The outer boundary of the sanctuary should extend westward to a point that minimizes restrictions and needless re-routing of vessel traffic and harbor maintenance

activities at the opening of Grays Harbor. To accomplish this objective, the outer limit of the sanctuary should be set at a distance between 2 and 10 miles from shore.

Response: Sanctuary boundaries are not established based on vessel traffic routes, particularly because routes are subject to change. NOAA will work with existing regulatory agencies to minimize impacts. While vessel traffic is in the scope of sanctuary regulations, NOAA is not promulgating vessel traffic regulations at this time.

Comment: The outer boundary should be established at either the 100 or 500 fathom isobath.

Response: NOAA has established the boundary at the 100 fathom isobath because it is generally recognized to be the seaward extent of the continental shelf, the area where photosynthetic activity is greatest.

Comment: Clarify the rationale for establishing the western boundary of alternatives 4 and 5.

Response: See response to previous comment.

MODIFICATION OF THE SHORELINE BOUNDARY

Comment: The shoreline boundary should be established at the lower low water mark to preclude interference with carefully crafted beach management plans regulating beach traffic, razor clam harvests and emergency aircraft landings.

Response: The shoreline boundary of the Sanctuary is located at the higher high water line where adjacent to Federally-owned land (including the Olympic National Park and the U.S. Fish and Wildlife refuges) and the lower low line mark when adjacent to State-owned land. Thus, the boundary does not interfere with beach management plans. Razor clam harvests within the intertidal zone of the Sanctuary will be managed by existing authorities such as the Washington State Department of Natural Resources, the Quinault Indian Tribe, and the National Park Service. Emergency aircraft landings are permissible in the Sanctuary.

Comment: The shoreline boundary should cut across the mouths of all rivers, streams and estuaries because there are sufficient management plans in place providing protection of inland environments such as the Washington State Coastal Zone Management Program and the Grays Harbor Estuary Management Plan.

Response: The shoreline boundary of the Sanctuary has been modified to cut across the mouths of all rivers, streams and estuaries.

Comment: Clarify why the shoreward boundary distinguishes between adjacency to tribal and non-tribal lands.

Response: The Tribes have jurisdiction to the mean lower low water line and the Sanctuary program does not have the authority to claim jurisdiction over tribal land without the consent of the governing body of the tribes. Both the Tribes and the State have requested that the Sanctuary boundary not overlap with tribal and State lands. Therefore, the coastal boundary has been modified so that it is at mean lower low water when adjacent to tribal and State owned lands and at mean higher high water when adjacent to Federally owned lands.

Comment: Existing National Park Service standards, regulations, and policies must not be diminished as a result of dual designation as a National Park and National Marine Sanctuary. The majority of the intertidal areas of the Olympic National Park are Federally designated Wilderness Area and must be managed accordingly.

Response: The Sanctuary boundary overlaps with the boundary of the Olympic National Park. NOAA will not diminish the standards, regulations and policies currently applying to the intertidal areas of the Olympic National Park. The existing standards, regulations and policies of the intertidal areas will remain. NOAA will enhance the protection of these intertidal areas by working with the Coast Guard to ensure a safer vessel traffic environment, and the upland users of the watershed to monitor and minimize the impacts of non-point source pollution. Additionally, NOAA will support research and resource monitoring initiatives in the intertidal areas and may seek compensation for damages if an accident were to occur that injures Sanctuary resources.

INCLUSION OF THE STRAIT OF JUAN DE FUCA

Comment: The northeastern boundary of the sanctuary should extend further into the Strait of Juan de Fuca to either: 1) the Lyre River; 2) the Clallam County Marine Sanctuary at Salt Creek; 3) Low Point; 4) Crescent Bay/Agate Beach; or 5) Pillar Point. Omission of the Strait of Juan de Fuca from the Sanctuary excludes the head of the Juan de Fuca Canyon from the boundary of the Sanctuary, and thus represents a boundary not based upon an ecological rationale.

Response: NOAA has examined the resources of the Strait

of Juan de Fuca and the FEIS/MP has been revised accordingly. Sections III and IV (Alternatives, and Environmental Consequences) examine the benefits and consequences of various alternatives in the Strait of Juan de Fuca. NOAA believes that the existence of a functional biotic community characteristic of the marine environment extends into the Strait of Juan de Fuca to Observatory Point. Eastward of Observatory Point, the ecosystem is more characteristic of an estuarine environment.

Despite the ecological arguments that support inclusion of the Strait of Juan de Fuca in the Sanctuary boundary, NOAA does not believe that the public has had ample opportunity to analyze and comment on the proposal to add the Strait. Since the Strait of Juan de Fuca lies entirely in state waters, the Strait of Juan de Fuca cannot be included without the approval of the Governor of Washington State. However, NOAA will pursue expanding the boundary if supported by the State of Washington.

Comment: The boundary of the Sanctuary should be contiguous with that of the proposed Northwest Straits Sanctuary. A gap between these two proposed sanctuaries would cause confusion for commercial shipping and fishing interests and government managing agencies.

Response: At this time, the future and nature of the proposed Northwest Straits National Marine Sanctuary is uncertain and cannot serve as a deciding factor in the determination of the eastern boundary of the Olympic Coast National Marine Sanctuary. The boundary of the Olympic Coast National Marine Sanctuary must be determined based on ecological and human use factors. NOAA can modify the boundary in the future if it is deemed appropriate. NOAA will coordinate with existing managing agencies to ensure that the Olympic Coast National Marine Sanctuary and the proposed Northwest Straits National Marine Sanctuary do not unduly disrupt the management of vessel traffic and fishing.

Comment: The boundary of the Sanctuary should not encompass the waters of the Strait of Juan de Fuca because closely-monitored vessel traffic lanes already exist.

Response: The MPRSA encourages multiple uses of the Sanctuary as long as they are compatible with the resource protection goals of the Sanctuary. Clearly, the Coordinated Vessel Traffic System in the Strait of Juan de Fuca is in the best interest of the vessel traffic industry and the environment. NOAA would not interfere with the vessel traffic management regime in the Strait of Juan de Fuca if the Governor of the State of Washington supported inclusion of the Strait of Juan de Fuca in the Sanctuary boundary.

NORTHERN BOUNDARY

Comment: The northern boundary of the Sanctuary should be adjacent to the international border and include vessel traffic lanes to facilitate the establishment of a cooperative international sanctuary and coordinated vessel traffic management regime.

Response: The northern boundary is adjacent to the international boundary.

INCLUSION OF THE ESTUARIES

Comment: NOAA recognized both the high resource values of the estuaries and the high level of point source discharges. By including the estuaries in the boundary NOAA would be in a position to work with the Washington Department of Ecology (WDOE) to correct the sources of pollution.

Response: NOAA has been working with the Washington Department of Ecology to address pollution problems in the coastal estuaries. The Grays Harbor Estuary Management Plan was supported by funding provided pursuant to the Washington Shorelands Management Act. NOAA agrees that the estuaries are extremely valuable environments with high levels of point source discharges. However, NOAA believes that the estuaries are ecologically distinct from the offshore waters of the Olympic Peninsula, which is the core area of the Sanctuary. Inclusion in the National Estuarine Research Reserve System (NERRS) is a more appropriate management framework for NOAA involvement in estuarine management.

Comment: The estuaries should be excluded from the Sanctuary boundary because the Washington State Coastal Zone Management Program and the Grays Harbor Management Plan offer sufficient protection to the estuaries.

Response: NOAA agrees. The estuaries are excluded from the preferred boundary of the Sanctuary.

CONSIDERATION OF OTHER NATIONAL MARINE SANCTUARIES AND NATIONAL ESTUARINE RESEARCH RESERVES (NERRS)

Comment: Some commenters believed that NOAA should designate the estuaries as NERR's if they are not included in the boundary of the Sanctuary because of their natural resource values. Other commenters believed that NERR status is inadequate since it does not include the marine environment. Clarification is needed on the specific elements of the NERRS: 1) the degree of protection that the NERRS would provide to Grays Harbor and Willapa Bay; 2) the process of designation; 3) timetable for designation; 4)

assurances that designation would occur; and 5) the degree of protection to the estuaries that would be provided in comparison to sanctuary status.

Response: The terms of designation as a NERR are determined between the State and NOAA. The process begins with the nomination of an estuary, or portion thereof, to NOAA for inclusion in the NERRS by the Governor of the State. The State holds scoping meetings in the region nominated for inclusion to solicit public input. The State then prepares a draft environmental impact statement and management plan (DEIS/MP) where boundary, management, and regulatory alternatives are assessed and a preferred alternative is decided upon. The DEIS/MP must demonstrate that the key core land and water areas are adequately protected by the state. Once the DEIS/MP is completed, public hearings are held in the region. After a comment period of one month, the State must produce a Final Environmental Impact Statement/Management Plan (FEIS/MP) incorporating the public comments. Once NOAA approves the FEIS/MP the Reserve is officially designated. The entire process requires approximately three years. Designation is contingent upon available funding.

Comment: NOAA should encourage sanctuary designations in Northern Puget Sound, Hood Canal, Southern Oregon and Northern California.

Response: NOAA is working with the State of Washington to study the feasibility of a sanctuary in Northern Puget Sound. New candidates for sanctuary status are selected from NOAA's SEL. Sites in southern Oregon and Northern California are presently on the SEL.

HARBOR EXCLUSION/INCLUSION

Comment: How will sanctuary designation influence the disposal of dredge material from harbor maintenance and development activities that occur in the Port of La Push, the mouth of the Quilleute River, and Neah Bay?

Response: No dredge spoil disposal will be permitted within the Sanctuary. Harbors are excluded from the Sanctuary boundary. Therefore, maintenance and development activities can occur, but disposal of dredge material must be either on land or outside the boundary of the Sanctuary.

GROWTH MANAGEMENT

Comment: The Sanctuary should help to limit population growth.

Response: The sanctuary program has no control over population growth adjacent to the Sanctuary boundary. Rather, the program exists to ensure that human uses resulting from growth do not have a negative impact on Sanctuary resources.

Comment: Private land owners should not lose development rights to their land, nor should they have the value of their land significantly decreased by regulation without due compensation for that loss.

Response: NOAA is issuing no regulations that will diminish the development rights of private property owners.

OPPOSITION TO SANCTUARY DESIGNATION

Comment: The marine sanctuary should not be designated because: 1) it would shut down the fishing industry; 2) existing legislation and management regimes offer adequate protection; 3) potential industrial interests would be stifled because the sanctuary would over-regulate the local economy and its growth; 4) the ecological/aesthetic values of Washington's coastline are not permanently threatened; 5) local airports in Aberdeen and Ocean Shores would close due to insurance problems; and 6) the Olympic National Park has too much control over the Olympic Peninsula already.

Response: The Sanctuary will not shut down the fishing industry. Fishing is not within the scope of Sanctuary regulation; the regulation of fishing would remain with existing management regimes. Further, the Sanctuary will ensure greater protection from risks due to oil, gas and mineral development and vessel traffic accidents.

NOAA disagrees that existing legislation offers adequate protection of the offshore resources. The threats from such things as vessel traffic, oil and gas development, sand and gravel mining and Navy practice bombing of Sea Lion Rock have not been addressed through a comprehensive management regime that recognizes the value and fragility of the marine ecosystem off the Olympic Peninsula. NOAA does not believe that the Sanctuary will over-regulate the local economy since the main source of income in the region is from tourism, fishing and timber production-none of which will be negatively affected by the Sanctuary. Tourism and fishing will likely benefit from Sanctuary status due to the increased protection of the marine environment.

ISSUE: ALTERATION OF/OR CONSTRUCTION ON THE SEABED

Comment: The regulation pertaining to alteration or construction of the seabed may be interpreted as prohibiting such activities as geologic research, the placement of current meters, sediment traps and similar research equipment, all of which might be necessary if environmental studies were to be conducted in the Mineral Management Service (MMS) Washington-Oregon planning area. To clarify the intent of this prohibition, "Government sponsored environmental studies" should be added in the second sentence of this section as one of the activities for which this prohibition does not apply.

Response: NOAA supports research within the Sanctuary. However, the prohibition on alteration of, or construction on the seabed applies to all research activities, including those conducted by governmental agencies. All research activities conducted within the Sanctuary that violate a Sanctuary regulation must be undertaken pursuant to a Sanctuary research permit to ensure that the impacts from the research are minimal and temporary.

Comment: The prohibition on the alteration of, or construction on the seabed should not interfere with current or future harbor maintenance or fishing activities including: 1) jetty and groin construction; 2) permitted dredging of channels and harbors; 3) the use of dredge spoils for underwater berm construction; 4) construction and improvement of boat launching and marine facilities adjacent to reservations; 5) the retrieval of fishing gear (including crab pots) and sunken vessels; 6) bottom trawling and scallop dredging; and 7) tribal fin and shellfish operations. NOAA needs to clarify the exemption of activities incidental to routine fishing and vessel operations. The exemptions for harbor maintenance and fishing activities should read: "attempting to alter the seabed for any purpose other than anchoring vessels, normal fishing operations to include commercial bottom trawling and crab pot recovery, and routine harbor maintenance."

Response: Ports and harbors are not included within the boundary of the Sanctuary. Further, there is the following exception to the alteration-of-the-seabed regulation: "Harbor maintenance in the areas necessarily associated with Federal Projects in existence on the effective date of Sanctuary designation, including dredging of entrance channels and repair, replacement or rehabilitation of breakwaters and jetties." The boundary of the Sanctuary adjacent to the Port of La Push is congruent with the Colreg lines at the mouth of the harbor. The boundary of the Sanctuary at Neah Bay forms an arc from Koitlah Point to the

point of land on the opposite side of Neah Bay. The arc is contiguous with the outer coast of Waadah Island. The noted activities incidental to fishing have been exempted from the Sanctuary regulations.

Comment: NOAA should prohibit all dredging and removal of sand and gravel within the Sanctuary boundary.

Response: NOAA has prohibited all dredging and removal of sand and gravel within the Sanctuary boundary. These activities threaten the integrity of the benthic community and the food source of many fish, marine mammals and seabirds.

Comment: NOAA should not subject the exploration and development of offshore mineral activities to the same restrictions proposed for the exploration and development of Outer Continental Shelf (OCS) oil and gas.

Response: All of these activities injure the benthic communities in the Sanctuary and NOAA does not believe that there is cause for exceptions.

Comment: Clarify NOAA's policy on establishing artificial reefs within the Sanctuary.

Response: There are no artificial reefs in the Sanctuary as of the date of designation. The creation of new artificial reefs would be prohibited pursuant to the prohibition on alteration of, or construction on, the seabed.

Comment: NOAA should prohibit the construction of pipelines on the sea floor.

Response: The regulation prohibiting the alteration of, or construction on, the seabed would prohibit the construction of pipelines on the sea floor.

ISSUE: CULTURAL AND HISTORIC RESOURCES

Comment: NOAA should prohibit moving, injuring, or possessing historic resources within the Sanctuary.

Response: NOAA agrees that it is necessary to protect and manage historical and cultural resources within the Sanctuary boundary. NOAA has included a prohibition on moving, removing, possessing, injuring, or attempting to move, remove, or injure these resources, except as resulting incidentally from traditional fishing operations. If NOAA determines that fishing activities are resulting in injury to Sanctuary historic and cultural resources, NOAA may amend the Sanctuary regulations to abolish the exemption for these activities.

Comment: The proposed regulations dealing with cultural resources fail to preserve the tribes' ability to control access to, and removal of, their cultural heritage. Therefore, NOAA should add a new section 925.5(a)(8) prohibiting: "removal or attempted removal of any Indian cultural resource or artifact, or entry onto a significant cultural site designated by a tribal governing body with the concurrence of the Director, except with the express written consent of the governing body of the tribe or tribes to which such resource, artifact, or cultural site pertains." NOAA should pursue a cooperative agreement with the tribes to coordinate management of cultural artifacts of tribal significance.

Response: The MPRSA provides NOAA with the authority to control access to cultural artifacts within the Sanctuary thereby helping to ensure their preservation. Accordingly, anyone proposing to remove a cultural or historic resource must apply for and obtain a sanctuary permit from NOAA. NOAA acknowledges the interest of the coastal tribes to preserve their cultural heritage and, in particular, those cultural artifacts of tribal significance found within the Sanctuary. NOAA considers its objective of preserving the historical and cultural resources of the Sanctuary to be compatible with the coastal tribes' desire to preserve their cultural heritage. Therefore, NOAA has clarified in section 925.9(d) that "In deciding whether to issue a permit, the Director or designee may consider such factors as . . . the effect of the activity on adjacent Indian Tribes." NOAA will work on a cooperative agreement with the tribes and the State of Washington to clarify the process by which permits will be granted to conduct research or salvage operations on historical and cultural resources of tribal significance.

Comment: Current management of cultural resources is agreed upon between the Bureau of Indian Affairs (BIA) and the

tribes. The BIA supports the tribes in the management of their cultural resources.

Response: See response to previous comment.

Comment: The regulation as proposed in the DEIS/MP is duplicative of State law. There already exists state and Federal antiquities acts to protect coastal archeological and historical sites that occur on or near the median high tide boundary. The State archeologist already coordinates archeological matters.

Response: The MPRSA is not duplicative of existing laws protecting historical and cultural resources. The MPRSA is more comprehensive in that it provides enforcement authority, including civil penalties, for the destruction or injury of historical and cultural resources.

The Abandoned Shipwreck Act of 1987 gives states the title to certain abandoned shipwrecks in state waters. Under the MPRSA, NOAA has trustee responsibilities for abandoned shipwrecks and other historical and cultural resources within national marine sanctuaries, including those located in state waters, for the purpose of protecting them. NOAA will coordinate with State agencies to ensure that historical and cultural resources within the Sanctuary are protected, and that the policies affecting historical and cultural resources in State waters are consonant with the policies in the Federal waters of the Sanctuary.

ISSUE: DISCHARGES

Ocean Dumping

Comment: NOAA should not prohibit the use of dredged material disposal sites off Grays Harbor, Willapa Bay, the Columbia River, or on the north jetty and breakwater of the Port of La Push.

Response: The Sanctuary boundary does not extend south of Copalis Beach and excludes ports and harbors. Therefore, the maintenance activities at La Push and the use of the dredge disposal sites south of the boundary is not prohibited.

Comment: No ocean dumping should be allowed in proximity to the major submarine canyons.

Response: The regulations prohibit ocean dumping within the Sanctuary, and outside the Sanctuary if the material enters and injures Sanctuary resources or qualities.

Point Source Discharges

Comment: Prohibit discharges of toxics, plastic, and municipal garbage and sewage into the marine environment.

Response: The dumping of municipal garbage, toxics and plastics is prohibited within the Sanctuary by Sanctuary regulations and by regulations promulgated pursuant to the Act to Prevent Pollution from Ships (33 U.S.C. §§ 1901 et seq.) and the Marine Plastic Pollution Research and Control Act of 1987, which implements Annex V of MARPOL 73/78 in the U.S. Point source discharges are allowed provided such discharge is certified by NOAA in accordance with section 925.10 or approved by NOAA in accordance with section 925.11. After expiration of current permits, discharges from municipal treatment plants will be subject to the review process of section 925.11. At a minimum, secondary treatment will be required.

Comment: Current regulations are adequate. NOAA has not proven that the proposed regulations will enhance the recreational or aesthetic appeal, and water quality.

Response: Current regulations do not protect the area from the cumulative impacts of various types of discharges, including: 1) some ocean dumping; 2) sewage receiving only primary treatment; and 3) non-point source discharges. NOAA's ocean disposal regulation offers protection to the offshore environment that does not otherwise exist. NOAA will work with existing tribal, State and Federal

authorities to ensure that the quality of the water and Sanctuary resources are maintained.

Comment: Clarify how discharges from drilling and production rigs may be addressed if oil and gas leasing were to occur in the future.

Response: The regulations prohibit oil and gas exploration, development, and production activities within the Sanctuary. NOAA will work with the Environmental Protection Agency (EPA) to ensure that best available technology is implemented on any drilling rigs located outside of the Sanctuary to ensure that no discharges enter and injure Sanctuary resources and qualities.

Comment: Depositing or discharging from any location within the Sanctuary or from beyond the Sanctuary should be prohibited.

Response: The mandate of the National Marine Sanctuary Program is to facilitate multiple uses that are compatible with resource protection. Depositing or discharging most materials within the boundary of the Sanctuary, or from beyond the boundary of the Sanctuary if such material subsequently enters the Sanctuary and injures Sanctuary resources or qualities is prohibited. NOAA will work with EPA, the Tribes and the State of Washington to maintain water quality. NOAA may require special terms and conditions, including (but not limited to) improved effluent quality, on EPA permits to ensure Sanctuary resources and qualities are protected.

Non-Point Source Discharges

Comment: NOAA should not require at a minimum secondary treatment and sometimes tertiary or more for non-point source pollution. It is virtually impossible to subject runoff to these levels of treatment.

Response: NOAA does not require such treatment for non-point source pollution. NOAA will monitor non-point source pollution and work with those living and working in the coastal watersheds to minimize runoff into the Sanctuary.

Comment: It should be stated that there is no intent to regulate forest practices by Sanctuary administrators. There is no research or evidence which would justify the statement made in the proposed DEIS that the "greatest source of non-point discharge is the forest." This statement needs clarification and tree farmers must be assured that they can continue to grow and harvest trees pursuant to Washington's Forest Practices Act, one of the

most stringent in the country.

Response: NOAA's Strategic Assessment Branch has analyzed existing watershed data from the National Coastal Pollutant Discharge Inventory to determine sources of runoff. Summaries of pollution discharges for total volumes of nitrogen, lead, and all suspended solids combined indicate that with the exception of suspended solids discharged by paper mills, the greatest source of sediments discharged into sanctuary waters is from natural forest runoff.

Despite this evidence, NOAA will not be directly regulating upland uses. However, NOAA will coordinate with the upland user groups, and managing agencies to minimize non-point source impacts on Sanctuary resources.

Comment: The suggestion that excessive erosion from clear cutting practices is the source of most non-point source pollution from forests supports the need for further study of this common practice and the issuance of more stringent controls due to the steep and unstable slopes and amount of rainfall.

Response: NOAA agrees and will conduct monitoring and research initiatives in coordination with those living and working in the watersheds to minimize the impacts from timbering activities.

Discharges Outside the Sanctuary

Comment: Clarify to what extent the "sphere of influence" of the discharge regulation extends, to what degree it may affect coastal communities including the Tribes, and who determines if injury to a Sanctuary resource has occurred. Would a community such as Ocean Shores or an Indian Tribe face increased water quality regulations or enforcement? Further, does the discharge prohibition apply to particulates that are discharged into the air from pulp mills and subsequently enter the Sanctuary and harm Sanctuary resources and qualities.

NOAA should not impose additional restrictions, beyond the existing requirements of the Federal Water Pollution Control Act (FWPA), on the discharge of effluent and dredge spoils into marine waters. There is no evidence that additional restrictions on these activities are required to protect water quality in the proposed sanctuary.

Response: The MPRSA protects Sanctuary resources and qualities (including water quality) from the impacts of discharges from within and outside the boundary of a

Sanctuary whether airborne or waterborne. NOAA is responsible for determining injury to Sanctuary resources. Discharges pursuant to existing permits may be continued subject to the certification requirements of section 925.10. New permits are subject to the review process of section 925.11. At a minimum, secondary treatment will be required for any treatment plants discharging directly into the Sanctuary. With respect to airborne or waterborne discharges outside the Sanctuary, NOAA may condition such permits only if it is established that the discharges are entering the Sanctuary and injuring Sanctuary resources or qualities. NOAA will work closely with all to ensure that noone is unduly burdened by permitting requirements related to discharges. NOAA will coordinate with the State's Air Quality Board and Department of Ecology to monitor air and water quality over and in the Sanctuary.

Application of Discharge Regulations to Vessel Traffic

Comment: The application of this regulation should prohibit organic and inorganic discharges from fishing vessels and submarines (including bilge), aircraft. The prohibition should apply to all naval operations.

Response: The Sanctuary regulations specify the fishing and vessel related activities exempted from the discharge prohibition (section 925.5(a)(2)(i)-(iv)). Discharges and deposits from vessels are prohibited except for specific discharges intended to provide for traditional fishing activities, such as fish wastes resulting from traditional fishing operations in the Sanctuary, and for allowed vessel operations in the Sanctuary, namely biodegradable effluent incidental to vessel use and generated by approved marine sanitation devices, water generated by routine vessel operations, and engine exhaust. Such discharges are determined to be of minimal threat to the Sanctuary and are important for the safe and effective functioning of fishing and other vessels. Other discharges from vessel operations are prohibited. If in the future NOAA determines that increased protection for Sanctuary resources and qualities from these exempted activities is warranted, the Sanctuary regulations could be revised.

Comment: Clarify acceptable and unacceptable discharges from fishing vessels.

Response: See response to previous comment.

Economic Impacts of Discharge Regulations

Comment: Banning the use of approved dredge disposal sites would impose severe economic impacts on marine navigation

and commerce, and ultimately to the coastal communities.

Response: The boundary of the Sanctuary does not encompass the approved dredge disposal sites off of Grays Harbor, Willapa Bay, and the Columbia River. However, no new dredge disposal sites may be located within the Sanctuary boundary.

Comment: NOAA must examine the economic impacts of the discharge regulations on existing industries. There are currently 72 identified dischargers in the study area. It is unclear if the proposed Sanctuary would impact the continued operation of the pulp mill's NPDES permitted discharge near Grays Harbor.

Response: The Sanctuary's boundary does not extend south of Copalis Beach. Therefore, the only discharge regulation that would apply to dischargers in Grays Harbor would be the prohibition on discharges from outside the boundary that subsequently enter and injure Sanctuary resources or qualities. NOAA will need to establish that effluents from pulp mills are injuring Sanctuary resources or qualities before it would impose terms and conditions on the pulp mill's NPDES permit. If this situation were to occur, NOAA would work with the discharger, the State of Washington, and EPA to minimize the economic impacts of reducing the impacts.

ISSUE: OIL AND GAS DEVELOPMENT

Comment: NOAA's failure to offer as an alternative an outright, no conditions ban on hydrocarbon development within the Sanctuary is contrary to NEPA regulations, 40 CFR 1502.14 which states that the alternatives section is the heart of the environmental impact statement. NOAA should permanently ban oil and gas exploration, development, and production activities.

Response: Section 2207 of the Oceans Act of 1992 prohibits oil and gas exploration, development and production within the Sanctuary. The Sanctuary regulations repeat this prohibition.

Comment: NOAA should designate a buffer zone based on ocean currents and local seabed geography to prevent damage from external mineral operations.

Response: NOAA believes that the Sanctuary is large enough to buffer the sensitive canyon and coastal ecosystems from negative impacts of mineral development. Further, NOAA's authority to regulate discharges from outside the Sanctuary boundary that subsequently enter and injure Sanctuary resources or qualities provides additional protection over mineral activities.

Comment: NOAA should commit in the FEIS/MP and Record of Decision to the preparation of an EIS before lifting the prohibition.

Response: As previously discussed, the Oceans Act of 1992 prohibits oil and gas explorations, development and production within the Sanctuary. This prohibition may only be lifted by an Act of Congress.

Comment: The oil companies should be excluded from voicing an opinion regarding the Sanctuary because this privilege should be extended only to those who have spent time enjoying the State of Washington coastline.

Response: The Sanctuary program does not and cannot discriminate against any individual, agency, or interest group. All individuals have the right to voice an opinion.

Comment: Has NOAA come across any proposal for offshore wind generated power?

Response: NOAA is not aware of any proposal for offshore wind generated power.

Comment: The President's decision to postpone OCS

activities off the coasts of Washington and Oregon until after the year 2,000 should expire at that time unless affirmatively extended.

Response: Section 2207 of the Oceans Act of 1992 indefinitely bans oil and gas exploration, development and production within the boundary of the Sanctuary. This prohibitions could only be lifted by an Act of Congress.

Contingency Plans

Comment: The Sanctuary should establish a contingency plan in coordination with existing state and Federal contingency plans. Efforts should be made to coordinate with the State of Washington Departments of Wildlife, Fisheries, Ecology, and Natural Resources and pursue data sharing opportunities.

Response: The FEIS/MP identifies existing oil spill contingency plans and efforts in the State of Washington to cover the Strait of Juan de Fuca and Outer Coast. NOAA will coordinate closely with the existing agencies involved in contingency and emergency response planning, particularly the U.S. and Canadian Coast Guard and the State of Washington Office of Marine Safety (OMS). However, NOAA agrees that the Sanctuary requires its own contingency plan to ensure that resources are protected during events that threaten the environment. A prototype Sanctuary Contingency Plan is being tested at the Channel Islands National Marine Sanctuary. Once implementation experience has been gained, the plan will be adapted to other sites, including the Olympic Coast National Marine Sanctuary. To implement successfully an organized emergency response, NOAA will incorporate state and Federal legislation as well as local efforts into the Sanctuary Contingency Plan.

Comment: NOAA needs to provide for better oil spill response planning.

Response: NOAA is coordinating with the regional response committees of the OMS to ensure that the equipment is available to address an emergency that would threaten Sanctuary resources.

Comment: An Oil Spill Response Center should be sited in close proximity to the Sanctuary to address small spills north of Grays Harbor where there is currently a lack of oil spill response capability.

Response: NOAA is promoting this idea in its participation on the regional response subcommittee whose jurisdiction is the Strait of Juan de Fuca and the Outer Coast. However, priority will be placed on the stationing

of tugs and barges dedicated to emergency response.

Comment: The tribes should be properly funded to handle resource damage assessment as well as other activities where an oil spill could impact their subsistence and ceremonial harvest and cultural values.

Response: The reservations are not within the Sanctuary boundary. Therefore, the Sanctuary cannot dedicate funds to the Tribes for the purpose of damage assessment pursuant to a spill of hazardous materials.

Comment: NOAA should request that the oil industry's Marine Spill Response Corporation station a tractor/tug response vessel at Neah Bay.

Response: NOAA has made the recommendation to the subcommittee on emergency response for the Strait of Juan de Fuca and the Outer Coast. NOAA is actively participating in formulating the recommendation to the State, and will coordinate with the Makah Tribe in their planning initiative to expand their marina to plan to accommodate a tug or emergency response vessel that is of appropriate size to service the Outer Coast and the Strait of Juan de Fuca.

Comment: NOAA should ensure that drills are conducted for the Clean Sound Cooperative with outside evaluation.

Response: NOAA intends to hire an operations manager immediately after designation to address issues related to vessel traffic and contingency planning. One of the priorities of this position will be to encourage the Coast Guard to focus on the Sanctuary during its emergency response drills.

Comment: NOAA should propose the examination of extending unlimited liability for spills to the shipping companies and the original firms providing the original source materials involved in the polluting activities.

Response: The MPRSA only provides NOAA with the authority to collect $100,000 per day for each violation pursuant to 16 U.S.C. 1437(c)(1), and damages to Sanctuary natural resources pursuant to 16 U.S.C. 1443.

ISSUE: NAVAL PRACTICE BOMBING OF SEALION ROCK

Comment: NOAA should prohibit, or at least condition, the Navy's practice bombing activities over Sealion Rock due to the impact on seabirds, depositing of metal objects in the Sanctuary, and because the military environment does not require such a sensitive area to be used for such purposes. At the very least, NOAA should prohibit the practice bombing during the breeding season. Section 7 consultations with the Department of Commerce and the Department of the Interior should not be construed as sufficient mitigation because these processes do not address impacts to non-endangered species.

Response: NOAA agrees that the Navy practice bombing of Sealion Rock is inconsistent with the goals of the Sanctuary program. Because the permit under which the Navy conducted its activities over Sealion Rock was rescinded by the Secretary of the Interior in August, 1993, NOAA may prohibit outright all bombing activities within the Sanctuary and has determined to do so. The regulation adopted by NOAA prohibits all practice bombing and provides that no exemption from the prohibition will be granted.

Comment: NOAA does not have the authority to prohibit or condition the Navy's activities.

Response: Because the Navy's authorization from the Secretary of Interior was rescinded, NOAA now has the authority to not only condition but also prohibit the Navy's practice bombing activities.

Comment: NOAA should place the Navy's bombing activities within the scope of regulation to allow future regulation if necessary. To not list military activities is in conflict with the primary goal of resource protection.

Response: NOAA has addressed Navy activities in section 925.5(d) of the regulations.

Comment: NOAA should investigate the history of the Navy's activities over Sealion Rock to determine if a grandfather clause is warranted.

Response: The history of the Navy's activities and the permit that authorized its activities has been outlined in the FEIS/MP. The Navy's authority to conduct practice bombing activities has been rescinded and thus consideration of a grandfather clause is irrelevant.

Comment: Clarify how Navy bombing of Sealion Rock at 200 feet is less disruptive than commercial overflights.

Response: NOAA does not assert that the Navy's low flying activities are less disruptive than commercial or non-commercial overflights. NOAA's differing regulations in the DEIS/MP applying to Navy and non-military overflights resulted from limitations placed on NOAA by the MPRSA with respect to terminating pre-existing leases and permits.

ISSUE: PROTECTION OF TREATY RIGHTS

Comment: NOAA's regulations do not formally recognize the Federal Government's trust responsibility to the coastal Tribes. The regulations contain no provision which formally requires the Director to consider and protect tribal interests when ruling on permit applications to conduct development activities within the Sanctuary. To address this issue, the following modifications to the section 925.8 should be made:

The Director . . . may issue a permit . . . to conduct an activity otherwise prohibited by section 925.5(a)(2)-(7), if the Director finds that the activity will: further research related to Sanctuary resources:

> . . .or promote the welfare of any Indian Tribe adjacent to the Sanctuary. In deciding whether to issue a permit, the Director shall consider such factors as . . . the impacts of the activity on adjacent Indian Tribes. Where the issuance or denial of a permit is requested by the governing body of an Indian Tribe, the Director shall consider and protect the interests of the Tribe to the fullest extent practicable in keeping with the purposes of the Sanctuary and his or her fiduciary duties to the Tribe. . ..

Response: NOAA agrees that the designation of the Olympic Coast National Marine Sanctuary is subject to the Federal government's general fiduciary responsibility to the coastal tribes. However, it is also clear that the Federal government is not obligated to provide particular services or benefits, nor to undertake any specific fiduciary responsibilities in the absence of a specific provision in a treaty, agreement, executive order, or statute. See Havasupai Tribe v. U.S., 752 F. Supp. 1471 (D. Ariz 1990), citing, Vigil, 667 (D.C. Cir. 1980); Gila River Pima-Maricopa Indian Community, 427 F.2d 1194, 190 Ct. Cl. 790 (1970). With respect to this designation, there is no specific provision in the coastal Tribes' treaties or any agreement, executive order, or statute which requires NOAA to undertake any specific fiduciary responsibility on behalf of the coastal Tribes. Therefore, NOAA can fulfill its obligations to the coastal Tribes with respect to the designation by giving due consideration to their interests and concerns during the decision-making process.

NOAA agrees that its trust responsibilities to the Tribes requires that it consider Tribal interest when ruling on permit applications to conduct activities within the Sanctuary. However, this responsibility does not require

that NOAA base its decision solely on what is in the best interest of the coastal Tribes. Therefore, NOAA opposes the addition of "or promote the welfare of any Indian Tribe adjacent to the Sanctuary", but agrees to include "the effects of the activity on adjacent Indian Tribes . . .." As previously stated, NOAA agrees that it must consider the interests of the Tribes when issuing permits, and language to that effect has been included in the regulations.

Comment: NOAA's regulation prohibiting the taking of marine mammals and seabirds conflicts with treaty rights to fish and hunt marine mammals in tribal usual and accustomed fishing grounds.

Response: NOAA recognizes that, given the standard for abrogating treaty rights enunciated by the Supreme Court in United States v. Dion, 476 U.S. 734 (1985), the provisions of the MPRSA do not abrogate the coastal Tribes' treaty fishing and hunting rights. However, it is unclear whether Congress intended the MMPA and the Endangered Species Act (ESA) to abrogate these rights. Recently, the Makah Tribe has pursued clarification regarding the applicability of the Marine Mammal Protection Act (MMPA) and ESA to its treaty rights to hunt whales and seals. The issue is currently being examined by the Tribes and the National Marine Fisheries Service (NMFS). Given the concerns raised by the coastal Tribes, section 925.5(a)(6) has been revised to read as follows:

> Taking any marine mammal, sea turtle, or seabird in or above the Sanctuary, except as authorized by the National Marine Fisheries Service or the United States Fish and Wildlife Service under the authority of the Marine Mammal Protection Act, as amended (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 16 U.S.C. 703 et seq., or pursuant to any treaty with an Indian Tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA, and MBTA.

The revised language recognizes the Makah Tribe's treaty right to hunt whales and seals. However, the regulation also requires that the right be exercised in accordance with the provisions of the MMPA, ESA, and MBTA. If the MMPA, ESA or MBTA is determined to abrogate or otherwise restrict the Tribe's exercise of its right to hunt whales and seals, then that determination shall apply to the Tribe's exercise of those rights within the boundary of the Sanctuary.

Comment: The regulations fail to preserve tribal control of their cultural heritage. NOAA should amend section 925.5(a)(8) to read as follows:

> Removal or attempted removal of any Indian cultural resource or artifact, or entry onto a significant cultural site designated by a Tribal governing body with the concurrence of the Director, except with the express written consent of the governing body of the Tribe or Tribes to which such resource, artifact, or cultural site pertains.

Response: The MPRSA provides NOAA with the authority to control access to cultural or historical artifacts within the Sanctuary thereby helping to ensure their preservation. Accordingly, anyone proposing to remove a cultural or historical resource must apply for and obtain a Sanctuary permit from NOAA. NOAA also acknowledges the coastal Tribes' desire to preserve their cultural heritage and, in particular, those cultural artifacts of tribal significance found within the Sanctuary. NOAA considers its objective of preserving the historical and cultural resources of the Sanctuary to be compatible with the coastal Tribes' desire to preserve their cultural heritage. Therefore, prior to issuing a Sanctuary permit to excavate a cultural or historical artifact that is of tribal significance, NOAA will consult with the affected Tribe(s). This clarification has been added to section 925.9.

Comment: The regulation prohibiting overflights under 1,000 ft. except for valid law enforcement purposes conflicts with the treaty secured rights to access certain reservation lands such as Tatoosh Island and Ozette, which are only accessible by helicopter in the winter months, and to conduct aerial timber cruises and engage in helicopter logging on portions of the reservation abutting the Sanctuary. Therefore the following amendment to section 925.5(7) is proposed:

> Flying motorized aircraft at less than 1,000 feet above the Sanctuary within one nautical mile of the coastal boundary of the Sanctuary and the Flattery Rocks, Quilleute Needles, and Copalis National Wildlife Refuges, except for valid law enforcement purposes or where authorized by a governing body of an Indian Tribe to provide access to reservation lands.

Response: NOAA acknowledges the Tribes' concerns and does not intend to interfere with tribal rights to access reservation lands. Also, for the reasons discussed below, the minimum altitude has been changed to 2000 ft. In order not to interfere with Tribal access to reservation lands,

the prohibition on flying has been changed to read:

> Flying motorized aircraft at less than 2,000 feet above the Sanctuary within one nautical mile of the Flattery Rocks, Quillayute Needles, or Copalis National Wildlife Refuge, and within one nautical mile seaward from the coastal boundary of the Sanctuary, except as necessary for valid law enforcement purposes, for activities related to tribal timber operations conducted on reservation lands, or to transport persons or supplies to or from reservation lands as authorized by a governing body of an Indian Tribe.

Comment: NOAA should apply the management plan equally to tribal and non-tribal governmental entities within the adopted boundary equally.

Response: NOAA is legally bound to recognize treaty secured rights and has no intention to interfere with these rights. As such, there will be circumstances in which Sanctuary regulations will apply to tribal and non-tribal members differently.

ISSUE: VESSEL TRAFFIC

Comment: Route tankers and barges as far away from near-shore reefs and islands as possible. Clarify what types of vessels can transit close to shore.

Response: There exists a Cooperative Vessel Traffic Management System (CVTMS) established and jointly managed by the United States and Canada. The CVTMS is a mandatory regime and consists of all navigable waters of the Strait of Juan de Fuca and its offshore approaches, southern Georgia Strait, the Gulf and San Juan Archipelagos, Rosario Strait, Boundary Pass, Haro Strait, and Puget Sound, bounded on the west by longitude 147°W and latitude 48°N, and on the northeast by a line along 49°N from Vancouver Island to Semiamoo Bay.

The rules of the CVTMS are intended to enhance safe and expeditious vessel traffic movement, to prevent groundings and collisions, and to minimize the risk of property damage and pollution to the marine environment. The rules apply to:

a. Each vessel of 30 meters or more in length; and

b. Each vessel that is engaged in towing alongside or astern, or in pushing ahead, one or more objects, other than fishing gear, where:

(1) the combined length of the vessel towing, the towing apparatus, and the vessel or object towed is 45 meters or more; or

(2) the vessel or object towed is 20 meters or more in overall length.

Both the Canadian and the United States Coast Guards are studying methods to improve the CVTMS in the area. Items being studied include replacement of outdated equipment, elimination of gaps in coverage, and increasing operator training and assignment length.

The Oil Pollution Act of 1990 (OPA 90) requires the U.S. Coast Guard to conduct a national Tanker Free Zone Study. This study is nearing completion and will recommend regulations requiring tank vessels to remain offshore during coastal transits.

Further, NOAA has recommended to the U.S. Coast Guard that an International Maritime Organization (IMO) approved ATBA be established within the proposed Sanctuary boundary. This would require vessels transporting hazardous materials to remain at least 25 nautical miles offshore while in the vicinity of Sanctuary waters or until making their approach to the Strait of Juan de Fuca using the established CVTMS traffic separation scheme. Although ATBA's are not

compulsory for foreign flag vessels, a maritime state may make such an area compulsory for domestic vessels transiting the waters under its jurisdiction.

Comment: Clarify "commercial vessel" and distinguish between various sizes, uses, and types of vessels.

Response: "Commercial vessel" means any vessel operating in return for payment or other type of compensation. Clarification between sizes, uses, and types of vessels would require more space than is available in this document. Rather than attempt to hold to a general definition of "commercial vessel", reference will be made to specific types of vessels, i.e., tank vessels, bulk carriers, fishing vessels, pleasure craft, etc., wherever required.

Comment: The Sanctuary boundary should be published on navigational charts.

Response: NOAA agrees and will submit the Sanctuary boundary to the Nautical Charting Division of the National Ocean Service. The boundary will be delineated on the next update of the appropriate navigational chart.

Comment: Spill containment and cleanup measures should be part of appropriate mitigation requirements for vessels operating within the Sanctuary.

Response: OPA 90 mandates that tank vessel contingency plans be prepared for a worst-case discharge, and that vessel plans be reviewed and approved by the U.S. Coast Guard. OPA 90 also stipulates that each responsible party for a vessel from which oil is discharged, or which poses the substantial threat of a discharge of oil into or upon the navigable waters or adjoining shorelines or the exclusive economic zone, is liable for the removal costs and damages resulting from such an incident.

Further, Washington State law (Title 88 Section 46 Revised Code of Washington) requires the owner or operator of a tank vessel to prepare and submit an oil spill prevention plan prior to the vessel's entry into a Washington port. The law also requires that each tank vessel, cargo vessel of greater than three hundred or more gross tons, or passenger vessel of greater than three hundred or more gross tons have a contingency plan for the containment and cleanup of oil spills from such vessel into the waters of the State.

Comment: NOAA should provide a more complete explanation of how implementation of each of the regulations would put U.S.

shipping companies at an economic disadvantage in relation to foreign vessels. Precisely what would be the estimated cost in dollars, time, inconvenience, and ultimate impact upon U.S. shipping companies.

Response: NOAA is promulgating no regulations that will adversely affect domestic vessels.

Comment: NOAA should put forth a vessel traffic management plan, spearheaded by the U.S. Coast Guard, that addresses research needs, vessel traffic monitoring and communication systems, and future regulatory alternatives. The management plan should be proactive, and establish a timetable for considering new vessel traffic regulations in the future.

Response: NOAA is working with the U.S. Coast Guard, which has the primary authority for vessel traffic regulation, to determine the need for additional measures to ensure protection of Sanctuary resources and qualities. In addition, NOAA will work with the U.S. Army Corps of Engineers (COE) and the EPA regarding vessel traffic activities resulting from the transport of dredged material through the Sanctuary for disposal outside the Sanctuary. These consultations will aim to determine which resources are most at risk, which vessel traffic practices are most threatening, and which regulations or restrictions would be most appropriate to alleviate such risk.

NOAA agrees that an improved vessel traffic monitoring and communication system along the coast is desirable. OPA 90 requires the Secretary of Transportation to complete a comprehensive study on the impact of installation, expansion, or improvement of vessel traffic servicing systems. NOAA will work with the State of Washington's OMS, the U.S. Coast Guard, and appropriate public agencies during the development of these monitoring studies to determine an appropriate system for the Sanctuary and the need for any additional site-specific protective measures.

Vessel traffic monitoring and research and coordination on this subject have been incorporated into the Sanctuary management plan.

Comment: Allow only double-hulled vessels in the Sanctuary.

Response: OPA 90 establishes double hull requirements for tank vessels. Most tank vessels over 5,000 gross tons will be required to have double hulls by 2010. Vessels under 5,000 gross tons will be required to have a double hull or a double containment system by 2015. All newly constructed tankers must have a double hull (or double containment system if under 5,000 gross tons), while

existing vessels are phased out over a period of years.

As previously stated, the U.S. Coast Guard is completing a study of a tanker free zone where tank vessels would be required to remain offshore during coastal transits. Further, a proposal to establish an ATBA within the Sanctuary boundary has been developed and will be submitted to the International Maritime Organization (IMO) for approval at the earliest possible date which, in accordance with IMO's procedures, is June, 1994. Both actions will serve to ensure that hazardous material laden vessels will remain an appropriate distance offshore.

Comment: Require vessels to have a pilot aboard.

Response: Requirements for pilots are set forth in both Federal and state regulations. NOAA will monitor and review vessel traffic in the Sanctuary and make recommendations to the appropriate regulatory agencies, state and Federal, regarding the need for additional pilotage requirements. Pilotage is currently compulsory for all vessels except those under enrollment or engaged exclusively in the coasting trade on the West Coast of the continental United States (including Alaska) and/or British Columbia. Port Angeles has been designated as the pilotage station for all vessels enroute to or from the sea.

OPA 90 requires the U.S. Coast Guard to designate U.S. waters where a second licensed officer must be on the bridge of a coastwise seagoing tanker over 1,600 gross tons. Under the Ports and Waterways Safety Act, the U.S. Coast Guard also is proposing to require a second officer on foreign flag tankers over 1,600 gross tons and on U.S. registered tankers over 1,600 gross tons.

Comment: Establish a tonnage limit within three nautical miles of shore except for those making a port call.

Response: All types of vessels and traffic patterns will be reviewed by NOAA, the U.S. Coast Guard, and the State of Washington OMS to determine any appropriate action to be taken. In conducting this review, attention will be paid to vessel type, cargo carried, and vessel size.

Comment: Require all vessels to have English speaking bridge personnel.

Response: All vessels required to participate in the Juan de Fuca region CVTMS are required to make all reports in English.

Comment: Curtail traffic during poor weather conditions.

Response: NOAA will work with the state, U.S. Coast Guard, and appropriate public agencies to determine the need for further vessel traffic regulations to specifically address vessel traffic during adverse weather conditions.

During conditions of vessel congestion, adverse weather, reduced visibility, or other hazardous circumstances in the area of the Juan de Fuca Region CVTMS, the Cooperative Vessel Traffic Management Center may issue directions to control and supervise traffic. They may also specify times when vessels may enter, move within or through, or depart from ports, harbors, or other waters of the CVTMS Zone.

Further, the U.S. Coast Guard's Navigation Rules, International and Inland, speak specifically to the conduct of vessels while at sea. Rule 6 of the International and Inland Steering and Sailing Rules states that "Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions."

Comment: Prohibit engine powered water craft of any type.

Response: A fundamental objective of the sanctuary program is "to facilitate, to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities" (16 U.S.C. 1431(b)(5)). NOAA will consider the threats from all types of vessels - power driven, sailing, or paddle propelled - as a continuing analysis of vessel traffic within the sanctuary boundaries.

Comment: Manage the off-loading or exchange of cargo or oil.

Response: No offloading or exchange of oil occurs within the boundary of the Sanctuary. This activity generally occurs in ports which are located outside of the Sanctuary boundary. Further, this type of activity is addressed by both OPA 90 and programs being established by the recently created Washington State OMS.

Comment: Prohibit shipment of reclaimed spent nuclear fuel from foreign reactors through the Sanctuary.

Response: As previously noted, NOAA has recommended to the U.S. Coast Guard that an IMO approved ATBA be established within the Sanctuary boundary. This would require vessels transporting hazardous materials to remain

at least 25 nautical miles offshore while in the vicinity of Sanctuary waters or until making their approach to the Strait of Juan de Fuca using the established CVTMS traffic separation scheme.

NOAA will also work with the State of Washington's OMS and both the U.S. and Canadian Coast Guards to be informed of, and alerted to, in a timely and regular manner, all hazardous cargo carriers transiting near Sanctuary waters. Further, through participation in regular meetings of the Washington State Regional Marine Safety Committees and discussions with the U. S. Coast Guard, NOAA will ensure that contingency plans adequately address such transport issues.

Comment: Prohibit commercial vessel anchorages within the Sanctuary, particularly off Makah Bay, except in emergencies.

Response: The use of the Makah Bay anchorage by vessels waiting either for an available pilot at Port Angeles or instructions from their home office, has been examined. Currently, its use as a temporary anchorage has been agreed upon by both the U.S. and Canadian Coast Guards. This is viewed as a more favorable alternative than having such vessels continuously underway within, and off the entrances to, the Strait. Vessels at anchor are subject to MARPOL, U.S. Federal law, and Sanctuary regulations regarding discharges. The use of this anchorage is monitored by Tofino Vessel Traffic Service which can also educate such vessels regarding the Sanctuary and its regulations.

Comment: Clarify NOAA's authority to regulate vessel traffic within State of Washington waters.

Response: Section 303 of the MPRSA gives NOAA the authority to promulgate regulations to implement the designation, including regulations necessary to achieve resource protection.

Comment: The State and Federal government have appropriated $75 million to expand and enhance maritime activity at Grays Harbor through waterway dredging and port terminal development programs. If vessel traffic is restricted, one branch of the government would be defeating the purpose of other parts of the government.

Response: NOAA has studied vessel traffic along the Washington coast. The result of the analysis was the recommendation for the previously mentioned ATBA. This proposal, if adopted, would add approximately 17 nautical

miles on a transit from Grays Harbor to the entrance of the Straits of Juan de Fuca and approximately 21 nautical miles on a transit from the entrance of the Straits to Grays Harbor. In comparison to the costs of cleanup, legal fees, liability, fines, loss of cargo, and vessel and environmental damages, the proposals to establish the ATBA seem reasonable.

Comment: Double-hulled proposals are not economically sensible in the foreseeable future.

Response: Congress has mandated (OPA 90) national double hull requirements for tank vessels.

ISSUE: OVERFLIGHTS

Comment: Establish the boundary for overflights at the beach rather than one (1) mile inland.

Response: The boundary for overflights is at the shoreline and not one (1) mile inland.

Comment: Establish a 2,500 foot minimum flight altitude over the sanctuary.

Response: To be consonant with current regulations regarding flights over charted National Park Service Areas, U.S. Fish and Wildlife Service Areas, and U.S. Forest Service Areas, NOAA is prohibiting the flying of motorized aircraft at less than 2,000 feet above the Sanctuary within one nautical mile of the Flattery Rocks, Quillayute Needles, or Copalis National Wildlife Refuge, and at less than 2,000 feet above the Sanctuary within one nautical mile seaward from the coastal boundary of the Sanctuary, except as necessary for valid law enforcement purposes, for activities related to tribal timber operations conducted on reservation lands, or to transport persons or supplies to or from reservation lands as authorized by a governing body of an Indian Tribe. NOAA will work with the Federal Aviation Administration (FAA) to reflect this regulation on aeronautical charts.

Comment: Permit search and rescue at all times by whatever aircraft is needed to accomplish the task.

Response: The prohibitions set forth in the Sanctuary regulations do not apply to activities necessary to respond to emergencies threatening life, property, or the environment pursuant to Section 925.5 (c) of the regulations. Thus, in any emergency, search and rescue aircraft are allowed to perform whatever tasks are required within the Sanctuary boundary.

Comment: When necessary to bring a research flight into the area below the Sanctuary prescribed ceiling, regulations should require the plane's engine be kept at or below a reasonable decibel level as heard from the ground.

Response: FAA regulations (14 CFR Part 36) codify noise standards for aircraft operating within U.S. airspace. Adherence to these standards is already required. When research is to be conducted within the Sanctuary boundary, aircraft operators will be required to obtain a permit and conduct such research in such a manner so as to minimize disturbance yet remain within safe aircraft operating parameters.

ISSUE: LIVING RESOURCE EXTRACTION

Fishing

Comment: NOAA should not restrict access to fishing grounds or catch-ability. Crab fishing and razor clam digging must be allowed.

Response: The regulation of fishing is not authorized by the Designation Document. NOAA has determined that existing fishery management authorities are adequate to address fishery resource issues. As with all other fisheries that occur within the Sanctuary, crab fishing and razor clam digging remain under the regulatory authority of existing Federal, state, tribal and regional fishery authorities. NOAA does not view fishing as contrary to the goals of the Sanctuary. The sanctuary program is by law mandated "to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources . . .." (including fishing) (16 U.S.C. 1431(b)(5)).

Existing fishery management agencies are primarily concerned with the regulation and management of fish stocks for a healthy fishery. In contrast, the National Marine Sanctuary Program has a different and broader mandate under the MPRSA to protect all Sanctuary resources on an ecosystem-wide basis. Thus, while fishery agencies may be concerned about certain fishing efforts and techniques in relation to fish stock abundance and distribution, the Marine Sanctuary Program is also concerned about the potential incidental impacts of specific fishery techniques on all Sanctuary resources including benthic habitats or marine mammals as well as the role the target species plays in the health of the ecosystem. In the case of the Olympic Coast, fish resources are already extensively managed by existing authorities and NOAA does not envision a fishery management role for the Sanctuary Program. Accordingly, fishing activities have not been included in the list of activities in the Designation Document subject to regulation as part of the Sanctuary regime. However, the Sanctuary Program will provide research results and recommendations to existing fishery management agencies in order to enhance the protection of fishery and other resources within the Sanctuary.

Comment: No additional fisheries management or regulation is needed in the Sanctuary. Commercial, recreation, and subsistence fishing can be compatible with sanctuary designation, and the existing regulatory framework is adequate at this time.

Response: See response to previous comment. The Designation Document places kelp harvesting within the scope of future regulation since there is no existing management plan for kelp harvesting.

Comment: Clarify the language associated with commercial fishing practices near sunken vessels, rocks and reefs in the proposed sanctuary to insure continuance of historical and customary fishing practices. Existing Federal and state regulations adequately protect archeological treasures, man-made reefs, and natural rock and reef formations. The FEIS should acknowledge and permit prevailing practices.

Response: Commercial fishing vis-a-vis historical resources is an exempted activity under the prohibition against disturbance of historical resources. However, the exemption is only for incidental disturbance and therefore does not allow deliberate disturbance.

Comment: Fishing should either be regulated, or placed in the scope of regulation, because there may be a time in the future when fishing needs to be regulated by the Sanctuary.

Response: NOAA believes that existing authorities are adequate to regulate fishing. Should the need arise to regulate fishing as part of the Sanctuary management regime, the Designation Document could be amended.

Comment: Proposed regulations should result in the gradual reduction of fishing, aquaculture, kelp harvesting and waterfowl hunting to insure that no commercial activity threatens the integrity of any resources in the proposed Sanctuary. Some commenters believed that the Sanctuary should ban all commercial fishing activities except Native American fishing activities.

Response: A blanket reduction of resource-use activities across the Sanctuary could not be imposed without credible evidence that each resource affected is threatened by a population decrease or stock failure. Absent such evidence, the Act requires that existing uses be facilitated to the extent compatible with the primary objective of resource protection.

Comment: True refugia should be established where all consumptive uses are prohibited for a period of time.

Response: The determination of whether refugia are established in the Sanctuary will be done in coordination with the NMFS, PFMC, Washington Department of Fisheries (WDF), the tribes, environmental groups, and industry. The Sanctuary Advisory Committee (SAC) will be an important

forum to address this issue. If, in coordination with other governmental agencies, it is determined that establishment of refugia is a desirable alternative, NOAA will analyze the alternative through the preparation of an environmental impact statement/management plan and solicitation of public input pursuant to the NEPA and the APA.

Comment: Driftnets, trawling, and all dragnet fisheries should be banned from the proposed Sanctuary as inconsistent with the regulation prohibiting alteration of, or construction on, the seabed.

Response: The only net gear used in fisheries in the Sanctuary are trolling gear (for salmon) and trawling gear (for groundfish). The regulatory prohibition on altering the seabed includes an exception for incidental disturbance resulting from traditional fishing operations. NMFS has conducted a limited study of the impact of trawl gear on the benthos and has not identified any resulting systematic destruction. However, the regulations could be modified to regulate any activity that is shown to cause significant disturbance of the seabed. This reflects adherence to the MPRSA's goals of preserving natural and human-use qualities of a marine area.

High-seas driftnets, defined as nets greater than 1.5 miles long, have been banned pursuant to United Nations resolution 46/215. While gillnets and setnets are currently used in the inland waters of the State of Washington, they are not used in Sanctuary waters.

Comment: NOAA should facilitate the regulation of resource extraction within the Sanctuary under a regulatory framework that is controlled by a single agency.

Response: Regulatory authority over resources and resource extraction industries is expressly granted by state and Federal statute. NOAA does not have the primary regulatory authority over resource extraction. NOAA can act to coordinate the various regulators and can impose additional regulations, but cannot reassign itself or other agencies regulatory authority.

Comment: NOAA must clarify and acknowledge all tribal treaty fishing rights in the FEIS/MP, and the interaction of Sanctuary regulations with the right of tribes to fish in their Usual and Accustomed fishing areas.

Response: This issue is clarified in the Designation Document and in Part II (under Socio-Demographic profile and Land Use). Treaty rights to hunt and fish are acknowledged.

Comment: The entire study area must be considered as a "fishing area" since fish migrate along the entire Washington coast.

Response: NOAA recognizes that fish "know no boundaries in the sea." The fishing areas identified in the FEIS/MP only represent known locations where certain fishery activity is concentrated. The fishing areas displayed in the FEIS/MP are not related to regulatory jurisdiction in any way. They are simplified visual aids to complement the discussion of resources off the coast of Washington.

Aquaculture

Comment: Clarify NOAA's intention to regulate, condition, or prohibit aquaculture activities throughout the Sanctuary and adjacent to Indian reservations.

Response: The Sanctuary regulations do not directly prohibit aquaculture operations within the Sanctuary boundary. However, discharge of matter into the Sanctuary, or alteration of or construction on the seabed in connection with aquaculture activities are prohibited. It is unlikely that permits would be granted for aquaculture activities in the Sanctuary that violate these prohibitions. This determination is based upon U.S. Army Corps of Engineers (COE) guidance related to permits for fish pen mariculture operations, which prohibits fish farms in Federal natural resource areas, such as national seashores, wilderness areas, wildlife refuges, parks or other areas designated for similar purposes (e.g., national marine sanctuaries).

Comment: NOAA should change the proposed regulation governing alteration of or construction on the seabed to "maintenance and development of approved aquaculture operations", and strike "existing prior to the effective date of these regulations." Eliminating future aquaculture development off the Olympic Coast would preclude opportunities for both private shellfish and finfish production and for public enhancement. Technology is being developed which would result in minimal environmental imbalance, and would afford employment for regional communities.

Response: See response to previous comment.

Comment: The Sanctuary should not regulate aquaculture activities because there are sufficient regulations in place.

Response: See response to previous comment.

Comment: The Sanctuary should provide mutually agreed upon requirements for aquaculture activities among the oyster growers of Willapa Bay.

Response: The boundary of the Sanctuary does not include Willapa Bay.

Comment: The discussion in the FEIS/MP on the impacts of aquaculture needs to be expanded and the proposal to not regulate aquaculture in the Sanctuary should be re-assessed. The FEIS/MP needs to address the use of drugs in farm-raised fish.

Response: The discussion of aquaculture within the Sanctuary is intended only to evaluate the current status of the industry in the study area - it is not intended to measure aggregate impacts. The request for expanded discussion of resources does not identify specific issues of discussion. A re-assessment of aquaculture vis-a-vis the Sanctuary reveals that the industry is adequately regulated by existing state and Federal requirements. However, any discharges from such operations into the Sanctuary would be prohibited. The Sanctuary has no jurisdiction over the use of drugs in aquaculture - such determinations are under the purview of the Washington State Department of Health (WDH) and the Federal Food and Drug Administration (FDA).

Comment: All aquaculture should be banned from within the Sanctuary.

Response: The Sanctuary is required by law to facilitate public and private uses of Sanctuary resources as long as resource protection is not jeopardized. If properly sited and operated, aquaculture does not appear to appreciably impact the health of the marine environment.

Comment: Kelp harvesting should be banned or regulated within the Sanctuary.

Response: At present there is no kelp harvesting within the Sanctuary. The Washington Department of Natural Resources (DNR) is in the process of preparing a management plan for kelp harvesting. NOAA has included kelp harvesting in the scope of regulations in the Designation Document in the event that future action by NOAA is necessary to protect this resource. NOAA will work with DNR to develop a kelp management plan within the Sanctuary.

ISSUE: MARINE MAMMALS, SEA TURTLES AND SEABIRDS

Comment: Clarify "takings". The prohibition on the taking of marine mammals and seabirds within the Sanctuary is redundant with the ESA, the MMPA and the MBTA, and what further impact it will have on the fishing community.

Response: "Taking" is defined in section 925.3 of the regulations to mean: (1) for any marine mammal, sea turtle or seabird listed as either endangered or threatened pursuant to the ESA to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or injure, or to attempt to engage in any such conduct and, (2) for any other marine mammal, sea turtle, or seabird, the term means to harass, hunt, capture, kill, collect or injure, or to attempt to engage in any such conduct. While marine mammals, seabirds and endangered and threatened species are protected under the MMPA, ESA and MBTA, NOAA believes that the higher penalties afforded under the MPRSA will provide a stronger deterrent.

The MBTA sets maximum criminal fines at either $500 or $2,000 per violation, depending on the violation. The MMPA sets maximum civil penalties at $10,000 and maximum criminal fines at $20,000. The ESA sets maximum civil penalties at $500, $12,000 or $25,000 per violation, depending on the violation; maximum criminal fines are set at $50,000. (All three statutes also provide for imprisonment for criminal violations.)

Section 307 of the MPRSA allows NOAA to assess civil penalties as high as $100,000 for each violation. In addition, monies collected under the MPRSA are available for use by the National Marine Sanctuary Program.

Comment: The MBTA would not allow any taking of migratory birds in the sanctuary, thus providing even stronger prohibition than sanctuary status can provide.

Response: See above response. Section 925.5(a)(6) of the Sanctuary regulations prohibits the taking of migratory birds within the Sanctuary. Including a prohibition on "taking" marine birds in the Sanctuary regulations allows such violations to be subject to the civil penalties authorized by the MPRSA which far exceed those authorized by the MBTA.

Comment: Prohibit all takings of marine mammals and seabirds, regardless of military or fishing exemptions.

Response: Section 925.5(a)(6) of the Sanctuary regulations prohibits the taking of marine mammals and

seabirds in or above the Sanctuary except as authorized by the NMFS or the United States Fish and Wildlife Service under the authority of the MMPA, as amended, 16 U.S.C. 1361 et seq., the ESA, as amended, 16 U.S.C. 1531 et seq., and the MBTA, as amended, 16 U.S.C. 703 et seq., or pursuant to any treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA, and MBTA. Exemptions include a limited five-year incidental take of marine mammals provided by interim regulations promulgated pursuant to the MMPA, which are in effect until October, 1993. The ESA also has a limited incidental take exemption. See 16 U.S.C. section 1539(a)(2)B(i). NMFS, in conjunction with environmental groups and the fishing industry, is developing a permanent management regime to be implemented upon expiration of the MMPA interim regulations.

If in the future NOAA determines that the existing regulations promulgated under MMPA, ESA, MBTA or any other state or Federal statute are not adequate to ensure the coordinated and comprehensive management of marine mammals and seabirds, changes to the Sanctuary regulations would be undertaken in accordance with the requirements of the MPRSA, NEPA and APA.

Comment: Exclude from [takings] prohibition birds considered game.

Response: The only birds section 925.5(a)(6) prohibits the taking of are seabirds--seabirds are not considered game species.

Comment: Section 925.5(a)(6) of the proposed regulations would prohibit the taking of marine mammals or seabirds unless affirmatively permitted by regulations promulgated under authority of the ESA, MMPA, or MBTA. Because these regulations do not expressly permit any takings by treaty Indians, the proposed sanctuary regulations would effectively prohibit the Makah Tribe from exercising their treaty rights to take marine mammals. The proposed regulations would also hinder the tribe's ability to exercise its fishing rights by precluding fisheries which result in the incidental taking of marine mammals and seabirds.

The DEIS/MP offers no conservation justification for imposing restrictions on the taking of marine mammals and seabirds which go beyond the restrictions imposed by the ESA and MMPA. The DEIS/MP concedes that the purpose of the proposed sanctuary regulations is not to protect particular species from extinction. According to the DEIS, the purpose of these additional prohibitions in the proposed regulations

is to "extend protection for sanctuary resources on an environmentally holistic basis." This goal does not permit infringement of treaty rights. Therefore, the regulations should be amended by adding "or in accordance with any treaty to which the United States is a party."

Response: The regulatory prohibitions do not abrogate or obstruct any rights under an existing treaty. The regulations have been changed by adding "or pursuant to any treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA and MBTA." The treaty between the Makah Tribe and the United States explicitly assures the "right of taking fish and of whaling or sealing at usual accustomed grounds and stations." (Article 4, Treaty of Neah Bay, 1855).

Incidental takes of marine mammals can legally occur under permit and exemption provisions of the MMPA. Currently, Washington coastal tribes apply for and receive exemption certificates from NMFS for the incidental taking of marine mammals during fishing. Fees for this exemption are waived for tribes.

Further, tribes cannot be denied entry into any fishery based on the likelihood or occurrence of seabird or marine mammal takings. However, they could be prosecuted if they violate the ESA, MMPA, or MBTA.

Comment: Change the wording of the regulation to read "as authorized or permitted by NMFS or [the U.S. Fish and Wildlife Service] USFWS under the authority of the MMPA and ESA." NMFS suggests that the preamble and/or regulations clarify that Sanctuary permits will not be required for activities authorized or permitted by NMFS or USFWS under MMPA or ESA. Such clarification would relieve many concerns over the possibility of overlapping and potentially duplicative permitting requirements.

Response: NOAA has amended the regulation by adding "as authorized by the National Marine Fisheries Service or the United States Fish and Wildlife Service under the authority of the Marine Mammal Protection Act, as amended, (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 16 U.S.C. 703 et seq. . . . ." The inclusion of "as authorized or permitted" is viewed by NOAA as redundant.

ISSUE: SANCTUARY ADMINISTRATION

Regulations/Permits

Comment: NOAA should use economic incentives rather than regulations to ensure that activities do not impact resources.

Response: NOAA does not have sufficient authority to provide economic incentives to ensure that activities do not impact Sanctuary resources. Even regulations, which include economic disincentives such as monetary penalties, are not sufficient to ensure that any activity does not impact resources.

Comment: Clarify the statement: "When a conflict with a sanctuary regulation related to specific [non-sanctuary] regulations occurs, the one more protective of sanctuary resources will prevail." NOAA regulations should not override those of the local jurisdictions. NOAA needs to clarify: 1) the application of this policy to fishing; 2) types of conflicts the statement applies to; 3) who determines whether a conflict exists; and 4) the process for resolving a conflict.

Response: NOAA agrees that the statement as written in the DEIS/MP is unclear. Accordingly, the statement has been deleted in the FEIS/MP. Essentially, the statement meant that if two regulations exist covering an activity in the Sanctuary, one promulgated by NOAA under the MPRSA authority and the other by another agency under a different statute, compliance with the less restrictive regulation will not relieve the obligation to comply with the other more restrictive one.

Comment: NOAA should follow the guidelines of NEPA when proposing any change in regulations that are listed in the scope of regulations. This is especially applicable to vessel traffic and discharge regulations. Also, clarification is needed on the rulemaking and amendment processes.

Response: Listing activities in the scope of regulation reflects that the issues and alternatives were addressed in the FEIS/MP, public hearings were held, and public comments were solicited regarding the activities. If NOAA later proposes the regulation of an activity listed in the scope of regulations in the Designation Document but not regulated at the time of Sanctuary designation, NOAA will request public comments on the proposal. When NOAA plans to amend a rule that has been promulgated, an analysis of the issues, affected environment, alternatives and consequences will be

completed and public comments solicited. NOAA will then modify the proposal if necessary and respond to public comments when taking the final action.

Comment: A procedure must be established to disagree with management and issue an appeal if permits to conduct research are denied.

Response: Section 925.12 of the Sanctuary regulations set forth the procedures for appealing denials of Sanctuary permits. The appeal process involves a written statement by the appellant to the Assistant Administrator of NOAA. The Assistant Administrator may conduct a hearing on the appeal.

Comment: Clarify the procedure for obtaining permits for low-flying aircraft engaged in ongoing species monitoring studies and damage assessment studies in response to an incident such as an oil spill. Activities authorized by the NMFS and USFWS should not require a Sanctuary permit because the requirements for permits would be duplicative.

Response: All flights engaged in monitoring or research activities that fly below 2,000 feet are required to obtain a Sanctuary permit, or, if the activity is already pursuant to a permit, to have that permit certified. Permits are not required for overflights necessary to respond to emergencies threatening life, property or the environment.

Comment: NOAA should not grandfather existing uses if otherwise prohibited by sanctuary regulations.

Response: Section 304(c)(1)(B) of the MPRSA specifies that NOAA may not terminate any valid lease, permit, license, or right of subsistence use or of access, if the lease, permit, license, or right "is in existence on the date of designation of any national marine sanctuary . . . ."

Comment: Treaty secured rights should not require sanctuary certification and registration. Further, NOAA should obligate federal regulators to consider and protect tribal interests when issuing permits which may affect those interests.

Response: Treaty secured rights do not require certification by the Sanctuary program.

Comment: The regulations, exemptions and authority to place conditions on existing permitted activities are unclear.

Response: Section 304(c)(2) of the MPRSA provides NOAA with the right to regulate the exercise of a lease, permit,

license, or right of subsistence use or of access existing on the effective date of Sanctuary designation.

Comment: Sanctuary management should be formally coordinated with tribal regulatory and law enforcement authorities through cooperative agreements.

Response: Cooperative agreements will be developed as necessary between NOAA and the tribes regarding regulatory and law enforcement activities.

Comment: The Sanctuary should offer increased enforcement which should be conducted by Sanctuary personnel rather than the U.S. Coast Guard. Clarify the enforcement procedures.

Response: There will be enforcement of Sanctuary regulations through cooperative agreements with the U.S. Coast Guard, NMFS, WDF, the coastal tribes, USFWS, and the National Park Service (NPS). Considering fiscal constraints, level of use, and availability of enforcement personnel working in the field already, NOAA has determined that it is not a high immediate priority to hire Sanctuary enforcement personnel. The Sanctuary must first become fully staffed and operational, and a determination must be made whether additional enforcement personnel are needed. The enforcement procedures will be determined pursuant to the cooperative agreements that are established.

Comment: The broad scope of the discharge prohibition will require a well-coordinated enforcement operation to monitor all discharge and disposal activities from sources on land as well as in offshore, coastal and inland waters over large areas outside of the Sanctuary boundary. It may be impossible to determine the origin of discharges or deposits found in the Sanctuary after the dumping activity has occurred.

Response: The prohibition on discharges from outside the boundary relates to discharges that enter and injure Sanctuary resources. NOAA must establish that discharges not only enter, but injure the resources before enforcement actions will be taken. It will, therefore be desirable for NOAA to undertake a comprehensive monitoring program by which it can determine ecosystem health and use impacts.

Comment: NOAA should impose unlimited liability for spills extended to shipping companies and firms providing original source materials involved in polluting activities.

Response: NOAA is permitted to seek penalties of up to $100,000 per day for a violation pursuant to Section 307(c)(1) of the MPRSA (16 U.S.C. 1437(c)(1)), and for

natural resource damages pursuant to section 312 of the MPRSA (16 U.S.C. 1443).

Transboundry Coordination

Comment: NOAA should coordinate with other Federal and Canadian authorities to regulate vessel traffic, reduce the risk of oil spills, and eliminate oil and gas drilling in Canadian waters adjacent to the proposed sanctuary. NOAA should encourage an adjacent sanctuary along the west coast of Vancouver Island.

Response: NOAA agrees and is working with the Canadian Coast Guard, the U.S. Coast Guard and the Washington OMS to reduce the risk of oil spills. The regulation of vessel traffic will currently remain with the U.S. and Canadian Coast Guards and the OMS. NOAA will support any Canadian initiative to designate a marine protected area in Canadian waters on the Pacific Coast.

Beach Management Policies

Comment: NOAA should grandfather in the existing beach management policies including allowable beach driving activities.

Response: The boundary of the Sanctuary does not encompass beaches where beach driving is permitted.

Advisory Committee/Decision Making

Comment: NOAA and the State of Washington should work together to determine the composition of the Sanctuary Advisory Committee (SAC). The SAC should include representatives from private landowners, local industry, the county and tribes. The SAC should be based at the local level to oversee operations and help maintain strong local input.

Response: NOAA will work with local user and interest groups and state and local governments to obtain broad representation on the SAC. The law limits the SAC to no more than 15 members.

Comment: The SAC should have the power to direct the Sanctuary manger and set priorities for funding. The SAC decisions should be binding. If the decisions are not binding, then the manager should at least provide a rationale for any actions taken which are directly contrary to the recommendations of the SAC.

Response: The SAC recommendations to the manager will

be instrumental in guiding the manager with respect to prioritizing actions. If the manager chooses not to pursue the recommendations of the SAC, a rationale will be provided to the members of the SAC.

Comment: One of the first tasks of the SAC should be to review and update the State of Washington's coastal zone management program to ensure consistency with the Sanctuary management plan. The Sanctuary management plan goals and objectives should also be reviewed.

Response: Prior to designation, the State of Washington will review the FEIS/MP as part of its consistency determination as it relates to Washington's approved coastal zone management program. The WDOE has jurisdiction for the Shoreline Management Act. The SAC will not share that jurisdiction, rather, the SAC will be responsible for reviewing the Sanctuary management plan goals and objectives. The SAC's first priority will be to help determine the five-year Sanctuary operating plan establishing priorities for education, research, monitoring, facilities siting and administration.

Miscellaneous

Comment: Firearms should be controlled or banned within the Sanctuary.

Response: Possession and use of firearms is regulated by State law for public safety purposes. The primary purpose of Sanctuary designation is resource protection.

Management Alternatives/Strategies

Comment: The administrative models being discussed in the Northwest Straits proposal should be considered.

Response: The administrative model identifying NOAA as the lead agency in managing the sanctuary with guidance and assistance from the SAC (which will represent State and local interests) will be implemented in the Olympic Coast National Marine Sanctuary. The administrative model which involves joint administration between NOAA and the State of Washington was not considered for the Olympic Coast National Marine Sanctuary because the Sanctuary is predominately in Federal waters. One model suggested for the proposed Northwest Straits National Marine Sanctuary focuses on joint administration because the Sanctuary would be located entirely within State waters. NOAA will work closely with the state and counties and other Federal agencies in the administration of the Olympic Coast National Marine Sanctuary.

Comment: The management plan needs to account for tribal sovereignty and jurisdiction with respect to cultural resources, law enforcement and research practices. NOAA needs to recognize the need to coordinate with each tribal entity in the same manner as with the state and its management agencies.

Response: NOAA acknowledges the importance of tribal sovereignty. Nothing in the designation will impact the treaty rights of the coastal tribes. NOAA will consult closely with the tribes on any action that may potentially impact tribal rights or interests.

Comment: NOAA should choose management plan alternative 1 which proposes to gradually phase in program activities and staffing. Staff could be co-located with another Federal agency in Port Angeles, with satellite sites in Klaloch or La Push. National concerns with fiscal restraint support this choice.

Some commenters supported management plan alternative 2 which proposes to set up the sanctuary headquarters and immediately provide full-staffing. Sanctuary headquarters should be located on the coast. The former Makah Air Force Station is one possible location.

Response: NOAA is experiencing the fiscal constraints that all Federal programs are experiencing. NOAA proposes to balance the needs for resource protection and fiscal restraint by phasing in staffing and maximizing cooperative relationships with other agencies and jurisdictions working in the area (e.g., NPS, U.S. Coast Guard, the tribes, and the USFWS) to implement the management plan. The Sanctuary manager will have an office on the Olympic Coast with administrative support facilities in Seattle.

Comment: Implementation of the final management plan must be adequately funded in order to prevent pollution and resource damage.

Response: The level of funding for the first year after Sanctuary designation will depend upon the Sanctuary Program's funding which is authorized and appropriated by Act of Congress. However, the reality of the program's funding situation will require the manager and SAC to identify alternative sources of funding for Sanctuary programs.

Comment: A volunteer program, coordinated by a full-time volunteer coordinator, should be established to assist in implementation of the management plan.

Response: NOAA agrees that the establishment of a volunteer program can assist in implementation of the management plan. The SAC will be influential in determining the priority of hiring a volunteer coordinator.

Comment: The management alternatives should more accurately describe NOAA's comprehensive planning as implemented through a combination of legal management authority over certain specific Sanctuary activities and advisory coordination with other entities managing the remaining essential components.

Response: NOAA agrees. The FEIS/MP outlines the regulations which NOAA is promulgating. The FEIS/MP also outlines the role of the SAC, whose composition is aimed at enhancing the coordination with other entities with management jurisdiction in the Sanctuary.

Comment: The Sanctuary manager should have a great deal of responsibility for setting the Sanctuary budget, as well as assigning funds to local governments for assistance in implementing management plans.

Response: The Sanctuary manager will have primary responsibility for recommending the Sanctuary budget to headquarters. The Sanctuaries and Reserves Division has responsibility for the entire National Marine Sanctuary Program budget, and will work with the site manager to develop the annual program budget. The manager has the discretion to earmark funds to local governments or groups to implement Sanctuary programs.

Comment: Zoning plans should be implemented which accommodate the varying resource management needs within the Sanctuary. Some zoning examples include allowing for the needs of ports to the south, designating areas which would be closed to all consumptive uses on a rotating basis, and zoning specific areas within the sanctuary for the sole purposes of research, recreational use, commercial use and no use.

Response: Zoning is not anticipated as part of the FEIS/MP for the Sanctuary. If NOAA, in consultation with the SAC, believes that zoning would better meet the needs of the program, the management plan and regulations can be amended in accordance with the requirements of the MPRSA, the NEPA and the APA.

Research/Education Protocol

Comment: Research results and data should be shared through existing databases with Federal and state agencies and tribes. The sharing of data should be formalized through cooperative agreements.

Response: NOAA agrees that research results and data should

be shared and will pursue appropriate cooperative agreements to ensure this coordination.

Comment: It is unnecessary to severely restrict or eliminate activities such as fishing, commercial vessel activity, dredging and aircraft operation in order to carry out the Sanctuary goals of promoting research and public education.

Response: The primary goal of sanctuary designation is the comprehensive long-term protection of marine resources. Some restrictions are necessary to accomplish this goal. Of the above activities, only dredging is being eliminated within the Sanctuary boundary. Research and education provide additional means to promote the goal of marine resource protection.

Comment: Geophysical exploration should not be prohibited, as the information gathered from this research can benefit coastal communities and academic institutions.

Response: NOAA's emphasis on research within the Sanctuary allows for research which may involve an otherwise prohibited activity (such as alteration of or construction on the seabed) as long as researchers obtain a research permit pursuant to section 925.9 of the Sanctuary regulations. NOAA will determine the environmental consequences of the proposed research, including short and long term effects on marine biota (such as noise which may interfere with cetacean communication) in deciding whether to issue a permit.

Comment: The research program should stress applied research such as research which can facilitate fisheries management, provide information on long-term environmental trends, and provide links between the marine systems and the adjacent terrestrial systems. Providing research results to decision makers at the various governmental levels would be an important link in addressing marine resource problems.

Response: NOAA agrees and has clarified this point in the research section of the management plan.

Comment: Criteria for acceptable research within the Sanctuary should be established prior to formal designation of the Sanctuary. The criteria should be used in review of research permit applications, and an appeal process should be established in the case of research permit application denial.

Response: Research permit applications will be reviewed on a case-by-case basis and evaluated to determine the potential short and long term impacts of the proposed activities. In addition, section 925.12 of the regulations sets forth the procedures for appealing to the Assistant Administrator the denial of a research permit.

Comment: NOAA should conduct research into the effects of fishing activities on the entire marine system. Fish stocks, species abundance, and monitoring information should be presented to the PFMC.

Response: The National Ocean Service (which includes the Sanctuaries and Reserves Division) and the NMFS have entered into a Memorandum of Understanding outlining the working relationship between the Sanctuary Program and the NMFS. The PFMC will be involved in this agreement, through its relationship with the NMFS. Research which benefits the overall goal of resource protection is addressed within this agreement by highlighting the need for interagency coordination, research and monitoring.

Comment: The benefits of sanctuary designation to the fishing community and others should be clearly articulated. Additionally, connections between the regulations and resource protection should be integrated in the education plan (e.g., establishing warning signs at popular access sites to alert boaters and hikers to the effect of disturbance of pelagic birds and marine mammals.)

Response: NOAA agrees and has clarified the education goals in the Sanctuary management plan. NOAA has articulated the benefits of the Sanctuary program for the fishing community. NOAA will coordinate with the USFWS and the NPS to post warning signs around critical marine bird and mammal habitat.

Comment: NOAA should provide for increased education and interpretation of the shoreline through a variety of media. Educational materials and outreach programs should be developed by pre-existing facilities and organizations on the Olympic Peninsula.

Response: Sanctuary designation will provide for increased education and interpretation of the entire Sanctuary ecosystem. Education materials and outreach programs will be developed in cooperation with existing Federal, tribal, state and local entities.

ISSUE: INFORNATIONAL AMENDMENTS TO THE DEIS/MP

Biological Amendments

Comment: The discussion of the neretic and shelf edge environments in the DEIS/MP needs to be expanded. The resource assessment must stress the biological richness of the area.

Response: The resource assessment describing the ecosystem of the Sanctuary study area has been expanded in the FEIS/MP.

Comment: Biological resources need to be discussed in terms of ecosystem interactions and not single species descriptions.

Response: NOAA has expanded the discussion to include a description of the study area from an ecosystem perspective.

Socioeconomic

Comment: The FEIS/MP must contain a socioeconomic impact study of the regulations on the affected coastal communities and Tribes. Failure to consider and mitigate these impacts violates the NEPA and Federal Trust responsibility to Indians.

Response: An economic analysis has been included within the FEIS/MP. NOAA is not promulgating regulations that will unduly burden the tribes. The regulations have provisions that recognize treaty secured rights. In addition, NOAA will consult with the tribes when considering permits affecting proposed development activities in the Sanctuary. NOAA believes that the regulations do not conflict with the economic interests of the tribes since the regulations offer increased protection for those natural resources critical to the tribal economy.

Comment: The Federal government should investigate the possibility of tax breaks to offset economic impacts of the management plan.

Response: NOAA's actions do not add economic burdens to the area. The issue of tax breaks should be addressed to an individual's representatives in Congress. NOAA does not have the legislative authority to address tax laws.

Supplemental Draft Environmental Impact Statement

Comment: NOAA should submit a supplemental Draft Environmental Impact Statement for the following reasons: 1) the DEIS/MP lacks a satisfactory examination of the socioeconomic impacts of the regulations on the coastal communities; 2) the DEIS/MP contains erroneous information related to port activities in Grays Harbor; 3) some information is missing, outdated, or inaccurate; 4) inadequate definition of the unique environment

deserving protection that is identified by the SEL.

Response: NOAA has determined that the matters for which an SEIS has been requested can be addressed in the FEIS/MP. The FEIS/MP addresses the socioeconomic impacts of regulations that could potentially affect the coastal communities in the alternatives and consequences section. Further, the vessel traffic section has been amended substantially to provide a detailed description of the significance of vessel traffic to the coastal communities. Additionally, the description of the marine environment under consideration has been expanded greatly.

Management

Comment: NOAA needs to address or recognize a number of current local and state regulatory controls in place within the shoreline areas.

Response: NOAA has addressed local and state regulatory controls within the shoreline areas. These controls are listed in Appendix J.

Table 7. Individual Commenters

Mr./Mrs. H.K. Adler
Catherine Allison
James G. Allison/
Janice A. Anthony
Glen L. Alexander
Susan Arbury
Therese Armetta
Elizabeth Award
Dennis J. Axt
Melissa Bale
Eric J. Bard
Douglas B. Barnett
Mr./Mrs. Alan Bates
Tawny Bates
Margaret Battles
Cheryl Baumann
Patti Benson
Thomas Berken
Linda D. Bernhardt
Timothy Bernthal
Jane Block
Linda Books
C. Edward Bowlby
David A. Berger
Tibor Bessko/
Debbie Shostock
Mary Blackstone
Kathleen Banchard
Saphire Blue
Margaret Boyle
Mary Sue Brancato
George Brandt
Rebecca Branscom
Kerri Brenaman
Karen Brown
Lloyd J. Brown
Marj Brown
Nancy V. Bryant
Jeanette Burrage
Jeff Buckland
Cheryl Bush
Ann T. Butler
Ellen Bynum
Jim/Marian Byse
Mary E. Cadigan
Jean E. Caldwell
Marcia Campbell
Terri Camean
Douglas J. Canning
Dianne Carreri
Pamela Chase
Dale Chestnut
Diane Civic
James W. Clarke
Virginia/Weldon
Clark
Mary Cline
Carol E. Clover
Mike/Denise Coghlan
Diane Coiner
Stacy S. Coleman
Kari Collis
Ames B. Colt
Steve Confer
Leo Shaw/Noelle
Congdon
Erika Courtois
Bruce/Judy Cowan
Maribeth Crandell
Steve/Jane Crawford
Henri Crawley
Nancy Curry
Laurie/Jeff Curtis
Donald A. Davidson
Jack Davis
Ruth/Harold Deery
Anita DeMarco
Mr./Mrs. J. Denison
Pauline Denison
Michael Denker
Lisa Dennsion
David DeRousse
Chris Detrock
D.L. Dickson
Lowell Dickson
Robin Dobson
Linda M. Donaldson
John E. Douglas
Dean A. Drugge
Glen Duncan
Taleah Edmond
Lou Ann Edwards
Stan Eilers
Laura M. Emerson
Betty Joyce Enbysk
Marc Eskenazi
Joseph E. Evans
Yole Evans
Mr. Jim Feigel
Mr./Mrs. Robert H.
Ferber
Judy Friesem
Debra Fisher
Louise R. Forrest
Annette Frahm
Robert A. Friedman
Anthony C. Garland
Gates Family
Laura Geselbracht
Nick Girten
John Grettenberger
Kevin G. Goebel
Ms. Jane E. Goforth
Helmut/Marcy Golde
Gottsfeld Family
Elinore B. Gordon
William W. Grace
Arthur Grunbaum/
Linda Orgel
Scott Guedale
Karen Guffy
Chris Haave
Tracy Haim
Hellen L. Halloran
Tully Hammill
David H. Hannon
Drew Hanson/
Christine M. Shulz
Laura A. Harders
John L. Hart
Warren Hartz
Mr./Mrs. Jerry
Hatton
Albert A. Haubrich
Elaine J. Haynes
Robert Haynes
Rob J. Healy
Shana L. Hedlund
Christopher Helf
Rosilla Helf
Susan Helf
Michael J. Hely
Edward McCrady
Henderson, Jr.
Gary Higbee
Mr. C.A. Higgins
Michael Hill
Theora M. Hills
Karea Hirsch

Mary T. Hodgson
Lisa Hoff
Edward P. Hoffman
Tracie Hornung
Steve Horsill
Grace Hubenthal
Claudia Huber
Dennis/Melanie Humfleet
Janette M. Hursh
Linda Ikeda
Matt Irinaga
Dorothy E. Jackins
Mrs. Judith L. Jackson
Hugh A. Jennings
Mr. Allen Johnson
Carl R. Johnson
Johnson Family
Dale R. Johnson
Morgan A. Jones
Marita Justice
Claudia L. Justis
George Kaminsky
Camilla Kelly
Jacqueline Kettman
Dianne S. Kirst
J. Klostermeyer
Mr./Mrs. Leonard Knecht
Dana Knizkerbocker
Roger/Phyllis Knight
David Kramer
Allen Kreger
Y. Kutt
Nancy N. Kroening
Dr. Daniel Krog
Max J. Krueger
Walter Kucij
Theresa/John Kwiecinski
John P. Lacy
Greg Lambert/ Patricia Fannigan-Lambert
Mark Langner
Terry Lavender
Robert P. Lee
Ann Lennartz
Thomas F. Lilly
Mrs. Valerie L. Lind
Charles D. Louch
James C. Lowthian
Nancy Luenn
Randy Lunsford
Ray Maddux
Christopher D. Magda
Tara K. Magner
Miguel Maestas
Philip H. Mathisen
Jim Malecki
June Mansfield
Lyman L. Marfell
Sheila Markman
Mary Markus
J. C. Marsh
Amy Sue Martin
Gordon Maul
Johanna Nitzke Marquis
Matty Maxwell
J.C. May
Patricia L. McGrath
John McKay
Susan E. McKinley
Brian McLaughlin
Susan McRae
Rick Mead
Robert Meier
Patricia A. Milliren
Janet E. Merriam
Sharon Merrill
Kay Metcalf
William Michel
Charles/Doris Miller
Craig F. Miller
Jeff Miller
John Mills/Patricia Kubala
Nancy Mills
Mrs. J.R. Mitchell
Vicki Morris
Peter Moser
Mrs. Albert Moss
Jennifer Moss
Joan/Stan Muench
Leo J. Muraro III
Scott Murdoch
Herbert E. Nelson
Dave Neupert
Duncan/Dennis Neuzil
Tamara Newport
Mr./Mrs. Nils von Veh
David Nordstrom
Lee Norton
Mr./Mrs. Kelly Oblad
Judy Ogilvie
Lilli Ohse
John Olson
Keith M. Oublanica
K.A. Padden
Mrs. Charles Paine
I. Wesley Padnoe
R.T. Paine
Mary E. Paulsen

Howard A. Pellett
Henry Pemh
Marlene Penry
Brenda Peterson
Craig Peterson
George Pickett
Marilyn Pierce
Eric Ross Pierce
Erin Lee Pierce
Mary R. Pierce
Carol Plank
Mary Plunkett
Chris/Andrew Poje
Jennifer Pretare
Nancy Price
Heather Pullen
Mark Pullen
Barbara R. Questad
Jack Raidy
Peggy Jo Randall
S. Fred Rapp
Krista Rave
Pamela Raddy
Lee/Karen Rentz
S.K.Retherford
Lisa Riener
Amy T. Riggle
John Dixon/Noriko Riggleman
Elizabeth Riggs
David Risvold
Glorian Robben

Joanne M. Roberts
Marie C. Roska
Ruth Roundy
Penny Ruby
Steven S. Rumrill
Janet M. Sailer
Michele Savelle
C. Thomas Schaefer
Milton/Carolyn Scheerer
Mark/Nina Schulz
Katherine Scott
Virginia Seese
Pazy Shapin
Richard Seifried
Darlene Shanfold
Mark Shapley
Dan Silver
William Simmons
Carol J./Emma Smith
Gordon Smith
Lynwood Smith
Sharon Smith
Susan D. Smith
Tiffany Snyder
Ciel Sonder
Maryanne Spear
Pat Spears
Terri Spencer
Richard Spotts
Suzanne Springer
Thomas C. Starr
Thomas H. Steck
Jim/Susan Stolzfus
Mary Ellen Stone
James M. Strong
Eric D. Stubb
Susan S. Sullivan
Peter C. Sweet
Robin Switzer
Barbara Szekais
Scott W. Teaford
John/Sylvia Teichert
Markus Tengesdal
Nina Tepedino
Jennifer Thames
Lorna Williamson/ Mark Tipperman
Graeme Ton
Darryl E. Toon
Douglas J. Townsend
Neil M. Travis
Peyt Turner
W. Banning Vail
Juanita Verschuyl
Wade Volwiler
Nancy Waddell
Bob Wallace
Dixie C. Walmsley
John Warth
Lars Watson
Raleigh Watts
Douglas W. Welti
M. Pat Wennekens
Jane B. Wentworth
David Werntz
Mike A. Wessels
Joanne Polayes-Wien/Perry Wien
Tracey Wiese
Keith/Janice K. Wiggers
Deirdre Wilcox
Marilyn Wilfong
Stephen A. Wille
Charles Williams
Harry E. Wilson
Richard C. Wilson
Patricia Woehrlin/ Scott Allison
Gordon/Marti Wolfe
Therese Wontorek
Leigh Wright
Kimie Wright
Pete Wyman
Bernice L/Bryon L. Youtz
E. Zahn
Fonda Zimmermen
David Zuckerman

Table 8. Public Hearing Speakers

November 6, 1991
Port Angeles, WA.

David Stalheim
David Sones
Roger Rudolph
Marycile Olexer
Betty Joyce Enbysk
John Ballentine
Donald Rudolph
Thomas Lilly
Roger Jackson
David Hays
Edwin Brown
Homer Frazier
Norma Turner
Rick Rodlend
Jenny Diimmel
Denise Diimmel
Jane Shefler
Mike Breitbach
Mike Allen
John Preston
Marguerite Glover
Dr. Pat Wennikers
Patricia Willits
Karl Schroeter
Steve Morrill
Mr. Clayton
Annette Hansen
Judy Eckland
John Preston
Mary Beth Crandell

November 7, 1991-
Seattle, WA.

Jim Gunsolos
Bruce Agnew
David McCraney
Mike Lowry
Priscilla Collins
Cathy Becker
Michael Gayler
Jim Goettler
Rachel Saunders
Rod Sandelin
Donna Osseward
Janet Taylor
Tom Putnam
Fred Felleman
David Orkman
Herbert Green
Jeff Rothel
Bob Goldberg
Ruth Taylor
Frank Schumann
Denise Wonderly
Paul Sorenson
Frank Crystal
Steve Winnaka
Jerry Price
Cynthia Rusk
Naki Stevens
Herb Wright
Gabriella Stone
Carl Luna

November 12, 1991-
Olympia, WA.

Jim Lowery
David McCraney
David Heiser
Eric Johnson
Laurie Sardina
Robert Gordon
Peter Andrews
Christine Platt
Jeff Parsons
Harper Hill
Sandy Moore
Meta Heller
Nigel Blakley
Fred Felleman
David Dickinson
Scott Richardson
Mike Leigh
David Jennings
Kenneth Dzinbal
Judith Johnson
Eli Sterling
Markus Tengesdal
Thomas Branot
Rhonda Hunter

November 13, 1991
(Aberdeen, WA)

Jim Lowery
Therese Swanson
Bob Basich
Mary Paulson
Phyllis Shrauger
John Stevens
Russel Richardson
Stan Lattin
O'Dean Williamson
Sue Patnude
Ken Kimura
Ernest Hensley
Ben Watson
Larry Westfall
Leroy Tipton
Dennis Benn
Diane Ellison
William Pickell
Chuck Peterson
Doug Ficke
Jim Fox
Ellen Pickell
Jim Walls
Steve Barnowemeyer
Lionel Brown
Louis Messmer
Ray Nelson
Chandra Coski
Joe Early
Stanley Trohimovich
John Olson
Darlene Caldwell
Fred Sharpe
Glenn Sundstrom
Marina Littleton

Table 8. Continued

November 14, 1991-
Seaview, WA.

Ann Saari
John Baker
Fred Mattfield
Scott McMullen
Virginia Leach
Ernie Soule
Kathleen Sayce
William Tufts
Gordon Tompkins
Ernie Soule
Nance Main
Lee Weighardt
Kathleen Boyle
Frank Wolfe
Frank Christhilf

November 20, 1991-
Washington, D.C.

Jeff Sass
Jack Sobel

Table 9. Petitions

Subject Supports: 1) designation of the Olympic Coast National Marine Sanctuary; 2) permanent ban on oil drilling throughout Sanctuary; 3) a plan of action to address commercial vessel traffic (especially tankers and barges); 4) ban on Navy's practice bombing of Sea Lion Rock; 5) boundary alternative #4 as the smallest acceptable boundary alteranative; 6) protection for Willapa Bay and Grays Harbor; and 7) adequate funding and staff.

Signatures 30

.....

Subject Supports: 1) permanent ban on oil and gas development; 2) near shore tanker transits; 3) Navy bombing practice along the entire Washington Coast; and 4) boundary alternative #5.

Signatures 17

.....

Subject Supports complete ban on oil and gas exploration and develpopment.

Signatures 23

.....

Subject Supports: 1) boundary alternative #5; 2) permanent ban on oil and gas drilling; and 3) protection of the Sanctuary from vessel traffic and military activities, particularly ending the Navy's bombing of Sea Lion Rock.

Signatures 11

.....

Subject Supports: 1) designation of the Olympic Coast Marine Sanctuary; 2) boundary alternative #5; 3) permanent ban on oil and gas drilling; and 4) designation of the Hood Canal, and Whidby, Marrowstone, and the San Juan Islands as Marine Sanctuaries.

Signatures 6

.....

Subject Supports: 1) designation of the Olympic Coast National Marine Sanctuary; 2) permanent ban on oil and gas drilling; 3) commercial vessel traffic management plan and implementation strategy; 4) permanent ban on practice bombing of Sea Lion Rock; 5) boundary alternative 5; and 6) protection for the Strait of Juan de Fuca.

Signatures 197

.....

Appendix B: NOTICE OF NATIONAL MARINE SANCTUARY DESIGNATION; FINAL RULE; AND SUMMARY OF FINAL MANAGEMENT PLAN

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

15 CFR Part 925

[ ]

RIN _____

Olympic Coast National Marine Sanctuary Regulations

AGENCY: Office of Ocean and Coastal Resource Management (OCRM), National Ocean Service (NOS), National Oceanic and Atmospheric Administration (NOAA), Department of Commerce (DOC)

ACTION: Notice of National Marine Sanctuary Designation; Final Rule; and Summary of Final Management Plan.

SUMMARY: The National Oceanic and Atmospheric Administration (NOAA), by the Designation Document contained in this notice, and as required by Section 205(a)(4) of Pub. L. No. 100-627, designates an approximately 2,500 square nautical mile area of coastal and ocean waters, and the submerged lands thereunder, off the Olympic Peninsula of Washington State, including the waters of the Strait of Juan de Fuca eastward to Koitlah Point, as the Olympic Coast National Marine Sanctuary (Sanctuary). This notice publishes the final Management Plan detailing the goals and objectives, management responsibilities, research activities, interpretive and educational programs, and enforcement, including surveillance, activities for the Sanctuary.

Further, NOAA, by this notice, issues final regulations to

implement the designation by regulating activities affecting the Sanctuary consistent with the provisions of the Designation Document. The intended effect of these regulations is to protect the conservational, recreational, ecological, historical, research, educational, and aesthetic resources and qualities of the Sanctuary.

Effective Dates: Pursuant to Section 304(b) of the Marine Protection, Research, and Sanctuaries Act (16 U.S.C. § 1434(b)), the Governor of the State of Washington has 45 days of continuous session of Congress beginning on the day on which this notice is published to review the designation and regulations before they take effect. After 45 days, the designation and regulations automatically become final and take effect. However, if the Governor of the State of Washington certifies within the 45-day period to the Secretary of Commerce that the designation or any of its terms are unacceptable, the designation or the unacceptable terms cannot take effect in the area of the Sanctuary lying within the seaward boundary of the State. If the Secretary considers that such disapproval will affect the designation in a manner that the goals and objectives of the Sanctuary cannot be fulfilled, the Secretary may withdraw the designation. A document announcing the effective date will be published in the Federal Register.

ADDRESSES: Copies of the Final Environmental Impact Statement

and Management Plan (FEIS/MP) prepared for the designation are available upon request from the Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East West Highway, Silver Spring, MD 20910, (301) 713-3125.

FOR FURTHER INFORMATION CONTACT: Nina Garfield, (301) 713-3141.

SUPPLEMENTARY INFORMATION:

I. Background

Section 303 of the Marine Protection, Research, and Sanctuaries Act, as amended (the "Act" or "MPRSA"), 16 U.S.C. § 1433), provides that the Secretary may designate any discrete area of the marine environment as a National Marine Sanctuary if the Secretary determines that such designation will fulfill the purposes and policies of the Act as set forth in Section 301(b) (16 U.S.C. § 1431(b)) and finds that: (1) the area is of special national significance due to its resource or human-use values; (2) existing state and Federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education; (3) designation of the area as a national marine sanctuary will facilitate the coordinated and comprehensive conservation and management of the area; and (4) the area is of a size and nature that will permit comprehensive and coordinated conservation and management.

The authority of the Secretary to designate national marine sanctuaries and administer the other provisions of the Act has been delegated to the Under Secretary of Commerce for Oceans and Atmosphere by DOC Organization Order 10-15, section 3.01(z), January 11, 1988. The authority to administer the other provisions of the Act has been re-delegated to the Assistant Administrator of NOAA for Ocean Services and Coastal Zone Management by NOAA Circular 83-38, Directive 05-50, September 21, 1983, as amended.

The coastal and ocean waters off the Olympic Coast were recognized for their high natural resource and human use values and placed on the National Marine Sanctuary Program Site Evaluation List (SEL) in August of 1983 (48 FR 35568). In 1988, Congress reauthorized and amended the Act and directed the Secretary to designate the Olympic Coast National Marine Sanctuary (P.L. 100-627, section 205(a)). In report language accompanying this legislation, Congress noted that the Olympic Coast possesses a unique and nationally significant collection of flora and fauna, and that adjacency of the area to the Olympic National Park merits the designation of this area as a national marine sanctuary (H. Rep. No. 4210, 100th Cong., 1st. Sess., 1988).

NOAA held four scoping meetings in Washington State April 10-13, 1989, to solicit public comments on the designation: Aberdeen on April 10, Port Angeles on April 11, Forks on April 12, and Seattle on April 13 (45 FR 10398, March 13, 1989).

On September 20, 1991, NOAA published a proposed Designation Document and proposed implementing regulations and announced the availability of the Draft Environmental Impact Statement/Management Plan (DEIS/MP) (56 FR 47836). Public hearings to receive comments on the proposed designation, proposed regulations, and DEIS/MP were held on November 6th in Port Angeles, November 7th in Seattle, November 12th in Olympia, November 13th in Aberdeen, November 14th in Seaview, and November 20th in Washington D.C. On November 14th, 1991, the period for submitting public comments was extended from November 27th, 1991 to December 13th, 1991 pursuant to requests from the State of Washington and the coastal counties (56 FR 57869). All comments received by NOAA in response to the Federal Register notice and at the public hearings were considered and, where appropriate, incorporated in the final regulations and FEIS/MP. A summary of the comments on the proposed regulations and the regulatory elements of the DEIS/MP and NOAA's responses to them follow.

ISSUE: BOUNDARIES

BOUNDARY ALTERNATIVE 1

Comment: NOAA should choose boundary alternative 1 because: 1) it contains most of the unique ecological features off the Washington Coast; 2) NOAA can offer greater protection to the coastal features than the resources further offshore in the event of a spill of hazardous materials; and 3) vessel traffic would be least affected, thereby ensuring safer seas.

Response: NOAA disagrees. Boundary alternative 1 contains most of the ecological features visible above the sea surface. However, a marine sanctuary should encompass a discrete ecological unit with definable boundaries (16 U.S.C. § 1433 (b)(1)(F)). The marine mammals and seabirds that transit the waters off the Olympic Peninsula and colonize the offshore rocks and islands forage in the rich waters and benthic communities over and on the continental shelf. The shelf is broad off the Strait of Juan de Fuca. The seaward extent of the shelf coupled with the upwelling produced from the Juan de Fuca Canyon are the physical parameters that support the food chain from the plankton to the marine mammals and seabirds. The offshore rocks and intertidal communities are only one habitat within the marine ecosystem off the Olympic Coast. Therefore, the marine sanctuary should encompass the ecologically significant offshore waters.

With respect to NOAA's ability to protect the offshore waters in the event of a spill, NOAA agrees that there is little that can be done once a spill has occurred. The high seas would

most likely render response capabilities ineffective. However, NOAA will coordinate with the U.S. Coast Guard, the Washington State Office of Marine Safety, and the coastal tribes to ensure that there is an adequate response capability for the coastal waters, intertidal regions, and beaches along the sanctuary including seabird and marine mammal rescue capabilities.

Extension of the Sanctuary boundary to the shelf edge provides a buffer area for protecting the coastal resources. NOAA is working with the U.S. Coast Guard to develop a proposal for an Area to be Avoided (ATBA) from the shoreward boundary to 25 nautical miles offshore of the Olympic Peninsula. This ATBA is designed to provide sufficient time to respond to a vessel that loses power off the Olympic Peninsula. The ATBA is compatible with many of the existing voluntarily adhered to traffic patterns along the coast and thus adds only minimal time and distance to transits between the Strait of Juan de Fuca and destinations to the south.

BOUNDARY ALTERNATIVE 2

Comment: NOAA should choose boundary alternative 2 as the preferred alternative.

Response: NOAA disagrees for the same reasons stated in response to the previous comment. The seaward extent of boundary alternative 2, which approximates the 50 fathom isobath, has no relation to the seaward extent of the coastal ecosystem.

BOUNDARY ALTERNATIVE 3

Comment: NOAA should choose boundary alternative 3 as the preferred alternative.

Response: Boundary Alternative 3 excludes the Juan de Fuca Canyon, which is one of the richest regions of the offshore oceanic ecosystem. It also excludes some of the highest concentrations of human uses which threaten the health of the marine ecosystem off the Olympic Peninsula.

Comment: NOAA should not choose boundary alternative 3 as the preferred alternative because it will be too restrictive for vessel traffic.

Response: NOAA is proposing no regulations that will unduly restrict vessel traffic. (See response to comment on boundary alternative 1).

BOUNDARY ALTERNATIVE 4

Comment: NOAA should select boundary alternative 4 as the preferred alternative because: 1) many of the unique unspoiled ecological resources that might be significantly impacted by oil are located in the physically complex area north of Pt. Grenville including areas of submarine canyons, productive fishing grounds, and coastal features that are critical habitat; 2) Sanctuary status in the southern portion of the study area would conflict with state managed activities such as dredged material disposal, while most of the shoreline in the north has little commercial

activity; and 3) NOAA can enlarge the boundary in the future.

Response: NOAA agrees. One of the most valuable qualities of the Olympic Peninsula is that it is undeveloped and relatively pristine. NOAA recognizes that the southern portion of the boundary is much more developed, especially with respect to the harbor maintenance activities in Grays Harbor. Further, the rocky intertidal habitats in the north are much more sensitive to pollution from oil and gas compared to the sandy beach environments in the southern portion of the study area. In the event of a spill of hazardous materials, experts predict that it would take years for intertidal communities of rocky intertidal environments to become reestablished, whereas it would take an order of months for the sandy intertidal communities to recolonize. Lastly, NOAA can expand Sanctuary boundary 4 in the future, in accordance with the requirements of the Marine Protection, Research, and Sanctuaries Act (MPRSA), the National Environmental Policy Act (NEPA), and the Administrative Procedure Act (APA), if deemed necessary.

Comment: NOAA should not choose boundary alternative 4 because: 1) it is not scientifically defensible for it fails to protect the important and environmentally delicate estuaries along the southern coast; 2) it would render ineffective NOAA's resource monitoring and sanctuary enforcement mandates; and 3) it will be too restrictive for vessel traffic.

Response: The boundary of a marine sanctuary should

approximate the most identifiable boundaries of a marine ecosystem. The Site Evaluation List (SEL), from which sites are selected for consideration as marine sanctuaries, identified the coastal offshore islands as the core of the proposed Olympic Coast National Marine Sanctuary (originally identified as the Western Washington Outer Coast). With this focus, NOAA has determined that the boundaries of the ecosystem are encompassed by boundary alternative 4. NOAA recognizes that the coastal estuaries are ecologically valuable and that many organisms that exist within, or transit through boundary alternative 4, depend on the estuaries. However, while the estuaries and outer coast are ecologically linked, the productivity of the two environments is a function of very distinct environmental processes.

NOAA believes that protection of the estuaries could be best achieved through possible inclusion of these areas in programs targeting estuarine management such as, the National Estuarine Research Reserve System, the National Estuary Program, or the Coastal Zone Management Program.

NOAA believes that the size of the sanctuary encompassed by boundary alternative 4 is manageable with respect to research and monitoring initiatives.

As discussed above, NOAA is working with the U.S. Coast Guard to develop a proposal for an ATBA off the northern Olympic Peninsula. It is designed to be as compatible with existing customary practices among mariners as possible. NOAA is not promulgating vessel traffic regulations with designation.

BOUNDARY ALTERNATIVE 5

Comment: NOAA should choose boundary alternative 5 because: 1) activities that are, or could occur, in the southern portion of the study area can affect the resources in the north; 2) the entire study area is ecologically connected; 3) the management needs are greatest in the south; 4) the sanctuary management regime would complement existing management initiatives (Willapa Bay watershed planning processes, Columbia and Snake River Salmon Recovery Planning, State National Heritage Plans); and 5) expansion of the Sanctuary boundary in the future will be too time-consuming.

Response: NOAA's preferred boundary alternative is based on an ecologically identifiable boundary. The northern and southern portions of the study area are distinct with respect to their coastal and offshore ecology. NOAA can protect Sanctuary resources from outside activities through the prohibition on discharges outside the Sanctuary boundary that enter and injure Sanctuary resources. NOAA will be involved in planning activities that could potentially threaten Sanctuary resources outside its boundary. The boundary can be expanded in the future if needed.

Comment: NOAA should not choose boundary alternative 5 because it is not necessary to encompass the entire Washington coastline as a marine sanctuary, and it would eliminate any future development of the coastal areas.

Response: NOAA agrees. See response to previous comment.

Comment: A more detailed analysis of the impacts of sanctuary designation must be undertaken before seriously considering boundary alternative 5.

Response: NOAA has undertaken an extensive analysis of the uses and ecology of the southern portion of the study area and believes that the ecologically sensitive estuarine environments are adequately protected.

ALTERNATIVE BOUNDARY SUGGESTIONS

Comment: NOAA should establish a series of smaller site-specific areas surrounding unique marine resources, such as ocean waters immediately adjacent to already protected terrestrial ecosystems such as wildlife refuges and the Olympic National Park. This alternative would afford sanctuary status to marine resources while maintaining provisions for compatible ocean uses.

Response: NOAA disagrees. Smaller site-specific areas would not encompass an ecosystem for the reasons stated above. Further, designation of the marine sanctuary would allow for the continuation of pre-existing and compatible uses.

Comment: NOAA's analysis of the resources within the study area identified the southern portion as highly important in terms of wildlife and fishery values, particularly the areas in and surrounding Willapa Bay. NOAA should consider modifying boundary

alternative 4 by adding a satellite site encompassing the estuarine environment and the offshore waters of Willapa Bay.

Response: NOAA's analysis confirmed that the estuarine areas in the southern portion of the study area are significant natural resources and that many of the resources utilize the waters off the northern coast as well. However, NOAA has determined that the estuarine ecosystems are distinct from the higher energy marine environment of the northern portion of the study area. In addition, the activities in, and adjacent to Grays Harbor are managed pursuant to an existing estuarine management plan promulgated pursuant to the Washington State Shorelands Management Act. The residents living in the watersheds of Willapa Bay are currently preparing an estuarine management plan.

Comment: NOAA should consider the creation of a north and south Olympic Coast National Marine Sanctuary with separate but coordinated management regimes.

Response: The Act requires the designation of one sanctuary on the Western Washington Outer Coast with the offshore Islands and coastal areas of the northern Olympic Peninsula as the core area of the sanctuary. In carrying out this mandate, NOAA examined the seaward, northerly, southerly, and easterly extent of the ecosystem that has as its core the intertidal communities of the outer coast.

Comment: The boundary of the Sanctuary should be modified as

further cetacean information is available.

Response: NOAA can modify the boundary in the future, in accordance with the requirements of the MPRSA, the NEPA and the APA, as more information becomes available.

MODIFICATION OF THE WESTERN BOUNDARY

Comment: The outer boundary of the sanctuary should extend westward to a point that minimizes restrictions and needless re-routing of vessel traffic and harbor maintenance activities at the opening of Grays Harbor. To accomplish this objective, the outer limit of the sanctuary should be set at a distance between 2 and 10 miles from shore.

Response: Sanctuary boundaries are not established based on vessel traffic routes, particularly because routes are subject to change. NOAA will work with existing regulatory agencies to minimize impacts. While vessel traffic is in the scope of sanctuary regulations, NOAA is not promulgating vessel traffic regulations at this time.

Comment: The outer boundary should be established at either the 100 or 500 fathom isobath.

Response: NOAA has established the boundary at the 100 fathom isobath because it is generally recognized to be the seaward extent of the continental shelf, the area where photosynthetic activity is greatest.

Comment: Clarify the rationale for establishing the western boundary of alternatives 4 and 5.

Response: See response to previous comment.

MODIFICATION OF THE SHORELINE BOUNDARY

Comment: The shoreline boundary should be established at the lower low water mark to preclude interference with carefully crafted beach management plans regulating beach traffic, razor clam harvests and emergency aircraft landings.

Response: The shoreline boundary of the Sanctuary is located at the higher high water line where adjacent to Federally-owned land (including the Olympic National Park and the U.S. Fish and Wildlife refuges) and the lower low line mark when adjacent to State-owned land. Thus, the boundary does not interfere with beach management plans. Razor clam harvests within the intertidal zone of the Sanctuary will be managed by existing authorities such as the Washington State Department of Natural Resources, the Quinault Indian Tribe, and the National Park Service. Emergency aircraft landings are permissible in the Sanctuary.

Comment: The shoreline boundary should cut across the mouths of all rivers, streams and estuaries because there are sufficient management plans in place providing protection of inland environments such as the Washington State Coastal Zone Management Program and the Grays Harbor Estuary Management Plan.

Response: The shoreline boundary of the Sanctuary has been modified to cut across the mouths of all rivers, streams and estuaries.

Comment: Clarify why the shoreward boundary distinguishes between adjacency to tribal and non-tribal lands.

Response: The Tribes have jurisdiction to the mean lower low water line and the Sanctuary program does not have the authority to claim jurisdiction over tribal land without the consent of the governing body of the tribes. Both the Tribes and the State have requested that the Sanctuary boundary not overlap with tribal and State lands. Therefore, the coastal boundary has been modified so that it is at mean lower low water when adjacent to tribal and State owned lands and at mean higher high water when adjacent to Federally owned lands.

Comment: Existing National Park Service standards, regulations, and policies must not be diminished as a result of dual designation as a National Park and National Marine Sanctuary. The majority of the intertidal areas of the Olympic National Park are Federally designated Wilderness Area and must be managed accordingly.

Response: The Sanctuary boundary overlaps with the boundary of the Olympic National Park. NOAA will not diminish the standards, regulations and policies currently applying to the intertidal areas of the Olympic National Park. The existing

standards, regulations and policies of the intertidal areas will remain. NOAA will enhance the protection of these intertidal areas by working with the Coast Guard to ensure a safer vessel traffic environment, and the upland users of the watershed to monitor and minimize the impacts of non-point source pollution. Additionally, NOAA will support research and resource monitoring initiatives in the intertidal areas and may seek compensation for damages if an accident were to occur that injures Sanctuary resources.

INCLUSION OF THE STRAIT OF JUAN DE FUCA

Comment: The northeastern boundary of the sanctuary should extend further into the Strait of Juan de Fuca to either: 1) the Lyre River; 2) the Clallam County Marine Sanctuary at Salt Creek; 3) Low Point; 4) Crescent Bay/Agate Beach; or 5) Pillar Point. Omission of the Strait of Juan de Fuca from the Sanctuary excludes the head of the Juan de Fuca Canyon from the boundary of the Sanctuary, and thus represents a boundary not based upon an ecological rationale.

Response: NOAA has examined the resources of the Strait of Juan de Fuca and the FEIS/MP has been revised accordingly. Sections III and IV (Alternatives, and Environmental Consequences) examine the benefits and consequences of various alternatives in the Strait of Juan de Fuca. NOAA believes that the existence of a functional biotic community characteristic of the marine environment extends into the Strait of Juan de Fuca to

Observatory Point. Eastward of Observatory Point, the ecosystem is more characteristic of an estuarine environment.

Despite the ecological arguments that support inclusion of the Strait of Juan de Fuca in the Sanctuary boundary, NOAA does not believe that the public has had ample opportunity to analyze and comment on the proposal to add the Strait. Since the Strait of Juan de Fuca lies entirely in state waters, the Strait of Juan de Fuca cannot be included without the approval of the Governor of Washington State. However, NOAA will pursue expanding the boundary if supported by the State of Washington.

Comment: The boundary of the Sanctuary should be contiguous with that of the proposed Northwest Straits Sanctuary. A gap between these two proposed sanctuaries would cause confusion for commercial shipping and fishing interests and government managing agencies.

Response: At this time, the future and nature of the proposed Northwest Straits National Marine Sanctuary is uncertain and cannot serve as a deciding factor in the determination of the eastern boundary of the Olympic Coast National Marine Sanctuary. The boundary of the Olympic Coast National Marine Sanctuary must be determined based on ecological and human use factors. NOAA can modify the boundary in the future if it is deemed appropriate. NOAA will coordinate with existing managing agencies to ensure that the Olympic Coast National Marine Sanctuary and the proposed Northwest Straits National Marine

Sanctuary do not unduly disrupt the management of vessel traffic and fishing.

Comment: The boundary of the Sanctuary should not encompass the waters of the Strait of Juan de Fuca because closely-monitored vessel traffic lanes already exist.

Response: The MPRSA encourages multiple uses of the Sanctuary as long as they are compatible with the resource protection goals of the Sanctuary. Clearly, the Coordinated Vessel Traffic System in the Strait of Juan de Fuca is in the best interest of the vessel traffic industry and the environment. NOAA would not interfere with the vessel traffic management regime in the Strait of Juan de Fuca if the Governor of the State of Washington supported inclusion of the Strait of Juan de Fuca in the Sanctuary boundary.

NORTHERN BOUNDARY

Comment: The northern boundary of the Sanctuary should be adjacent to the international border and include vessel traffic lanes to facilitate the establishment of a cooperative international sanctuary and coordinated vessel traffic management regime.

Response: The northern boundary is adjacent to the international boundary.

INCLUSION OF THE ESTUARIES

Comment: NOAA recognized both the high resource values of the estuaries and the high level of point source discharges. By including the estuaries in the boundary NOAA would be in a position to work with the Washington Department of Ecology (WDOE) to correct the sources of pollution.

Response: NOAA has been working with the Washington Department of Ecology to address pollution problems in the coastal estuaries. The Grays Harbor Estuary Management Plan was supported by funding provided pursuant to the Washington Shorelands Management Act. NOAA agrees that the estuaries are extremely valuable environments with high levels of point source discharges. However, NOAA believes that the estuaries are ecologically distinct from the offshore waters of the Olympic Peninsula, which is the core area of the Sanctuary. Inclusion in the National Estuarine Research Reserve System (NERRS) is a more appropriate management framework for NOAA involvement in estuarine management.

Comment: The estuaries should be excluded from the Sanctuary boundary because the Washington State Coastal Zone Management Program and the Grays Harbor Management Plan offer sufficient protection to the estuaries.

Response: NOAA agrees. The estuaries are excluded from the preferred boundary of the Sanctuary.

CONSIDERATION OF OTHER NATIONAL MARINE SANCTUARIES AND NATIONAL ESTUARINE RESEARCH RESERVES (NERRS)

Comment: Some commenters believed that NOAA should designate the estuaries as NERR's if they are not included in the boundary of the Sanctuary because of their natural resource values. Other commenters believed that NERR status is inadequate since it does not include the marine environment. Clarification is needed on the specific elements of the NERRS: 1) the degree of protection that the NERRS would provide to Grays Harbor and Willapa Bay; 2) the process of designation; 3) timetable for designation; 4) assurances that designation would occur; and 5) the degree of protection to the estuaries that would be provided in comparison to sanctuary status.

Response: The terms of designation as a NERR are determined between the State and NOAA. The process begins with the nomination of an estuary, or portion thereof, to NOAA for inclusion in the NERRS by the Governor of the State. The State holds scoping meetings in the region nominated for inclusion to solicit public input. The State then prepares a draft environmental impact statement and management plan (DEIS/MP) where boundary, management, and regulatory alternatives are assessed and a preferred alternative is decided upon. The DEIS/MP must demonstrate that the key core land and water areas are adequately protected by the state. Once the DEIS/MP is completed, public hearings are held in the region. After a comment period of one month, the State must produce a Final Environmental Impact Statement/Management Plan (FEIS/MP)

incorporating the public comments. Once NOAA approves the FEIS/MP the Reserve is officially designated. The entire process requires approximately three years. Designation is contingent upon available funding.

Comment: NOAA should encourage sanctuary designations in Northern Puget Sound, Hood Canal, Southern Oregon and Northern California.

Response: NOAA is working with the State of Washington to study the feasibility of a sanctuary in Northern Puget Sound. New candidates for sanctuary status are selected from NOAA's SEL. Sites in southern Oregon and Northern California are presently on the SEL.

HARBOR EXCLUSION/INCLUSION

Comment: How will sanctuary designation influence the disposal of dredge material from harbor maintenance and development activities that occur in the Port of La Push, the mouth of the Quilleute River, and Neah Bay?

Response: No dredge spoil disposal will be permitted within the Sanctuary. Harbors are excluded from the Sanctuary boundary. Therefore, maintenance and development activities can occur, but disposal of dredge material must be either on land or outside the boundary of the Sanctuary.

GROWTH MANAGEMENT

Comment: The Sanctuary should help to limit population growth.

Response: The sanctuary program has no control over population growth adjacent to the Sanctuary boundary. Rather, the program exists to ensure that human uses resulting from growth do not have a negative impact on Sanctuary resources.

Comment: Private land owners should not lose development rights to their land, nor should they have the value of their land significantly decreased by regulation without due compensation for that loss.

Response: NOAA is issuing no regulations that will diminish the development rights of private property owners.

OPPOSITION TO SANCTUARY DESIGNATION

Comment: The marine sanctuary should not be designated because: 1) it would shut down the fishing industry; 2) existing legislation and management regimes offer adequate protection; 3) potential industrial interests would be stifled because the sanctuary would over-regulate the local economy and its growth; 4) the ecological/aesthetic values of Washington's coastline are not permanently threatened; 5) local airports in Aberdeen and Ocean Shores would close due to insurance problems; and 6) the Olympic National Park has too much control over the Olympic Peninsula already.

Response: The Sanctuary will not shut down the fishing

industry. Fishing is not within the scope of Sanctuary regulation; the regulation of fishing would remain with existing management regimes. Further, the Sanctuary will ensure greater protection from risks due to oil, gas and mineral development and vessel traffic accidents.

NOAA disagrees that existing legislation offers adequate protection of the offshore resources. The threats from such things as vessel traffic, oil and gas development, sand and gravel mining and Navy practice bombing of Sea Lion Rock have not been addressed through a comprehensive management regime that recognizes the value and fragility of the marine ecosystem off the Olympic Peninsula. NOAA does not believe that the Sanctuary will over-regulate the local economy since the main source of income in the region is from tourism, fishing and timber production-none of which will be negatively affected by the Sanctuary. Tourism and fishing will likely benefit from Sanctuary status due to the increased protection of the marine environment.

ISSUE: ALTERATION OF/OR CONSTRUCTION ON THE SEABED

Comment: The regulation pertaining to alteration or construction of the seabed may be interpreted as prohibiting such activities as geologic research, the placement of current meters, sediment traps and similar research equipment, all of which might be necessary if environmental studies were to be conducted in the Mineral Management Service (MMS) Washington-Oregon planning area.

To clarify the intent of this prohibition, "Government sponsored environmental studies" should be added in the second sentence of this section as one of the activities for which this prohibition does not apply.

Response: NOAA supports research within the Sanctuary. However, the prohibition on alteration of, or construction on the seabed applies to all research activities, including those conducted by governmental agencies. All research activities conducted within the Sanctuary that violate a Sanctuary regulation must be undertaken pursuant to a Sanctuary research permit to ensure that the impacts from the research are minimal and temporary.

Comment: The prohibition on the alteration of, or construction on the seabed should not interfere with current or future harbor maintenance or fishing activities including: 1) jetty and groin construction; 2) permitted dredging of channels and harbors; 3) the use of dredge spoils for underwater berm construction; 4) construction and improvement of boat launching and marine facilities adjacent to reservations; 5) the retrieval of fishing gear (including crab pots) and sunken vessels; 6) bottom trawling and scallop dredging; and 7) tribal fin and shellfish operations. NOAA needs to clarify the exemption of activities incidental to routine fishing and vessel operations. The exemptions for harbor maintenance and fishing activities should read: "attempting to alter the seabed for any purpose other than anchoring vessels,

normal fishing operations to include commercial bottom trawling and crab pot recovery, and routine harbor maintenance."

Response: Ports and harbors are not included within the boundary of the Sanctuary. Further, there is the following exception to the alteration-of-the-seabed regulation: "Harbor maintenance in the areas necessarily associated with Federal Projects in existence on the effective date of Sanctuary designation, including dredging of entrance channels and repair, replacement or rehabilitation of breakwaters and jetties." The boundary of the Sanctuary adjacent to the Port of La Push is congruent with the Colreg lines at the mouth of the harbor. The boundary of the Sanctuary at Neah Bay forms an arc from Koitlah Point to the point of land on the opposite side of Neah Bay. The arc is contiguous with the outer coast of Waadah Island. The noted activities incidental to fishing have been exempted from the Sanctuary regulations.

Comment: NOAA should prohibit all dredging and removal of sand and gravel within the Sanctuary boundary.

Response: NOAA has prohibited all dredging and removal of sand and gravel within the Sanctuary boundary. These activities threaten the integrity of the benthic community and the food source of many fish, marine mammals and seabirds.

Comment: NOAA should not subject the exploration and development of offshore mineral activities to the same restrictions proposed

for the exploration and development of Outer Continental Shelf (OCS) oil and gas.

Response: All of these activities injure the benthic communities in the Sanctuary and NOAA does not believe that there is cause for exceptions.

Comment: Clarify NOAA's policy on establishing artificial reefs within the Sanctuary.

Response: There are no artificial reefs in the Sanctuary as of the date of designation. The creation of new artificial reefs would be prohibited pursuant to the prohibition on alteration of, or construction on, the seabed.

Comment: NOAA should prohibit the construction of pipelines on the sea floor.

Response: The regulation prohibiting the alteration of, or construction on, the seabed would prohibit the construction of pipelines on the sea floor.

ISSUE: CULTURAL AND HISTORIC RESOURCES

Comment: NOAA should prohibit moving, injuring, or possessing historic resources within the Sanctuary.

Response: NOAA agrees that it is necessary to protect and manage historical and cultural resources within the Sanctuary boundary. NOAA has included a prohibition on moving, removing, possessing, injuring, or attempting to move, remove, or injure

these resources, except as resulting incidentally from traditional fishing operations. If NOAA determines that fishing activities are resulting in injury to Sanctuary historic and cultural resources, NOAA may amend the Sanctuary regulations to abolish the exemption for these activities.

Comment: The proposed regulations dealing with cultural resources fail to preserve the tribes' ability to control access to, and removal of, their cultural heritage. Therefore, NOAA should add a new section 925.5(a)(8) prohibiting: "removal or attempted removal of any Indian cultural resource or artifact, or entry onto a significant cultural site designated by a tribal governing body with the concurrence of the Director, except with the express written consent of the governing body of the tribe or tribes to which such resource, artifact, or cultural site pertains." NOAA should pursue a cooperative agreement with the tribes to coordinate management of cultural artifacts of tribal significance.

Response: The MPRSA provides NOAA with the authority to control access to cultural artifacts within the Sanctuary thereby helping to ensure their preservation. Accordingly, anyone proposing to remove a cultural or historic resource must apply for and obtain a sanctuary permit from NOAA. NOAA acknowledges the interest of the coastal tribes to preserve their cultural heritage and, in particular, those cultural artifacts of tribal significance found within the Sanctuary. NOAA considers its

objective of preserving the historical and cultural resources of the Sanctuary to be compatible with the coastal tribes' desire to preserve their cultural heritage. Therefore, NOAA has clarified in section 925.9(d) that "In deciding whether to issue a permit, the Director or designee may consider such factors as . . . the effect of the activity on adjacent Indian Tribes." NOAA will work on a cooperative agreement with the tribes and the State of Washington to clarify the process by which permits will be granted to conduct research or salvage operations on historical and cultural resources of tribal significance.

Comment: Current management of cultural resources is agreed upon between the Bureau of Indian Affairs (BIA) and the tribes. The BIA supports the tribes in the management of their cultural resources.

Response: See response to previous comment.

Comment: The regulation as proposed in the DEIS/MP is duplicative of State law. There already exists state and Federal antiquities acts to protect coastal archeological and historical sites that occur on or near the median high tide boundary. The State archeologist already coordinates archeological matters.

Response: The MPRSA is not duplicative of existing laws protecting historical and cultural resources. The MPRSA is more comprehensive in that it provides enforcement authority, including civil penalties, for the destruction or injury of

historical and cultural resources.

The Abandoned Shipwreck Act of 1987 gives states the title to certain abandoned shipwrecks in state waters. Under the MPRSA, NOAA has trustee responsibilities for abandoned shipwrecks and other historical and cultural resources within national marine sanctuaries, including those located in state waters, for the purpose of protecting them. NOAA will coordinate with State agencies to ensure that historical and cultural resources within the Sanctuary are protected, and that the policies affecting historical and cultural resources in State waters are consonant with the policies in the Federal waters of the Sanctuary.

ISSUE: DISCHARGES

Ocean Dumping

Comment: NOAA should not prohibit the use of dredged material disposal sites off Grays Harbor, Willapa Bay, the Columbia River, or on the north jetty and breakwater of the Port of La Push.

Response: The Sanctuary boundary does not extend south of Copalis Beach and excludes ports and harbors. Therefore, the maintenance activities at La Push and the use of the dredge disposal sites south of the boundary is not prohibited.

Comment: No ocean dumping should be allowed in proximity to the major submarine canyons.

Response: The regulations prohibit ocean dumping within the Sanctuary, and outside the Sanctuary if the material enters and

injures Sanctuary resources or qualities.

Point Source Discharges

Comment: Prohibit discharges of toxics, plastic, and municipal garbage and sewage into the marine environment.

Response: The dumping of municipal garbage, toxics and plastics is prohibited within the Sanctuary by Sanctuary regulations and by regulations promulgated pursuant to the Act to Prevent Pollution from Ships (33 U.S.C. §§ 1901 et seq.) and the Marine Plastic Pollution Research and Control Act of 1987, which implements Annex V of MARPOL 73/78 in the U.S. Point source discharges are allowed provided such discharge is certified by NOAA in accordance with section 925.10 or approved by NOAA in accordance with section 925.11. After expiration of current permits, discharges from municipal treatment plants will be subject to the review process of section 925.11. At a minimum, secondary treatment will be required.

Comment: Current regulations are adequate. NOAA has not proven that the proposed regulations will enhance the recreational or aesthetic appeal, and water quality.

Response: Current regulations do not protect the area from the cumulative impacts of various types of discharges, including: 1) some ocean dumping; 2) sewage receiving only primary treatment; and 3) non-point source discharges. NOAA's ocean disposal regulation offers protection to the offshore environment that does not otherwise exist. NOAA will work with existing

tribal, State and Federal authorities to ensure that the quality of the water and Sanctuary resources are maintained.

Comment: Clarify how discharges from drilling and production rigs may be addressed if oil and gas leasing were to occur in the future.

Response: The regulations prohibit oil and gas exploration, development, and production activities within the Sanctuary. NOAA will work with the Environmental Protection Agency (EPA) to ensure that best available technology is implemented on any drilling rigs located outside of the Sanctuary to ensure that no discharges enter and injure Sanctuary resources and qualities.

Comment: Depositing or discharging from any location within the Sanctuary or from beyond the Sanctuary should be prohibited.

Response: The mandate of the National Marine Sanctuary Program is to facilitate multiple uses that are compatible with resource protection. Depositing or discharging most materials within the boundary of the Sanctuary, or from beyond the boundary of the Sanctuary if such material subsequently enters the Sanctuary and injures Sanctuary resources or qualities is prohibited. NOAA will work with EPA, the Tribes and the State of Washington to maintain water quality. NOAA may require special terms and conditions, including (but not limited to) improved effluent quality, on EPA permits to ensure Sanctuary resources and qualities are protected.

Non-Point Source Discharges

Comment: NOAA should not require at a minimum secondary treatment and sometimes tertiary or more for non-point source pollution. It is virtually impossible to subject runoff to these levels of treatment.

Response: NOAA does not require such treatment for non-point source pollution. NOAA will monitor non-point source pollution and work with those living and working in the coastal watersheds to minimize runoff into the Sanctuary.

Comment: It should be stated that there is no intent to regulate forest practices by Sanctuary administrators. There is no research or evidence which would justify the statement made in the proposed DEIS that the "greatest source of non-point discharge is the forest." This statement needs clarification and tree farmers must be assured that they can continue to grow and harvest trees pursuant to Washington's Forest Practices Act, one of the most stringent in the country.

Response: NOAA's Strategic Assessment Branch has analyzed existing watershed data from the National Coastal Pollutant Discharge Inventory to determine sources of runoff. Summaries of pollution discharges for total volumes of nitrogen, lead, and all suspended solids combined indicate that with the exception of suspended solids discharged by paper mills, the greatest source of sediments discharged into sanctuary waters is from natural forest runoff.

Despite this evidence, NOAA will not be directly regulating upland uses. However, NOAA will coordinate with the upland user groups, and managing agencies to minimize non-point source impacts on Sanctuary resources.

Comment: The suggestion that excessive erosion from clear cutting practices is the source of most non-point source pollution from forests supports the need for further study of this common practice and the issuance of more stringent controls due to the steep and unstable slopes and amount of rainfall.

Response: NOAA agrees and will conduct monitoring and research initiatives in coordination with those living and working in the watersheds to minimize the impacts from timbering activities.

Discharges Outside the Sanctuary

Comment: Clarify to what extent the "sphere of influence" of the discharge regulation extends, to what degree it may affect coastal communities including the Tribes, and who determines if injury to a Sanctuary resource has occurred. Would a community such as Ocean Shores or an Indian Tribe face increased water quality regulations or enforcement? Further, does the discharge prohibition apply to particulates that are discharged into the air from pulp mills and subsequently enter the Sanctuary and harm Sanctuary resources and qualities.

NOAA should not impose additional restrictions, beyond the

existing requirements of the Federal Water Pollution Control Act (FWPA), on the discharge of effluent and dredge spoils into marine waters. There is no evidence that additional restrictions on these activities are required to protect water quality in the proposed sanctuary.

Response: The MPRSA protects Sanctuary resources and qualities (including water quality) from the impacts of discharges from within and outside the boundary of a Sanctuary whether airborne or waterborne. NOAA is responsible for determining injury to Sanctuary resources. Discharges pursuant to existing permits may be continued subject to the certification requirements of section 925.10. New permits are subject to the review process of section 925.11. At a minimum, secondary treatment will be required for any treatment plants discharging directly into the Sanctuary. With respect to airborne or waterborne discharges outside the Sanctuary, NOAA may condition such permits only if it is established that the discharges are entering the Sanctuary and injuring Sanctuary resources or qualities. NOAA will work closely with all to ensure that noone is unduly burdened by permitting requirements related to discharges. NOAA will coordinate with the State's Air Quality Board and Department of Ecology to monitor air and water quality over and in the Sanctuary.

Application of Discharge Regulations to Vessel Traffic

Comment: The application of this regulation should prohibit organic and inorganic discharges from fishing vessels and submarines (including bilge), aircraft. The prohibition should apply to all naval operations.

Response: The Sanctuary regulations specify the fishing and vessel related activities exempted from the discharge prohibition (section 925.5(a)(2)(i)-(iv)). Discharges and deposits from vessels are prohibited except for specific discharges intended to provide for traditional fishing activities, such as fish wastes resulting from traditional fishing operations in the Sanctuary, and for allowed vessel operations in the Sanctuary, namely biodegradable effluent incidental to vessel use and generated by approved marine sanitation devices, water generated by routine vessel operations, and engine exhaust. Such discharges are determined to be of minimal threat to the Sanctuary and are important for the safe and effective functioning of fishing and other vessels. Other discharges from vessel operations are prohibited. If in the future NOAA determines that increased protection for Sanctuary resources and qualities from these exempted activities is warranted, the Sanctuary regulations could be revised.

Comment: Clarify acceptable and unacceptable discharges from fishing vessels.

Response: See response to previous comment.

Economic Impacts of Discharge Regulations

Comment: Banning the use of approved dredge disposal sites would impose severe economic impacts on marine navigation and commerce, and ultimately to the coastal communities.

Response: The boundary of the Sanctuary does not encompass the approved dredge disposal sites off of Grays Harbor, Willapa Bay, and the Columbia River. However, no new dredge disposal sites may be located within the Sanctuary boundary.

Comment: NOAA must examine the economic impacts of the discharge regulations on existing industries. There are currently 72 identified dischargers in the study area. It is unclear if the proposed Sanctuary would impact the continued operation of the pulp mill's NPDES permitted discharge near Grays Harbor.

Response: The Sanctuary's boundary does not extend south of Copalis Beach. Therefore, the only discharge regulation that would apply to dischargers in Grays Harbor would be the prohibition on discharges from outside the boundary that subsequently enter and injure Sanctuary resources or qualities. NOAA will need to establish that effluents from pulp mills are injuring Sanctuary resources or qualities before it would impose terms and conditions on the pulp mill's NPDES permit. If this situation were to occur, NOAA would work with the discharger, the State of Washington, and EPA to minimize the economic impacts of reducing the impacts.

ISSUE: OIL AND GAS DEVELOPMENT

Comment: NOAA's failure to offer as an alternative an outright, no conditions ban on hydrocarbon development within the Sanctuary is contrary to NEPA regulations, 40 CFR 1502.14 which states that the alternatives section is the heart of the environmental impact statement. NOAA should permanently ban oil and gas exploration, development, and production activities.

Response: Section 2207 of the Oceans Act of 1992 prohibits oil and gas exploration, development and production within the Sanctuary. The Sanctuary regulations repeat this prohibition.

Comment: NOAA should designate a buffer zone based on ocean currents and local seabed geography to prevent damage from external mineral operations.

Response: NOAA believes that the Sanctuary is large enough to buffer the sensitive canyon and coastal ecosystems from negative impacts of mineral development. Further, NOAA's authority to regulate discharges from outside the Sanctuary boundary that subsequently enter and injure Sanctuary resources or qualities provides additional protection over mineral activities.

Comment: NOAA should commit in the FEIS/MP and Record of Decision to the preparation of an EIS before lifting the prohibition.

Response: As previously discussed, the Oceans Act of 1992

prohibits oil and gas explorations, development and production within the Sanctuary. This prohibition may only be lifted by an Act of Congress.

Comment: The oil companies should be excluded from voicing an opinion regarding the Sanctuary because this privilege should be extended only to those who have spent time enjoying the State of Washington coastline.

Response: The Sanctuary program does not and cannot discriminate against any individual, agency, or interest group. All individuals have the right to voice an opinion.

Comment: Has NOAA come across any proposal for offshore wind generated power?

Response: NOAA is not aware of any proposal for offshore wind generated power.

Comment: The President's decision to postpone OCS activities off the coasts of Washington and Oregon until after the year 2,000 should expire at that time unless affirmatively extended.

Response: Section 2207 of the Oceans Act of 1992 indefinitely bans oil and gas exploration, development and production within the boundary of the Sanctuary. This prohibitions could only be lifted by an Act of Congress.

Contingency Plans

Comment: The Sanctuary should establish a contingency plan in coordination with existing state and Federal contingency plans. Efforts should be made to coordinate with the State of Washington Departments of Wildlife, Fisheries, Ecology, and Natural Resources and pursue data sharing opportunities.

Response: The FEIS/MP identifies existing oil spill contingency plans and efforts in the State of Washington to cover the Strait of Juan de Fuca and Outer Coast. NOAA will coordinate closely with the existing agencies involved in contingency and emergency response planning, particularly the U.S. and Canadian Coast Guard and the State of Washington Office of Marine Safety (OMS). However, NOAA agrees that the Sanctuary requires its own contingency plan to ensure that resources are protected during events that threaten the environment. A prototype Sanctuary Contingency Plan is being tested at the Channel Islands National Marine Sanctuary. Once implementation experience has been gained, the plan will be adapted to other sites, including the Olympic Coast National Marine Sanctuary. To implement successfully an organized emergency response, NOAA will incorporate state and Federal legislation as well as local efforts into the Sanctuary Contingency Plan.

Comment: NOAA needs to provide for better oil spill response planning.

Response: NOAA is coordinating with the regional response

committees of the OMS to ensure that the equipment is available to address an emergency that would threaten Sanctuary resources.

Comment: An Oil Spill Response Center should be sited in close proximity to the Sanctuary to address small spills north of Grays Harbor where there is currently a lack of oil spill response capability.

Response: NOAA is promoting this idea in its participation on the regional response subcommittee whose jurisdiction is the Strait of Juan de Fuca and the Outer Coast. However, priority will be placed on the stationing of tugs and barges dedicated to emergency response.

Comment: The tribes should be properly funded to handle resource damage assessment as well as other activities where an oil spill could impact their subsistence and ceremonial harvest and cultural values.

Response: The reservations are not within the Sanctuary boundary. Therefore, the Sanctuary cannot dedicate funds to the Tribes for the purpose of damage assessment pursuant to a spill of hazardous materials.

Comment: NOAA should request that the oil industry's Marine Spill Response Corporation station a tractor/tug response vessel at Neah Bay.

Response: NOAA has made the recommendation to the

subcommittee on emergency response for the Strait of Juan de Fuca and the Outer Coast. NOAA is actively participating in formulating the recommendation to the State, and will coordinate with the Makah Tribe in their planning initiative to expand their marina to plan to accommodate a tug or emergency response vessel that is of appropriate size to service the Outer Coast and the Strait of Juan de Fuca.

Comment: NOAA should ensure that drills are conducted for the Clean Sound Cooperative with outside evaluation.

Response: NOAA intends to hire an operations manager immediately after designation to address issues related to vessel traffic and contingency planning. One of the priorities of this position will be to encourage the Coast Guard to focus on the Sanctuary during its emergency response drills.

Comment: NOAA should propose the examination of extending unlimited liability for spills to the shipping companies and the original firms providing the original source materials involved in the polluting activities.

Response: The MPRSA only provides NOAA with the authority to collect $100,000 per day for each violation pursuant to 16 U.S.C. 1437(c)(1), and damages to Sanctuary natural resources pursuant to 16 U.S.C. 1443.

ISSUE: SEALION ROCK

Comment: NOAA should prohibit, or at least condition, the Navy's practice bombing activities over Sealion Rock due to the impact on seabirds, depositing of metal objects in the Sanctuary, and because the military environment does not require such a sensitive area to be used for such purposes. At the very least, NOAA should prohibit the practice bombing during the breeding season. Section 7 consultations with the Department of Commerce and the Department of the Interior should not be construed as sufficient mitigation because these processes do not address impacts to non-endangered species.

Response: NOAA agrees that the Navy practice bombing of Sealion Rock is inconsistent with the goals of the Sanctuary program. Because the permit under which the Navy conducted its activities over Sealion Rock was rescinded by the Secretary of the Interior in August, 1993, NOAA may prohibit outright all bombing activities within the Sanctuary and has determined to do so. The regulation adopted by NOAA prohibits all practice bombing and provides that no exemption from the prohibition will be granted.

Comment: NOAA does not have the authority to prohibit or condition the Navy's activities.

Response: Because the Navy's authorization from the Secretary of Interior was rescinded, NOAA now has the authority to not only condition but also prohibit the Navy's practice

bombing activities.

Comment: NOAA should place the Navy's bombing activities within the scope of regulation to allow future regulation if necessary. To not list military activities is in conflict with the primary goal of resource protection.

Response: NOAA has addressed Navy activities in section 925.5(d) of the regulations.

Comment: NOAA should investigate the history of the Navy's activities over Sealion Rock to determine if a grandfather clause is warranted.

Response: The history of the Navy's activities and the permit that authorized its activities has been outlined in the FEIS/MP. The Navy's authority to conduct practice bombing activities has been rescinded and thus consideration of a grandfather clause is irrelevant.

Comment: Clarify how Navy bombing of Sealion Rock at 200 feet is less disruptive than commercial overflights.

Response: NOAA does not assert that the Navy's low flying activities are less disruptive than commercial or non-commercial overflights. NOAA's differing regulations in the DEIS/MP applying to Navy and non-military overflights resulted from limitations placed on NOAA by the MPRSA with respect to terminating pre-existing leases and permits.

ISSUE: PROTECTION OF TREATY RIGHTS

Comment: NOAA's regulations do not formally recognize the Federal Government's trust responsibility to the coastal Tribes. The regulations contain no provision which formally requires the Director to consider and protect tribal interests when ruling on permit applications to conduct development activities within the Sanctuary. To address this issue, the following modifications to the section 925.8 should be made:

> The Director . . . may issue a permit . . . to conduct an activity otherwise prohibited by section 925.5(a)(2)-(7), if the Director finds that the activity will: further research related to Sanctuary resources:
> . . .or promote the welfare of any Indian Tribe adjacent to the Sanctuary. In deciding whether to issue a permit, the Director shall consider such factors as . . . the impacts of the activity on adjacent Indian Tribes. Where the issuance or denial of a permit is requested by the governing body of an Indian Tribe, the Director shall consider and protect the interests of the Tribe to the fullest extent practicable in keeping with the purposes of the Sanctuary and his or her fiduciary duties to the Tribe . . ..

Response: NOAA agrees that the designation of the Olympic Coast National Marine Sanctuary is subject to the Federal government's general fiduciary responsibility to the coastal tribes. However, it is also clear that the Federal government is not obligated to provide particular services or benefits, nor to undertake any specific fiduciary responsibilities in the absence of a specific provision in a treaty, agreement, executive order, or statute. See Havasupai Tribe v. U.S., 752 F. Supp. 1471 (D. Ariz 1990), citing, Vigil, 667 (D.C. Cir. 1980); Gila River Pima-Maricopa Indian Community, 427 F.2d 1194, 190 Ct. Cl. 790 (1970). With respect to this designation, there is no specific provision

in the coastal Tribes' treaties or any agreement, executive order, or statute which requires NOAA to undertake any specific fiduciary responsibility on behalf of the coastal Tribes. Therefore, NOAA can fulfill its obligations to the coastal Tribes with respect to the designation by giving due consideration to their interests and concerns during the decision-making process.

NOAA agrees that its trust responsibilities to the Tribes requires that it consider Tribal interest when ruling on permit applications to conduct activities within the Sanctuary. However, this responsibility does not require that NOAA base its decision solely on what is in the best interest of the coastal Tribes. Therefore, NOAA opposes the addition of "or promote the welfare of any Indian Tribe adjacent to the Sanctuary", but agrees to include "the effects of the activity on adjacent Indian Tribes . . .." As previously stated, NOAA agrees that it must consider the interests of the Tribes when issuing permits, and language to that effect has been included in the regulations.

Comment: NOAA's regulation prohibiting the taking of marine mammals and seabirds conflicts with treaty rights to fish and hunt marine mammals in tribal usual and accustomed fishing grounds.

Response: NOAA recognizes that, given the standard for abrogating treaty rights enunciated by the Supreme Court in United States v. Dion, 476 U.S. 734 (1985), the provisions of the MPRSA do not abrogate the coastal Tribes' treaty fishing and

hunting rights. However, it is unclear whether Congress intended the MMPA and the Endangered Species Act (ESA) to abrogate these rights. Recently, the Makah Tribe has pursued clarification regarding the applicability of the Marine Mammal Protection Act (MMPA) and ESA to its treaty rights to hunt whales and seals. The issue is currently being examined by the Tribes and the National Marine Fisheries Service (NMFS). Given the concerns raised by the coastal Tribes, section 925.5(a)(6) has been revised to read as follows:

> Taking any marine mammal, sea turtle, or seabird in or above the Sanctuary, except as authorized by the National Marine Fisheries Service or the United States Fish and Wildlife Service under the authority of the Marine Mammal Protection Act, as amended (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 16 U.S.C. 703 et seq., or pursuant to any treaty with an Indian Tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA, and MBTA.

The revised language recognizes the Makah Tribe's treaty right to hunt whales and seals. However, the regulation also requires that the right be exercised in accordance with the provisions of the MMPA, ESA, and MBTA. If the MMPA, ESA or MBTA is determined to abrogate or otherwise restrict the Tribe's exercise of its right to hunt whales and seals, then that determination shall apply to the Tribe's exercise of those rights within the boundary of the Sanctuary.

Comment: The regulations fail to preserve tribal control of their cultural heritage. NOAA should amend section 925.5(a)(8)

to read as follows:

> Removal or attempted removal of any Indian cultural resource or artifact, or entry onto a significant cultural site designated by a Tribal governing body with the concurrence of the Director, except with the express written consent of the governing body of the Tribe or Tribes to which such resource, artifact, or cultural site pertains.

Response: The MPRSA provides NOAA with the authority to control access to cultural or historical artifacts within the Sanctuary thereby helping to ensure their preservation. Accordingly, anyone proposing to remove a cultural or historical resource must apply for and obtain a Sanctuary permit from NOAA. NOAA also acknowledges the coastal Tribes' desire to preserve their cultural heritage and, in particular, those cultural artifacts of tribal significance found within the Sanctuary. NOAA considers its objective of preserving the historical and cultural resources of the Sanctuary to be compatible with the coastal Tribes' desire to preserve their cultural heritage. Therefore, prior to issuing a Sanctuary permit to excavate a cultural or historical artifact that is of tribal significance, NOAA will consult with the affected Tribe(s). This clarification has been added to section 925.9.

Comment: The regulation prohibiting overflights under 1,000 ft. except for valid law enforcement purposes conflicts with the treaty secured rights to access certain reservation lands such as Tatoosh Island and Ozette, which are only accessible by helicopter in the winter months, and to conduct aerial timber cruises and engage in helicopter logging on portions of the

reservation abutting the Sanctuary. Therefore the following amendment to section 925.5(7) is proposed:

> Flying motorized aircraft at less than 1,000 feet above the Sanctuary within one nautical mile of the coastal boundary of the Sanctuary and the Flattery Rocks, Quilleute Needles, and Copalis National Wildlife Refuges, except for valid law enforcement purposes or where authorized by a governing body of an Indian Tribe to provide access to reservation lands.

Response: NOAA acknowledges the Tribes' concerns and does not intend to interfere with tribal rights to access reservation lands. Also, for the reasons discussed below, the minimum altitude has been changed to 2000 ft. In order not to interfere with Tribal access to reservation lands, the prohibition on flying has been changed to read:

> Flying motorized aircraft at less than 2,000 feet above the Sanctuary within one nautical mile of the Flattery Rocks, Quillayute Needles, or Copalis National Wildlife Refuge, and within one nautical mile seaward from the coastal boundary of the Sanctuary, except as necessary for valid law enforcement purposes, for activities related to tribal timber operations conducted on reservation lands, or to transport persons or supplies to or from reservation lands as authorized by a governing body of an Indian Tribe.

Comment: NOAA should apply the management plan equally to tribal and non-tribal governmental entities within the adopted boundary equally.

Response: NOAA is legally bound to recognize treaty secured rights and has no intention to interfere with these rights. As such, there will be circumstances in which Sanctuary regulations will apply to tribal and non-tribal members differently.

ISSUE: VESSEL TRAFFIC

Comment: Route tankers and barges as far away from near-shore reefs and islands as possible. Clarify what types of vessels can transit close to shore.

Response: There exists a Cooperative Vessel Traffic Management System (CVTMS) established and jointly managed by the United States and Canada. The CVTMS is a mandatory regime and consists of all navigable waters of the Strait of Juan de Fuca and its offshore approaches, southern Georgia Strait, the Gulf and San Juan Archipelagos, Rosario Strait, Boundary Pass, Haro Strait, and Puget Sound, bounded on the west by longitude 147°W and latitude 48°N, and on the northeast by a line along 49°N from Vancouver Island to Semiamoo Bay.

The rules of the CVTMS are intended to enhance safe and expeditious vessel traffic movement, to prevent groundings and collisions, and to minimize the risk of property damage and pollution to the marine environment. The rules apply to:

a. Each vessel of 30 meters or more in length; and

b. Each vessel that is engaged in towing alongside or astern, or in pushing ahead, one or more objects, other than fishing gear, where:

(1) the combined length of the vessel towing, the towing apparatus, and the vessel or object towed is 45 meters or more; or

(2) the vessel or object towed is 20 meters or more in overall length.

Both the Canadian and the United States Coast Guards are studying methods to improve the CVTMS in the area. Items being studied include replacement of outdated equipment, elimination of gaps in coverage, and increasing operator training and assignment length.

The Oil Pollution Act of 1990 (OPA 90) requires the U.S. Coast Guard to conduct a national Tanker Free Zone Study. This study is nearing completion and will recommend regulations requiring tank vessels to remain offshore during coastal transits.

Further, NOAA has recommended to the U.S. Coast Guard that an International Maritime Organization (IMO) approved ATBA be established within the proposed Sanctuary boundary. This would require vessels transporting hazardous materials to remain at least 25 nautical miles offshore while in the vicinity of Sanctuary waters or until making their approach to the Strait of Juan de Fuca using the established CVTMS traffic separation scheme. Although ATBA's are not compulsory for foreign flag vessels, a maritime state may make such an area compulsory for domestic vessels transiting the waters under its jurisdiction.

Comment: Clarify "commercial vessel" and distinguish between various sizes, uses, and types of vessels.

Response: "Commercial vessel" means any vessel operating in return for payment or other type of compensation. Clarification between sizes, uses, and types of vessels would require more

space than is available in this document. Rather than attempt to hold to a general definition of "commercial vessel", reference will be made to specific types of vessels, i.e., tank vessels, bulk carriers, fishing vessels, pleasure craft, etc., wherever required.

Comment: The Sanctuary boundary should be published on navigational charts.

Response: NOAA agrees and will submit the Sanctuary boundary to the Nautical Charting Division of the National Ocean Service. The boundary will be delineated on the next update of the appropriate navigational chart.

Comment: Spill containment and cleanup measures should be part of appropriate mitigation requirements for vessels operating within the Sanctuary.

Response: OPA 90 mandates that tank vessel contingency plans be prepared for a worst-case discharge, and that vessel plans be reviewed and approved by the U.S. Coast Guard. OPA 90 also stipulates that each responsible party for a vessel from which oil is discharged, or which poses the substantial threat of a discharge of oil into or upon the navigable waters or adjoining shorelines or the exclusive economic zone, is liable for the removal costs and damages resulting from such an incident.

Further, Washington State law (Title 88 Section 46 Revised Code of Washington) requires the owner or operator of a tank

vessel to prepare and submit an oil spill prevention plan prior to the vessel's entry into a Washington port. The law also requires that each tank vessel, cargo vessel of greater than three hundred or more gross tons, or passenger vessel of greater than three hundred or more gross tons have a contingency plan for the containment and cleanup of oil spills from such vessel into the waters of the State.

Comment: NOAA should provide a more complete explanation of how implementation of each of the regulations would put U.S. shipping companies at an economic disadvantage in relation to foreign vessels. Precisely what would be the estimated cost in dollars, time, inconvenience, and ultimate impact upon U.S. shipping companies.

Response: NOAA is promulgating no regulations that will adversely affect domestic vessels.

Comment: NOAA should put forth a vessel traffic management plan, spearheaded by the U.S. Coast Guard, that addresses research needs, vessel traffic monitoring and communication systems, and future regulatory alternatives. The management plan should be proactive, and establish a timetable for considering new vessel traffic regulations in the future.

Response: NOAA is working with the U.S. Coast Guard, which has the primary authority for vessel traffic regulation, to determine the need for additional measures to ensure protection

of Sanctuary resources and qualities. In addition, NOAA will work with the U.S. Army Corps of Engineers (COE) and the EPA regarding vessel traffic activities resulting from the transport of dredged material through the Sanctuary for disposal outside the Sanctuary. These consultations will aim to determine which resources are most at risk, which vessel traffic practices are most threatening, and which regulations or restrictions would be most appropriate to alleviate such risk.

NOAA agrees that an improved vessel traffic monitoring and communication system along the coast is desirable. OPA 90 requires the Secretary of Transportation to complete a comprehensive study on the impact of installation, expansion, or improvement of vessel traffic servicing systems. NOAA will work with the State of Washington's OMS, the U.S. Coast Guard, and appropriate public agencies during the development of these monitoring studies to determine an appropriate system for the Sanctuary and the need for any additional site-specific protective measures.

Vessel traffic monitoring and research and coordination on this subject have been incorporated into the Sanctuary management plan.

Comment: Allow only double-hulled vessels in the Sanctuary.

Response: OPA 90 establishes double hull requirements for tank vessels. Most tank vessels over 5,000 gross tons will be required to have double hulls by 2010. Vessels under 5,000 gross

tons will be required to have a double hull or a double containment system by 2015. All newly constructed tankers must have a double hull (or double containment system if under 5,000 gross tons), while existing vessels are phased out over a period of years.

As previously stated, the U.S. Coast Guard is completing a study of a tanker free zone where tank vessels would be required to remain offshore during coastal transits. Further, a proposal to establish an ATBA within the Sanctuary boundary has been developed and will be submitted to the International Maritime Organization (IMO) for approval at the earliest possible date which, in accordance with IMO's procedures, is June, 1994. Both actions will serve to ensure that hazardous material laden vessels will remain an appropriate distance offshore.

Comment: Require vessels to have a pilot aboard.

Response: Requirements for pilots are set forth in both Federal and state regulations. NOAA will monitor and review vessel traffic in the Sanctuary and make recommendations to the appropriate regulatory agencies, state and Federal, regarding the need for additional pilotage requirements. Pilotage is currently compulsory for all vessels except those under enrollment or engaged exclusively in the coasting trade on the West Coast of the continental United States (including Alaska) and/or British Columbia. Port Angeles has been designated as the pilotage station for all vessels enroute to or from the sea.

OPA 90 requires the U.S. Coast Guard to designate U.S. waters where a second licensed officer must be on the bridge of a coastwise seagoing tanker over 1,600 gross tons. Under the Ports and Waterways Safety Act, the U.S. Coast Guard also is proposing to require a second officer on foreign flag tankers over 1,600 gross tons and on U.S. registered tankers over 1,600 gross tons.

Comment: Establish a tonnage limit within three nautical miles of shore except for those making a port call.

Response: All types of vessels and traffic patterns will be reviewed by NOAA, the U.S. Coast Guard, and the State of Washington OMS to determine any appropriate action to be taken. In conducting this review, attention will be paid to vessel type, cargo carried, and vessel size.

Comment: Require all vessels to have English speaking bridge personnel.

Response: All vessels required to participate in the Juan de Fuca region CVTMS are required to make all reports in English.

Comment: Curtail traffic during poor weather conditions.

Response: NOAA will work with the state, U.S. Coast Guard, and appropriate public agencies to determine the need for further vessel traffic regulations to specifically address vessel traffic during adverse weather conditions.

During conditions of vessel congestion, adverse weather,

reduced visibility, or other hazardous circumstances in the area of the Juan de Fuca Region CVTMS, the Cooperative Vessel Traffic Management Center may issue directions to control and supervise traffic. They may also specify times when vessels may enter, move within or through, or depart from ports, harbors, or other waters of the CVTMS Zone.

Further, the U.S. Coast Guard's Navigation Rules, International and Inland, speak specifically to the conduct of vessels while at sea. Rule 6 of the International and Inland Steering and Sailing Rules states that "Every vessel shall at all times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions."

Comment: Prohibit engine powered water craft of any type.

Response: A fundamental objective of the sanctuary program is "to facilitate, to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities" (16 U.S.C. 1431(b)(5)). NOAA will consider the threats from all types of vessels - power driven, sailing, or paddle propelled - as a continuing analysis of vessel traffic within the sanctuary boundaries.

Comment: Manage the off-loading or exchange of cargo or oil.

Response: No offloading or exchange of oil occurs within the boundary of the Sanctuary. This activity generally occurs in ports which are located outside of the Sanctuary boundary. Further, this type of activity is addressed by both OPA 90 and programs being established by the recently created Washington State OMS.

Comment: Prohibit shipment of reclaimed spent nuclear fuel from foreign reactors through the Sanctuary.

Response: As previously noted, NOAA has recommended to the U.S. Coast Guard that an IMO approved ATBA be established within the Sanctuary boundary. This would require vessels transporting hazardous materials to remain at least 25 nautical miles offshore while in the vicinity of Sanctuary waters or until making their approach to the Strait of Juan de Fuca using the established CVTMS traffic separation scheme.

NOAA will also work with the State of Washington's OMS and both the U.S. and Canadian Coast Guards to be informed of, and alerted to, in a timely and regular manner, all hazardous cargo carriers transiting near Sanctuary waters. Further, through participation in regular meetings of the Washington State Regional Marine Safety Committees and discussions with the U. S. Coast Guard, NOAA will ensure that contingency plans adequately address such transport issues.

Comment: Prohibit commercial vessel anchorages within the

Sanctuary, particularly off Makah Bay, except in emergencies.

Response: The use of the Makah Bay anchorage by vessels waiting either for an available pilot at Port Angeles or instructions from their home office, has been examined. Currently, its use as a temporary anchorage has been agreed upon by both the U.S. and Canadian Coast Guards. This is viewed as a more favorable alternative than having such vessels continuously underway within, and off the entrances to, the Strait. Vessels at anchor are subject to MARPOL, U.S. Federal law, and Sanctuary regulations regarding discharges. The use of this anchorage is monitored by Tofino Vessel Traffic Service which can also educate such vessels regarding the Sanctuary and its regulations.

Comment: Clarify NOAA's authority to regulate vessel traffic within State of Washington waters.

Response: Section 303 of the MPRSA gives NOAA the authority to promulgate regulations to implement the designation, including regulations necessary to achieve resource protection.

Comment: The State and Federal government have appropriated $75 million to expand and enhance maritime activity at Grays Harbor through waterway dredging and port terminal development programs. If vessel traffic is restricted, one branch of the government would be defeating the purpose of other parts of the government.

Response: NOAA has studied vessel traffic along the Washington coast. The result of the analysis was the

recommendation for the previously mentioned ATBA. This proposal, if adopted, would add approximately 17 nautical miles on a transit from Grays Harbor to the entrance of the Straits of Juan de Fuca and approximately 21 nautical miles on a transit from the entrance of the Straits to Grays Harbor. In comparison to the costs of cleanup, legal fees, liability, fines, loss of cargo, and vessel and environmental damages, the proposals to establish the ATBA seem reasonable.

Comment: Double-hulled proposals are not economically sensible in the foreseeable future.

Response: Congress has mandated (OPA 90) national double hull requirements for tank vessels.

ISSUE: OVERFLIGHTS

Comment: Establish the boundary for overflights at the beach rather than one (1) mile inland.

Response: The boundary for overflights is at the shoreline and not one (1) mile inland.

Comment: Establish a 2,500 foot minimum flight altitude over the sanctuary.

Response: To be consonant with current regulations regarding flights over charted National Park Service Areas, U.S. Fish and Wildlife Service Areas, and U.S. Forest Service Areas, NOAA is prohibiting the flying of motorized

aircraft at less than 2,000 feet above the Sanctuary within one nautical mile of the Flattery Rocks, Quillayute Needles, or Copalis National Wildlife Refuge, and at less than 2,000 feet above the Sanctuary within one nautical mile seaward from the coastal boundary of the Sanctuary, except as necessary for valid law enforcement purposes, for activities related to tribal timber operations conducted on reservation lands, or to transport persons or supplies to or from reservation lands as authorized by a governing body of an Indian Tribe. NOAA will work with the Federal Aviation Administration (FAA) to reflect this regulation on aeronautical charts.

Comment: Permit search and rescue at all times by whatever aircraft is needed to accomplish the task.

Response: The prohibitions set forth in the Sanctuary regulations do not apply to activities necessary to respond to emergencies threatening life, property, or the environment pursuant to Section 925.5 (c) of the regulations. Thus, in any emergency, search and rescue aircraft are allowed to perform whatever tasks are required within the Sanctuary boundary.

Comment: When necessary to bring a research flight into the area below the Sanctuary prescribed ceiling, regulations should require the plane's engine be kept at or below a

reasonable decibel level as heard from the ground.

Response: FAA regulations (14 CFR Part 36) codify noise standards for aircraft operating within U.S. airspace. Adherence to these standards is already required. When research is to be conducted within the Sanctuary boundary, aircraft operators will be required to obtain a permit and conduct such research in such a manner so as to minimize disturbance yet remain within safe aircraft operating parameters.

ISSUE: LIVING RESOURCE EXTRACTION

Fishing

Comment: NOAA should not restrict access to fishing grounds or catch-ability. Crab fishing and razor clam digging must be allowed.

Response: The regulation of fishing is not authorized by the Designation Document. NOAA has determined that existing fishery management authorities are adequate to address fishery resource issues. As with all other fisheries that occur within the Sanctuary, crab fishing and razor clam digging remain under the regulatory authority of existing Federal, state, tribal and regional fishery authorities. NOAA does not view fishing as contrary to the goals of the Sanctuary. The sanctuary program is by law mandated "to facilitate to the extent compatible with the primary objective of resource protection, all public and

private uses of the resources . . .." (including fishing) (16 U.S.C. 1431(b)(5)).

Existing fishery management agencies are primarily concerned with the regulation and management of fish stocks for a healthy fishery. In contrast, the National Marine Sanctuary Program has a different and broader mandate under the MPRSA to protect all Sanctuary resources on an ecosystem-wide basis. Thus, while fishery agencies may be concerned about certain fishing efforts and techniques in relation to fish stock abundance and distribution, the Marine Sanctuary Program is also concerned about the potential incidental impacts of specific fishery techniques on all Sanctuary resources including benthic habitats or marine mammals as well as the role the target species plays in the health of the ecosystem. In the case of the Olympic Coast, fish resources are already extensively managed by existing authorities and NOAA does not envision a fishery management role for the Sanctuary Program. Accordingly, fishing activities have not been included in the list of activities in the Designation Document subject to regulation as part of the Sanctuary regime. However, the Sanctuary Program will provide research results and recommendations to existing fishery management agencies in order to enhance the protection of fishery and other resources within the Sanctuary.

Comment: No additional fisheries management or regulation is needed in the Sanctuary. Commercial, recreation, and subsistence fishing can be compatible with sanctuary designation, and the existing regulatory framework is adequate at this time.

Response: See response to previous comment. The Designation Document places kelp harvesting within the scope of future regulation since there is no existing management plan for kelp harvesting.

Comment: Clarify the language associated with commercial fishing practices near sunken vessels, rocks and reefs in the proposed sanctuary to insure continuance of historical and customary fishing practices. Existing Federal and state regulations adequately protect archeological treasures, man-made reefs, and natural rock and reef formations. The FEIS should acknowledge and permit prevailing practices.

Response: Commercial fishing vis-a-vis historical resources is an exempted activity under the prohibition against disturbance of historical resources. However, the exemption is only for incidental disturbance and therefore does not allow deliberate disturbance.

Comment: Fishing should either be regulated, or placed in the scope of regulation, because there may be a time in the future when fishing needs to be regulated by the Sanctuary.

Response: NOAA believes that existing authorities are adequate to regulate fishing. Should the need arise to regulate fishing as part of the Sanctuary management regime, the Designation Document could be amended.

Comment: Proposed regulations should result in the gradual reduction of fishing, aquaculture, kelp harvesting and waterfowl hunting to insure that no commercial activity threatens the integrity of any resources in the proposed Sanctuary. Some commenters believed that the Sanctuary should ban all commercial fishing activities except Native American fishing activities.

Response: A blanket reduction of resource-use activities across the Sanctuary could not be imposed without credible evidence that each resource affected is threatened by a population decrease or stock failure. Absent such evidence, the Act requires that existing uses be facilitated to the extent compatible with the primary objective of resource protection.

Comment: True refugia should be established where all consumptive uses are prohibited for a period of time.

Response: The determination of whether refugia are established in the Sanctuary will be done in coordination with the NMFS, PFMC, Washington Department of Fisheries (WDF), the tribes, environmental groups, and industry. The

Sanctuary Advisory Committee (SAC) will be an important forum to address this issue. If, in coordination with other governmental agencies, it is determined that establishment of refugia is a desirable alternative, NOAA will analyze the alternative through the preparation of an environmental impact statement/management plan and solicitation of public input pursuant to the NEPA and the APA.

Comment: Driftnets, trawling, and all dragnet fisheries should be banned from the proposed Sanctuary as inconsistent with the regulation prohibiting alteration of, or construction on, the seabed.

Response: The only net gear used in fisheries in the Sanctuary are trolling gear (for salmon) and trawling gear (for groundfish). The regulatory prohibition on altering the seabed includes an exception for incidental disturbance resulting from traditional fishing operations. NMFS has conducted a limited study of the impact of trawl gear on the benthos and has not identified any resulting systematic destruction. However, the regulations could be modified to regulate any activity that is shown to cause significant disturbance of the seabed. This reflects adherence to the MPRSA's goals of preserving natural and human-use qualities of a marine area.

High-seas driftnets, defined as nets greater than 1.5 miles long, have been banned pursuant to United Nations

resolution 46/215. While gillnets and setnets are currently used in the inland waters of the State of Washington, they are not used in Sanctuary waters.

Comment: NOAA should facilitate the regulation of resource extraction within the Sanctuary under a regulatory framework that is controlled by a single agency.

Response: Regulatory authority over resources and resource extraction industries is expressly granted by state and Federal statute. NOAA does not have the primary regulatory authority over resource extraction. NOAA can act to coordinate the various regulators and can impose additional regulations, but cannot reassign itself or other agencies regulatory authority.

Comment: NOAA must clarify and acknowledge all tribal treaty fishing rights in the FEIS/MP, and the interaction of Sanctuary regulations with the right of tribes to fish in their Usual and Accustomed fishing areas.

Response: This issue is clarified in the Designation Document and in Part II (under Socio-Demographic profile and Land Use). Treaty rights to hunt and fish are acknowledged.

Comment: The entire study area must be considered as a "fishing area" since fish migrate along the entire Washington coast.

Response: NOAA recognizes that fish "know no boundaries in the sea." The fishing areas identified in the FEIS/MP only represent known locations where certain fishery activity is concentrated. The fishing areas displayed in the FEIS/MP are not related to regulatory jurisdiction in any way. They are simplified visual aids to complement the discussion of resources off the coast of Washington.

Aquaculture

Comment: Clarify NOAA's intention to regulate, condition, or prohibit aquaculture activities throughout the Sanctuary and adjacent to Indian reservations.

Response: The Sanctuary regulations do not directly prohibit aquaculture operations within the Sanctuary boundary. However, discharge of matter into the Sanctuary, or alteration of or construction on the seabed in connection with aquaculture activities are prohibited. It is unlikely that permits would be granted for aquaculture activities in the Sanctuary that violate these prohibitions. This determination is based upon U.S. Army Corps of Engineers (COE) guidance related to permits for fish pen mariculture operations, which prohibits fish farms in Federal natural resource areas, such as national seashores, wilderness areas, wildlife refuges, parks or other areas designated for similar purposes (e.g., national marine sanctuaries).

Comment: NOAA should change the proposed regulation

governing alteration of or construction on the seabed to "maintenance and development of approved aquaculture operations", and strike "existing prior to the effective date of these regulations." Eliminating future aquaculture development off the Olympic Coast would preclude opportunities for both private shellfish and finfish production and for public enhancement. Technology is being developed which would result in minimal environmental imbalance, and would afford employment for regional communities.

Response: See response to previous comment.

Comment: The Sanctuary should not regulate aquaculture activities because there are sufficient regulations in place.

Response: See response to previous comment.

Comment: The Sanctuary should provide mutually agreed upon requirements for aquaculture activities among the oyster growers of Willapa Bay.

Response: The boundary of the Sanctuary does not include Willapa Bay.

Comment: The discussion in the FEIS/MP on the impacts of aquaculture needs to be expanded and the proposal to not regulate aquaculture in the Sanctuary should be re-assessed.

The FEIS/MP needs to address the use of drugs in farm-raised fish.

Response: The discussion of aquaculture within the Sanctuary is intended only to evaluate the current status of the industry in the study area - it is not intended to measure aggregate impacts. The request for expanded discussion of resources does not identify specific issues of discussion. A re-assessment of aquaculture vis-a-vis the Sanctuary reveals that the industry is adequately regulated by existing state and Federal requirements. However, any discharges from such operations into the Sanctuary would be prohibited. The Sanctuary has no jurisdiction over the use of drugs in aquaculture - such determinations are under the purview of the Washington State Department of Health (WDH) and the Federal Food and Drug Administration (FDA).

Comment: All aquaculture should be banned from within the Sanctuary.

Response: The Sanctuary is required by law to facilitate public and private uses of Sanctuary resources as long as resource protection is not jeopardized. If properly sited and operated, aquaculture does not appear to appreciably impact the health of the marine environment.

Comment: Kelp harvesting should be banned or regulated within the Sanctuary.

Response: At present there is no kelp harvesting within the Sanctuary. The Washington Department of Natural Resources (DNR) is in the process of preparing a management plan for kelp harvesting. NOAA has included kelp harvesting in the scope of regulations in the Designation Document in the event that future action by NOAA is necessary to protect this resource. NOAA will work with DNR to develop a kelp management plan within the Sanctuary.

ISSUE: MARINE MAMMALS, SEA TURTLES AND SEABIRDS

Comment: Clarify "takings". The prohibition on the taking of marine mammals and seabirds within the Sanctuary is redundant with the ESA, the MMPA and the MBTA, and what further impact it will have on the fishing community.

Response: "Taking" is defined in section 925.3 of the regulations to mean: (1) for any marine mammal, sea turtle or seabird listed as either endangered or threatened pursuant to the ESA to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or injure, or to attempt to engage in any such conduct and, (2) for any other marine mammal, sea turtle, or seabird, the term means to harass, hunt, capture, kill, collect or injure, or to attempt to engage in any such conduct. While marine mammals, seabirds and endangered and threatened species are protected under the MMPA, ESA and MBTA, NOAA believes that the higher penalties afforded under the MPRSA will provide a stronger

deterrent.

The MBTA sets maximum criminal fines at either $500 or $2,000 per violation, depending on the violation. The MMPA sets maximum civil penalties at $10,000 and maximum criminal fines at $20,000. The ESA sets maximum civil penalties at $500, $12,000 or $25,000 per violation, depending on the violation; maximum criminal fines are set at $50,000. (All three statutes also provide for imprisonment for criminal violations.)

Section 307 of the MPRSA allows NOAA to assess civil penalties as high as $100,000 for each violation. In addition, monies collected under the MPRSA are available for use by the National Marine Sanctuary Program.

Comment: The MBTA would not allow any taking of migratory birds in the sanctuary, thus providing even stronger prohibition than sanctuary status can provide.

Response: See above response. Section 925.5(a)(6) of the Sanctuary regulations prohibits the taking of migratory birds within the Sanctuary. Including a prohibition on "taking" marine birds in the Sanctuary regulations allows such violations to be subject to the civil penalties authorized by the MPRSA which far exceed those authorized by the MBTA.

Comment: Prohibit all takings of marine mammals and

seabirds, regardless of military or fishing exemptions.

Response: Section 925.5(a)(6) of the Sanctuary regulations prohibits the taking of marine mammals and seabirds in or above the Sanctuary except as authorized by the NMFS or the United States Fish and Wildlife Service under the authority of the MMPA, as amended, 16 U.S.C. 1361 et seq., the ESA, as amended, 16 U.S.C. 1531 et seq., and the MBTA, as amended, 16 U.S.C. 703 et seq., or pursuant to any treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA, and MBTA. Exemptions include a limited five-year incidental take of marine mammals provided by interim regulations promulgated pursuant to the MMPA, which are in effect until October, 1993. The ESA also has a limited incidental take exemption. See 16 U.S.C. section 1539(a)(2)B(i). NMFS, in conjunction with environmental groups and the fishing industry, is developing a permanent management regime to be implemented upon expiration of the MMPA interim regulations.

If in the future NOAA determines that the existing regulations promulgated under MMPA, ESA, MBTA or any other state or Federal statute are not adequate to ensure the coordinated and comprehensive management of marine mammals and seabirds, changes to the Sanctuary regulations would be undertaken in accordance with the requirements of the MPRSA, NEPA and APA.

Comment: Exclude from [takings] prohibition birds considered game.

Response: The only birds section 925.5(a)(6) prohibits the taking of are seabirds--seabirds are not considered game species.

Comment: Section 925.5(a)(6) of the proposed regulations would prohibit the taking of marine mammals or seabirds unless affirmatively permitted by regulations promulgated under authority of the ESA, MMPA, or MBTA. Because these regulations do not expressly permit any takings by treaty Indians, the proposed sanctuary regulations would effectively prohibit the Makah Tribe from exercising their treaty rights to take marine mammals. The proposed regulations would also hinder the tribe's ability to exercise its fishing rights by precluding fisheries which result in the incidental taking of marine mammals and seabirds.

The DEIS/MP offers no conservation justification for imposing restrictions on the taking of marine mammals and seabirds which go beyond the restrictions imposed by the ESA and MMPA. The DEIS/MP concedes that the purpose of the proposed sanctuary regulations is not to protect particular species from extinction. According to the DEIS, the purpose of these additional prohibitions in the proposed regulations is to "extend protection for sanctuary resources on an

environmentally holistic basis." This goal does not permit infringement of treaty rights. Therefore, the regulations should be amended by adding "or in accordance with any treaty to which the United States is a party."

Response: The regulatory prohibitions do not abrogate or obstruct any rights under an existing treaty. The regulations have been changed by adding "or pursuant to any treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA and MBTA." The treaty between the Makah Tribe and the United States explicitly assures the "right of taking fish and of whaling or sealing at usual accustomed grounds and stations." (Article 4, Treaty of Neah Bay, 1855).

Incidental takes of marine mammals can legally occur under permit and exemption provisions of the MMPA. Currently, Washington coastal tribes apply for and receive exemption certificates from NMFS for the incidental taking of marine mammals during fishing. Fees for this exemption are waived for tribes.

Further, tribes cannot be denied entry into any fishery based on the likelihood or occurrence of seabird or marine mammal takings. However, they could be prosecuted if they violate the ESA, MMPA, or MBTA.

Comment: Change the wording of the regulation to read "as

authorized or permitted by NMFS or [the U.S. Fish and Wildlife Service] USFWS under the authority of the MMPA and ESA." NMFS suggests that the preamble and/or regulations clarify that Sanctuary permits will not be required for activities authorized or permitted by NMFS or USFWS under MMPA or ESA. Such clarification would relieve many concerns over the possibility of overlapping and potentially duplicative permitting requirements.

Response: NOAA has amended the regulation by adding "as authorized by the National Marine Fisheries Service or the United States Fish and Wildlife Service under the authority of the Marine Mammal Protection Act, as amended, (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 16 U.S.C. 703 et seq. . . . ." The inclusion of "as authorized or permitted" is viewed by NOAA as redundant.

ISSUE: SANCTUARY ADMINISTRATION

Regulations/Permits

Comment: NOAA should use economic incentives rather than regulations to ensure that activities do not impact resources.

Response: NOAA does not have sufficient authority to provide economic incentives to ensure that activities do not impact Sanctuary resources. Even regulations, which include

economic disincentives such as monetary penalties, are not sufficient to ensure that any activity does not impact resources.

Comment: Clarify the statement: "When a conflict with a sanctuary regulation related to specific [non-sanctuary] regulations occurs, the one more protective of sanctuary resources will prevail." NOAA regulations should not override those of the local jurisdictions. NOAA needs to clarify: 1) the application of this policy to fishing; 2) types of conflicts the statement applies to; 3) who determines whether a conflict exists; and 4) the process for resolving a conflict.

Response: NOAA agrees that the statement as written in the DEIS/MP is unclear. Accordingly, the statement has been deleted in the FEIS/MP. Essentially, the statement meant that if two regulations exist covering an activity in the Sanctuary, one promulgated by NOAA under the MPRSA authority and the other by another agency under a different statute, compliance with the less restrictive regulation will not relieve the obligation to comply with the other more restrictive one.

Comment: NOAA should follow the guidelines of NEPA when proposing any change in regulations that are listed in the scope of regulations. This is especially applicable to

vessel traffic and discharge regulations. Also, clarification is needed on the rulemaking and amendment processes.

Response: Listing activities in the scope of regulation reflects that the issues and alternatives were addressed in the FEIS/MP, public hearings were held, and public comments were solicited regarding the activities. If NOAA later proposes the regulation of an activity listed in the scope of regulations in the Designation Document but not regulated at the time of Sanctuary designation, NOAA will request public comments on the proposal. When NOAA plans to amend a rule that has been promulgated, an analysis of the issues, affected environment, alternatives and consequences will be completed and public comments solicited. NOAA will then modify the proposal if necessary and respond to public comments when taking the final action.

Comment: A procedure must be established to disagree with management and issue an appeal if permits to conduct research are denied.

Response: Section 925.12 of the Sanctuary regulations set forth the procedures for appealing denials of Sanctuary permits. The appeal process involves a written statement by the appellant to the Assistant Administrator of NOAA. The Assistant Administrator may conduct a hearing on the appeal.

Comment: Clarify the procedure for obtaining permits for low-flying aircraft engaged in ongoing species monitoring studies and damage assessment studies in response to an incident such as an oil spill. Activities authorized by the NMFS and USFWS should not require a Sanctuary permit because the requirements for permits would be duplicative.

Response: All flights engaged in monitoring or research activities that fly below 2,000 feet are required to obtain a Sanctuary permit, or, if the activity is already pursuant to a permit, to have that permit certified. Permits are not required for overflights necessary to respond to emergencies threatening life, property or the environment.

Comment: NOAA should not grandfather existing uses if otherwise prohibited by sanctuary regulations.

Response: Section 304(c)(1)(B) of the MPRSA specifies that NOAA may not terminate any valid lease, permit, license, or right of subsistence use or of access, if the lease, permit, license, or right "is in existence on the date of designation of any national marine sanctuary . . . ."

Comment: Treaty secured rights should not require sanctuary certification and registration. Further, NOAA should obligate federal regulators to consider and protect tribal interests when issuing permits which may affect those

interests.

Response: Treaty secured rights do not require certification by the Sanctuary program.

Comment: The regulations, exemptions and authority to place conditions on existing permitted activities are unclear.

Response: Section 304(c)(2) of the MPRSA provides NOAA with the right to regulate the exercise of a lease, permit, license, or right of subsistence use or of access existing on the effective date of Sanctuary designation.

Comment: Sanctuary management should be formally coordinated with tribal regulatory and law enforcement authorities through cooperative agreements.

Response: Cooperative agreements will be developed as necessary between NOAA and the tribes regarding regulatory and law enforcement activities.

Comment: The Sanctuary should offer increased enforcement which should be conducted by Sanctuary personnel rather than the U.S. Coast Guard. Clarify the enforcement procedures.

Response: There will be enforcement of Sanctuary regulations through cooperative agreements with the U.S. Coast Guard, NMFS, WDF, the coastal tribes, USFWS, and the National Park Service (NPS). Considering fiscal constraints, level of use, and availability of enforcement

personnel working in the field already, NOAA has determined that it is not a high immediate priority to hire Sanctuary enforcement personnel. The Sanctuary must first become fully staffed and operational, and a determination must be made whether additional enforcement personnel are needed. The enforcement procedures will be determined pursuant to the cooperative agreements that are established.

Comment: The broad scope of the discharge prohibition will require a well-coordinated enforcement operation to monitor all discharge and disposal activities from sources on land as well as in offshore, coastal and inland waters over large areas outside of the Sanctuary boundary. It may be impossible to determine the origin of discharges or deposits found in the Sanctuary after the dumping activity has occurred.

Response: The prohibition on discharges from outside the boundary relates to discharges that enter and injure Sanctuary resources. NOAA must establish that discharges not only enter, but injure the resources before enforcement actions will be taken. It will, therefore be desirable for NOAA to undertake a comprehensive monitoring program by which it can determine ecosystem health and use impacts.

Comment: NOAA should impose unlimited liability for spills extended to shipping companies and firms providing original

source materials involved in polluting activities.

Response: NOAA is permitted to seek penalties of up to $100,000 per day for a violation pursuant to Section 307(c)(1) of the MPRSA (16 U.S.C. 1437(c)(1)), and for natural resource damages pursuant to section 312 of the MPRSA (16 U.S.C. 1443).

Transboundry Coordination

Comment: NOAA should coordinate with other Federal and Canadian authorities to regulate vessel traffic, reduce the risk of oil spills, and eliminate oil and gas drilling in Canadian waters adjacent to the proposed sanctuary. NOAA should encourage an adjacent sanctuary along the west coast of Vancouver Island.

Response: NOAA agrees and is working with the Canadian Coast Guard, the U.S. Coast Guard and the Washington OMS to reduce the risk of oil spills. The regulation of vessel traffic will currently remain with the U.S. and Canadian Coast Guards and the OMS. NOAA will support any Canadian initiative to designate a marine protected area in Canadian waters on the Pacific Coast.

Beach Management Policies

Comment: NOAA should grandfather in the existing beach management policies including allowable beach driving activities.

Response: The boundary of the Sanctuary does not encompass beaches where beach driving is permitted.

Advisory Committee/Decision Making

Comment: NOAA and the State of Washington should work together to determine the composition of the Sanctuary Advisory Committee (SAC). The SAC should include representatives from private landowners, local industry, the county and tribes. The SAC should be based at the local level to oversee operations and help maintain strong local input.

Response: NOAA will work with local user and interest groups and state and local governments to obtain broad representation on the SAC. The law limits the SAC to no more than 15 members.

Comment: The SAC should have the power to direct the Sanctuary manger and set priorities for funding. The SAC decisions should be binding. If the decisions are not binding, then the manager should at least provide a rationale for any actions taken which are directly contrary to the recommendations of the SAC.

Response: The SAC recommendations to the manager will be instrumental in guiding the manager with respect to prioritizing actions. If the manager chooses not to pursue the recommendations of the SAC, a rationale will be provided to the members of the SAC.

Comment: One of the first tasks of the SAC should be to

review and update the State of Washington's coastal zone management program to ensure consistency with the Sanctuary management plan. The Sanctuary management plan goals and objectives should also be reviewed.

Response: Prior to designation, the State of Washington will review the FEIS/MP as part of its consistency determination as it relates to Washington's approved coastal zone management program. The WDOE has jurisdiction for the Shoreline Management Act. The SAC will not share that jurisdiction, rather, the SAC will be responsible for reviewing the Sanctuary management plan goals and objectives. The SAC's first priority will be to help determine the five-year Sanctuary operating plan establishing priorities for education, research, monitoring, facilities siting and administration.

Miscellaneous

Comment: Firearms should be controlled or banned within the Sanctuary.

Response: Possession and use of firearms is regulated by State law for public safety purposes. The primary purpose of Sanctuary designation is resource protection.

Management Alternatives/Strategies

Comment: The administrative models being discussed in the Northwest Straits proposal should be considered.

Response: The administrative model identifying NOAA as the lead agency in managing the sanctuary with guidance and assistance from the SAC (which will represent State and local

interests) will be implemented in the Olympic Coast National Marine Sanctuary. The administrative model which involves joint administration between NOAA and the State of Washington was not considered for the Olympic Coast National Marine Sanctuary because the Sanctuary is predominately in Federal waters. One model suggested for the proposed Northwest Straits National Marine Sanctuary focuses on joint administration because the Sanctuary would be located entirely within State waters. NOAA will work closely with the state and counties and other Federal agencies in the administration of the Olympic Coast National Marine Sanctuary.

Comment: The management plan needs to account for tribal sovereignty and jurisdiction with respect to cultural resources, law enforcement and research practices. NOAA needs to recognize the need to coordinate with each tribal entity in the same manner as with the state and its management agencies.

Response: NOAA acknowledges the importance of tribal sovereignty. Nothing in the designation will impact the treaty rights of the coastal tribes. NOAA will consult closely with the tribes on any action that may potentially impact tribal rights or interests.

Comment: NOAA should choose management plan alternative 1 which proposes to gradually phase in program activities and staffing. Staff could be co-located with another Federal agency in Port

Angeles, with satellite sites in Klaloch or La Push. National concerns with fiscal restraint support this choice.

Some commenters supported management plan alternative 2 which proposes to set up the sanctuary headquarters and immediately provide full-staffing. Sanctuary headquarters should be located on the coast. The former Makah Air Force Station is one possible location.

Response: NOAA is experiencing the fiscal constraints that all Federal programs are experiencing. NOAA proposes to balance the needs for resource protection and fiscal restraint by phasing in staffing and maximizing cooperative relationships with other agencies and jurisdictions working in the area (e.g., NPS, U.S. Coast Guard, the tribes, and the USFWS) to implement the management plan. The Sanctuary manager will have an office on the Olympic Coast with administrative support facilities in Seattle.

Comment: Implementation of the final management plan must be adequately funded in order to prevent pollution and resource damage.

Response: The level of funding for the first year after Sanctuary designation will depend upon the Sanctuary Program's funding which is authorized and appropriated by Act of Congress. However, the reality of the program's funding situation will require the manager and SAC to identify alternative sources of funding for Sanctuary programs.

Comment: A volunteer program, coordinated by a full-time volunteer coordinator, should be established to assist in implementation of the management plan.

Response: NOAA agrees that the establishment of a volunteer program can assist in implementation of the management plan. The SAC will be influential in determining the priority of hiring a volunteer coordinator.

Comment: The management alternatives should more accurately describe NOAA's comprehensive planning as implemented through a combination of legal management authority over certain specific Sanctuary activities and advisory coordination with other entities managing the remaining essential components.

Response: NOAA agrees. The FEIS/MP outlines the regulations which NOAA is promulgating. The FEIS/MP also outlines the role of the SAC, whose composition is aimed at enhancing the coordination with other entities with management jurisdiction in the Sanctuary.

Comment: The Sanctuary manager should have a great deal of responsibility for setting the Sanctuary budget, as well as assigning funds to local governments for assistance in implementing management plans.

Response: The Sanctuary manager will have primary responsibility for recommending the Sanctuary budget to

headquarters. The Sanctuaries and Reserves Division has responsibility for the entire National Marine Sanctuary Program budget, and will work with the site manager to develop the annual program budget. The manager has the discretion to earmark funds to local governments or groups to implement Sanctuary programs.

Comment: Zoning plans should be implemented which accommodate the varying resource management needs within the Sanctuary. Some zoning examples include allowing for the needs of ports to the south, designating areas which would be closed to all consumptive uses on a rotating basis, and zoning specific areas within the sanctuary for the sole purposes of research, recreational use, commercial use and no use.

Response: Zoning is not anticipated as part of the FEIS/MP for the Sanctuary. If NOAA, in consultation with the SAC, believes that zoning would better meet the needs of the program, the management plan and regulations can be amended in accordance with the requirements of the MPRSA, the NEPA and the APA.

Research/Education Protocol

Comment: Research results and data should be shared through existing databases with Federal and state agencies and tribes. The sharing of data should be formalized through cooperative agreements.

Response: NOAA agrees that research results and data should be shared and will pursue appropriate cooperative agreements to ensure this coordination.

Comment: It is unnecessary to severely restrict or eliminate activities such as fishing, commercial vessel activity, dredging and aircraft operation in order to carry out the Sanctuary goals of promoting research and public education.

Response: The primary goal of sanctuary designation is the comprehensive long-term protection of marine resources. Some restrictions are necessary to accomplish this goal. Of the above activities, only dredging is being eliminated within the Sanctuary boundary. Research and education provide additional means to promote the goal of marine resource protection.

Comment: Geophysical exploration should not be prohibited, as the information gathered from this research can benefit coastal communities and academic institutions.

Response: NOAA's emphasis on research within the Sanctuary allows for research which may involve an otherwise prohibited activity (such as alteration of or construction on the seabed) as long as researchers obtain a research permit pursuant to section 925.9 of the Sanctuary regulations. NOAA will determine the environmental consequences of the proposed research, including short and long term effects on marine biota (such as noise which may interfere with cetacean communication) in deciding whether to issue a permit.

Comment: The research program should stress applied research such as research which can facilitate fisheries management,

provide information on long-term environmental trends, and provide links between the marine systems and the adjacent terrestrial systems. Providing research results to decision makers at the various governmental levels would be an important link in addressing marine resource problems.

Response: NOAA agrees and has clarified this point in the research section of the management plan.

Comment: Criteria for acceptable research within the Sanctuary should be established prior to formal designation of the Sanctuary. The criteria should be used in review of research permit applications, and an appeal process should be established in the case of research permit application denial.

Response: Research permit applications will be reviewed on a case-by-case basis and evaluated to determine the potential short and long term impacts of the proposed activities. In addition, section 925.12 of the regulations sets forth the procedures for appealing to the Assistant Administrator the denial of a research permit.

Comment: NOAA should conduct research into the effects of fishing activities on the entire marine system. Fish stocks, species abundance, and monitoring information should be presented to the PFMC.

Response: The National Ocean Service (which includes the Sanctuaries and Reserves Division) and the NMFS have entered into

a Memorandum of Understanding outlining the working relationship between the Sanctuary Program and the NMFS. The PFMC will be involved in this agreement, through its relationship with the NMFS. Research which benefits the overall goal of resource protection is addressed within this agreement by highlighting the need for interagency coordination, research and monitoring.

Comment: The benefits of sanctuary designation to the fishing community and others should be clearly articulated. Additionally, connections between the regulations and resource protection should be integrated in the education plan (e.g., establishing warning signs at popular access sites to alert boaters and hikers to the effect of disturbance of pelagic birds and marine mammals.)

Response: NOAA agrees and has clarified the education goals in the Sanctuary management plan. NOAA has articulated the benefits of the Sanctuary program for the fishing community. NOAA will coordinate with the USFWS and the NPS to post warning signs around critical marine bird and mammal habitat.

Comment: NOAA should provide for increased education and interpretation of the shoreline through a variety of media. Educational materials and outreach programs should be developed by pre-existing facilities and organizations on the Olympic Peninsula.

Response: Sanctuary designation will provide for increased

education and interpretation of the entire Sanctuary ecosystem. Education materials and outreach programs will be developed in cooperation with existing Federal, tribal, state and local entities.

ISSUE: INFORNATIONAL AMENDMENTS OF THE DEIS/MP

Biological Amendments

Comment: The discussion of the neretic and shelf edge environments in the DEIS/MP needs to be expanded. The resource assessment must stress the biological richness of the area.

Response: The resource assessment describing the ecosystem of the Sanctuary study area has been expanded in the FEIS/MP.

Comment: Biological resources need to be discussed in terms of ecosystem interactions and not single species descriptions.

Response: NOAA has expanded the discussion to include a description of the study area from an ecosystem perspective.

Socioeconomic

Comment: The FEIS/MP must contain a socioeconomic impact study of the regulations on the affected coastal communities and Tribes. Failure to consider and mitigate these impacts violates the NEPA and Federal Trust responsibility to Indians.

Response: An economic analysis has been included within the FEIS/MP. NOAA is not promulgating regulations that will unduly burden the tribes. The regulations have provisions that recognize treaty secured rights. In addition, NOAA will consult

with the tribes when considering permits affecting proposed development activities in the Sanctuary. NOAA believes that the regulations do not conflict with the economic interests of the tribes since the regulations offer increased protection for those natural resources critical to the tribal economy.

Comment: The Federal government should investigate the possibility of tax breaks to offset economic impacts of the management plan.

Response: NOAA's actions do not add economic burdens to the area. The issue of tax breaks should be addressed to an individual's representatives in Congress. NOAA does not have the legislative authority to address tax laws.

Supplemental Draft Environmental Impact Statement

Comment: NOAA should submit a supplemental Draft Environmental Impact Statement for the following reasons: 1) the DEIS/MP lacks a satisfactory examination of the socioeconomic impacts of the regulations on the coastal communities; 2) the DEIS/MP contains erroneous information related to port activities in Grays Harbor; 3) some information is missing, outdated, or inaccurate; 4) inadequate definition of the unique environment deserving protection that is identified by the SEL.

Response: NOAA has determined that the matters for which an SEIS has been requested can be addressed in the FEIS/MP. The FEIS/MP addresses the socioeconomic impacts of regulations that

could potentially affect the coastal communities in the alternatives and consequences section. Further, the vessel traffic section has been amended substantially to provide a detailed description of the significance of vessel traffic to the coastal communities. Additionally, the description of the marine environment under consideration has been expanded greatly.

Management

Comment: NOAA needs to address or recognize a number of current local and state regulatory controls in place within the shoreline areas.

Response: NOAA has addressed local and state regulatory controls within the shoreline areas. These controls are listed in Appendix J.

The following sets forth the text of the Designation Document for the Olympic Coast National Marine Sanctuary.

DESIGNATION DOCUMENT FOR

THE OLYMPIC COAST NATIONAL MARINE SANCTUARY

Under the authority of Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (the "Act"), 16 U.S.C. §§ 1431 et seq., the waters off the Olympic Coast of Washington State including the U.S. portion of the Strait of Juan de Fuca west of Koitlah Point, and the submerged lands thereunder, as described in Article II, are hereby designated as the Olympic Coast National Marine Sanctuary for the purposes of protecting and managing the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the area.

Article I. Effect of Designation

The Act authorizes the issuance of such final regulations as are necessary and reasonable to implement the designation, including managing and protecting the conservation, recreational, ecological, historical, research, educational, and aesthetic resources and qualities of the Olympic Coast National Marine Sanctuary. Section 1 of Article IV of this Designation Document lists activities that either will be regulated on the effective date of designation or may have to be regulated at some later date in order to protect Sanctuary resources and qualities. Listing does not necessarily mean that a type of activity will be

regulated; however, if an activity is not listed, it may not be regulated, except on an emergency basis, unless section 1 of Article IV is amended to include the type of activity by the same procedures by which the original designation was made.

Article II. Description of the Sanctuary Area

The Olympic Coast National Marine Sanctuary boundary encompasses approximately 2500 square nautical miles (approximately 8577 sq. kilometers) of coastal and ocean waters, and the submerged lands thereunder, off the central and northern coast of the State of Washington. The Sanctuary boundary extends from Koitlah Point due north to the United States/Canada international boundary seaward to the 100 fathom isobath. The seaward boundary of the Sanctuary approximates the 100 fathom isobath in a southerly direction from the U.S./Canada international boundary to a point due west of the Copalis River, cutting across the heads of Nitnat, Juan de Fuca, and Quinault Canyons.

The shoreward boundary of the Sanctuary is the mean lower low water line when adjacent to Indian reservations and State and county lands. When adjacent to Federally managed lands, the coastal boundary extends to the mean higher high water line. The coastal boundary cuts across the mouths of all rivers and streams. The precise boundary of the Sanctuary is set forth in Appendix I of this Designation Document.

Article III. Characteristics of the Sanctuary Area That Give it Particular Value

The Sanctuary is a highly productive, nearly pristine ocean and coastal environment that is important to the continued survival of several ecologically and commercially important species of fish, seabirds, and marine mammals. Its rugged and undeveloped coastline makes the region one of the more dramatic natural wonders of the coastal United States, paralleling the majestic splendor of such terrestrial counterparts as Yosemite National Park and the Grand Tetons. The region's high biological productivity is fueled by seasonal enhanced upwelling along the edge of the continental shelf, especially at submarine canyons, during periods of high solar radiation.

The diversity of habitats that make up the Sanctuary support a great variety of biological communities. This unusually large range of habitat types include: offshore islands and rocks; some of the most diverse kelp beds in the world; intertidal pools; erosional features such as rocky headlands, seastacks, and arches; interspersed exposed beaches and protected bays; submarine canyons and ridges; the continental shelf, including a broad shallow plateau extending from the mouth of the Juan de Fuca canyon; and continental slope environments. The numerous seastacks and rocky outcrops along the Sanctuary shoreline, coupled with a large tidal range and wave splash zone, support some of the most diverse and complex intertidal zones in the United States.

The Sanctuary provides an essential habitat for a wide variety of marine mammals and birds, and is of particular interest due to the presence of endangered and threatened species that live or migrate through the region. Twenty seven species of marine mammals are reported to breed, rest within, or migrate offshore of the Olympic Peninsula. Of particular interest is the migration route of the endangered California gray whale, the threatened northern sea lion, the occasional presence of the endangered right, fin, sei, blue, humpback, and sperm whales, and the reintroduced resident population of sea otters.

In addition, the seabird colonies of Washington's outer coast are among the largest in the continental United States and include a number of species listed as endangered or threatened including the short-tailed albatross, peregrine falcon, brown pelican, Aleutian Canada goose, marbled murrelet, and one of the largest populations of bald eagles in the continental United States.

The high biological productivity of the coastal and offshore waters in the Sanctuary support valuable fisheries that contribute significantly to the State and tribal economies. The commercially important species of fish include five species of salmon, groundfish, and shellfish.

In addition to the Sanctuary's value with respect to its biological resources, the region encompasses significant historical resources including Indian village sites, ancient canoe runs, petroglyphs, Indian artificats, and numerous

shipwrecks.

The diversity and richness of marine resources suggests that the marine sanctuary designations will provide exceptional opportunities for scientific research in the areas of species interactions, population dynamics, physiological ecology, linkages between terrestrial and aquatic ecosystems, and marine anthropology. The scientific research encouraged by the Sanctuary management plan will, in turn, help support an intensive public education and awareness program that will address the diverse, complex, and sensitive ecosystems in Washington's coastal and oceanic environments.

Article IV. Scope of Regulations

Section 1. Activities Subject to Regulation

The following activities are subject to regulation, including prohibition, to the extent necessary and reasonable to ensure the protection and management of the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the area:

a. Exploring for, developing, or producing oil, gas or minerals (e.g., clay, stone, sand, metalliferous ores, gravel, non-metalliferous ores or any other solid material or other solid matter of commercial value) within the Sanctuary;

b. Discharging or depositing from within the boundary of the Sanctuary, any material or other matter;

c. Discharging or depositing, from beyond the boundary of

the Sanctuary, any material or other matter;

d. Taking, removing, moving, catching, collecting, harvesting, feeding, injuring, destroying or causing the loss of, or attempting to take, remove, move, catch, collect, harvest, feed, injure, destroy or cause the loss of, a marine mammal, sea turtle, seabird, historical resource or other Sanctuary resource;

e. Drilling into, dredging, or otherwise altering the seabed of the Sanctuary; or constructing, placing, or abandoning any structure, material or other matter on the seabed of the Sanctuary;

f. Possessing within the Sanctuary a Sanctuary resource or any other resource, regardless of where taken, removed, moved, caught, collected or harvested, that, if it had been found within the Sanctuary, would be a Sanctuary resource;

g. Flying a motorized aircraft above the Sanctuary;

h. Operating a vessel (i.e., watercraft of any description in the Sanctuary;

i. Harvesting kelp within the Sanctuary;

j. Interfacing with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the Act or any regulation or permit issued under the Act.

Section 2. Emergencies

Where necessary to prevent or minimize the destruction of,

loss of, or injury to a Sanctuary resource or quality, or minimize the imminent risk of such destruction, loss or injury, any and all activities, including those not listed in Section 1 of this Article, are subject to immediate temporary regulation, including prohibition.

Article V. Effect on Leases, Permits, Licenses, and Rights

Pursuant to Section 304(c)(1) of the Act, 16 U.S.C. § 1434(c)(1), no valid lease, permit, license, or other authorization issued by any Federal, State, or local authority of competent jurisdiction, or any right of subsistence use of access, may be terminated by the Secretary of Commerce or designee as a result of this designation. The Secretary of Commerce or designee, however, may regulate the exercise (including, but not limited to, the imposition of terms and conditions) of such authorization or right consistent with the purposes for which the Sanctuary is designated.

In no event may the Secretary or designee issue a permit authorizing, or otherwise approve: (1) exploration for, development or production of oil, gas or minerals within the Sanctuary; (2) the discharge of primary treated sewage (except for regulation, pursuant to Section 304(c)(2) of the Act, of the exercise of valid authorizations in existence on the effective date of Sanctuary designation and issued by other authorities of competent jurisdiction); (3) the disposal of dredged material within the Sanctuary other than in connection with beach nourishment projects related to harbor maintenance activities; or

(4) bombing activities within the Sanctuary. Any purported authorizations issued by other authorities after the effective date of Sanctuary designation for any of these activities within the Sanctuary shall be invalid.

Article VI. Alteration of this Designation

The terms of designation, as defined under Section 304(a) of the Act, may be modified only by the same procedures by which the original designation is made, including public hearings consultation with interested Federal, State, and local agencies, review by the appropriate Congressional committees and the Governor of the State of Washington, and approval by the Secretary of Commerce or designee.

Appendix I Olympic Coast National Marine Sanctuary

Boundary Coordinates. (Based on North American Datum of 1983).

2500 square nautical miles

Point	LATITUDE	LONGITUDE
1	47°07'45"	124°11'02"
2	47°07'45"	124°58'12"
3	47°35'05"	125°00'00"
4	47°40'05"	125°04'44"
5	47°50'01"	125°05'42"
6	47°57'13"	125°29'13"
7	48°07'33"	125°38'20"
8	48°14'46"	125°40'59"
9	48°20'12"	125°22'59"
10	48°27'49"	125°06'04"
11	48°29'59"	124°59'13"
12	48°30'19"	124°50'42"
13	48°29'38"	124°43'41"
14	48°27'50"	124°38'13"
15	48°23'17"	124°38'13"

III. Summary of Final Management Plan

The FEIS/MP for the Olympic Coast National Marine Sanctuary sets forth the Sanctuary's location and provides details on the most important resources and uses of the Sanctuary. The FEIS/MP describes the resources and uses of the Sanctuary. The FEIS/MP describes the resource protection, research, education and interpretive programs, and establishes goals and objectives to be accomplished by each program. The FEIS/MP includes a detailed discussion, by program area, of agency roles and responsibilities.

The goals and objectives for the Sanctuary are:

Resource Protection

The highest priority management goal is to protect the marine environment, resources and qualities of the Sanctuary. The specific objectives of protection efforts are to:

(1) Coordinate policies and procedures among agencies sharing responsibility for protection and management of resources;

(2) Encourage participation by interested agencies and organizations in the development of procedures to address specific management concerns (e.g., monitoring and emergency-response programs);

(3) Develop an effective and coordinated program for the enforcement of Sanctuary regulations;

(4) Enforce Sanctuary regulations in addition to other regulations already in place;

(5) Promote public awareness of, and voluntary compliance with, Sanctuary regulations and objectives, through an educational/interpretive program stressing resource sensitivity and wise use;

(6) Ensure that the water quality of the coastal and ocean waters off the Olympic Peninsula is maintained at a level consonant with Sanctuary designation;

(7) Establish mechanisms for coordination among all the agencies participating in Sanctuary management;

(8) Ensure that the appropriate management agencies incorporate research results and scientific data into effective resource protection strategies; and

(9) Reduce threats to Sanctuary resources and qualities.

Research Program

Effective management of the Sanctuary requires the implementation of a Sanctuary research program. The purpose of Sanctuary research activities is to improve understanding of the marine environment off the Olympic peninsula, its resources and qualities, and to resolve specific management problems, some of which may involve resources common to both the marine and upland freshwater environments. Research results will be used in interpretive programs for visitors, for those living on the Peninsula, and working adjacent to or in the Sanctuary, others interested in the Sanctuary, as well as for protection and management of resources and qualities.

Specific objectives of the research program are to:

(1) Establish a framework and procedures for administering research to ensure that research projects are responsive to management concerns and that results contribute to improve management of the Sanctuary;

(2) Incorporate research results into the interpretive/education program in a format useful for the general public;

(3) Focus and coordinate data collection efforts on the physical, chemical, geological and biological oceanography of the Sanctuary;

(4) Encourage studies that integrate research from the variety of coastal habitats with nearshore and open ocean processes;

(5) Initiate a monitoring program to assess environmental changes as they occur due to natural and human processes;

(6) Identify the range of effects on the environment that would result from predicted changes in human activity or natural phenomena; and

(7) Encourage information exchange among all the organizations and agencies undertaking management-related research in the Sanctuary to promote more informed management.

Education Program

The goal for the education program is to improve public awareness and understanding of the significance of the Sanctuary resources and qualities to foster a heightened sense of stewardship for Sanctuary resources and qualities.

The management objectives designed to meet this goal are to:

(1) Provide the public with information on the Sanctuary and its goals and objectives, with an emphasis on the need to use Sanctuary resources and qualities wisely to ensure their long-term viability;

(2) Broaden support for the Sanctuary management by offering programs suited to visitors with a range of diverse interests;

(3) Foster public involvement by encouraging feedback on the effectiveness of education programs, collaboration with Sanctuary management staff in extension and outreach programs, and participation in other volunteer programs; and

(4) Collaborate with other organizations to provide educational services complementary to the Sanctuary program.

Visitor Use

The Sanctuary goal for visitor management is to facilitate, to the extent compatible with the primary objective of resource protection, public and private uses of the resources of the Sanctuary not prohibited pursuant to other authorities.

Specific management objectives are to:

(1) Provide relevant information about Sanctuary regulations, use policies and standards;

(2) Collaborate with public and private organizations in promoting compatible uses of the Sanctuary;

(3) Encourage the public who use the Sanctuary to respect sensitive Sanctuary resources and qualities; and

(4) Monitor and assess the levels of use to identify and

control potential degradation of resources and qualities and minimize potential user conflicts.

The Sanctuary headquarters will be located at a yet to be determined location.

IV. **Summary of Regulations**

The regulations set forth the boundary of the Sanctuary; prohibit a relatively narrow range of activities; set forth procedures for applying for national marine sanctuary permits to conduct prohibited activities; set forth certification procedures for existing leases, licenses, permits, other authorizations or rights authorizing the conduct of a prohibited activity; set forth notification and review procedures for applications for licenses, permits, or other authorizations to conduct a prohibited activity; set forth the maximum per-day penalties for violating Sanctuary regulations; and set forth procedures for administrative appeals.

The regulations are codified in part 925 of Title 15, Code of Federal Regulations.

Section 925.1 sets forth as the purpose of the regulations to implement the designation of the Olympic Coast National Marine Sanctuary by regulating activities affecting the Sanctuary consistent with the terms of that designation in order to protect and manage the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the area.

Section 925.2 and Appendix I following § 925.12 set forth the boundary of the Sanctuary.

Section 925.3 defines various terms used in the regulations. Other terms appearing in the regulations are defined at 15 CFR 922.2 and/or in the MPRSA.

Section 925.4 allows all activities except those prohibited by § 925.5 to be undertaken subject to the requirements of any emergency regulation promulgated pursuant to § 925.6, subject to all prohibitions, restrictions and conditions validly imposed by any other authority of competent jurisdiction, and subject to the liability established by Section 312 of the Act.

Section 925.5 prohibits a variety of activities and thus makes it unlawful for any person to conduct them or cause them to be conducted. However, any of the prohibited activities except for: (1) the exploration for, development or production of oil, gas or minerals in the Sanctuary; (2) the discharge of primary-treated sewage within the Sanctuary (except pursuant to certification under § 925.10, of a valid authorization in existence on the effective date of Sanctuary designation and issued by other authorities of competent jurisdiction); (3) the disposal of dredged material within the Sanctuary other than in connection with beach nourishment projects related to harbor maintenance activities; and (4) bombing activities within the Sanctuary could be conducted lawfully if:

(1) The activity is necessary to respond to an emergency threatening life, property, or the environment (not applicable to the prohibitions against takings and interference with law enforcement); authorized by a National Marine Sanctuary permit issued under § 925.9 (not applicable to the prohibition against interference with law enforcement); or authorized by a Special Use Permit issued under Section 310 of the Act (not applicable to

the prohibition against interference with law enforcement);

(2) With regard to Department of Defense activities: (A) the activity is an existing military activity including hull integrity tests and other deep water tests; live firing of guns, missiles, torpedoes, and chaff; activities associated with the Quinault Range including the in-water testing of non-explosive torpedoes; and anti-submarine warfare operations, or (B) the activity is a new activity and exempted by the Director of the Office of Ocean and Coastal Resource Management or designee after consultation between the Director or designee and the Department of Defense. The regulations require that the Department of Defense carry out its activities in a manner that avoids to the maximum extent practicable any adverse impact on Sanctuary resources and qualities and that it, in the event of threatened or actual destruction of, loss of, or injury to a Sanctuary resource or quality resulting from an untoward incident, including but not limited to spills and groundings, caused by it, promptly coordinate with the Director or designee for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the Sanctuary resource or quality. The final regulation regarding Department of Defense activities differs from the proposed regulation principally by prohibiting all bombing activities within the Sanctuary;

(3) The activity is authorized by a certification by the Director of the Office of Ocean and Coastal Resource Management

or designee under § 924.10 of a valid lease, permit, license or other authorization issued by any Federal, State or local authority of competent jurisdiction and in existence on (or conducted pursuant to any valid right of subsistence use or access in existence on) the effective date of this designation, subject to complying with any terms and conditions imposed by the Director or designee as he or she deems necessary to achieve the purposes for which the Sanctuary was designated;

(4) The activity is authorized by a valid lease, permit, license, or other authorization issued by any Federal, State or local authority of competent jurisdiction after the effective date of Sanctuary designation, provided that the Director of the Office of Ocean and Coastal Resource Management or designee was notified of the application in accordance with the requirements of § 925.11, the applicant complies with the requirements of § 925.11, the Director or designee notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization, and the applicant complies with any terms and conditions the Director or designee deems necessary to protect Sanctuary resources and qualities.

The first activity prohibited is exploring for, developing or producing oil, gas or minerals within the Sanctuary. With regard to oil and gas, this regulation implements the requirements of Section 2207 of the Oceans Act of 1992 which prohibits "oil or gas leasing or pre-leasing activity [from being] conducted within the area designated as the Olympic Coast

National Marine Sanctuary . . . ." The resources and qualities of the coastal and offshore waters of the Olympic Peninsula, particularly the sea birds and pinnipeds that use the haul-out sites, kelp forests and rocks along the Olympic Coast, and the high water quality of the area, are especially vulnerable to oil and gas activities in the area. A prohibition on oil and gas exploration, development and production activities within the Sanctuary boundary partially protects Sanctuary resources and qualities from oil and gas activities. Only partial protection will be provided due to the remaining threat from oil and gas from vessel traffic transiting through and near the Sanctuary, particularly oil tankers not operating in accordance with the voluntary agreement of the Western States Petroleum Association to remain 50 nautical miles from shore. A prohibition on mineral activities within the Sanctuary is consistent with the prohibition on alteration of or construction on the seabed as discussed below. "Mineral" is defined to mean clay, stone, sand, gravel, metalliferous ore, nonmetalliferous ore, or any other solid material or other solid matter of commercial value. The prohibition on oil, gas and mineral activities additionally will prevent the negative effects of physical and possible chemical disturbances associated with extraction activities, e.g., destruction of benthic biota; resuspension of fine sediments; interference with filtering, feeding and respiratory functions of marine organisms; loss of food sources and habitats; and lowered photosynthesis and oxygen levels.

The second activity prohibited is depositing or discharging from within the boundary of the Sanctuary any material or other matter except: (1) fish, fish parts, chumming materials or bait used in or resulting from traditional fishing operations in the Sanctuary; (2) biodegradable effluent incidental to vessel use and generated by marine sanitation devices approved in accordance with Section 312 of the Federal Water Pollution Control Act, as amended, (FWPCA), 33 U.S.C. 1322 et seq.; (3) water generated by routine vessel operations (e.g., cooling water, deck wash down and graywater as defined by Section 312 of the FWPCA) excluding oily-wastes from bilge pumping; (4) engine exhaust; and (5) dredge spoil in connection with beach nourishment projects related to harbor maintenance activities.

This prohibition is necessary to protect Sanctuary resources and qualities from the effects of pollutants deposited or discharged into the Sanctuary.

After expiration of current permits, discharges from municipal treatment plants will be subject to the review process of § 925.11. At a minimum, secondary treatment will be required. Depending on the risk to Sanctuary resources and qualities, greater treatment may be required. The intent of this prohibition is to protect Sanctuary resources and qualities from the effects of land and sea originating pollutants.

The third activity prohibited is depositing or discharging, from beyond the boundary of the Sanctuary, any material or other matter that subsequently enters the Sanctuary and injures a

Sanctuary resource or quality, except for the five exclusions discussed above for the second prohibited activity.

The fourth activity prohibited is moving, removing or injuring or attempting to move, remove or injure a Sanctuary historical resource. Historical resources in the marine environment are fragile, finite and non-renewable. This prohibition is designed to protect these resources so that they may be researched and information about their contents and type made available for the benefit of the public. This prohibition does not apply to moving, removing or injury resulting incidentally from traditional fishing operations.

Historical resources located within the Sanctuary that are of significance to an Indian tribe(s) (e.g., submerged Indian villages) will be managed so as to protect other Sanctuary resources and the interests of the governing body of an Indian tribe(s) in such historical resources. If an Indian tribe determines that a historical resource of tribal significance should be researched, excavated or salvaged, the Sanctuary manager may issue a Sanctuary permit if the criteria for issuance have been met (See § 925.9). The terms and conditions of the permit will ensure that the Sanctuary program has access to artifacts and research results for education purposes and that the artifacts are placed in a location agreed upon by the interested Indian tribes.

The fifth activity prohibited is drilling into, dredging or otherwise altering the seabed of the Sanctuary; or constructing,

placing or abandoning any structure, material or other matter on the seabed of the Sanctuary, except if any of the above results incidentally from: (1) anchoring vessels; (2) traditional fishing operations; (3) installation of navigation aids; (4) harbor maintenance in the areas necessarily associated with Federal Projects in existence on the effective date of Sanctuary designation, including dredging of entrance channels and harbors, and repair, replacement or rehabilitation of-breakwaters and jetties; (5) construction, repair, replacement, enhancement or rehabilitation of docks or piers; or (6) beach nourishment projects related to harbor maintenance activities. Federal projects are any water resources development projects conducted by the U.S. Army Corps of Engineers or operating under a permit or authorization issued by the Corps of Engineers and authorized by Federal law.

The intent of this prohibition is to protect the resources and qualities of the Sanctuary from the harmful effects of activities such as, but not limited to, archaeological excavations, drilling into the seabed, strip mining, laying of pipelines and outfalls, and offshore commercial development, which may disrupt and/or destroy sensitive marine benthic habitats, such as kelp beds, invertebrate populations, fish habitats and estuaries.

The sixth activity prohibited is taking marine mammals, sea turtles or seabirds in or above the Sanctuary, except as authorized by NMFS or USFWS under the authority of the Marine

Mammal Protection Act, as amended, (MMPA), 16 U.S.C. §§ 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. §§ 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 16 U.S.C. §§ 703 et seq., or pursuant to a treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA and MBTA. The term "taking" includes all forms of harassment. The MMPA, ESA and MBTA prohibit the taking of species protected under those acts. The prohibition overlaps with the MMPA, ESA and MBTA but also extends protection for Sanctuary resources on an environmentally holistic basis and provides a greater deterrent with civil penalties of up to $100,000 per taking. The prohibition covers all marine mammals, sea turtles and seabirds in or above the Sanctuary. The prohibition recognizes existing treaty rights to hunt marine mammals, sea turtles and seabirds to the extent that the treaty rights have not been abrogated by provisions of the MMPA, ESA or MBTA.

The seventh activity prohibited is flying motorized aircraft at less than 2,000 feet (610m) both above the Sanctuary within one nautical mile of the Flattery Rocks, Quillayute Needles or Copalis National Wildlife Refuge, or within one nautical mile seaward of the coastal boundary of the Sanctuary, except as necessary for valid law enforcement purposes, for activities related to tribal timber operations conducted on reservation lands, or to transport persons or supplies to or from reservation

lands as authorized by a governing body of an Indian tribe. This prohibition is designed to limit potential noise impacts, particularly those that might startle hauled-out seals and sea lions, and colonial seabirds along the shoreline margins of the Sanctuary.

Both the eighth and ninth prohibitions serve to facilitate enforcement actions for violations of Sanctuary regulations. The eighth prohibition is the possession within the Sanctuary of any historical resource or marine mammal, sea turtle or seabird, regardless of where the resource was taken, except in compliance with the MMPA, ESA and MBTA and the ninth prohibition is interfering with, obstructing, delaying or preventing investigations, searches, seizures or disposition of seized property in connection with enforcement of the Act or any regulation or permit issued under the Act.

Section 925.6 authorizes the regulation, including prohibition, on a temporary basis of any activity where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource or quality, or minimize the imminent risk of such destruction, loss or injury.

Section 925.7 sets for the maximum statutory civil penalty for violating a regulation -- $100,000. Each day of a continuing violation constitutes a separate violation. Section 925.8 repeats the provision in Section 312 of the Act that any person who destroys, causes the loss of, or injures any sanctuary resource is liable to the United States for response costs and

damages resulting from such destruction, loss or injury, and any vessel used to destroy, cause the loss of, or injure any sanctuary resource is liable in rem to the United States for response costs and damages resulting from such destruction, loss or injury. The purpose of these sections is to draw the public's attention to the liability for violating a Sanctuary regulation or the Act.

Regulations setting forth the procedures governing administrative proceedings for assessment of civil penalties, permit sanctions and denials for enforcement reasons, issuance and use of written warnings, and release or forfeiture of seized property appear in 15 CFR part 904.

Section 925.9 sets forth the procedures for applying for a National Marine Sanctuary permit to conduct a prohibited activity and the criteria governing the issuance, denial, amendment, suspension and revocation of such permits. A permit may be granted by the Director of the Office for Ocean and Coastal Resource Management or designee if he or she finds that the activity will have only negligible short-term adverse effects on Sanctuary resources and qualities and will: further research related to Sanctuary resources; further the educational, natural or historical resource value of the Sanctuary; further salvage or recovery operations in or near the Sanctuary in connection with a recent air or marine casualty; assist in the management of the Sanctuary; or further salvage or recovery operations in connection with an abandoned shipwreck in the Sanctuary title to

which is held by the State of Washington. In deciding whether to issue a permit, the Director or designee may consider such factors as the professional qualifications and financial ability of the applicant as related to the proposed activity, the duration of the activity and the duration of its effects, the appropriateness of the methods and procedures proposed by the applicant for the conduct of the activity, the extent to which the conduct of the activity may diminish or enhance Sanctuary resources and qualities, the cumulative effects of the activity, the end value of the activity, and the effects of the activity on adjacent Indian tribes. In addition, the Director or designee is authorized to consider any other factors she or he deems appropriate.

Section 925.10 sets forth procedures for requesting certification of leases, licenses, permits, other authorizations, or rights in existence on the date of Sanctuary designation authorizing the conduct of an activity prohibited under paragraphs (a)(2)-(8) of § 925.5. Pursuant to paragraph (f) of § 925.5, the prohibitions in paragraphs (a)(2)-(8) of § 925.5 do not apply to any activity authorized by a valid lease, permit, license, or other authorization in existence on the effective date of Sanctuary designation and issued by any Federal, State or local authority of competent jurisdiction, or by any valid right of subsistence use or access in existence on the effective date of Sanctuary designation, provided that the holder of such authorization or right complies with the requirements of § 925.10

(e.g. notifies the Director or designee of the existence of, requests certification of, and provides requested information regarding such authorization or right) and complies with any terms and conditions on the exercise of such authorization or right imposed as a condition of certification by the Director or designee as she or he deems necessary to achieve the purposes for which the Sanctuary was designated.

Section 925.10 allows the holder 90 days from the effective date of Sanctuary designation to request certification. The holder is allowed to conduct the activity without being in violation of the prohibitions in paragraphs (a)(2)-(8) of § 925.5 with regard to which the holder is requesting certification pending final agency action on his or her certification request, provided the holder has complied with all requirements of § 925.10.

Section 925.10 also allows the Director or designee to request additional information from the holder and to seek the views of other persons.

As a condition of certification, the Director or designee will impose such terms and conditions on the exercise of such lease, permit, license, other authorization or right as she or he deems necessary to achieve the purposes for which the Sanctuary was designated. This is consistent with the Secretary's authority under Section 304(c)(2) of the Act. The holder may appeal any action conditioning, amending, suspending or revoking any certification in accordance with the procedures set forth in

§ 925.12.

Any amendment, renewal or extension not in existence as of the date of Sanctuary designation of a lease, permit, license, other authorization or right is subject to the provisions of § 925.11.

Section 925.11 states that consistent with paragraph (g) of § 925.5, the prohibitions of paragraphs (a)(2)-(8) of § 925.5 do not apply to any activity authorized by any valid lease, permit, license, or other authorization issued after the effective date of Sanctuary designation by any Federal, State or local authority of competent jurisdiction, provided that the applicant notifies the Director or designee of the application for such authorization within 15 days of the date of filing of the application or of the effective date of Sanctuary designation, whichever is later, that the applicant is in compliance with the other provisions of § 925.11, that the Director or designee notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization, and that the applicant complies with any terms and conditions the Director or designee deems necessary to protect Sanctuary resources and qualities.

Section 925.11 allows the Director or designee to request additional information from the applicant and to seek the views of other persons.

An application for an amendment to, an extension of, or a renewal of an authorization is also subject to the provisions of

§ 925.11.

The applicant may appeal any objection by, or terms or conditions imposed by, the Director or designee to the Assistant Administrator or designee in accordance with the procedures set forth in § 925.12.

Section 925.12 sets forth the procedures for appealing to the Assistant Administrator or designee actions of the Director or designee with respect to: 1) the granting, conditioning, amendment, denial, suspension or revocation of a National Marine Sanctuary permit under § 925.9 or a Special Use permit under Section 310 of the Act; 2) the granting, denial, conditioning, amendment, suspension or revocation of a certification under § 925.10; or 3) the objection to issuance or the imposition of terms and conditions under § 925.11.

Prior to conditioning the exercise of existing leases, permits, licenses, other authorizations or rights or conditioning or objecting to proposed authorizations, NOAA intends to consult with relevant issuing agencies as well as owners, holders or applicants.

NOAA's policy is to encourage best available management practices to minimize non-point source pollution entering the Sanctuary and, for municipal sewage discharge, to require, at a minimum, secondary treatment and sometimes tertiary treatment or more, depending on predicted effects on Sanctuary resources and qualities.

V. Miscellaneous Rulemaking Requirements

Executive Order 12291

Under Executive Order 12291, the Department must judge whether the regulations in this notice are "major" within the meaning of section 1 of the Order, and therefore subject to the requirement that a Regulatory Impact Analysis be prepared. The Administrator of NOAA has determined that the regulations in this notice are not major because they are not likely to result in:

(1) An annual effect on the economy of $100 million or more;

(2) A major increase in costs or prices for consumers, individual industries, Federal, state or local government agencies or geographic regions; or

(3) Significant adverse effects on competition, employment, investment, productivity, innovation or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

Regulatory Flexibility Act

The regulations in this notice allow all activities to be conducted in the Sanctuary other than a relatively narrow range of prohibited activities. The procedures in these regulations for applying for National Marine Sanctuary permits to conduct prohibited activities, for requesting certifications for pre-existing leases, licenses, permits, other authorizations or rights authorizing the conduct of a prohibited activity and for notifying NOAA of applications for leases, licenses, permits,

approvals or other authorizations to conduct a prohibited activity will all act to lessen any adverse economic effect on small entities. The regulations, in total, will not have a significant economic impact on a substantial number of small entities, and when they were proposed the General Counsel of the Department of Commerce so certified to the Chief Counsel for Advocacy of the Small Business Administration. As a result, neither an initial nor final Regulatory Flexibility Analysis was prepared.

Paperwork Reduction Act

This rule contains collection of information requirements subject to the requirements of the Paperwork Reduction Act (Pub. L. 96-511). The collection of information requirements contained in the rule have been reviewed by the Office of Management and Budget (OMB) under section 3504(h) of the Paperwork Reduction Act and have been approved under OMB Control No. 0648-0141. Comments from the public on the collection of information requirements contained in this rule are invited and should be addressed to the Office of Information and Regulatory Affairs, Office of Management and Budget, Paperwork Reduction Project (06480141) Washington, D.C. 20503 (Attn: Desk Officer for NOAA) and to Richard A. Roberts, Room 724, 6010 Executive Boulevard, Rockville, MD 20852.

Executive Order 12612

A Federalism Assessment (FA) was prepared for the proposed designation, draft management plan and proposed implementing

regulations. The FA concluded that all were fully consistent with the principles, criteria and requirements set forth in sections 2 through 5 of Executive Order 12612, Federalism Considerations in Policy Formulation and Implementation (52 Fed. Reg. 41685, Oct. 26, 1987). Copies of the FA are available upon request to the Office of ocean and Coastal Resource Management at the address listed above.

National Environmental Policy Act

In accordance with Section 304(a)(2) of the Act (16 U.S.C. § 1434(a)(2)) and the provisions of the National Environmental Policy Act of 1969 (42 U.S.C. §§ 4321-4370(a)), a DEIS/MP was prepared for the designation and proposed regulations. As required by Section 304(a)(2) of the Act, the DEIS/MP included the resource assessment report required by Section 303(b)(3) of the Act (16 U.S.C. § 1433(b)(3)), maps depicting the boundary of the area proposed to be designated, and the existing and potential uses and resources of the area. Copies of the DEIS/MP were made available for public review on September 20, 1991, with comments due on December 13, 1991. Public hearings were held in Port Angeles, Seattle, Olympia, Aberdeen, Seaview and Washington, D.C. from November 7 to 20, 1991. All comments were reviewed and, where appropriate, incorporated into the FEIS/MP and these regulations. Copies of the FEIS/MP are available upon request (see address section).

Executive Order 12630

This rule does not have takings implications within the

meaning of Executive Order 12630 sufficient to require preparation of a Takings Implications Assessment under that order. It would not appear to have an effect on private property sufficiently severe as effectively to deny economically viable use of any distinct legally potential property interest to its owner or to have the effect of, or result in, a permanent or temporary physical occupation, invasion or deprivation. While the prohibition on the exploration, development and production of oil, gas and minerals from the Sanctuary might have a takings implication if it abrogated an existing lease for OCS tracts within the Sanctuary or an approval of an exploration or development and production plan, no OCS leases have been sold for tracts within the Sanctuary and no exploration or production and development plans have been filed or approved.

List of Subjects in 15 CFR Part 925

Administrative practice and procedure, Coastal zone, Education, Environmental protection, Marine resources, Natural resources, Penalties, Recreation and recreation areas, Reporting and recordkeeping requirements, Research.

W. Stanley Wilson
Assistant Administrator for Ocean Services
and Coastal Zone Management

DATE

Federal Domestic Assistance Catalog Number 11.429
Marine Sanctuary Program

Accordingly, for the reasons set forth above, 15 CFR Chapter IX is amended as follows:

1. Subchapter B heading is added to read as follows:

Subchapter B - Ocean and Coastal Resource Management

2. Part 925 is added to subchapter B to read as follows:

Part 925 - Olympic Coast National Marine Sanctuary

Sec.

925.1 Purpose.

925.2 Boundary.

925.3 Definitions.

925.4 Allowed activities.

925.5 Prohibited activities.

925.6 Emergency regulations.

925.7 Penalties for violations or regulations.

925.8 Response costs and damages.

925.9 National Marine Sanctuary permits - application procedures and issuance criteria.

925.10 Certification of pre-existing leases, licenses, permits, approvals, other authorizations or rights to conduct a prohibited activity.

925.11 Notification and review of applications for leases, licenses, permits, approvals or other authorizations to conduct a prohibited activity.

925.12 Appeals of administrative action.

Appendix to Part 925 - Olympic Coast National Marine Sanctuary Boundary Coordinates

Authority: Sections 302, 303, 304, 305, 306, 307, 310 and 312 of Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (16 U.S.C. 1431 et seq.).

§ 925.1 Purpose.

The purpose of the regulations in this Part is to implement the designation of the Olympic Coast National Marine Sanctuary by regulating activities affecting the Sanctuary consistent with the terms of that designation in order to protect and manage the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the area.

§ 925.2 Boundary.

(a) The Olympic Coast National Marine Sanctuary consists of an area of approximately 2500 square nautical miles (approximately 8577 sq. kilometers) of coastal and ocean waters, and the submerged lands thereunder, off the central and northern coast of the State of Washington.

(b) The Sanctuary boundary extends from Koitlah Point due north to the United States/Canada international boundary. The Sanctuary boundary then follows the U.S./Canada international boundary seaward to the 100 fathom isobath. The seaward boundary of the Sanctuary approximates the 100 fathom isobath in a southerly direction from the U.S./Canada international boundary

to a point due west of the mouth of the Copalis River cutting across the heads of Nitnat, Juan de Fuca and Quinault Canyons. The coastal boundary of the Sanctuary is the mean higher high water line when adjacent to Federally managed lands cutting across the mouths of all rivers and streams, except where adjacent to Indian reservations, state and county owned lands; in such case, the coastal boundary is the mean lower low water line. La Push harbor is excluded from the Sanctuary boundary shoreward of the International Collision at Sea regulation (Colreg.) demarcation lines. The harbor at Neah Bay is excluded shoreward of an arc connecting the western and easternmost points of Neah Bay and adjacent to the outermost boundary of Waadah Island. The precise boundary of the Sanctuary is set forth in Appendix I to this Part.

§ 925.3 Definitions.

Act means Title III of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (16 U.S.C. 1431 et seq.).

Administrator or Under Secretary means the Administrator of the National Oceanic and Atmospheric Administration/Under Secretary of Commerce for Oceans and Atmosphere.

Assistant Administrator means the Assistant Administrator for Ocean Services and Coastal Zone Management, National Oceanic and Atmospheric Administration.

Director means the Director of the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration.

Effective date of Sanctuary designation means the date the regulations implementing the designation of the Sanctuary (the regulations in this Part) become effective.

Federal project means any water resources development project conducted by the U.S. Army Corps of Engineers or operating under a permit or authorization issued by the Corps of Engineers and authorized by Federal law.

Historical resource means any resource possessing historical, cultural, archaeological or paleontological significance, including sites, structures, districts and objects significantly associated with or representative of earlier people, cultures and human activities and events. Historical resources include historical properties as defined in the National Historic Preservation Act, as amended, and implementing regulations, as amended.

Indian reservation means a tract of land set aside by the Federal Government for use by a Federally recognized American Indian tribe and includes, but is not limited to, the Makah, Quileute, Hoh and Quinault Reservations.

Indian tribe means any American Indian tribe, band, group, or community recognized by the Secretary of the Interior.

Injure means to change adversely, either in the short or long term, a chemical, biological or physical attribute of, or the viability of, and includes, but is not limited to, to cause the loss of or to destroy.

Mineral means clay, stone, sand, gravel, metalliferous ore,

non-metalliferous ore, or any other solid material or other solid matter of commercial value.

Person means any private individual, partnership, corporation or other entity; or any officer, employee, agent, department, agency or instrumentality of the Federal Government, of any State or local unit of government, or of any foreign government.

Sanctuary means the Olympic Coast National Marine Sanctuary.

Sanctuary quality means any particular and essential characteristic of the Sanctuary, including, but not limited to, water, sediment and air quality.

Sanctuary resource means any living or non-living resource of the Sanctuary that contributes to its conservation, recreational, ecological, historical, research, educational or aesthetic value, including, but not limited to, the substratum of the waters off the Olympic Peninsula, bottom formations, marine plants and algae, invertebrates, plankton, fish, birds, turtles, marine mammals and historical resources.

Take or taking means:

(1) For any marine mammal, sea turtle or seabird listed as either endangered or threatened pursuant to the Endangered Species Act, the term means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect or injure, or to attempt to engage in any such conduct;

(2) For any other marine mammal, sea turtle or seabird, to harass, hunt, capture, kill, collect or injure, or to attempt to

engage in any such conduct.

For the purpose of both paragraphs (1) and (2) of this definition, the term includes, but is not limited to, collecting any dead or injured marine mammal, sea turtle or seabird, or any part thereof; restraining or detaining any marine mammal, sea turtle or seabird, or any part thereof, no matter how temporarily; tagging any sea turtle, marine mammal or seabird; operating a vessel or aircraft or doing any other act that results in the disturbing or molesting of any marine mammal, sea turtle or seabird.

Traditional fishing means fishing using a commercial or recreational fishing method that has been used in the Sanctuary before the effective date of Sanctuary designation, including the retrieval of fishing gear.

Treaty means a formal agreement between the United States Government and an Indian tribe.

Vessel means a watercraft of any description capable of being used as a means of transportation in/on the waters of the Sanctuary.

Other terms appearing in the regulations in this Part are defined at 15 CFR 922.2 and/or in the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1401 et seq. and 16 U.S.C. 1431 et seq.

§ 925.4 Allowed Activities

All activities except those prohibited by § 925.5 may be

undertaken subject to any emergency regulations promulgated pursuant to § 925.6, subject to all prohibitions, restrictions, and conditions validly imposed by any other authority of competent jurisdiction, and subject to the liability established by Section 312 of the Act (see § 925.8).

§ 925.5 Prohibited activities.

(a) Except as specified in paragraphs (c) through (h) of this § 925.5, the following activities are prohibited and thus unlawful for any person to conduct or cause to be conducted:

(1) Exploring for, developing or producing oil, gas or minerals within the Sanctuary.

(2) Discharging or depositing, from within the boundary of the Sanctuary, any material or other matter except:

(i) Fish, fish parts, chumming materials or bait used in or resulting from traditional fishing operations in the Sanctuary;

(ii) Biodegradable effluent incidental to vessel use and generated by marine sanitation devices approved in accordance with Section 312 of the Federal Water Pollution Control Act, as amended, (FWPCA) 33 U.S.C. 1322 et seq.;

(iii) Water generated by routine vessel operations (e.g., cooling water, deck wash down and graywater as defined by Section 312 of the FWPCA) excluding oily wastes from bilge pumping;

(iv) Engine exhaust; or

(v) dredge spoil in connection with beach nourishment projects related to harbor maintenance activities.

(3) Discharging or depositing, from beyond the boundary of the Sanctuary, any material or other matter, except those listed in paragraph (a)(2)(i-v) of this § 925.5, that subsequently enters the Sanctuary and injures a Sanctuary resource or quality.

(4) Moving, removing or injuring, or attempting to move, remove or injure, a Sanctuary historical resource. This prohibition does not apply to moving, removing or injury resulting incidentally from traditional fishing operations.

(5) Drilling into, dredging or otherwise altering the seabed of the Sanctuary; or constructing, placing or abandoning any structure, material or other matter on the seabed of the Sanctuary, except as an incidental result of:

(i) Anchoring vessels;

(ii) Traditional fishing operations;

(iii) Installation of navigation aids;

(iv) Harbor maintenance in the areas necessarily associated with Federal projects in existence on the effective date of Sanctuary designation, including dredging of entrance channels and repair, replacement or rehabilitation of breakwaters and jetties;

(v) Construction, repair, replacement or rehabilitation of docks or piers; or

(vi) Beach nourishment projects related to harbor maintenance activities.

(6) Taking any marine mammal, sea turtle or seabird in or above the Sanctuary, except as authorized by the National Marine Fisheries Service or the United States Fish and Wildlife Service under the authority of the Marine Mammal Protection Act, as amended, (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 703 et seq., or pursuant to any treaty with an Indian tribe to which the United States is a party, provided that the treaty right is exercised in accordance with the MMPA, ESA and MBTA.

(7) Flying motorized aircraft at less than 2,000 feet both above the Sanctuary within one nautical mile of the Flattery Rocks, Quillayute Needles, or Copalis National Wildlife Refuge, or within one nautical mile seaward from the coastal boundary of the Sanctuary, except as necessary for valid law enforcement purposes, for activities related to tribal timber operations conducted on reservation lands, or to transport persons or supplies to or from reservation lands as authorized by a governing body of an Indian tribe.

(8) Possessing within the Sanctuary (regardless of where taken, moved or removed from), except as necessary for valid law enforcement purposes, any historical resource, or any marine mammal, sea turtle, or seabird taken in violation of the MMPA, ESA or MBTA.

(9) Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property

in connection with enforcement of the Act or any regulation or permit issued under the Act.

(b) The regulations in this Part apply to foreign persons and foreign vessels in accordance with generally recognized principles of international law, and in accordance with treaties, conventions and other international agreements to which the United States is a party.

(c) The prohibitions in paragraphs (a)(2) through (5), (7) and (8) of this § 925.5 do not apply to activities necessary to respond to emergencies threatening life, property or the environment.

(d)(1) All Department of Defense military activities shall be carried out in a manner that avoids to the maximum extent practicable any adverse impacts on Sanctuary resources and qualities. Except as provided in paragraph d(2) of this § 925.5, the prohibitions in paragraphs (a)(2) through (8) of this § 925.5 do not apply to the following military activities performed by the Department of Defense in W-237A, W237-B, and Military Operating Areas Olympic A and B in the Sanctuary: 1) hull integrity tests and other deep water tests; 2) live firing of guns, missiles, torpedoes, and chaff; 3) activities associated with the Quinault Range including the in-water testing of non-explosive torpedoes; and 4) anti-submarine warfare operations. New activities may be exempted from the prohibitions in paragraphs (a)(2) through (8) of this § 945.5 by the Director or designee after consultation between the Director or designee and

the Department of Defense. If it is determined that an activity may be carried out, such activity shall be carried out in a manner that avoids to the maximum extent practicable any adverse impact on Sanctuary resources and qualities. Civil engineering and other civil works projects conducted by the U.S. Army Corps of Engineers are excluded from the scope of this paragraph (d)(1).

(2) The Department of Defense is prohibited from conducting bombing activities within the Sanctuary.

(3) In the event of threatened or actual destruction of, loss of, or injury to a Sanctuary resource or quality resulting from an untoward incident, including but not limited to spills and groundings caused by the Department of Defense, the Department of Defense shall promptly coordinate with the Director or designee for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the Sanctuary resource or quality.

(e) The prohibitions in paragraphs (a)(2) through (8) of this section do not apply to any activity executed in accordance with the scope, purpose, terms and conditions of a National Marine Sanctuary permit issued pursuant to § 925.9 or a Special Use permit issued pursuant to Section 310 of the Act.

(f) The prohibitions in paragraphs (a)(2) through (8) of this § 925.5 do not apply to any activity authorized by a valid lease, permit, license, approval or other authorization in existence on the effective date of Sanctuary designation and

issued by any Federal, State or local authority of competent jurisdiction, or by any valid right of subsistence use or access in existence on the effective date of Sanctuary designation, provided that the holder of such authorization or right complies with § 925.10 and with any terms and conditions on the exercise of such lease, permit, license, other authorization or right imposed by the Director or designee as a condition of certification as he or she deems necessary to achieve the purposes for which the Sanctuary was designated.

(g) The prohibitions in paragraphs (a)(2) through (8) of § 925.5 do not apply to any activity authorized by any lease, permit, license, or other authorization issued after the effective date of Sanctuary designation and issued by any Federal, State or local authority of competent jurisdiction, provided that the applicant complies with § 925.11, the Director or designee notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization, and the applicant complies with any terms and conditions the Director or designee deems necessary to protect Sanctuary resources and qualities. Amendments, renewals and extensions of authorizations in existence on the effective date of designation constitute authorizations issued after the effective date.

(h) Notwithstanding paragraphs (e) and (g) of this § 925.5, in no event may the Director or designee issue a National Marine Sanctuary permit under § 925.9 or a Special Use permit under Section 310 of the Act authorizing, or otherwise approve: the

exploration for, development or production of oil, gas or minerals within the Sanctuary; the discharge of primary-treated sewage within the Sanctuary (except by certification, pursuant to § 925.10, of valid authorizations in existence on the effective date of Sanctuary designation and issued by other authorities of competent jurisdiction); the disposal of dredged material within the Sanctuary other than in connection with beach nourishment projects related to harbor maintenance activities; or bombing activities within the Sanctuary. Any purported authorizations issued by other authorities after the effective date of Sanctuary designation for any of these activities within the Sanctuary shall be invalid.

§ 925.6 Emergency regulations.

Where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource or quality, or minimize the imminent risk of such destruction, loss or injury, any and all activities are subject to immediate temporary regulation, including prohibition.

§ 925.7 Penalties for violations of regulations.

(a) Each violation of the Act, any regulation in this Part, or any permit issued pursuant thereto, is subject to a civil penalty of not more than $100,000. Each day of a continuing violation constitutes a separate violation.

(b) Regulations setting forth the procedures governing

administrative proceedings for assessment of civil penalties, permit sanctions and denials for enforcement reasons, issuance and use of written warnings, and release or forfeiture of seized property appear in 15 CFR Part 904.

§ 925.8 Response costs and damages.

Under Section 312 of the Act, any person who destroys, causes the loss of, or injures any Sanctuary resource is liable to the United States for response costs and damages resulting from such destruction, loss or injury, and any vessel used to destroy, cause the loss of, or injure any Sanctuary resource is liable in rem to the United States for response costs and damages resulting from such destruction, loss or injury.

§ 925.9 National Marine Sanctuary permits - application procedures and issuance criteria.

(a) A person may conduct an activity prohibited by paragraphs (a)(2) through (8) of § 925.5 if conducted in accordance with the scope, purpose, terms and conditions of a permit issued under this § 925.9.

(b) Applications for such permits should be addressed to the Director of the Office of Ocean and Coastal Resource Management; Attn: Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East-West Highway, Building 4, Silver Spring, MD 20910. An application must include

a detailed description of the proposed activity including a timetable for completion of the activity and the equipment, personnel and methodology to be employed. The qualifications and experience of all personnel must be set forth in the application. The application must set forth the potential effects of the activity on Sanctuary resources and qualities. Copies of all other required licenses, permits, approvals or other authorizations must be attached.

(c) Upon receipt of an application, the Director or designee may request such additional information from the applicant as he or she deems necessary to act on the application and may seek the views of any persons.

(d) The Director or designee, at his or her discretion, may issue a permit, subject to such terms and conditions as he or she deems appropriate, to conduct an activity prohibited by paragraphs (a)(2) through (8) of § 925.5, if the Director or designee finds that the activity will have only negligible short-term adverse effects on Sanctuary resources and qualities and will: further research related to Sanctuary resources and qualities; further the educational, natural or historical resource value of the Sanctuary; further salvage or recovery operations in or near the Sanctuary in connection with a recent air or marine casualty; assist in managing the Sanctuary; or further salvage or recovery operations in connection with an abandoned shipwreck in the Sanctuary title to which is held by the State of Washington. In deciding whether to issue a permit,

the Director or designee may consider such factors as: the professional qualifications and financial ability of the applicant as related to the proposed activity; the duration of the activity and the duration of its effects; the appropriateness of the methods and procedures proposed by the applicant for the conduct of the activity; the extent to which the conduct of the activity may diminish or enhance Sanctuary resources and qualities; the cumulative effects of the activity; the end value of the activity; and the effect of the activity on adjacent Indian tribes. The Director or designee may also deny a permit application pursuant to this § 925.9, in whole or in part, if it is determined that the permittee or applicant has acted in violation of the terms or conditions of a permit or of these regulations. (Procedures governing permit denials for enforcement reasons are set forth in Subpart D of 15 CFR Part 904). In addition, the Director or designee may consider such other factors as he or she deems appropriate.

(e) A permit issued pursuant to this § 925.9 is nontransferable.

(f) The Director or designee may amend, suspend or revoke a permit issued pursuant to this section for good cause. Any such action shall be communicated in writing to the permittee or applicant by certified mail and shall set forth the reason(s) for the action taken. Procedures governing permit sanctions for enforcement reasons are set forth in Subpart D of 15 CFR Part 904.

(g) It shall be a condition of any permit issued that the permit or a copy thereof be displayed on board all vessels or aircraft used in the conduct of the activity.

(h) The Director or designee may, inter alia, make it a condition of any permit issued that any data or information obtained under the permit be made available to the public.

(i) The Director or designee may, inter alia, make it a condition of any permit issued that a NOAA official be allowed to observe any activity conducted under the permit and/or that the permit holder submit one or more reports on the status, progress or results of any activity authorized by the permit.

(j) The Director or designee shall consult with the governing body of an Indian Tribe prior to issuing a permit, if the proposed activity involves or affects resources of cultural or historical significance to the tribe.

(k) The applicant for or holder of a National Marine Sanctuary permit may appeal the denial, conditioning, amendment, suspension or revocation of the permit in accordance with the procedures set forth in § 925.12.

§ 925.10 Certification of pre-existing leases, licenses, permits, approvals, other authorizations-or rights to conduct a prohibited activity.

(a) the prohibitions set forth in paragraphs (a)(2) through (8) of § 925.5 do not apply to any activity authorized by a valid lease, permit, license, approval or other authorization in

existence on the effective date of Sanctuary designation and issued by any Federal, State or local authority of competent jurisdiction, or by any valid right of subsistence use or access in existence on the effective date of Sanctuary designation, provided that: 1) The holder of such authorization or right notifies the Director or designee, in writing, within 90 days of the effective date of Sanctuary designation, of the existence of such authorization or right and requests certification of such authorization or right; 2) The holder complies with the other provisions of this § 925.10; and 3) The holder complies with any terms and conditions on the exercise of such authorization or right imposed as a condition of certification by the Director or designee to achieve the purposes for which the Sanctuary was designated.

(b) The holder of a valid lease, permit, license, or other authorization in existence on the effective date of sanctuary designation and issued by any Federal, State or local authority of competent jurisdiction, or of any valid right of subsistence use or access in existence on the effective date of Sanctuary designation, authorizing an activity prohibited by paragraphs (a)(2) through (8) of § 925.5 may conduct the activity without being in violation of § 925.5, pending final agency action on his or her certification request, provided the holder is in compliance with this § 925.10.

(c) Any holder of a valid lease, permit, license, or other authorization in existence on the effective date of Sanctuary

designation and issued by any Federal, State or local authority of competent jurisdiction, or any holder of a valid right of subsistence use or access in existence on the effective date of Sanctuary designation, may request the Director or designee to issue a finding as to whether the activity for which the authorization has been issued, or the right given, is prohibited by (a)(1) through (8) of § 925.5.

(d) Requests for findings or certifications should be addressed to the Director, Office of Ocean and Coastal Resource Management; Attn: Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East-West Highway, Building 4, Silver Spring, MD 20910. A copy of the lease, permit, license, or other authorization must accompany the request.

(e) The Director or designee may request additional information from the certification requester as he or she deems necessary to condition appropriately the exercise of the certified authorization or right to achieve the purposes for which the Sanctuary was designated. The information requested must be received by the Director or designee within 45 days of the postmark date of the request. The Director or designee may seek the views of any persons on the certification request.

(f) The Director or designee may amend any certification made under this § 925.10 whenever additional information becomes available justifying such an amendment.

(g) The Director or designee shall communicate any decision on a certification request or any action taken with respect to any certification made under this § 925.10, in writing, to both the holder of the certified lease, permit, license, approval, other authorization or right, and the issuing agency, and shall set forth the reason(s) for the decision or action taken.

(h) Any time limit prescribed in or established under this § 925.10 may be extended by the Director or designee for good cause.

(i) The holder may appeal any action conditioning, amending, suspending or revoking any certification in accordance with the procedures set forth in § 925.12.

(j) Any amendment, renewal or extension not in existence on the effective date of Sanctuary designation of permit, license, approval, other authorization or right is subject to the provisions of § 925.11.

§ 925.11 Notification and review of applications for leases, licenses, permits, or other authorizations to conduct a prohibited activity.

(a) The prohibitions set forth in paragraphs (a)(2) through (8) of § 925.5 do not apply to any activity authorized by any valid lease, permit, license, or other authorization issued after the effective date of Sanctuary designation by any Federal, State or local authority of competent jurisdiction, provided that: 1) The applicant notifies the Director or designee, in writing, of

the application for such authorization (and of any application for an amendment, renewal or extension of such authorization) within fifteen (15) days of the date of application or of the effective date of Sanctuary designation, whichever is later; 2) The applicant complies with the other provisions of this § 925.11; 3) The Director or designee notifies the applicant and authorizing agency that he or she does not object to issuance of the authorization (or amendment, renewal or extension); and 4) The applicant complies with any terms and conditions the Director or designee deems necessary to protect Sanctuary resources and qualities.

(b) Any potential applicant for a lease, permit, license or other authorization from any Federal, State or local authority (or for an amendment, renewal or extension of such authorization) may request the Director or designee to issue a finding as to whether the activity for which an application is intended to be made is prohibited by paragraphs (a)(2) through (8) of § 925.5.

(c) Notifications of filings of applications and requests for findings should be addressed to the Director, Office of Ocean and Coastal Resource Management; ATTN: Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East West Highway, Building 4, Silver Spring, MD 20910. A copy of the application must accompany the notification.

(d) The Director or designee may request additional

information from the applicant as he or she deems necessary to determine whether to object to issuance of such lease, license, permit, or other authorization (or to issuance of an amendment, extension or renewal of such authorization), or what terms and conditions are necessary to protect Sanctuary resources and qualities. The information requested must be received by the Director or designee within 45 days of the postmark date of the request. The Director or designee may seek the views of any persons on the application.

(e) The Director or designee shall notify, in writing, the agency to which application has been made of his or her review of the application and possible objection to issuance. After review of the application and information received with respect thereto, the Director or designee shall notify both the agency and applicant, in writing, whether he or she has an objection to issuance and what terms and conditions he or she deems necessary to protect Sanctuary resources and qualities. The Director or designee shall state the reason(s) for any objection or the reason(s) that any terms and conditions are deemed necessary to protect Sanctuary resources and qualities.

(f) The Director or designee may amend the terms and conditions deemed necessary to protect Sanctuary resources and qualities whenever additional information becomes available justifying such an amendment.

(g) Any time limit prescribed in or established under this section may be extended by the Director or designee for good

cause.

(h) The applicant may appeal any objection by, or terms or conditions imposed by, the Director or designee to the Assistant Administrator or designee in accordance with the procedures set forth in § 925.12.

§ 925.12 Appeals of administrative action.

(a) Except for permit actions taken for enforcement reasons (see Subpart D of 15 CFR Part 904 for applicable procedures), an applicant for, or a holder of, a § 925.9 National Marine Sanctuary permit, an applicant for, or a holder of, a Section 310 of the Act Special Use permit, a § 925.10 certification requester or a § 925.11 applicant (hereinafter appellant) may appeal to the Assistant Administrator or designee:

1) The grant, denial, conditioning, amendment, suspension or revocation by the Director or designee of a National Marine Sanctuary or Special Use permit;

2) The conditioning, amendment, suspension or revocation of a certification under § 925.10; or

3) The objection to issuance or the imposition of terms and conditions under § 925.11.

(b) An appeal under paragraph (a) of this § 925.12 must be in writing, state the action(s) by the Director or designee appealed and the reason(s) for the appeal, and be received within 30 days of receipt of notice of the action by the Director or designee. Appeals should be addressed to the Assistant

Administrator, Office of Ocean and Coastal Resource Management, ATTN: Sanctuaries and Reserves Division, Office of Ocean and Coastal Resource Management, National Ocean Service, National Oceanic and Atmospheric Administration, 1305 East-West Highway, Building 4, Silver Spring, MD 20910.

(c) While the appeal is pending, appellants requesting certification pursuant to § 925.10 who are in compliance with such section may continue to conduct their activities without being in violation of the prohibitions in paragraphs (a) (2) through (8) of § 925.5 with regard to which they are requesting certification. All other appellants may not conduct their activities without being subject to the prohibitions in paragraphs (a) (1) through (9) of § 925.5.

(d) The Assistant Administrator or designee may request the appellant to submit such information as the Assistant Administrator or designee deems necessary in order for him or her to decide the appeal. The information requested must be received by the Assistant Administrator or designee within 45 days of the postmark date of the request. The Assistant Administrator may seek the views of any other persons. The Assistant Administrator or designee may hold an informal hearing on the appeal. If the Assistant Administrator or designee determines that an informal hearing should be held, the Assistant Administrator or designee may designate an officer before whom the hearing shall be held. The hearing officer shall give notice in the Federal Register of the time, place and subject matter of the hearing. The appellant

and the Director or designee may appear personally or by counsel at the hearing and submit such material and present such arguments as deemed appropriate by the hearing officer. Within 60 days after the record for the hearing closes, the hearing officer shall recommend a decision in writing to the Assistant Administrator or designee.

(e) The Assistant Administrator or designee shall decide the appeal using the same regulatory criteria as for the initial decision and shall base the appeal decision on the record before the Director or designee and any information submitted regarding the appeal, and, if a hearing has been held, on the record before the hearing officer and the hearing officer's recommended decision. The Assistant Administrator or designee shall notify the appellant of the final decision and the reason(s) therefore in writing. The Assistant Administrator or designee's decision shall constitute final agency action for the purposes of the Administrative Procedure Act.

(f) Any time limit prescribed in or established under this § 925.12 other than the 30-day limit for filing an appeal may be extended by the Assistant Administrator, designee or hearing officer for good cause.

Appendix I To Part 925 - Olympic Coast National Marine Sanctuary Boundary Coordinates. (Based on North American Datum of 1983).

2500 square nautical miles

Point	LATITUDE	LONGITUDE
1	47°07'45"	124°11'02"
2	47°07'45"	124°58'12"
3	47°35'05"	125°00'00"
4	47°40'05"	125°04'44"
5	47°50'01"	125°05'42"
6	47°57'13"	125°29'13"
7	48°07'33"	125°38'20"
8	48°14'46"	125°40'59"
9	48°20'12"	125°22'59"
10	48°27'49"	125°06'04"
11	48°29'59"	124°59'13"
12	48°30'19"	124°50'42"
13	48°29'38"	124°43'41"
14	48°27'50"	124°38'13"
15	48°23'17"	124°38'13"

APPENDIX C: AN EVALUATION OF WESTERN WASHINGTON COASTAL MARINE AREAS AND ADJACENT LANDS: SPECIAL REPORT

An Evaluation of Western Washington Coastal Marine Areas and Adjacent Lands: Special Report

Special Report

Information Pertinent to Site Selection for the Proposed Olympic Coast National Marine Sanctuary:

An Evaluation of Western Washington Coastal Marine Areas and Adjacent Lands

Strategic Assessment Branch
National Oceanic and Atmospheric Administration
Office of Oceanography and Marine Assessment
6001 Executive Blvd., N/OMA31
Rockville, MD 20852
(301)443-8843

August, 1990

Material for use in preparation of Environmental Impact Statement

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CONTENTS & GENERAL MAP

I. Introduction and General Information

A national marine sanctuary for the outer coast of the State of Washington has been mandated by the U.S. Congress. To identify the best possible site(s) for this sanctuary, an extensive region along Washington's coast was studied. The following is a presentation of material used to examine that region.

Included in this presentation are:

- A general description of the study region;
- Maps of pertinent information;
- An analysis of living marine resources that occur and are utilized off Washington; and
- Additional information describing various features of coastal lands adjacent to the study region (e.g., land uses, pollution discharges, demographics, etc.).

Information pertinent to areas under consideration for marine sanctuary status are arranged in sections. Within each section are associated figures and tables, and a "major features" page which summarizes notable material. Support material for findings presented in each section are listed in accompanying data appendices. In combination, these material provide a comprehensive examination of the outer coast of Washington and its resources.

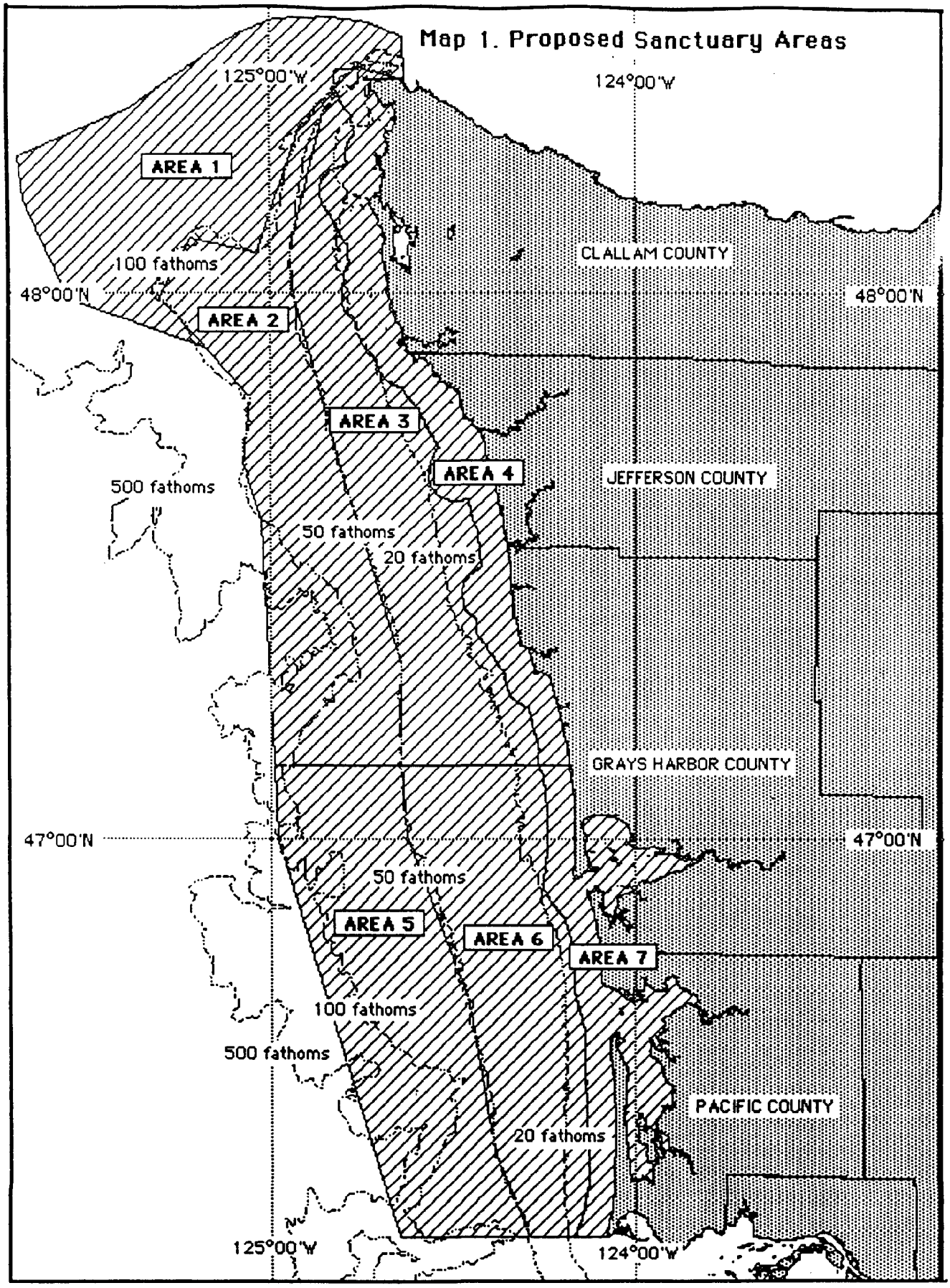
Description of the Study Region

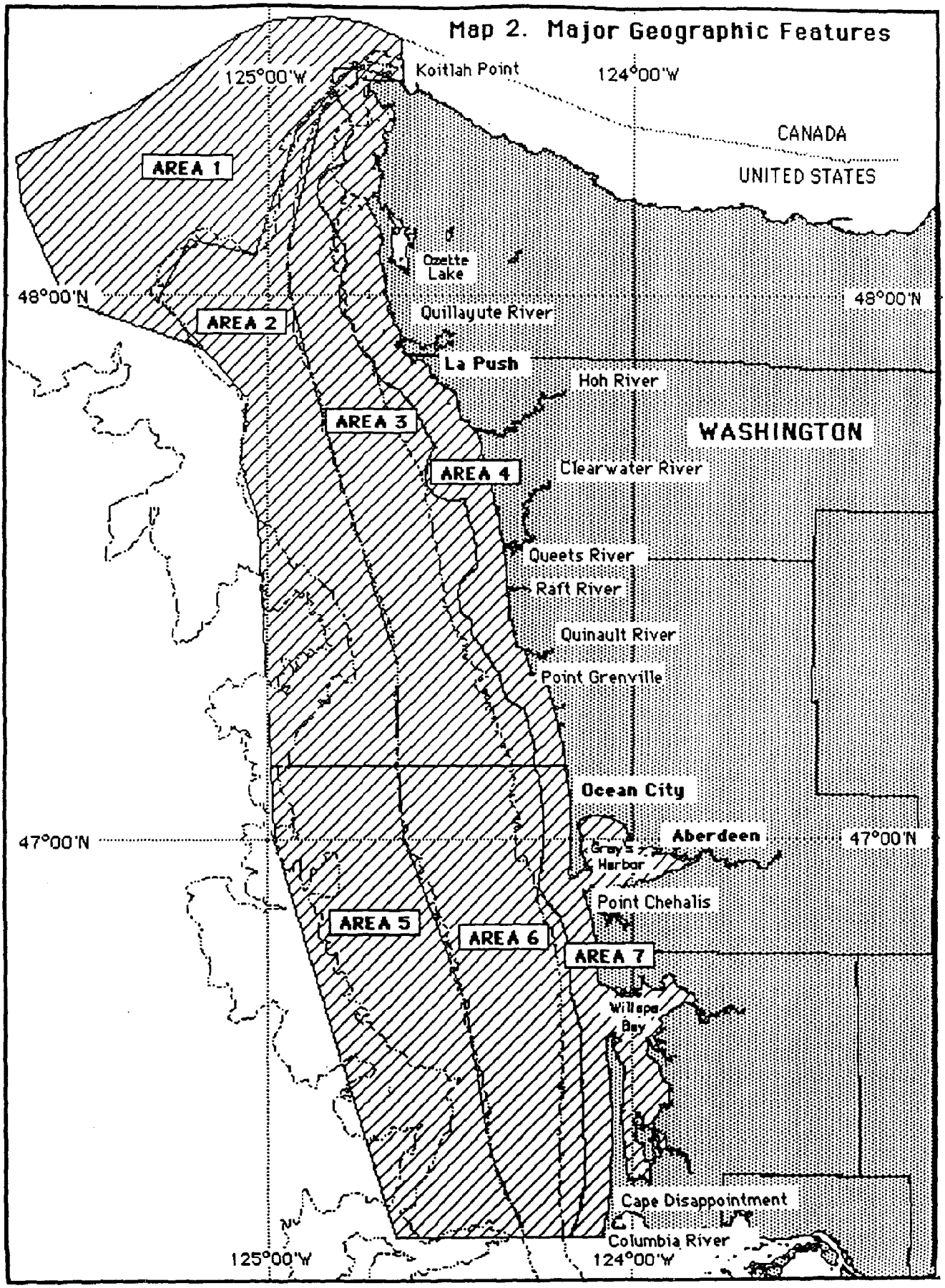
The study region is a nearly 6,000 sq s mi (square statute mile) area of the Pacific Northwest. It extends from the USA-Canada boundary at the mouth of the Strait of Juan De Fuca southward to the Washington shoreline at Koitlah Point, and from there along the shoreline to Cape Disappointment at the mouth of the Columbia River (Map 2). From Cape Disappointment, the region's boundary extends seaward to the continental shelf edge (100 fathom isobath) and then northward along the shelf edge to the Juan De Fuca Canyon (not indicated) and the USA-Canada boundary. Included in the study region are canyons off the southern and central portions of the coast, and a deep-water area known as "the plain" at the head of Juan De Fuca Canyon. The study region stops at the mean low water line and at stream/river mouths along the coast of Native American Tribal lands, but extends landward to the mean high tide line and upstream to the limit of tidal influence along the remaining coast.

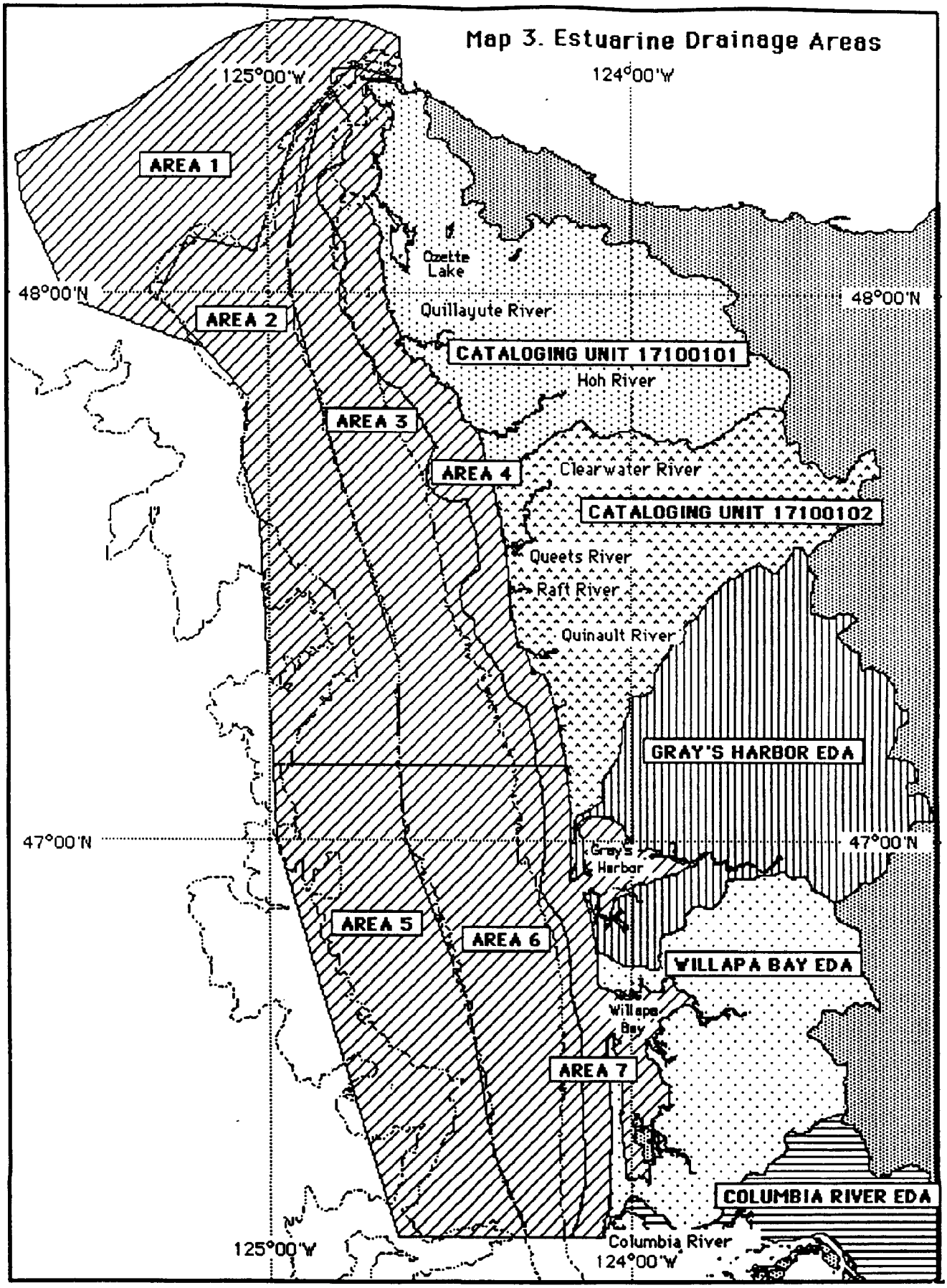
Area Descriptions. The study region was divided into seven areas to comparatively examine information for various segments of the marine region (Map 1), and note important sanctuary-related characteristics for each area.

Study Area	Area Description
1	An area at the head of the Juan De Fuca Canyon, including "the plain" and a small coastal area from Cape Flattery to Koitlah Point. It is bounded on the north by the USA-Canada marine boundary; on the east by a line extending from the USA-Canada line down to Koitlah Point; on the south from Cape Flattery to a point 3 n mi (nautical miles) offshore and then southwestward along the 100 fm isobath to the edge of the Juan De Fuca Canyon (about 35 n mi offshore); and on the west by a line extending northwestward to the USA-Canada boundary, approximately 40 n mi off Cape Flattery. Its surface area is roughly 1,000 sq s mi.
2	An offshore, deep water area that extends from 3 n mi off Cape Flattery southward along the 50 fm isobath to a line extending seaward from the southern boundary of the Copalis National Wildlife Refuge at the mouth of the Copalis River (not shown, but at Lat. 47° 07' N), seaward along the line to the 100 fm isobath, and northward along the 100 fm curve to about 3 n mi off Cape Flattery. Also included is a portion of the canyon off the Quinault River. The surface area of this study area is about 1,050 sq s mi.

Area	Area Description
3	The northern intermediate depth area shoreward of Area 2, extending out from 3 n mi off the coast out to the 50 fm isobath from off Cape Flattery south to the line extending seaward from the Copalis River mouth. It has a surface area of about 890 sq s mi.
4	An inshore area extending along the coast from Cape Flattery south to the southern boundary of the Copalis National Wildlife Refuge, and offshore to 3 n. mi. Most waters in this area are shallower than 20 fm, and the study area's surface area is about 521 sq s mi. Clallam County, Jefferson County, and a portion of Grays Harbor County are found shoreward of this study area, and rivers and streams which drain into this study area occur within the USGS (US Geological Survey) Estuarine Cataloging Units 17100101 and 102 (Map 3).
5	An offshore area between the 50 fm and 100 fm isobaths from the southern border of Area 2 southward to a line extending seaward from Cape Disappointment. This study area also includes a portion of the Grays Harbor Canyon and has a total surface area of nearly 1,100 sq s mi.
6	The southern intermediate depth study area between the 50 fm isobath and a line 3 n mi off the coast, from the southern boundary of Area 3 to the line extending seaward from Cape Disappointment. It has a total surface area of about 915 sq s mi.
7	The southern coastal area extending landward from 3 n mi offshore between the southern boundary of Area 4 and Cape Disappointment. This study area includes the significant estuaries of Grays Harbor and Willapa Bay and has a total surface area of about 400 sq s mi. Rivers and streams which drain into this study area occur within the USGS Estuarine Cataloging Units 17100104, 105, and 106 (Grays Harbor and Willapa Bay Estuarine Drainage Areas on Map 3).


Map 1. Proposed Sanctuary Areas
125°00'W
124°00'W
AREA 1
100 fathoms
48°00'N
CLALLAM COUNTY
48°00'N
AREA 2
AREA 3
AREA 4
JEFFERSON COUNTY
500 fathoms
50 fathoms
20 fathoms
GRAYS HARBOR COUNTY
47°00'N
47°00'N
50 fathoms
AREA 5
AREA 6
AREA 7
100 fathoms
500 fathoms
PACIFIC COUNTY
20 fathoms
125°00'W
124°00'W


Map 2. Major Geographic Features
125°00'W
Koitlah Point
124°00'W
CANADA
UNITED STATES
AREA 1
Ozette Lake
48°00'N
Quillayute River
AREA 2
La Push
Hoh River
AREA 3
WASHINGTON
AREA 4
Clearwater River
Queets River
Raft River
Quinault River
Point Grenville
Ocean City
47°00'N
Aberdeen
Gray's Harbor
Point Chehalis
AREA 5
AREA 6
AREA 7
Willapa Bay
Cape Disappointment
Columbia River
125°00'W
124°00'W


Map 3. Estuarine Drainage Areas
125°00'W
124°00'W
AREA 1
Ozette Lake
48°00'N
48°00'N
AREA 2
Quillayute River
CATALOGING UNIT 17100101
Hoh River
AREA 3
AREA 4
Clearwater River
CATALOGING UNIT 17100102
Queets River
Raft River
Quinault River
GRAY'S HARBOR EDA
47°00'N
47°00'N
Gray's Harbor
AREA 5
AREA 6
WILLAPA BAY EDA
Willapa Bay
AREA 7
COLUMBIA RIVER EDA
Columbia River
125°00'W
124°00'W

LAND USE

II Land use

- Lands adjacent to the study region are undeveloped, although logging is significant.

- Nearly all adjacent land is forested (94%). (See Figure 1.)

- Of the non-forested area, most is utilized for urban purposes, agriculture, and wetlands (each comprises about 2% of the total area in coastal counties).

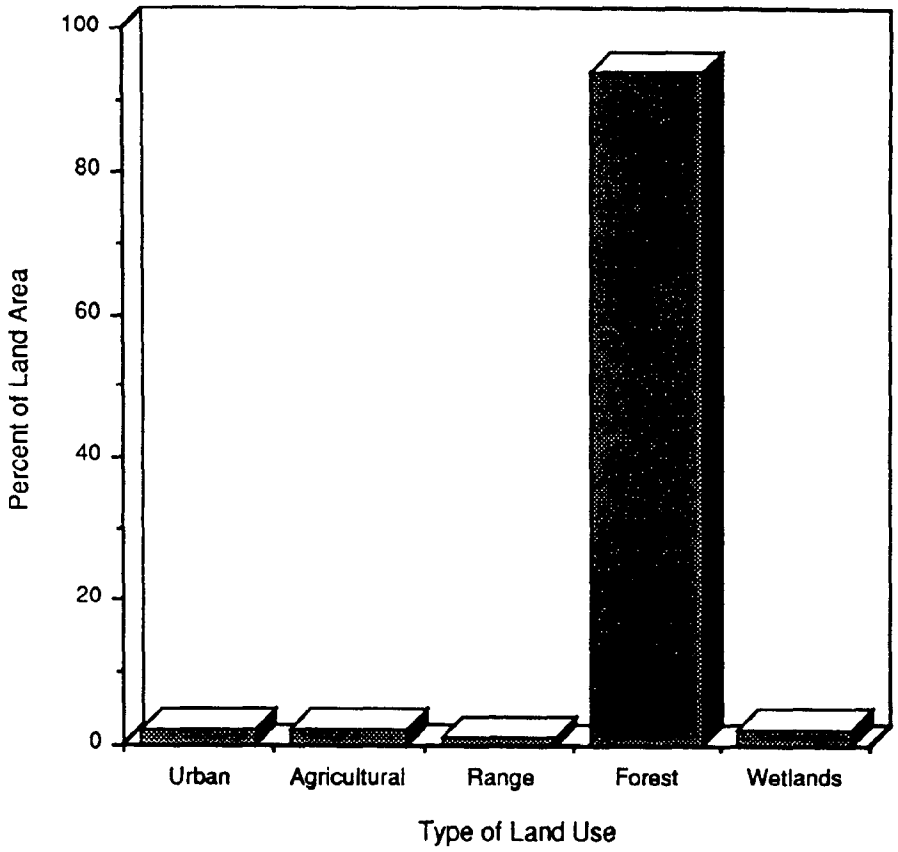


Figure 1. Land use for counties adjacent to the area under consideration for the Coastal Washington Marine Sanctuary.

Source: Strategic Assessment Branch. 1986. *West Coast land Use Data for NCPDI Counties* [data base]. Rockville, MD: Office of Oceanography and Marine Assessement/NOAA.

FRESHWATER INFLOW

III Freshwater Inflow

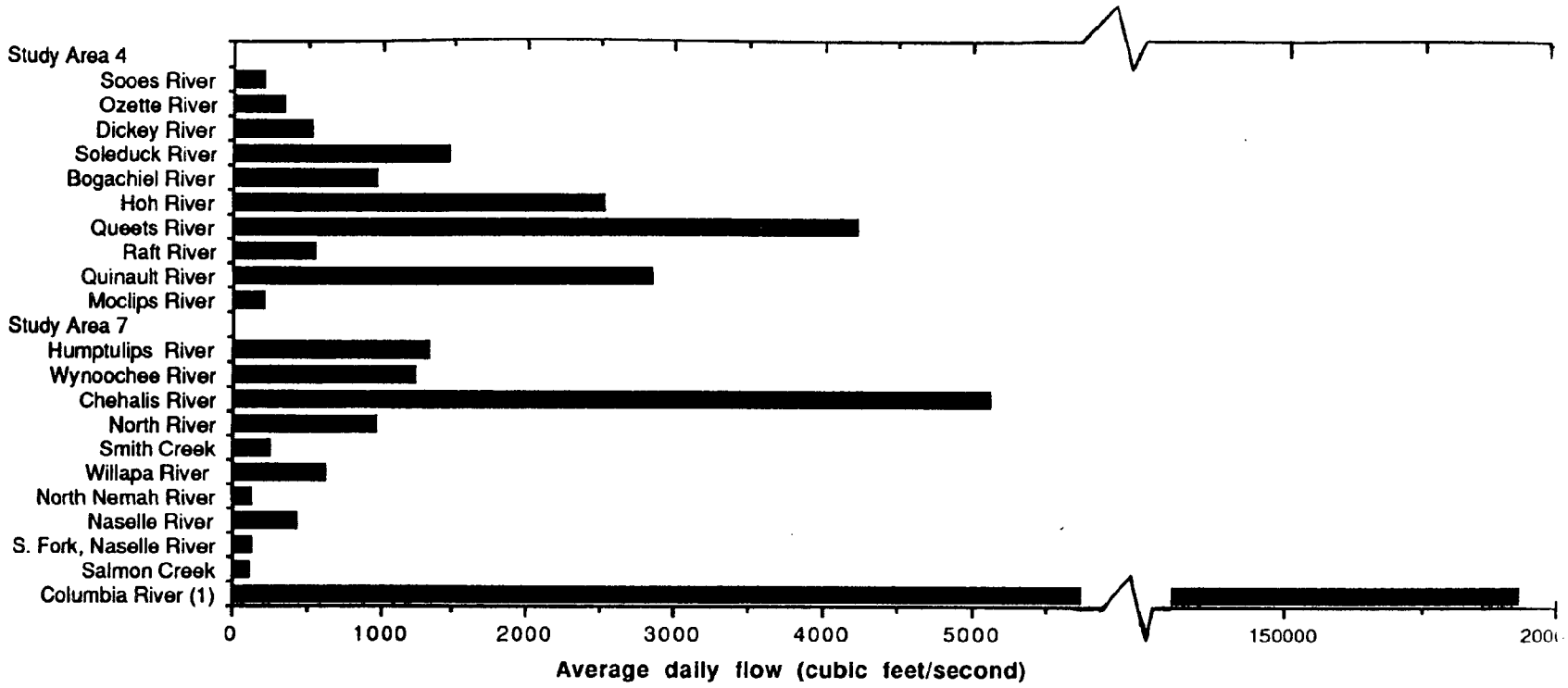
- When compared to other regions of the contiguous West Coast, freshwater flow from lands adjacent to the study region is relatively small.

- The Chehalis River, which discharges into Grays Harbor, has the largest flow of any river emptying into the study region, but its long term average flow is only about 2.5% of that for the Columbia River (Figure 2). (Measured upstream from a major Columbia River tributary, the Willamette River).

- Despite low overall amounts of freshwater flowing into the study region, volumes per square mile of drainage basin are high. High volumes per unit area result from small drainage basins with high rainfall and steep terrain.

- An example of high freshwater yield per unit area is the Quinault River which empties into Study Area 4. It ranks first in water yield (10.77 cfs per sq mi) for the 47 West Coast rivers that have been inventoried by NOAA. In contrast, the Columbia River ranks 40th (0.80 cfs per sq mi).

Flows and yields for several rivers discharging into the study region are presented in Appendix B, Table B.1; "cfs" is cubic feed per second.



(1) Information for Columbia River included for comparison purposes.

Figure 2. Freshwater discharges into study region waters.

Source: Personal communication with Steve Rohmann. Strategic Assessment Branch, OMA/NOAA.

POLLUTION DISCHARGES

IV. Pollution Discharges and Sources

- Because of the undeveloped nature of land adjacent to areas under consideration for marine sanctuary, the entire study region is relatively unspoiled .

- Pollution from traditional sources (i.e., wastewater treatment plants, industry and urban runoff, etc.) is low (Figure 3).

- There are no major industrial polluters within Area 4, and only seven in Area 7. (See Table C.2 in Appendix C.).

- An exception to low pollution throughout the study region is the discharge from two pulp and paper mills in Area 7.

- Pesticide use along coastal Washington is very low relative to other areas of the West Coast (Figure 4).

- Summaries of pollution discharges for total volumes of nitrogen, lead, and all suspended solids combined indicate that with the exception of suspended solids discharged by paper mills, the greatest source of pollutants into study region waters is from backgroud material in natural forest runoff (Figures 5-7). Information for these pollutants and seven others are presented in Table C.1 of Appendix C

- Note: the above information relates to data from the early 1980s. More recently, there are indications that logging activity may have expanded considerably. Increases in logging of these lands would substantially increase many pollutant discharges, especially from clear cutting along river banks and estuary shorelines.

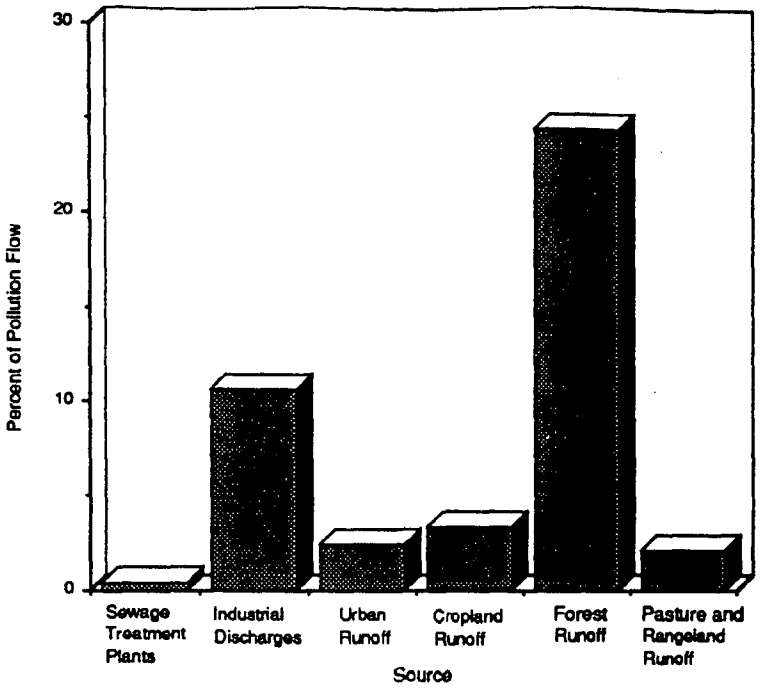


Figure 3. Pollution discharges by source (as percentage of U.S. West Coast totals) in counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary.

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD.

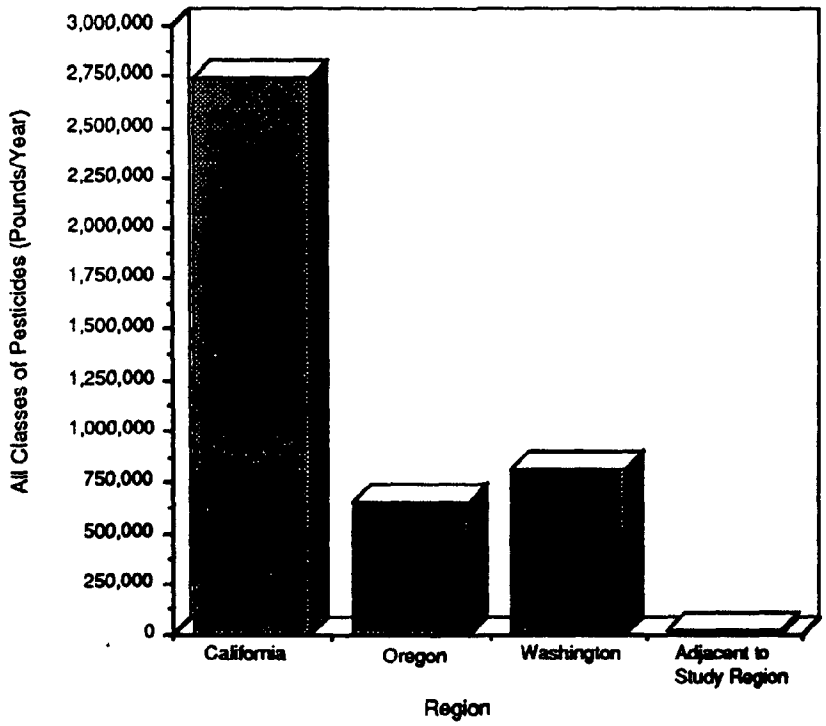


Figure 4. Pesticide use per year in West Coast states and on lands adjacent to areas under consideration for the Coastal Washington Marine Sanctuary.

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD.

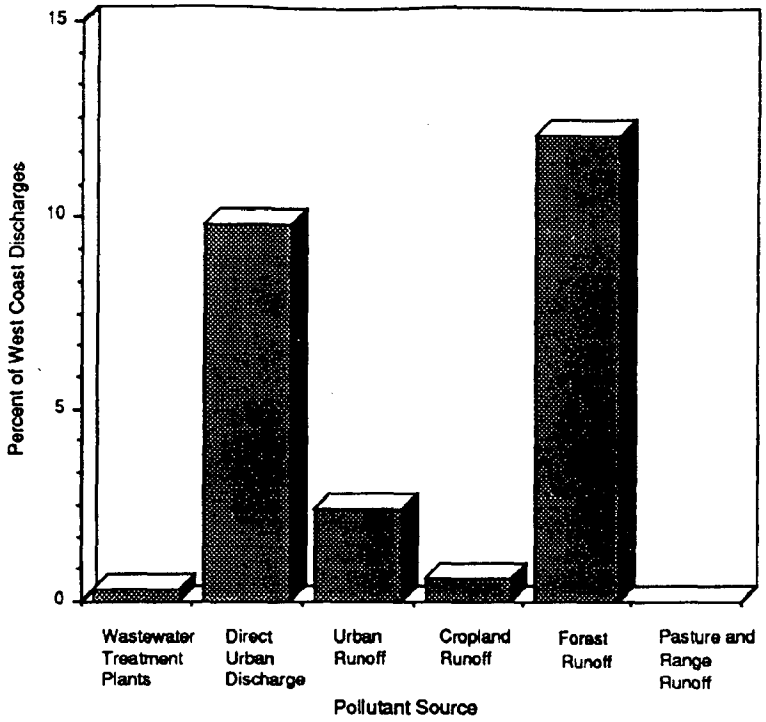


Figure 5. Total nitrogen discharged into counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary by source (as a percentage of the U.S. West Coast).

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD.

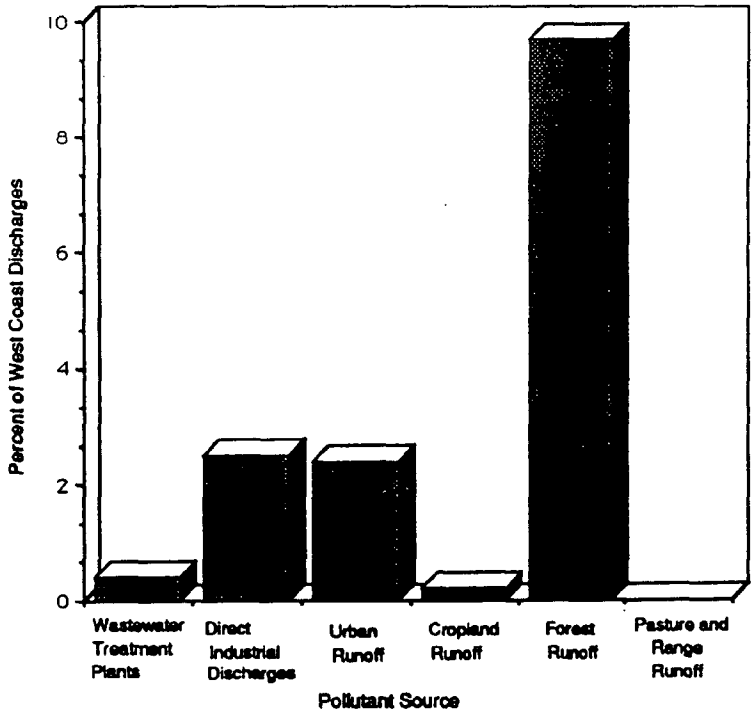


Figure 6. Total lead discharged into counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary, by source (as a percentage of U.S. West Coast discharges).

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD.

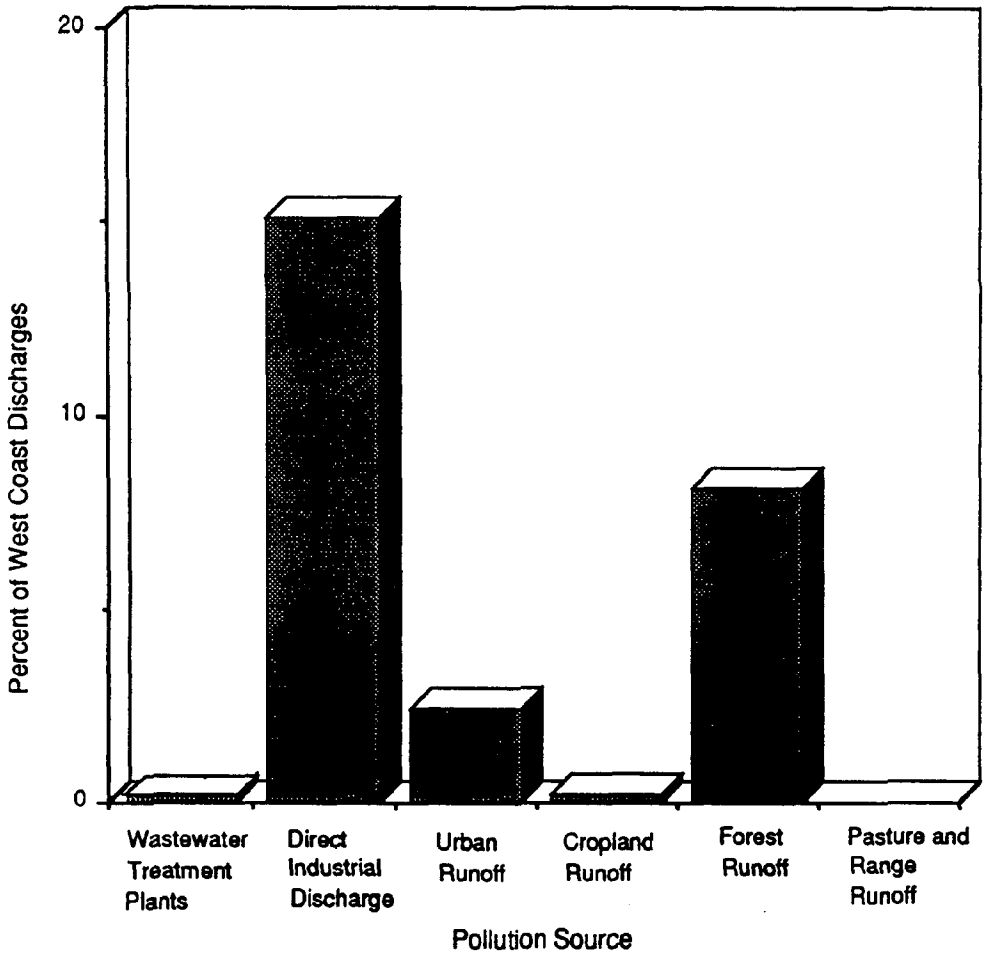


Figure 7. Total volume of all suspended solids discharged into counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary by source (expressed as a percentage of the U.S. West Coast total).

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD.

SOCIO-ECONOMIC PROFILE

V Socio-Economic Coastal Characteristics

- The human population within coastal areas adjacent to the sanctuary study region is low, slowly growing, and is projected to remain so (Figure 8).

- Most people in the study area are employed in manufacturing, whereas in all other coastal counties in the USA, most employment is in services (Figure 9). This is primarily the result of pulp and paper manufacturing and commercial fishing in the study region.

- Unemployment is high relative to most other areas in the Nation (Figure 10). This reflects seasonal employment associated with fishing, timber, and tourism.

- New construction in the area is low (Figure 11).

- Although similar to most other areas in Washington (Figure 12), property values for lands adjacent to the sanctuary study region are much lower than property values for other regions of the Coastal USA.

- Large tracts of land are publicly owned (e.g., 74% of Clallam and Jefferson counties).

- Counties adjacent to the study region contain only 10% of the total number of public recreation areas in the state of Washington, but these represent nearly 70% of statewide publicly owned acreage (Figure 13).

- There is a large tourist industry in the study area. For example, the Olympic National Park alone generates $560 million annually.

- The fishing industry is extremely important in the study region. Nearly two-thirds of the poundage and 37% of the value for Washington's commercial fisheries come from harvests within the sanctuary study region (Tables 1 and 2). (These statistics are for 1987 and 1988, and do not reflect landings from off other states and British Columbia. Detailed catch statistics are presented in Appendix E.)

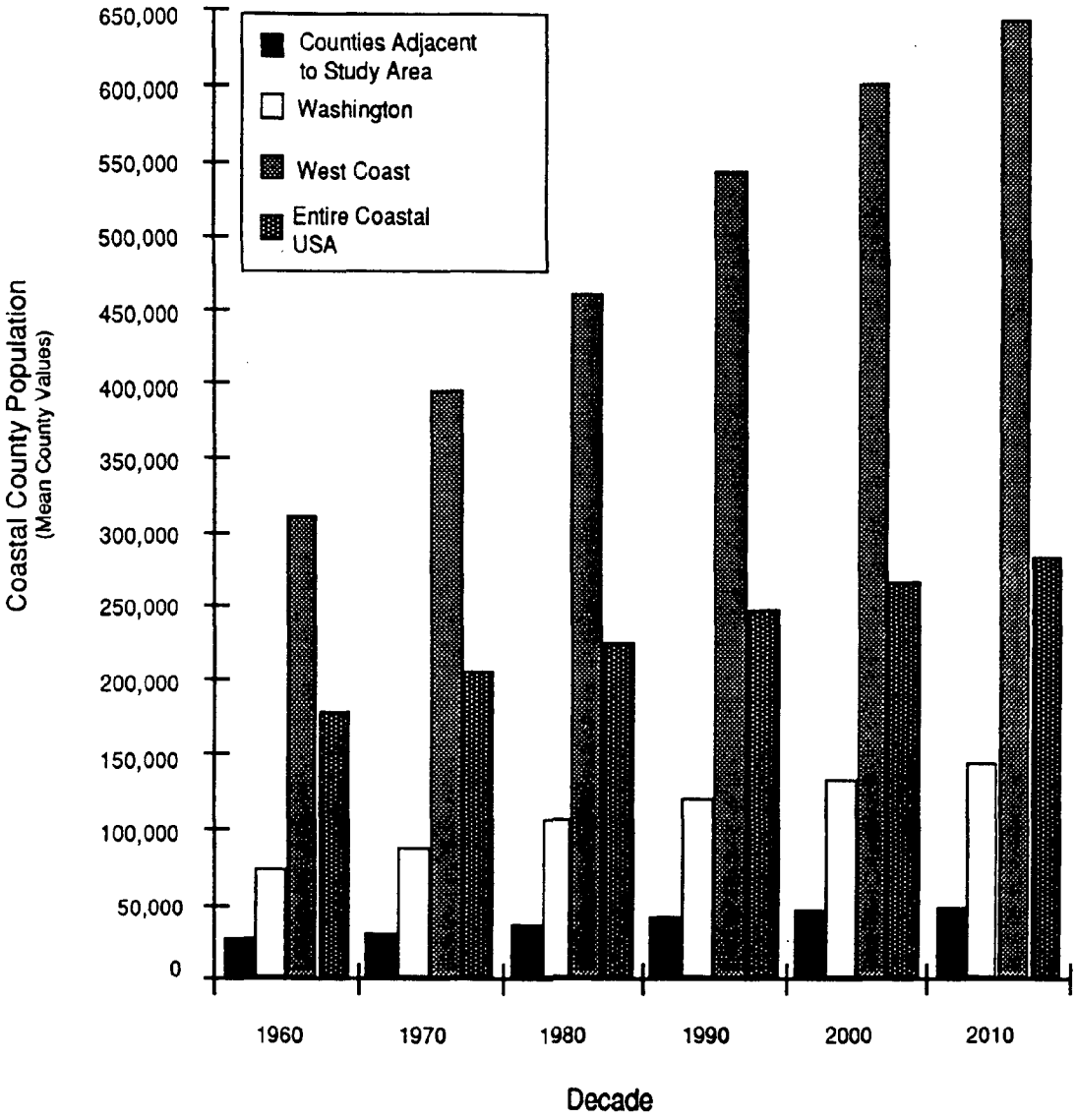


Figure 8. Population change for counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary, the State of Washington, the U.S. West Coast, and the entire coastal USA.

Source: Culliton, et al. 1990: 50 Years of Population Change Along the Nation's Coasts, 1960-2010. Strategic Assessment Branch, Office of Oceanography and Marine Assessments, Ocean Assessment Division, National Ocean Service, National Oceanic and Atmospheric Adminsitration, Rockville, MD.

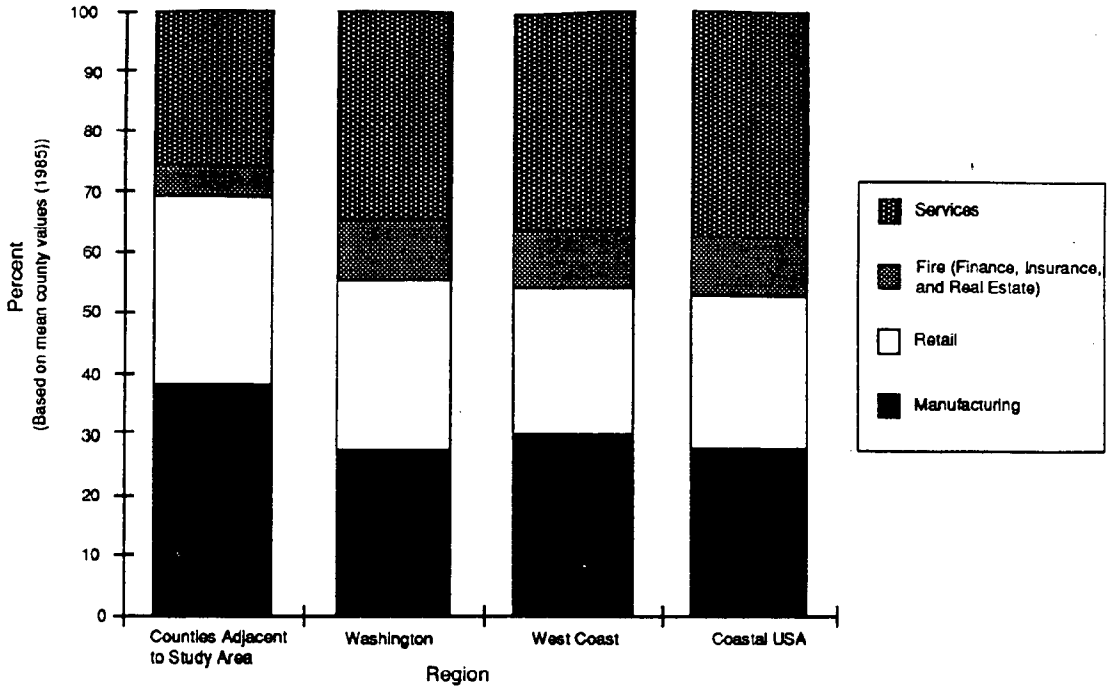


Figure 9. Employment by job sector for the counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary, the State of Washington, the U.S. West Coast, and the entire coastal USA.

Source: Culliton, et al. 1990: 50 Years of Population Change Along the Nation's Coasts, 1960-2010. Strategic Assessment Branch, Office of Oceanography and Marine Assessments, Ocean Assessment Division, National Ocean Service, National Oceanic and Atmospheric Adminsitration, Rockville, MD.

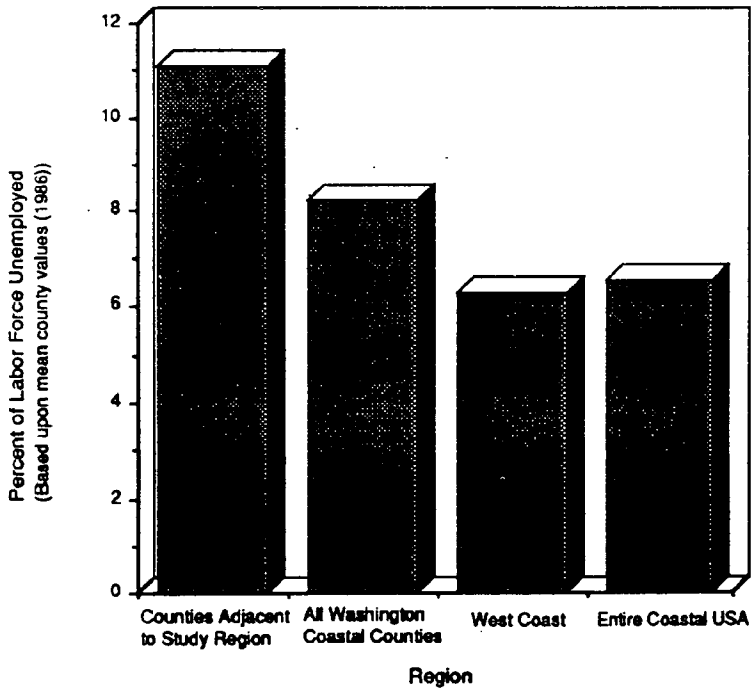


Figure 10. Annual unemployment for the counties adjacent to the areas under consideration for the Coastal Washington Marine Sanctuary , Washingtc coastal counties, the U.S. West Coast, and the entire coastal USA.

Sources: Bureau of the Census. 1980. *County and City Data Book*, 1988. U.S. Dept. of Commerce. Washington, D.C.: U.S. Gvt. Printing Office. 797 pp. + Appendicies.
Bureau of the Census, 1990. Building Permit Data Offering Information Package [data base]. Prepared by the Construction

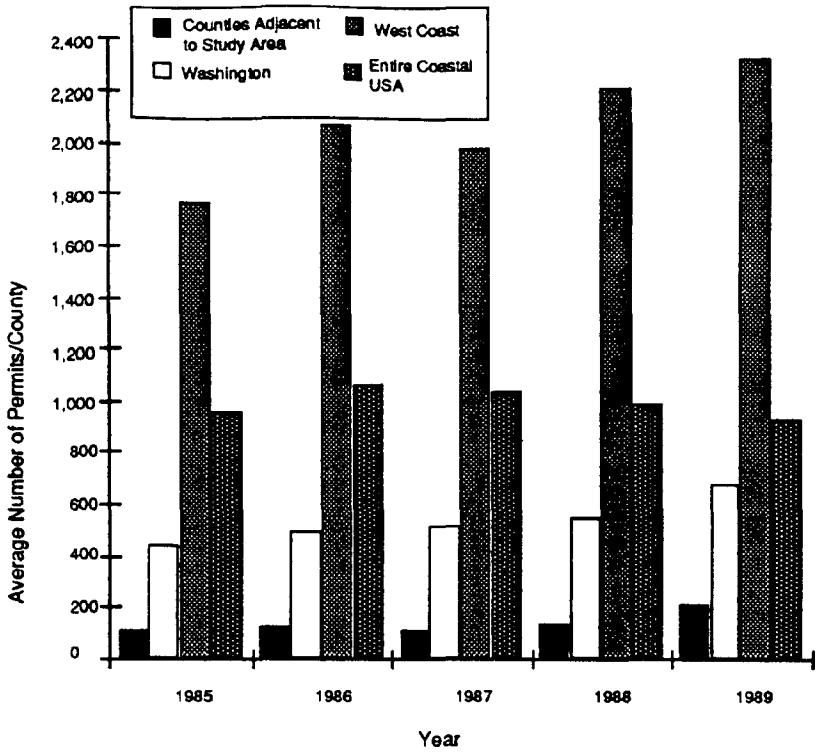


Figure 11. Construction permits (all types) by region and year, 1985-1989, in the counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary, the State of Washington, the U.S. West Coast, and the entire coastal USA.

Source: Culliton, et al. 1990: 50 Years of Population Change Along the Nation's Coasts, 1960-2010. Strategic Assessment Branch, Office of Oceanography and Marine Assessments, Ocean Assessment Division, National Ocean Service, National Oceanic and Atmospheric Adminsitration, Rockville, MD.

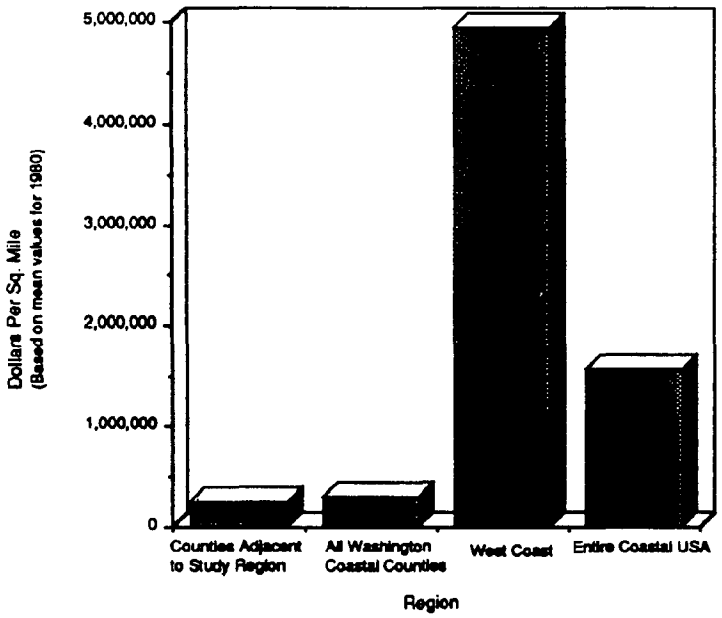


Figure 12. Average county real estate value for the counties adjacent to areas under consideration for the Coastal Washington Marine Sanctuary, the State of Washington, the U.S. West Coast, and the entire coastal USA.

Sources: Bureau of the Census. 1980. *County and City Data Book*, 1988. U.S. Dept. of Commerce. Washington, D.C.: U.S. Gvt. Printing Office. 797 pp. + Appendicies.
Bureau of the Census, 1990. Building Permit Data Offering Information Package [data base]. Prepared by the Construction Statistics Division, Building Permits Branch. Washington, D.C. U.S. Department of Commerce.
Slater Hall Information Products, Inc. 1988. *Populations Statistics* [data base]. Washington, D.C.: Slater Hall Information Products, Inc.

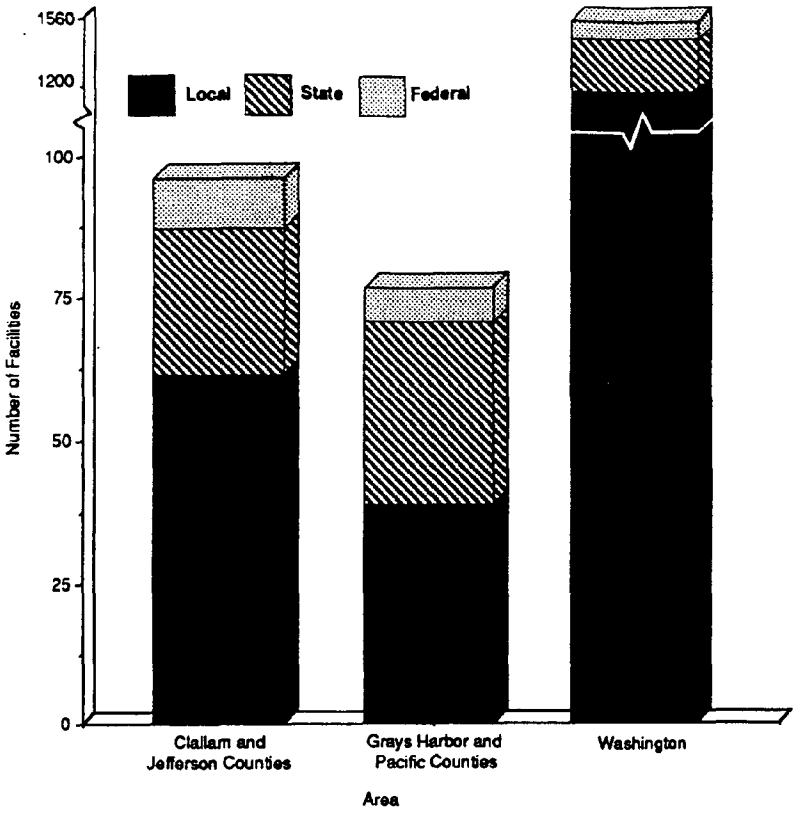


Figure 13a. Number of public recreational facilities adjacent to areas considered for the Coastal Washington Marine Sanctuary, and the entire state of Washington.

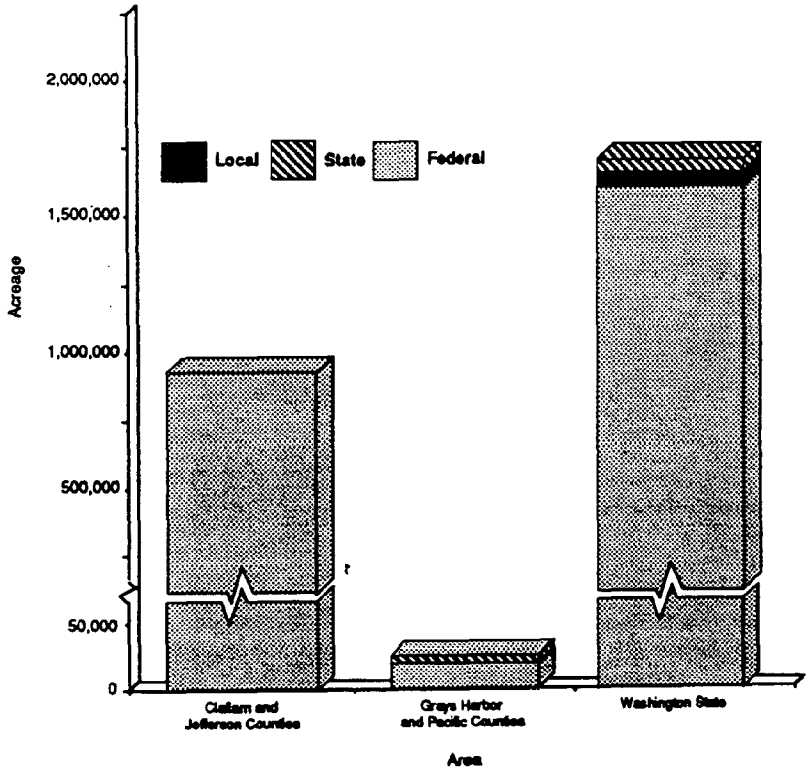


Figure 13b. Acreage of public recreational facilities adjacent to areas considered for the Coastal Washington Marine Sanctuary, and for the entire state of Washington.

Source: NOAA Inventory of Public Recreation Areas and Facilities, 1984. Strategic Assessment Branch, Ocean Assessments Division, Office of Oceanography and Marine Assessment, National Ocean Service, National Oceanic and AtmosphericAdministration, Rockville, MD.

Table 1. Estimates of values and volumes for commercial harvests in the state of Washington (1) (2).

Species	Landed value	Pounds landed
Sockeye salmon **	$ 20,593,593	8,620,521
Coho salmon **	18,655,221	10,485,109
Chum salmon **	18,361,898	15,973,980
Chinook salmon **	16,586,065	8,454,675
Dungeness crab *	13,593,309	11,600,271
Pacific oyster **	10,991,082	8,606,887
Ocean pink shrimp	6,176,103	13,459,058
Sea urchins	5,749,167	6,224,967
Sablefish	4,447,218	6,127,331
Geoduck *	2,948,037	4,535,442
Manila clam *	2,926,049	3,506,203
Pacific cod	1,903,630	6,439,232
Widow rockfish	1,880,523	6,146,421
Yellowtail rockfish	1,291,100	4,306,187
Rockfish spp.	1,102,119	4,735,237
Others	13,053,223	4,691,591
Total	$140,258,337	123,913,112 lbs.

Table 2. Estimates of values and volumes for commercial harvests in areas under consideration for the proposed coastal Washington marine sanctuary (1).

Species	Landed value	Pounds landed
Dungeness crab *	$ 11,407,311	9,771,405
Pacific oyster **	7,551,846	5,930,458
Ocean pink shrimp	7,208,086	13,460,058
Chinook salmon **	5,052,149	2,593,888
Sablefish	4,407,200	6,119,654
Coho salmon **	3,039,474	1,547,717
Chum salmon**	1,927,083	1,681,745
Widow rockfish	1,880,523	6,146,421
Pacific cod	1,172,195	4,022,983
Albacore	1,090,613	1,320,249
Dover sole	956,236	3,745,539
Petrale sole	686,334	918,160
Lingcod *	636,334	1,898,565
Arrowtooth flounder	498,242	3,492,503
Others	4,676,854	19,942,025
Total	$ 52,190,480	82,591,370 lbs.

(1) Average of 1987 and 1988.
(2) Washington landings from other state's waters and from off British Columbia are excluded.
* Estuarine Associated Species (i.e., uses estuaries during one or more life stages)
** Estuarine Dependent Species (i.e., requires estuaries during one or more life stages)

Sources:

NMFS. 1989. State of Washington volumes and values for fish and shellfish landed in the state of Washington during 1988 [computer printout]. Seattle, WA.

NMFS. 1990. State of Washington volumes and values for fish and shellfish landed in the state of Washington during 1989 [computer printout]. Seattle, WA.

PacFIN. 1989. PFMC source report #002: Commercial groundfish landed catch (mt) for 1981-88, all areas. Seattle, WA.

WDF. 1989. Commercial catches for fish and shellfish species by statistical subarea and month for the state of Washington, 1987 and 1988 [computer printout]. Olympia, WA.

INVERTEBRATES

VI Information on Marine Invertebrates

- Both the comparative significance analysis of species distributions (Table 3) and the distributions analysis weighted by species abundance (Table 4) reveal that the inshore Areas 4 and 7 are the most important areas in the study region.

- Areas 4 and 7 contain beaches where the majority of the entire U.S. West Coast recreational harvests of razor clams are taken. An average of over 7.5 million razor clams were taken by nearly 1 million recreational clam diggers during 1960s and 1970s. More recently, razor clam populations have been reduced in size in Washington (due to disease); however, harvests from Washington beaches still account for about 70% of contiguous West Coast recreational catches (e.g., 6.2 million clams of the 8.7 million clams total for 1988 and 1989, combined).

- Areas 4 and 7 include Grays Harbor and Willapa Bay where harvests of Pacific oysters can account for over half of all oysters harvested along the entire U.S. West Coast. Harvests in these estuaries sometimes represent nearly one-fifth of nation wide harvests (Figure 14).

- More than three-quarters of the state's Dungeness crab catch is taken in Areas 4 and 7 and the shallow, shoreward portions of Areas 3 and 6.

- Pacific oyster, Dungeness crab, and ocean pink shrimp landings from areas under consideration for sanctuary status had combined landed values in 1987-88 of over $25 million (about 85% of statewide totals for harvests of these species off Washington).

- In addition to the significance of oyster harvests, landings for other shellfish in the study region represent:
  -- 32% of all contiguous US West Coast commercial crab harvests (1985-88 data);
  -- About 25% of all shrimp harvests (1985-88 data); and

Note: Also see Tables 1 and 2 (Commercial landings and values...) in Section V, Socio-economic Coastal Characteristics.

Table 3. Comparative significance of study areas based on the distributions of selected invertebrate species occurring off Washington.

INVERTEBRATES	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Weathervane Scallop	○	○	●	○	●	●	○
Pacific Oyster 1/				○			●
Pacific Geoduck	○			○			○
Fat Gaper	○			●			●
Pacific Gaper				○			●
Pacific Razor 2/				●			●
Pacific Littleneck				○			●
Manila Clam				○			●
Pinto Abalone	○		○	●			○
Giant Octopus	○	●	●	●	○	●	●
Market Squid	●	●	●	●	●	●	●
Red Squid	●						
Northern Pink Shrimp	○	○	○		○	○	
Ocean Pink Shrimp 1/	●	●	●		●	●	○
Sidestripe Shrimp	●	○	○		○	○	
Coonstripe Shrimp	○						
Spot Shrimp	●	●	●	●	●	●	●
Bairdi Tanner Crab	○	○					
Dungeness Crab 1/	○	●	●	●	●	●	●
Point Totals 3/	21	15	18	25	14	17	27

Legend:
○ Not Significant = 1
● Significant = 2
● Very Significant = 3
(Significance relative to species distribution along the contiguous U.S. West Coast)

1/ Commercially Important in Study Region.
2/ Recreationally Important in Study Region.
3/ A summary of point values (i.e. significance) associated with all species within an area.

Source: Strategic Assessment Branch. *West Coast North America Coastal Zones Strategic Assessment: Data Atlas*, Invertebrate and Fish Pre-publication Volume. Rockville, MD: National Oceanic and Atmospheric Administration.

Table 4. Comparative significance of study areas based on the relative abundance and importance of selected invertebrate species occurring off Washington.

INVERTEBRATES	Density Index	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Weathervane Scallop	4	4	4	8	4	8	8	4
Pacific Oyster	10				10			20
Pacific Geoduck	2	2			2			2
Fat Gaper	3	3			9			9
Pacific Gaper	3				3			6
Pacific Razor	5	5			10			10
Pacific Littleneck	3				3			6
Manila Clam	3				3			6
Pinto Abalone	1	1		1	2			1
Flat Abalone	1				2			
Giant Octopus	4	4	8	12	12	4	12	12
Market Squid	4	8	8	8	8	8	8	8
Red Squid	2	4						
Northern Pink Shrimp	1	1	1	1		1	1	
Ocean Pink Shrimp	10	20	30	20		30	20	10
Sidestripe Shrimp	2	6	2	2		2	2	
Coonstripe Shrimp	1	1						
Spot Shrimp	2	6	4	6	6	4	6	6
Baird Tanner Crab	1	1	1					
Dungeness Crab	10	10	20	30	20	20	30	20
Area (column) Total		71	78	88	94	77	87	120

Legend:

Density Index: Defined as the relative density or abundance of the species, based on commercial and recreational harvests. Rated 1 - 10, with 1 = rare, and 10 = highly abundant.

Key for Areas 1 - 7

21 - 30 = Very Significant. Species has broad areal coverage of the analysis area, and/or is abundant.

11 - 20 = Significant. Species has some areal coverage, and/or is present in some abundance.

0 - 10 = Not Significant. Species is either present or only occasionally occurs there; low, if any, abundance.

Source: Strategic Assessment Branch (SAB) analysis of the State of Washington commercial and recreational catch statistics in relation to species distribution maps in the NOAA *West Coast of North America, Coastal and Ocean Zones Strategic Assessment: Data Atlas*, Invertebrate and Fish pre-publication volume. NOAA, SAB, Rockville, MD.

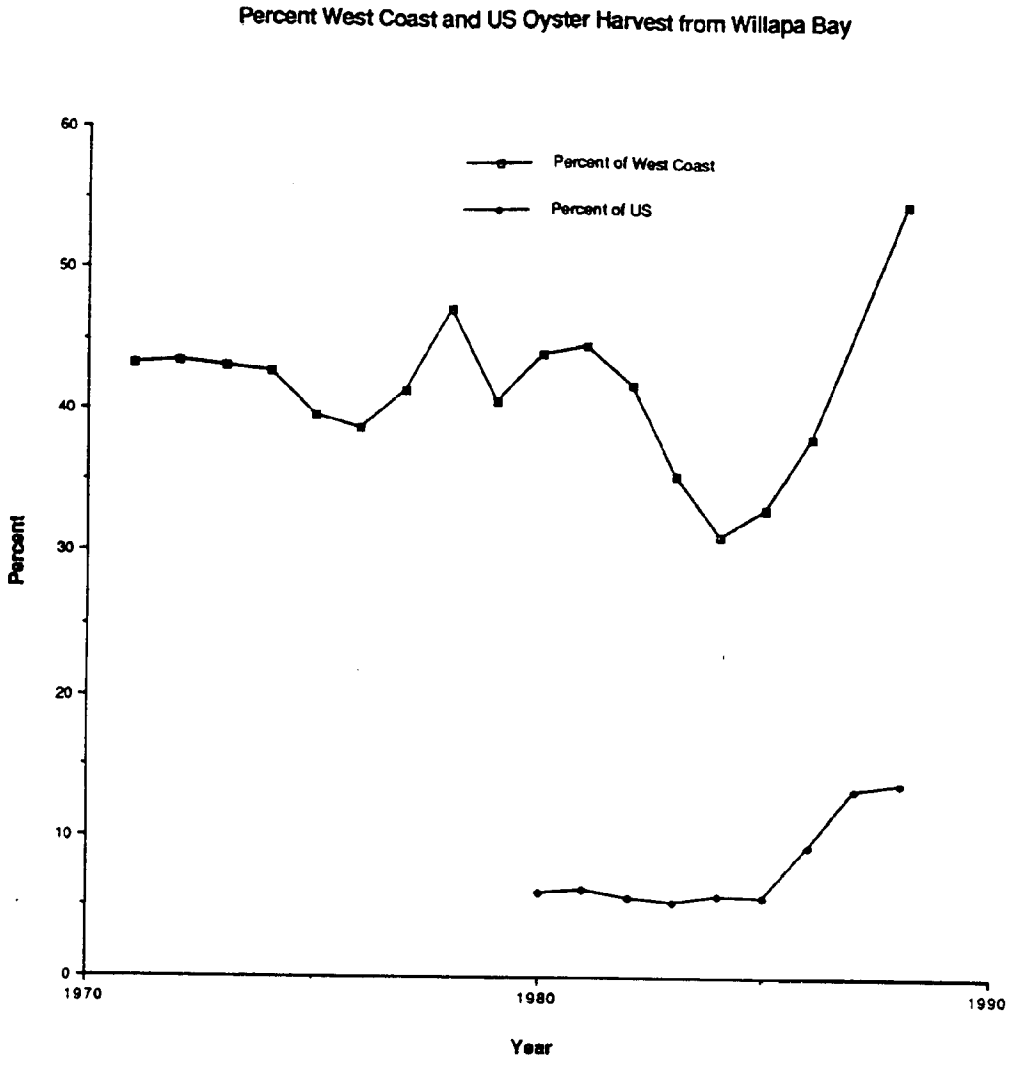


Figure 14. Percent of annual U.S. West Coast oyster harvests and nationwide harvests occurring in Willapa Bay.

Source:

Leonard, D. L. and D. A. Slaughter. 1990. The quality of shellfish growing waters on the West Coast of the United States. NOAA/SAB, Rockville, MD.

NMFS. 1898. State of Washington volumes and values for fish and shellfish landed in the state of Washington during 1988. NMFS/NW Region Headquarters, Seattle, WA.

WDF. 1989. Commercial catches for fish and shellfish species by statistical subarea and month for the state of Washington, 1987 and 1988. WDF, Olympia, WA.

Razor clams and the outer coast of Washington

The clam industry in Washington produces about 95% of U.S. West Coast landings. Although it now accounts for only a small fraction of harvest volumes nationwide, Washington was the leader of clam harvests for many years primarily because of its innovations in canning. Clams have always been a part of Washington culture, especially such species as the Pacific geoduck (or geoduc) and the razor clam. Harvests of the former comprise a significant portion of current commerical harvests, and the latter is the paramount recreational bivalve for the west coast of North America.

Razor clams are found primarily on open coast, sandy beaches of Study Area 7; many occur on Area 4 beaches also. This species normally occurs from low intertidal waters out to about depths of about 30 feet, and mostly from the low tide line to depths of less than 10 feet.

Since the 1960s, most razor clams have been taken by recreational diggers. During 1969-1974, annual recreational harvests for the contiguous West Coast averaged about 9.5 million clams; about 80% came from Washington beaches. Recreational harvests in Washington ranged between 7 million and 15 million clams at that time, but pathogen infestations and other natural calamities during the early 1980s severely decimated razor clam populations along Washington's coast. Since that time, populations have recovered somewhat and recreational digging has resumed. During 1988-89, about 3 million razor clams were annually taken by recreational diggers along Washington's coast; this amount represents over 70% of (contiguous) coastwide U.S. sport harvests.

Although extensive earlier this century, commercial harvests of razor clams now are minor in Washington. Annual harvests peaked at 3.2 million pounds of meats in 1915 and still averaged about 2 million pounds during the 1930s, but harvests substantially declined thereafter. By the 1970s, commercial harvests annually averaged less than 270,000 pounds; this reduced volume reflected natural and human-caused population declines, as well as ever-increasing recreational harvests. Harvests dropped to only a few thousand pounds annually by the early 1980s due to a variety of problems: El Nino-related temperature changes, the Mt. St. Helen eruption, and diseases. The resurgence of coastal Washington razor clam populations during the latter 1980s did not signal the return of notable commercial harvests; recreational harvests now dominate human use.

Sources:

Schink, T. J. K. A. McGraw, and K. K. Chew. 1983. Pacific coast clam fisheries. Washington State Sea Grant Technical Rep. 83-1. Univ. of Washington, Seattle, WA. 72 pp.

Leonard, D. L. and D. A. Slaughter. 1990. Quality of shellfish growing waters on the West Coast of the United States. NOAA, Natl. Ocean Serv., Strategic Assessments Branch, 6001 Executive Blvd., Suite 220, Rockville, MD. 52 pp.

Washington Department of Fisheries. 1983. 1982 Fisheries Statistical Report for the State of Washington. Compiled and edited by W. D. Ward and L. J. Hoines. Wash. Dep. Fish., Olympia, WA. 77 pp.

Washington Department of Fisheries. 1987. 1986 Fisheries Statistical Report for the State of Washington. Compiled and edited by W. D. Ward and L. J. Hoines. Wash. Dep. Fish., Olympia, WA. 89 pp.

Personal communication from D. Simons, Wash. Dep. of Fisheries, Montasano, WA.

Personal communication from T. Link, Oregon Dep. of Fisheries and Wildlife, Astoria, OR.

FISH

VII Information on Marine Fishes

- Both the comparative significance analysis of species distributions (Table 5) and the analysis weighted by species abundance (Table 6) reveal that offshore and intermediate areas under sanctuary consideration (Areas 1,2,3,5, and 6) generally are more significant for marine fishes than inshore areas (Areas 4 and 7).

- Using commercial harvests as a means of assessing the significance of fish stocks within the proposed sanctuary region relative to other parts of the contiguous U.S. West Coast, the following is noted:
  --About 15% of all West Coat groundfish harvests come from the sanctuary study region (based on 1987-1988 data); and
  --Nearly 13% of all salmon harvests come from the region (1988-1990).

- When looking at commercial harvests, offshore Areas 1 and 5 were the most important. More than two-thirds of annual 1987-88 study region harvests came from these areas for the following species:
  —Pacific ocean perch
  —Lingcod
  —English sole
  —Dover sole
  —Pacific cod, and
  —Sablefish.

- Area 5, alone, produced the majority of harvests of widow rockfish.

- Although non-coastal areas scored highest in the comparative significance analyses, the importance of coastal waters for marine fishes is underscored by the association of many species with estuarine habitats:
  —Four of the top ten fishes commercially harvested along the outer coast of Washington are either estuarine-associated (i.e., they use estuaries during some time in their lives) or estuarine-dependent (i.e., they require estuaries to complete their life cycles). (Examples of estuarine associated/dependent species are chinook, coho, and chum salmon, and lingcod) (Table 2) .
  —The top four recreational species (chinook and coho salmon, steelhead, and lingcod) for Washington all utilize estuaries, at least as juveniles.

Note: Also see Tables 1. and 2. (Commercial landings and values...) in Section V, Socio-economic Coastal Characteristics.

Table 5. Comparative significance of study areas based on the distribution of selected fish species occurring off Washington.

FISHES	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Spiny Dogfish 1/	●	●	●	●	●	●	●
Pacific Herring 1/	●	●	●	●	●	●	●
Pacific Sardine	○	○	○		○	○	
Northern Anchovy	●	●	●	●	●	●	●
Pink Salmon 1/ 2/	●	●	●	●	●	●	●
Chum Salmon 1/ 2/	●	●	●	●	●	●	●
Coho Salmon 1/ 2/ 3/	●	●	●	●	●	●	●
Sockeye Salmon 2/	●	●	●	●	●	●	●
Chinook Salmon 1/ 2/ 3/	●	●	●	●	●	●	●
Steelhead 3/ 4/	●	●	●	●	●	●	●
Pacific Cod 1/	●	●	●	●	●	●	●
Walleye Pollock	●	●	●	●	●	●	●
Pacific Hake 1/	●	●	●	○	●	●	○
Jack Mackerel	●	●	●	●	●	●	●
Albacore Tuna 1/	○						
Chub Mackerel	○	○	○	○	○	○	○
Swordfish	○	○	○	○	○	○	○
Striped Bass	○			○			○
Pacific Bonito	○	○	○		○	○	
California Halibut	○	○	○	○	○	○	○
Pacific Barracuda	○	○	○	○	○	○	○
Yellowtail	○	○	○	○	○	○	○
Pacific Ocean Perch 1/	●	●	○	○	●	○	○
Widow Rockfish 1/	●	●	●	●	●	●	●
Sablefish 1/	●	●	○	○	●	○	○
Lingcod 1/ 3/	●	●	●	●	●	●	●
Pacific Halibut 1/ 3/	●	●	●	○	●	●	○
English Sole 1/	●	●	●	○	●	●	○
Flathead Sole	●	●	●	○	●	●	○
Petrale Sole 1/	●	●	●	○	●	●	○
Starry Flounder 1/	○	○	●	●	○	●	●
Dover Sole 1/	●	●	●	○	●	●	○
Arrowtooth Flounder 1/	●	●	●	○	●	●	○
Point Totals 5/	69	68	66	51	68	67	51

Legend:
- ○ Not Significant = 1
- ● Significant = 2
- ● Very Significant = 3

(Significance relative to species distribution along the contiguous U S. West Coast)

1/ Commercially Important in Study Region.
2/ Anadromous Species. Presence in study area is limited to small out-migrating juveniles; larger, foraging juveniles; and nearly mature fish returning to rivers to spawn.
3/ Recreationally Important in Study Region.
4/ Anadromous Species. Unlike salmon, steelhead adults are also present.
5/ A summary of point values (i e. significance) associated with all species within an area.

Source: Strategic Assessment Branch (SAB) analysis of State of Washington commerical and recreational catch statistics in relation to species distribution maps present in the NOAA *West Coast North America Coastal Zones Strategic Assessment: Data Atlas,* Invertebrate and Fish Pre-publication Volume NOAA SAB Rockville MD

Table 6. Comparative significance of study areas based on the relative abundance and importance of selected fish species occurring off Washington.

FISHES	Density Index	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Spiny Dogfish	5	15	15	15	10	15	15	10
Pacific Herring	5	10	10	10	10	10	10	15
Pacific Sardine	1	1	1	1		1	1	
Northern Anchovy	5	10	10	10	10	10	10	10
Pink Salmon	7	14	14	14	14	14	14	14
Chum Salmon	7	14	14	14	14	14	14	14
Coho Salmon	10	30	20	20	30	20	30	30
Sockeye Salmon	5	15	10	10	15	10	10	10
Chinook Salmon	10	30	20	30	30	20	30	30
Steelhead	8	24	24	24	24	24	24	24
Pacific Cod	7	21	21	21	14	21	21	14
Walleye Pollock	4	12	12	12	8	12	12	8
Pacific Hake	8	16	16	16	8	16	16	8
Jack Mackerel	3	6	6	6	6	6	6	6
Albacore Tuna	2	15						
Chub Mackerel	1	1	1	1	1	1	1	1
Striped Bass	1	1			1			1
Pacific Bonito	1	1	1	1		1	1	
California Halibut	1	1	1	1	1	1	1	1
Pacific Barracuda	1	1	1	1	1	1	1	1
Yellowtail	1	1	1	1	1	1	1	1
Pacific Ocean Perch	6	18	18	6	6	18	6	6
Widow Rockfish	9	18	27	27	18	27	27	18
Sablefish	8	24	24	8	8	24	8	8
Lingcod	10	30	30	30	30	30	30	30
Pacific Halibut	4	12	12	12	4	12	12	4
English Sole	5	10	15	15	5	15	15	5
Flathead Sole	2	6	6	6	2	6	6	2
Petrale Sole	6	2	3	3	1	2	3	1
Starry Flounder	5	5	5	10	15	5	10	15
Dover Sole	6	18	18	18	6	18	18	6
Arrowtooth Flounder	5	10	15	15	5	15	15	5
Area (column) total		379	371	358	298	371	368	298

Legend:

Density Index: Defined as the relative density or abundance of the species, based on commercial and recreational harvests. Rated 1 - 10, with 1 = rare, and 10 = highly abundant.

Key for Areas 1 - 7

21 - 30 = Very Significant. Species has broad areal coverage of the analysis area, and/or is abundant.

11 - 20 = Significant. Species has some areal coverage, and/or is present in some abundance.

0 - 10 = Not Significant. Species is either present or only occasionally occurs there, low, if any, abundance.

Source: Strategic Assessment Branch (SAB) analysis of the State of Washington commercial and recreational catch statistics in relation to species distribution maps in the NOAA *West Coast of North America, Coastal and Ocean Zones Strategic Assessment: Data Atlas*, Invertebrate and Fish Pre-publication Volume, NOAA, SAB, Rockville MD

BIRDS

VIII Information on Marine Birds

- Coastal Areas 4 and 7 standout from other areas under consideration for sanctuary status when distributions of marine birds are examined (Table 7). Examples follow.

- Lands adjacent to Area 7 (around Grays Harbor) contain one of only two major concentrations of adult bald eagles along the contiguous U.S. West Coast.

- Only two major colonies of rhinocerous auklet (>20,000 birds) occur within the contiguous U.S.A. One occurs along the coast of Area 4 and the other is found in the adjacent Strait of Juan De Fuca.

- Only two large colonies of tufted puffins (>1,000 birds) occur within the contiguous U.S. One is found along the coast of Area 4.

- Grays Harbor and Willapa Bay in Area 7 are final staging areas for shorebird migrations during early spring.

The following relate to seabird colonies:

- Seabird populations in Washington represent 12% of the contiguous U.S. West Coast total of 4.5 million birds (Table 8).

- In toto, over 500,000 seabirds occur in nesting colonies within Washington. Nearly 70% of these occur along the outer coast; over 325,000 seabirds are found in Area 4 and about 45,500 are present in colonies in Area 7.

- Nesting colonies along the outer coast of Washington (Figure 15) contain more than 50% of contiguous U.S. West Coast total populations for the following species:
  —Fork-tailed storm-petrel
  —Caspian tern
  —Cassin's auklet
  —Tufted puffin.

Table 7. Estimates of seabird populations in areas considered for the coastal Washington marine sanctuary.

Species	Life Stage	Estimates for		Estimates by State			Total for Contiguous West Coast
		Area 4	Area 7	Washington	Oregon	California	
Fork-tailed Storm-petrel *Oceanodroma furcata*	Adults	2,318	0	3,878	400	410	4,688
	Juveniles	1,391	0	2,327	240	246	2,813
Leach's Storm-petrel *Oceanodroma leucorhoa*	Adults	25,298	0	35,700	435,458	9,870	481,028
	Juveniles	15,179	0	21,420	261,275	5,922	288,617
Ashy Storm-petrel *Oceanodroma homochroa*	Adults	0	0	0	0	3,854	3,854
	Juveniles	0	0	0	0	2,312	2,312
Brown Pelican *Pelecanus occidentalis*	Adults	0	0	0	0	2,690	2,690
	Juveniles	0	0	0	0	1,614	1,614
Double-crested Cormorant *Phalacrocorax auritus*	Adults	1,276	916	3,296	3,964	5,204	12,464
	Juveniles	2,552	1,832	6,592	7,928	10,408	24,928
Brandt's Cormorant *Phalacrocorax penicillatus*	Adults	458	96	554	22,730	59,960	83,244
	Juveniles	1,053	221	1,274	52,279	137,908	191,461
Pelagic Cormorant *Phalacrocorax pelagicus*	Adults	2,398	240	4,866	10,999	12,100	27,965
	Juveniles	5,515	552	11,192	25,298	27,830	64,320
Black Oystercatcher *Haematopus bachmani*	Adults	194	0	334	358	358	1,050
	Juveniles	213	0	367	394	394	1,155
Glaucous-winged /Western Gull *Larus glaucescens/Larus occidentalis*	Adults	8,147	8,228	39,441	16,592	43,060	92,001
	Juveniles	13,850	13,988	67,050	10,600	78,753	156,402
Caspian Tern *Sterna caspia*	Adults	0	7,918	7,918	0	1,480	9,398
	Juveniles	0	11,085	11,085	0	2,072	13,157
Least Tern *Sterna antillarum*	Adults	0	0	0	0	2,472	2,472
	Juveniles	0	0	0	0	2,719	2,719
Common Murre *Uria aalge*	Adults	30,780	0	30,780	426,280	351,336	808,396
	Juveniles	18,468	0	18,468	255,768	210,802	485,038
Pigeon Guillemot *Cepphus columba*	Adults	552	69	4,270	4,996	13,886	23,152
	Juveniles	552	69	4,270	4,996	13,886	23,152
Cassin's Auklet *Ptychoramphus aleuticus*	Adults	87,599	0	87,600	100	63,400	151,100
	Juveniles	52,559	0	52,560	60	38,040	90,660
Rhinoceros Auklet *Cerorhinca monocerata*	Adults	24,010	0	60,814	1,000	1,703	63,517
	Juveniles	14,406	0	36,488	600	1,022	38,110
Tufted Puffin *Fratercula cirrhata*	Adults	18,051	0	23,342	5,031	266	28,639
	Juveniles	10,831	0	14,005	3,019	160	17,183
TOTAL - Adults		192,934	17,467	263,352	911,316	528,989	1,703,657
TOTAL - Juveniles		133,886	27,747	272,535	636,029	1,926,276	2,834,839
TOTAL - Overall		326,820	45,214	535,887	1,547,345	2,455,265	4,538,496

Sources:

Sowls, A. L., A. R. DeGange, J. W. Nelson, and G. S. Lester. 1980. Catalog of California seabird colonies. U.S. Fish and Wildl. Serv., Biol. Serv. Program. FWS/OBS 80/37.

Massey, B. W. 1988. California least tern field study, 1988 breeding season. Cal. Dept. Fish and Game Contract FG 7660, Cal. State Univ., Long Beach, CA.

Speich, S. M. and T. R. Wahl. 1989. Catalog of Washington seabird colonies. U.S. Fish and Wildl. Serv., Biol. Rpt. 88(6).

Carter, E. R., D. L. Jaques, C. S. Strong, G. J. McChesney, M. W. Parker, and J. E. Takekawa. In prep. Survey of seabird colonies in northern and central California. U.S.Fish and Wildl. Serv., Dixon, CA.

Strategic Assessment Branch. 1990. Cmas (Computer Mapping and Analysis System) analysis of seabird colonies for the west coast of North America. NOAA/SAB, Rockville, MD.

Personal communications from R Lowe for Oregon information.

Table 8. Comparative significance of study areas based on the distributions of selected marine bird species occurring off Washington.

MARINE BIRDS	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Pacific Loon	○	○	●	●		●	●
Western & Clark's Grebes				○			●
Northern Fulmar 1/2/	●	●	●		●	●	
Sooty Shearwater 1/2/	●	○	○	○	○	●	○
Brown Pelican	○	○	○	○	○	○	○
Brandt's Cormorant	○			●			●
Brant				○			● 3/
Surf Scoter 2/	○	○	●	● 3/		○	○
Sanderling 2/				●			● 3/
Bald Eagle				●			●
Red Phalarope	○	●	●	●	●	●	●
California Gull	○	○	○	○	○	○	○
Western Gull	○	○	○	○	○	○	●
Glaucous-winged Gull	○	○	●	●	●	●	●
Black-Legged Kittiwake 1/2/	●	●	●	●	●	●	●
Common & Thick Billed Murres 4/	●	○	●	●	●	●	●
Ancient Murrelet 2/	●	○	○	○	○	○	○
Cassin's Auklet	○	○	○	○	○	○	○
Rhinoceros Auklet	●	●	●	●	●	●	●
Tufted Puffin	●	●	●	●	●	●	●
Point Totals 5/	26	23	26	33	23	27	36

○ Not Significant = 1
● Significant = 2
● Very Significant = 3

(Significance relative to species distribution along the contiguous U.S. West Coast.)

Source: Strategic Assessment Branch (SAB). *West Coast of North America Coastal and Ocean Zones Strategic Assessment: Data Atlas*, Marine Birds Pre-publication Volume. NOAA, SAB, Rockville, MD.

FOOTNOTES:
1/ Pelagic seabird.
2/ Uses Region as a non-breeding, wintering area.
3/ Possible staging area for spring migrations.
4/ Mainly present during winter.
5/ A summary of point values (i.e. significance) associated with all species within an area.

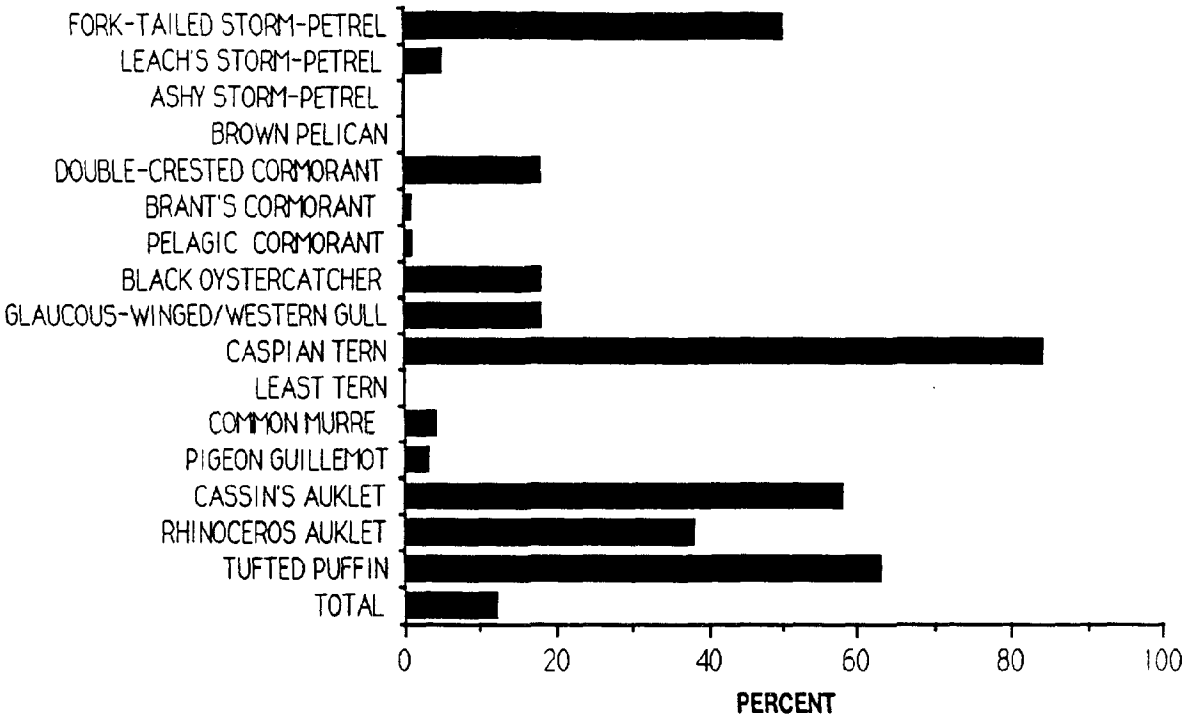


Figure 15. Percentages of contiguous U.S. West Coast seabird populations present within coastal Washington areas under consideration for marine sanctuary status.

Sources:

Sowls, A. L., A. R. DeGange, J. W. Nelson, and G. S. Lester. 1980. Catalog of California seabird colonies. U.S. Fish and Wildl. Serv., Biol. Serv. Program. FWS/OBS 80/37.

Massey, B. W. 1988. California least tern field study, 1988 breeding season. Cal. Dept. Fish and Game Contract FG 7660, Cal. State Univ., Long Beach, CA.

Speich, S. M. and T. R. Wahl. 1989. Catalog of Washington seabird colonies. U.S. Fish and Wildl. Serv., Biol. Rpt. 88(6).

Carter, E. R., D. L. Jaques, C. S. Strong, G. J. McChesney, M. W. Parker, and J. E. Takekawa. In prep. Survey of seabird colonies in northern and central California. U.S.Fish and Wildl. Serv., Dixon, CA.

Strategic Assessment Branch. 1990. Cmas (Computer Mapping and Analysis System) analysis of seabird colonies for the west coast of North America. NOAA/SAB, Rockville, MD.

Personal communications from R. Lowe for Oregon information.

MAMMALS

IX Information on Marine Mammals

- A comparative significance analysis of marine mammal distributions (Table 8) suggests that offshore areas under consideration for marine sanctuary status (Areas 1, 2, and 5) are more important for marine mammal distributions than other areas.

- In general, most of the region under consideration for sanctuary status occurs within migration pathways for several species.

- A major adult summer area for the endangered fin whale occurs along the continental slope seaward of the study area.

Table 9 Comparative significance of study areas based on the distributions of selected marine mammal species occurring off Washington.

MAMMALS	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7
Sea Otter 1/	○	○	○	●	○		
Northern Fur Seal 2/	◉	◉			◉		
Northern Sea Lion	●	●	●	●	●	●	●
California Sea Lion 3/	●	●	●	●	●	●	●
Northern Elephant Seal 4/	●	●	●	●	●	●	●
Harbor Seal 5/	○	◉	◉	●	◉	◉	●
Killer Whale	●	●	●	●	●	●	●
Northern Right Whale Dolphin	○	◉			◉		
Pacific White-side Dolphin	●	●	●		●	●	
Harbor Porpoise 6/	◉	○	◉	◉	○	●	●
Sperm Whale 7/	●	●			●		
Cuvier's Beaked Whale	◉	◉			◉		
Baird's Beaked Whale	●	●			●		
Stejneger's Beaked Whale	◉	◉			◉		
Hubb's Beaked Whale	◉	◉			◉		
Gray Whale 8/	●	●	●	●		●	●
Right Whale 7/ 9/	●	●	●	●	●	●	●
Humpback Whale 7/	◉	◉	◉	◉	◉	◉	◉
Minke Whale 7/ 10/	◉	◉	◉	◉	◉	◉	◉
Fin Whale 7/ 11/	●	●	●	●	●	●	●
Blue Whale 7/	◉	◉	◉	◉	◉	◉	◉
Risso's Whale	●	●			●	○	
Dall's Porpoise	●	●	●	○	●	●	
Striped Dolphin	○	○	○		○	●	
Point Totals 12/	56	55	38	35	55	40	32

○ Not Significant = 1
● Significant = 2
● Very Significant = 3

(Significance relative to species distribution along the contiguous U.S. West Coast.)

Source: Strategic Assessment Branch (SAB). *West Coast of North America Coastal and Ocean Zones Strategic Assessment: Data Atlas, Marine Mammals Pre-publication Volume.*. NOAA, SAB, Rockville, MD.

FOOTNOTES:

1/ Mainly found in waters shallower than 20 m.
2/ Concentration of juveniles less than 3 years old and some adult females occur off the Washington Coast.
3/ No rookeries and only one minor haulout area occurs in Washington waters.
4/ Only males are found in Washington waters.
5/ Area 7 contains two out of the eight major rookeries located along the U S West Coast. Approx. 10,000 harbor seals are found in Washington
6/ Year-round Adult concentrations occur in Areas 6 and 7.
7/ Endangered.
8/ Areas important during seasonal migrations in Nov.-June.
9/ Nearly extinct in north Pacific (~200 animals).
10/ Feeding and migration areas occur off Washington.
11/ A major adult area occurs on the continental slope seaward of the study region during April-Sept.; additional individuals migrate through area in Sept. - Oct.
12/ A summary of point values (i e. significance) associated with all species within an area

APPENDIX A

Table A.1--Land use by county and USGS Cataloging Unit in lands adjacent to waters considered for the proposed coastal Washington marine sanctuary.

Study Area	County	Land use (in square miles)					
		Urban	Agriculture	Range	Forest	Wetlands	Totals
4	Clallam	29	35	11	1550	16	1641
4	Jefferson	22	9	17	1572	8	1627
4 & 7	Grays Harbor	34	58	6	1751	57	1906
7	Pacific	10	28	6	794	16	854
	Total	95	130	39	5666	97	6028

Study Area	Cataloging Unit	Land use (in square miles)					
		Urban	Agriculture	Range	Forest	Wetlands	Totals
4	17100101	9	4	9	1132	11	1165
4	17100102	6	0	1	1041	34	1082
7	17100104 (1)	15	37	1	780	9	843
7	17100105	11	4	2	430	18	466
7	17100106	11	27	6	869	17	929
	Total	42	68	10	3121	78	3320

(1) Land use information for Cataloging Unit 17100103 is not available.

Source: Strategic Assessment Branch. 1986. *West Coast Land Use Data for NCPDI Counties* [data base]. Rockville, MD: OMA/NOAA.

APPENDIX B

Appendix B. Freshwater Flow Information

Information on Freshwater Inputs into Areas Considered for the Proposed Coastal Washington Marine Sanctuary

Appendix Table B.1. lists the major rivers and streams in watersheds which drain into coastal portions of the sanctuary study region, along with the average long-term flow and the drainage area above the gage from which flow is measured. Of the 20 rivers and streams shown on Table B.1, the Chelhalis River, which discharges to Grays Harbor, has the largest flow. Compared to other major rivers on the West Coast, the rivers in this region are relatively small in terms of long term average flow. For example, the long-term flow of the Columbia River, measured at a point upstream of the confluence with the Williamette River, is about 40 times larger than that of the Chehalis River (192,000 cubic feet per second (cfs) versus 5,100 cfs).

While relatively small in terms of flow, the rivers adjacent to the study region have high water yields - the volume of river flow generated per unit area of land - compared to other rivers on the West Coast. For example, the Quinault River ranks first in water yield of the 47 rivers inventoried by NOAA in 1990, with a yield of 10.77 cfs per square mile, while the Columbia River ranks 40th on the West Coast, with a yield of 0.8 cfs per square mile. Water yield is a function of many factors, including precipitation, land use and topography of the river's watershed. In this case, the high yields for rivers in the study area primarily reflects substantial precipitation in the region and the relatively steep topography associated with mountainous terrain.

Source: Personal communication with Steve Rohmann, NOAA Strategic Assessment Branch, Rockville, MD.

Table B.1--Information on freshwater flow of rivers in lands adjacent to areas under consideration for the proposed coastal Washington marine sanctuary.

Study Area	River Name	Monitoring Station Location	Average daily flow (in cubic feet per second)	Drainage area at Gage (in square miles)	Ranking based on flow (1)	Yield (average flow/ drainage area)	Ranking based on yield (2)
4	Queets River	near Clearwater	4,227	445	14	9.50	4
4	Quinault River	at Quinault Lake	2,843	264	17	10.77	1
4	Hoh River	at Highway 101 near Forks	2,521	253	18	9.96	3
4	Soleduck River	near Quillayute	1,465	219	24	6.69	11
4	Bogachiel River	near Forks	955	111	28	8.60	5
4	Raft River	below Rainy Creek near Queets	543	76	32	7.14	8
4	Dickey River	near La Push	525	86	33	6.10	17
4	Ozette River	at Ozette	337	78	35	4.32	24
4	Moclips River	at Moclips	200	35	38	5.71	18
4	Sooes River	below Miller Creek near Ozette	198	32	40	6.19	16
7	Chehalis River	near Satsop	5,109	1,761	11	2.90	31
7	Humptulips River	near Humptulips	1,335	130	25	10.27	2
7	Wynoochee River	below Black Creek near Montesano	1,235	180	26	6.86	10
7	North River	near Raymond	963	219	27	4.40	23
7	Willapa River	near Willapa	628	130	29	4.83	21
7	Naselle River	near Naselle	425	55	34	7.73	6
7	Smith Creek	near Richmond	237	58	36	4.09	26
7	S. Fk., Naselle River	near Naselle	129	18	43	7.17	7
7	North Nemah River	near South Bend	115	18	44	6.39	13
7	Salmon Creek	near Naselle	112	16	45	7.00	9
	Total		24,102				

(1) Compares the average daily flow for 47 rivers discharging into the Pacific Ocean and Puget Sound. Included in the 47 rivers are the three with the largest average daily discharge: the Columbia River (192,734 cfs); the Willamette River (33,208 cfs); and the Sacramento River (25,217 cfs).

(2) Compares the yield for 47 rivers discharging into the Pacific Ocean and Puget Sound.

Source: Personal communication with Steve Rohmann. Strategic Assessment Branch, OMA/NOAA.

APPENDIX C

Appendix C. Pollution of Coastal Waters Information

Agricultural Pesticide Use in Lands Adjacent to Areas Considered for the Proposed Coastal Washington Marine Sanctuary

Lands adjacent to study Areas 4 and 7 contain relatively minor agricultural activity. The majority of these lands are forested (approximately 90%). The average agricultural acreage by county within these two study areas is only 3.6% (Appendix D Table D 1.3.). The major crops (excluding pasture/range) are alfalfa, barley, corn, wheat and peas. According to NOAA's National Coastal Pollutant Discharge Inventory, which maintains a data base of estimates on pesticide use for 28 common agricultural pesticides, the highest application by county for Areas 4 and 7 occurs in Grays Harbor County, with 6,836 pounds (base year 1982). In contrast, San Joaquin County, California is 98% agricultural area, with an estimated 658,000 pounds of the 28 agricultural pesticides applied. Typical of most pesticide application, herbicides make up the majority of amounts applied to lands adjacent to the proposed sanctuary region. Also, it should be noted that Clallum and Jefferson counties extend inland to Puget Sound; as a result, the total amount of agricultural pesticides applied in study Areas 4 and 7 is probably less than amounts estimated for those entire counties.

Additional Sources of Pesticides

Agricultural pesticide use in the Puget Sound and Columbia River Estuarine Drainage Areas (EDAs) is significantly higher than in drainage areas discharging to coastal waters of the proposed marine sanctuary. While it is possible that pesticides from the Columbia River and Puget Sound EDAs may affect the areas of the proposed sanctuary, it is unlikely because of travel times and amounts of dilution that occur in these systems.

Comparison of West Coast Pesticide Application Patterns by State

In comparison to the rest of the West Coast, Washington ranks second to California in agricultural pesticide application to coastal areas. More than three times as much pesticide was applied in coastal areas of California than in Washington. It should be noted, however, that California has significantly more coastal land area than Oregon and Washington combined.

Source: National Coastal Pollutant Discharge Inventory Program Data Base on Pesticide Use in Coastal Areas of the United States

Appendix Table C.1. Summary of pollutant discharges into counties adjacent to the proposed Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

Flow (millions of gallons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	40	7,630	567	0	798,700	6,666	0	813,603
17100102	4	97	4,232	0	0	599,100	582	0	604,011
17100103	7	8	11,800	173	2,440	12,220	1,649	824,000	852,289
17100104	7	417	27,480	11,800	14,350	315,600	12,470	0	382,117
17100105	7	2,403	17,530	7,154	4,390	219,800	1,260	0	252,537
17100106	7	636	6,033	100	3,782	212,700	5,973	0	229,224
Study Region Total:		3,602	74,705	19,794	24,962	2,158,120	28,600	824,000	3,133,781
West Coast Total:		971,400	702,000	862,500	750,200	8,858,000	1,352,000	94,850,000	112,500,000
% of West Coast:		0.4	10.6	2.3	3.3	24.4	2.1	0.9	2.8

BOD - Biochemical Oxygen Demand (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	5.1	153.0	28.4	0.0	8,061.1	9.4	0.0	8,257.0
17100102	4	12.9	84.8	0.0	0.0	4,152.1	0.8	0.0	4,250.6
17100103	7	1.1	1,648.0	10.9	93.8	116.3	4.8	5,160.0	7,034.8
17100104	7	63.5	4,068.2	589.0	28.4	5,187.4	11.2	0.0	9,947.7
17100105	7	89.8	2,384.0	459.0	0.3	3,526.0	1.2	0.0	6,460.3
17100106	7	114.0	482.3	50.3	256.6	7,058.5	21.5	0.0	7,983.3
Study Region Total:		286.3	8,820.3	1,137.6	379.1	28,101.5	48.8	5,160.0	43,933.7
West Coast Total:		339,670.0	54,580.0	46,748.0	58,652.0	232,630.0	163,840.0	620,180.0	1,516,300.0
% of West Coast:		0.1	16.2	2.4	0.6	12.1	0.0	0.8	2.9

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.1. Summary of pollutant discharges into counties adjacent to the proposed Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

TSS - Total Suspended Solids (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	5.1	191.0	426.0	0.0	474,010.0	314.7	0.0	474,950.0
17100102	4	18.6	106.2	0.0	0.0	787,520.0	108.0	0.0	787,750.0
17100103	7	1.1	951.0	138.0	4,690.7	5,634.0	237.8	20,600.0	32,253.0
17100104	7	88.3	4,398.3	8,840.0	1,435.1	209,640.0	615.9	0.0	225,020.0
17100105	7	66.8	5,782.4	5,744.0	20.8	141,010.0	60.6	0.0	152,680.0
17100106	7	174.0	362.2	755.0	11,716.0	282,110.0	1,434.3	0.0	296,550.0
Study Region Total:		353.8	11,791.1	15,903.0	17,862.5	1,899,924.0	2,771.4	20,600.0	1,969,205.9
West Coast Total:		224,090.0	77,892.0	660,710.0	9,737,500	23,592,000	35,790,000	30,833,000	101,000,000
% of West Coast:		0.2	15.1	2.4	0.2	8.1	0.0	0.1	1.9

TN - Total Nitrogen (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	1.9	22.3	6.5	0.0	4,023.5	4.7	0.0	4,058.9
17100102	4	4.6	12.4	0.0	0.0	2,075.8	0.4	0.0	2,093.2
17100103	7	0.5	116.7	2.1	73.1	58.2	2.4	2,890.0	3,143.0
17100104	7	22.9	104.2	136.0	29.1	2,593.6	5.6	0.0	2,891.4
17100105	7	113.5	65.5	89.1	3.6	1,763.1	0.6	0.0	2,035.4
17100106	7	37.1	31.4	11.6	139.6	3,524.0	10.8	0.0	3,754.5
Study Region Total:		180.4	352.5	245.4	245.4	14,038.3	24.4	2,890.0	17,976.3
West Coast Total:		55,648.0	3,605.1	10,167.0	39,110.0	116,300.0	81,931.0	330,520.0	644,520.0
% of West Coast:		0.3	9.8	2.4	0.6	12.1	0.0	0.9	2.8

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.1. Summary of pollutant discharges into counties adjacent to the proposed Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

TP - Total Phosphorus (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	1.3	3.2	1.0	0.0	40.2	0.0	0.0	45.8
17100102	4	2.8	1.8	0.0	0.0	20.8	0.0	0.0	25.4
17100103	7	0.4	4.5	0.3	2.3	0.6	0.0	129.0	137.2
17100104	7	17.3	8.0	20.6	1.2	25.9	0.1	0.0	73.1
17100105	7	71.4	3.2	14.4	0.2	17.6	0.0	0.0	106.8
17100106	7	30.0	2.7	1.8	2.1	35.2	0.1	0.0	71.9
Study Region Total:		123.2	23.4	38.0	5.9	140.4	0.2	129.0	460.1
West Coast Total:		39,844.0	312.9	1,576.7	1,029.6	1,163.0	819.3	30,738.0	75,574.0
% of West Coast:		0.3	7.5	2.4	0.6	12.1	0.0	0.4	0.6

As - Arsenic (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	0.0	0.0	0.0	0.0	3.1	0.0	0.0	3.1
17100102	4	0.0	0.0	0.0	0.0	5.1	0.0	0.0	5.1
17100103	7	0.0	0.0	0.0	0.0	0.0	0.0	3.4	3.5
17100104	7	0.1	0.0	0.3	0.0	1.4	0.0	0.0	1.8
17100105	7	0.3	0.0	0.2	0.0	0.9	0.0	0.0	1.5
17100106	7	0.1	0.0	0.0	0.1	1.8	0.0	0.0	2.0
Study Region Total:		0.5	0.0	0.6	0.1	12.4	0.0	3.4	17.0
West Coast Total:		91.7	24.1	24.2	77.7	114.5	221.8	630.7	1,184.6
% of West Coast:		0.5	0.1	2.4	0.1	10.8	0.0	0.5	1.4

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.1. Summary of pollutant discharges into counties adjacent to the proposed Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

Cd - Cadmium (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2
17100102	4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.3
17100103	7	0.0	0.0	0.0	0.0	0.0	0.0	3.4	3.4
17100104	7	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.2
17100105	7	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.4
17100106	7	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.2
Study Region Total:		0.3	0.1	0.2	0.0	0.8	0.0	3.4	4.8
West Coast Total:		72.9	8.2	7.3	3.9	9.4	14.3	431.7	547.7
% of West Coast:		0.4	1.6	2.4	0.2	8.0	0.0	0.8	0.9

Cr - Chromium (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	0.0	0.0	0.0	0.0	47.4	0.0	0.0	47.5
17100102	4	0.0	0.0	0.0	0.0	78.8	0.0	0.0	78.8
17100103	7	0.0	0.0	0.0	0.5	0.6	0.0	34.4	35.5
17100104	7	0.1	1.0	0.5	0.1	21.0	0.1	0.0	22.8
17100105	7	0.4	1.5	0.5	0.0	14.1	0.0	0.0	16.6
17100106	7	0.2	0.0	0.0	1.2	28.2	0.1	0.0	29.8
Study Region Total:		0.8	2.6	1.1	1.8	190.0	0.3	34.4	230.8
West Coast Total:		240.8	74.5	42.5	814.5	2,166.4	3,017.2	4,195.5	10,551.3
% of West Coast:		0.3	3.4	2.5	0.2	8.8	0.0	0.8	2.2

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.1. Summary of pollutant discharges into counties adjacent to the proposed Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

Pb - Lead (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	0.0	0.0	0.4	0.0	11.4	0.0	0.0	11.8
17100102	4	0.0	0.0	0.0	0.0	15.7	0.0	0.0	15.7
17100103	7	0.0	0.0	0.2	0.1	0.1	0.0	17.4	17.8
17100104	7	0.1	0.3	8.9	0.0	4.2	0.0	0.0	13.6
17100105	7	0.5	1.1	6.3	0.0	2.8	0.0	0.0	10.6
17100106	7	0.1	0.0	0.8	0.2	5.6	0.0	0.0	6.8
Study Region Total:		0.7	1.4	16.6	0.4	39.8	0.1	17.4	76.3
West Coast Total:		191.5	55.7	684.4	204.0	411.4	824.6	1,013.2	3,384.8
% of West Coast:		0.4	2.5	2.4	0.2	9.7	0.0	1.7	2.3

Hg - Mercury (pounds per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	0.1	0.0	0.5	0.0	132.6	0.1	0.0	133.3
17100102	4	0.3	0.0	0.0	0.0	165.7	0.0	0.0	166.1
17100103	7	0.0	0.0	0.2	1.0	1.9	0.1	725.0	728.2
17100104	7	1.7	6.9	9.8	0.6	82.0	0.2	0.0	101.2
17100105	7	7.6	15.8	9.2	0.0	56.3	0.0	0.0	89.0
17100106	7	2.8	0.1	0.8	4.7	112.5	0.6	0.0	121.5
Study Region Total:		12.5	22.8	20.6	6.2	551.1	1.0	725.0	1,339.2
West Coast Total:		4,535.3	912.4	835.5	2,399.0	4,377.2	8,271.1	227,861.4	249,191.9
% of West Coast:		0.3	2.5	2.5	0.3	12.6	0.0	0.3	0.5

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.1. Summary of pollutant discharges into counties adjacent to the proposed Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

Oil and Grease (tons per year)

		Point Sources		Nonpoint Sources					All Sources
USGS Cataloging Unit	Study Area	Wastewater Treatment Plants	Direct Industrial Dischargers	Urban Runoff	Cropland Runoff	Forestland Runoff	Pasture/ Range	Upstream Sources	Total
17100101	4	2.6	0.0	16.9	0.0	0.0	0.0	0.0	19.5
17100102	4	4.6	0.0	0.0	0.0	0.0	0.0	0.0	4.6
17100103	7	1.0	0.0	5.2	0.0	0.0	0.0	0.0	6.1
17100104	7	33.6	2.4	191.0	0.0	0.0	0.0	0.0	227.0
17100105	7	116.5	0.6	159.4	0.0	0.0	0.0	0.0	276.4
17100106	7	60.9	0.7	15.4	0.0	0.0	0.0	0.0	77.0
Study Region Total:		219.1	3.6	387.9	0.0	0.0	0.0	0.0	610.6
West Coast Total:		62,561.5	1,652.2	29,581.3	0.0	0.0	0.0	0.0	93,795.1
% of West Coast:		0.4	0.2	1.3	N/A	N/A	N/A	N/A	0.7

Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.2--Major point source dischargers into counties adjacent to areas under consideration for the proposed coastal Washington marine sanctuary (circa 1984).

Study Area	USGS Cataloging Unit	NPDES Code	Facility Name	SIC Code	Activity	Flow - in millions of gallons/year
7	17100103	WA0039144	Domsea Farms	2091	Canned and cured seafoods	900.0
7	17100104	WA0000809	Weyerhaeuser Co., Cosmopolis	2611	Pulp mills	8,220.0
7	17100105	WA0003077	ITT Rayonier Inc., Hoquiam	2611	Pulp mills	9,760.0
7	17100105	WA0037192	Aberdeen Sewage Treatment Plant	4952	Sewerage systems	1,680.0
7	17100105	WA0020915	Hoquiam Sewage Treatment Plant	4952	Sewerage systems	617.0
7	17100106	WA0024848	Peterson and Sons Seafood, Inc.	2091	Canned and cured seafoods	110.0
7	17100106	WA0001988	Harbor Bell, Inc.	2092	Fresh and frozen packaged fish	43.6
Total						21,330.6

Notes: NPDES-- National Pollutant Discharge Elimination System; SIC - Standard Industrial Classification
Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix C.3--Description of pollutant outputs by major point sources discharging into counties adjacent to areas under consideration for the proposed coastal Washington marine sanctuary (circa 1984).

Facility Name	BOD tons/year	TSS tons/year	TN tons/year	TP tons/year	Arsenic tons/year	Cadmium tons/year	Chromium tons/year	Lead tons/year	Mercury pounds/year	Oil & Grease tons/year
Domsea Farms	1,430	679	85	0	0	0	0	0	0	0
Weyerhaeuser Co., Cosmopolis	3,680	3,910	48	0	0	0	1.03	0.343	6.86	0
ITT Rayonier Inc., Hoquiam	2,140	5,520	39	0	0.0257	0.128	1.48	1.05	15.8	0
Aberdeen Sewage Treatment Plant	60	30	79	49	0.226	0.0792	0.301	0.313	5.23	79
Hoquiam Sewage Treatment Plant	11	15	29	18	0.0831	0.0291	0.11	0.115	1.92	29
Peterson and Sons Seafood, Inc.	255	155	9	0	0.000157	0.000784	0.00392	0.0047	0.0627	0
Harbor Bell, Inc.	76	39	4	0	0	0	0	0	0	0
Totals	7,651	10,348	292	67	0	0	3	2	30	108

Notes: BOD - Biochemical Oxygen Demand; TSS - Total Suspended Solids; TN - Total Nitrogen; TP - Total Phosphorus
Source: Strategic Assessment Branch, NOAA, 1984: The National Coastal Pollutant Discharge Inventory, Rockville, MD

Appendix Table C.4--Number of direct discharging point sources within counties adjacent to areas under consideration for the proposed coastal Washington marine sanctuary, by USGS Cataloging Unit and source category (circa 1984).

USGS Cataloging Unit	Study Area	Industrial			Waste Water Treatment Plants			Total		
		Major	Minor	Total	Major	Minor	Total	Major	Minor	Total
17100101	4	0	2	2	0	2	2	0	4	4
17100102	4	0	2	2	0	2	2	0	4	4
17100103	7	1	5	6	0	1	1	1	6	7
17100104	7	1	9	10	0	3	3	1	12	13
17100105	7	1	17	18	2	2	4	3	19	22
17100106	7	2	16	18	0	4	4	2	20	22
Totals		5	51	56	2	14	16	7	65	72

Note: The qualifiers "Major" and "Minor" are from EPA'a classification for discharging facilities.

APPENDIX D

Table D.1--Socio-economic information for coastal counties associated with the proposed coastal Washington marine sanctuary and other coastal regions of the USA: Demographics.

Region	Population by age group (1980)					Total population by year							Population Density
	Under 5	5-17	Under 18	18-64	Over 65	1960	1970	1980	1988	1990	2000	2010	1988
Outer Washington Coast													
Clallam County	4,009	9,857	13,866	30,370	7,312	30,022	34,770	51,648	56,000	58,802	67,801	73,577	32
Grays Harbor County	5,252	13,716	18,968	38,950	8,396	54,465	59,553	66,314	62,900	64,011	67,463	70,953	33
Jefferson County	1,071	2,907	3,978	9,469	2,518	9,639	10,661	15,965	19,500	21,048	25,490	28,150	11
Pacific County	1,188	3,221	4,409	9,860	2,968	14,674	15,796	17,237	17,800	17,937	19,138	20,216	20
Counties combined	11,520	29,801	41,321	88,649	21,194	108,800	120,780	151,164	156,200	161,798	179,892	192,896	24
County average	2,880	7,450	10,330	22,162	5,299	27,200	30,195	37,791	39,050	40,450	44,973	48,224	24
State of Washington													
Coastal counties combined	306,123	833,237	1,139,360	2,561,234	431,562	2,853,000	3,413,000	4,132,000	4,648,000	4,733,000	5,235,000	5,593,000	70
County average	7,849	21,365	29,214	65,673	11,066	73,154	87,513	105,949	119,179	121,359	134,231	143,410	70
West Coast (1)													
Coastal counties combined	1,681,325	4,639,395	6,320,720	15,112,452	2,401,728	16,171,992	20,485,022	23,835,249	27,574,600	28,250,430	31,288,949	33,497,063	351
County average	32,333	89,219	121,552	290,624	46,187	311,000	393,943	458,370	530,281	543,278	601,711	644,174	351
Total Coastal USA (2)													
Coastal counties combined	6,919,389	20,505,029	27,424,418	62,016,017	11,407,738	79,757,829	92,941,938	100,849,575	110,181,700	111,643,081	120,005,141	127,226,234	157
County average	15,342	45,466	60,808	137,508	25,294	176,847	206,080	223,613	244,305	247,546	266,087	282,098	157

(1) Washington, Oregon, and California.
(2) Includes Alaska, Hawaii, and the Great Lakes region.

Sources: Bureau of the Census. 1989. Current Populations Reports, Population Estimates and Projections. Series p-26, No. 88-a. County Population Estimates: July 1, 1988, 1987, and 1986. U.S. Department of Commerce. Washington, D.C.: U.S. Government Printing Office. 45 pp.
National Planning Association Data Services, Inc. 1988. *Key Indicators of County Growth, 1970-2010* [data base]. Washington, D.C.: National Planning Association Data Services, Inc.
Slater Hall Information Products, Inc. 1988. *Populations Statistics* [data base]. Washington, D.C.: Slater Hall Information Products, Inc.

Table D.2--Socio-economic information for coastal counties associated with the proposed coastal Washington marine sanctuary and other coastal regions of the USA: Single unit housing construction permits and levels of occupancy.

Region	Numbers of Construction Permits for Single Housing Units by Year					Total Housing Units	Total Units Occupied	Total Year-round Detached Housing (3)	Aggregate Value in Dollars (4)
	1985	1986	1987	1988	1989	(1980)	(1980)	(1980)	(1980)
Outer Washington Coast									
Clallam County	178	230	195	283	414	21,851	19,996	14,908	2,479,525
Grays Harbor County	100	95	80	108	118	28,598	25,181	18,912	2,509,515
Jefferson County	128	125	127	137	255	8,826	6,359	5,740	849,725
Pacific County	48	58	50	46	56	10,949	6,940	5,810	616,010
Counties combined	454	508	462	574	843	70,224	58,476	45,370	6,454,775
County average	114	127	116	144	211	17,556	14,619	11,343	1,613,694
State of Washington									
Coastal counties combined	17,041	19,262	19,962	21,484	26,420	1,689,450	1,540,510	1,145,385	80,183,508
County average	437	494	512	551	677	43,319	39,500	67,376	2,055,987
West Coast (1)									
Coastal counties combined	91,908	107,543	103,089	114,925	121,473	9,347,412	8,807,322	5,292,796	1,554,550,670
County average	1,767	2,068	1,982	2,210	2,336	179,758	169,372	101,785	29,895,205
Total Coastal USA (2)									
Coastal counties combined	430,989	479,222	465,496	448,062	420,071	39,598,628	36,236,919	20,103,017	4,409,191,540
County average	956	1,063	1,032	993	931	87,802	80,348	44,574	9,776,478

(1) Washington, Oregon, and California.
(2) Includes Alaska, Hawaii, and the Great Lakes region.
(3) Total year-round, detached, single family housing units (includes owner-occupied and rentals).
(4) Aggregation for all non-condominium dwellings (owner-occupied only). Value should be multiplied by 250.

Sources: Bureau of the Census. 1988. *County and City Data Book, 1988*. U. S. Department of Commerce. Washington, D. C.: U. S. Government Printing Office. 797 pp. + Appendices.
Bureau of the Census. 1990. *Building Permit Data Offering Information Package* [data base]. Prepared by the Construction Statistics Division, Building Permits Branch. Washington, D.C. U.S. Department of Commerce.
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Table D.3--Socio-economic information for coastal counties associated with the proposed coastal Washington marine sanctuary and other coastal regions of the USA: Employment and farming information.

Region	Employment							Farming (1982)		Total Land Area (1980)
	Numbers per sector (1985)					Total work force 1986	Total unemployed 1986	Farm acreage (x 1000)	Value of farm report ($ x 1kk)	(sq. mi.)
	Manufacturing	Retail	FIRE (3)	Service	Total non-farm					
Outer Washington Coast										
Clallam County	2,785	3,010	454	2,292	10,660	21,956	2,161	28	6	1,753
Grays Harbor County	5,782	3,735	598	3,305	16,066	25,910	3,272	49	17	1,918
Jefferson County	644	943	117	700	2,876	7,776	638	16	3	1,805
Pacific County	989	827	155	772	3,441	6,968	870	39	9	908
Counties combined	10,200	8,515	1,324	7,069	33,043	62,610	6,941	132	35	6,384
County average	2,550	2,129	331	1,767	8,261	15,653	1,735	33	9	1,596
State of Washington										
Coastal counties combined	280,329	300,816	100,123	361,519	1,336,675	2,178,000	179,000	16,470	2,831	66,511
County average	7,188	7,713	2,567	9,270	34,274	55,846	4,590	422	73	1,705
West Coast (1)										
Coastal counties combined	2,265,532	1,945,214	807,037	2,737,134	9,803,060	13,454,362	846,407	12,921	4,843	78,502
County average	43,568	37,408	15,520	52,637	188,520	258,738	16,277	248	93	1,510
Total Coastal USA (2)										
Coastal counties combined	8,449,476	7,819,010	3,250,097	11,287,437	38,927,505	53,121,270	3,470243	62,471	16,987	701,894
County average	18,735	17,337	7,206	25,028	86,314	117,786	7,695	139	38	1,556

(1) Washington, Oregon, and California.
(2) Includes Alaska, Hawaii, and the Great Lakes region.
(3) Finance, Insurance, and Real Estate.

Source: Bureau of the Census. 1988. *County and City Data Book, 1988.* U. S. Department of Commerce. Washington, D. C.: U. S. Government Printing Office. 797 pp. + Appendices.

APPENDIX E

Appendix E. Living Marine Resources Information

Methodology for the Comparative Significance of Study Areas analyses

The relative importance of the seven analysis areas within the marine sanctuary study region was determined by examining information concerning distribution and abundance of the region's living marine resources. The assumption of this examination was that an area which was important at the highest level of significance for the greatest number of species would be more valuable as a marine sanctuary than other study areas. This was tested by evaluating the "significance" of each study area based on geographical distributions for any life stage of a variety of species. The species selected for this analysis were those addressed in the *West Coast of North America Coastal and Ocean Zones Strategic Assessment: Data Atlas*, a NOAA publication. They included 19 species of invertebrates, 33 fishes, 22 marine birds, and 24 marine mammals. The following is a list of factors relating to this analysis.

- Each group of species (i.e., invertebrates, fishes, etc.) was treated separately, but examined similarly.
- The criterion for the analysis was the extent that the species used the study area (i.e., how much of a species' distribution covered the area) and the relative level of abundance of the species as shown in the atlas (e.g., occasional occurrence, adult area, major adult area, etc.).
- Scores were given to each area for every species as follows:
  --"3" for *very significant presence*. For this rating, at least one-quarter of the study area contained the highest level of abundance present off the contiguous U.S. West Coast (for any life stage), and most of the remaining portion of the study area contained other levels of abundance.
  --"2" for *significant presence*. This rating was given when at least half of the study area contained the at least the lowest level of abundance present off the West Coast.
  --"1" for *present, but not significantly*. This rating was given when less than half of the study area contained the lowest level of abundance present off the West Coast.
  --"0" for not present.
- A two-person team analyzed each group.
- No judgements were made regarding the importance of the species.
- After the team examined its group, the two team members compared their independent evaluations and reconciled scoring differences.

The relative significance of each area was then determined by summing the scores for all species in the group: the higher the cumulative total, the more important the area.

The above described analysis attempted to objectively examine qualitative information to derive the relative importance of one study area to another. However, the analysis was somewhat biased toward species with wide geographic distributions. For example, market squid pelagically occurs along most of the West Coast from coastal waters to far offshore, while Pacific razor clam is found only along sandy beaches at very restricted depths. Area 7, a shallow-water nearshore area, was scored identically for the two species, even though high concentrations of the razor clam occur in this area. The identical moderate score ("2") resulted because the razor clam concentrations occur only in a narrow band that was smaller than that identified for the highest rating ("3").

Because of possibly low rankings of limited-distribution species, a second analysis was performed on invertebrates and fishes. This analysis incorporated a "density index" into scoring species importance for each study area. Since all species examined have recreational and/or commercial importance, the density index was based on commercial and sport catch statistics for harvests in

Appendix E.
Methodology...(continued).

the study region. The index ranged from 10 to 1, depending upon harvest levels. For example, a heavily harvested species like Dungeness crab was assigned an index value of "10", the moderately harvested giant octopus was assigned an index value of "4", and the slightly harvested spot shrimp was assigned a value of "2". The study area score from the previous analysis was then multiplied by the density index and resulted in the following scores:

--21 to 30. This score was given to an area when it contained a widely distributed and highly abundant species.

--11 to 20. This score was assigned when the area contained a species that was either widely distributed or highly abundant.

--10 or less. This score was assigned when the area contained a species that only occasionally occurred there and not abundantly.

An area's relative importance was then determined by summing that area's scores for all species and comparing the totals for each area.

Table E.1--Estimated volumes (lbs) landed for commerical harvests from along Washington's outer coast and from all Washington waters, 1987 and 1988.

	Washington's outer coast (1)			Washington in-state total (2)		
Species (3)	1987	1988	Average	1987	1988	Average
albacore	183,986	2,456,513	1,320,250	183,986	2,456,513	1,320,250
northern anchovy	171,111	78,864	124,988	171,111	78,957	125,034
Pacific herring	0	0	0	1,190,921	1,756,510	1,473,716
silver smelt	75,330	64,762	70,046	135,132	150,846	142,989
Pacific halibut	322,121	267,218	294,670	346,948	286,047	316,498
butter sole	60	0	30	1,478	3,266	2,372
Dover sole	3,239,532	4,229,425	3,734,479	3,288,115	4,278,631	3,783,373
English sole	1,002,043	835,678	918,861	1,813,727	1,835,938	1,824,833
petrale sole	999,804	836,134	917,969	1,000,044	836,276	918,160
rex sole	130,157	93,849	112,003	130,639	93,849	112,244
rock sole	5,837	7,223	6,530	74,810	63,771	69,291
sand sole	197,417	50,852	124,135	255,100	141,008	198,054
sole spp.	13,854	12,550	13,202	13,884	12,550	13,217
sanddab	12,870	5,169	9,020	13,013	5,169	9,091
starry flounder	111,114	259,570	185,342	612,439	818,031	715,235
arrowtooth flounder	4,315,506	2,654,272	3,484,889	4,324,834	2,660,171	3,492,503
sablefish	6,219,161	6,034,711	6,126,936	6,257,003	6,105,933	6,181,468
lingcod	2,211,308	1,589,194	1,900,251	2,332,417	1,682,270	2,007,344
Pacific cod	3,273,366	4,773,738	4,023,552	5,029,319	5,971,136	5,500,228
walleye pollock	58,289	47,048	52,669	134,812	69,023	101,918
Pacific whiting	5,700	35,397	20,549	672,588	616,217	644,403
Pacific ocean perch	979,545	1,190,554	1,085,050	979,890	1,190,554	1,085,222
idiot rockfish		64,003	32,002	7,069,021	64,057	3,566,539
widow rockfish		5,223,678	2,611,839	3,694,795	5,223,820	4,459,308
yellowtail rockfish		4,846,618	2,423,309	0	4,917,578	2,458,789
rockfish spp	16,190,859	3,910,067	10,050,463	5,557,830	3,912,644	4,735,237
rockfish oth.		2,544,913	1,272,457	0	2,662,550	1,331,275
striped seaperch	0	0	0	18,178	18,253	18,216
pile perch	98	232	165	79,137	99,671	89,404
silver perch	128	12	70	128	12	70
sculpins spp.	1,964	2,441	2,203	4,629	4,888	4,759
sharks spp.	2,173	2,761	2,467	5,075	4,213	4,644
blue shark	497	123	310	497	123	310
spiny dogfish	301,176	431,075	366,126	3,456,157	3,520,486	3,488,322
soupfin shark	3,332	2,410	2,871	3,593	2,410	3,002
thresher shark	60,144	1,792	30,968	60,144	1,792	30,968
skates	103,732	55,180	79,456	336,133	279,953	308,043
chinook salmon	2,616,986	2,570,789	2,593,888	8,016,318	8,893,032	8,454,675
chum salmon	1,307,989	2,055,501	1,681,745	13,953,578	17,994,381	15,973,980
pink salmon	93,401	234	46,818	9,611,376	1,076	4,806,226
coho salmon	2,277,399	8,180,325	5,228,862	12,722,433	8,247,784	10,485,109
sockeye salmon	100,993	103,083	102,038	11,930,998	5,310,045	8,620,522
butter clam	0	0	0	15,315	8,561	11,938
cockles	0	0	0	1,657	2,450	2,054
horse clams	0	0	0	21,648	6,575	14,112
geoduc	0	0	0	4,462,055	4,608,828	4,535,442
Pacific littleneck	13,977	206	7,092	1,253,165	960,082	1,106,624
razor clam	103	94	99	103	94	99
Manila clam	119,003	80,134	99,569	3,888,210	3,124,197	3,506,204
softshell clams	0	6,031	3,016	344,210	135,645	239,928

Table E.1--Estimated volumes (lbs) landed ... (continued)

Species (3)	Washington's outer coast (1)			Washington in-state total (2)		
	1987	1988	Average	1987	1988	Average
blue mussel	0	0	0	284,039	248,861	266,450
California mussel	0	0	0	645	0	323
mussels spp.	75	0	38	12,885	0	6,443
Olympia oyster	0	0	0	7,125	38,464	22,795
Pacific oyster	6,374,513	5,437,602	5,906,058	9,436,221	7,777,552	8,606,887
Kumamoto oyster	0	0	0	312	89	201
European oyster	0	0	0	9,030	8,385	8,708
Dungeness crab	5,067,139	14,546,162	9,806,651	6,720,516	16,480,027	11,600,272
coonstripe shrimp	0	20	10	50,598	98,420	74,509
spot shrimp	0	0	0	34,214	65,861	50,038
sidestripe shrimp	0	0	0	1,002	856	929
ocean pink shrimp	12,168,800	14,690,461	13,429,631	12,202,834	14,715,282	13,459,058
scallops	0	0	0	39,163	46,682	42,923
octopus	38,237	47,210	42,724	85,041	131,096	108,069
squid	1,669	519	1,094	8,720	3,280	6,000
sea cucumbers	0	0	0	365,081	2,100,114	1,232,598
red sea urchin	0	7,030	3,515	3,602,986	8,846,945	6,224,966
green sea urchin	0	0	0	300,258	1,010,090	655,174
Totals	70,374,485	90,335,415	80,352,963	148,631,250	152,691,858	150,659,567

Notes:

(1) Cape Flattery to Cape Disappointment; landings for anadromous species include harvests from coastal rivers.

(2) Includes outer coastal waters, the Strait of Juan De Fuca, Puget Sound, and Washington rivers (landings for Columbia River tributaries are incorporated).

(3) Estimates are based on 1987 and 1988 pounds landed by State of Washington statistical subarea provided by Dale Ward, Washington Department of Fisheries, Olympia, WA.

Table E.2--Estimated values (dollars) for commercial landings from harvests along Washington's outer coast and from all Washington waters, 1987 and 1988.

Species (3)	Washington's outer coast (1)			Washington in-state total (2)		
	1987	1988	Average	1987	1988	Average
albacore	132,249	2,048,977	1,090,613	132,249	2,048,977	1,090,613
northern anchovy	58,742	29,945	44,344	58,742	29,980	44,361
Pacific herring	0	0	0	479,346	1,085,348	782,347
silver smelt	8,814	22,304	15,559	15,810	51,951	33,881
Pacific halibut	464,273	328,892	396,582	500,056	352,067	426,061
butter sole	25	0	12	611	1,225	918
Dover sole	827,053	1,079,772	953,412	839,456	1,092,334	965,895
English sole	296,304	247,110	271,707	536,319	542,887	539,603
petrale sole	747,653	625,261	686,457	747,833	625,367	686,600
rex sole	39,112	28,202	33,657	39,257	28,202	33,729
rock sole	2,185	3,021	2,603	28,001	26,669	27,335
sand sole	121,017	31,172	76,094	156,376	86,438	121,407
sole spp.	5,729	4,482	5,105	5,741	4,482	5,111
sanddab	4,129	1,658	2,893	4,175	1,658	2,916
starry flounder	28,323	66,164	47,244	156,111	208,516	182,313
arrowtooth flounder	630,064	361,246	495,655	631,426	362,049	496,738
sablefish	4,215,347	4,608,105	4,411,726	4,240,997	4,662,490	4,451,744
lingcod	773,294	500,278	636,786	815,646	529,579	672,612
Pacific cod	1,063,189	1,281,749	1,172,469	1,633,523	1,603,250	1,618,386
walleye pollock	10,271	3,359	6,815	23,754	4,928	14,341
Pacific whiting	305	1,734	1,020	35,983	30,195	33,089
Pacific ocean perch	310,026	340,975	325,500	310,135	340,975	325,555
idiot rockfish	2,255,018	18,452	1,136,735	2,255,018	18,468	1,136,743
widow rockfish	1,166,853	1,505,986	1,336,420	1,166,853	1,506,027	1,336,440
yellowtail rockfish	0	1,397,280	698,640	0	1,417,738	708,869
rockfish spp	5,164,884	1,127,272	3,146,078	5,206,605	1,128,015	3,167,310
rockfish oth.	0	733,698	366,849	0	767,613	383,807
striped seaperch	0	0	0	0	0	0
pile perch	0	0	0	0	0	0
silver perch	0	0	0	0	0	0
sculpins spp.	689	488	589	1,625	978	1,301
sharks spp.	3,101	3,778	3,440	7,243	5,765	6,504
blue shark	709	168	439	709	168	439
spiny dogfish	40,599	63,152	51,876	465,890	515,751	490,821
soupfin shark	4,755	3,298	4,027	5,128	3,298	4,213
thresher shark	85,838	2,452	44,145	85,838	2,452	44,145
skates	5,830	3,316	4,573	18,891	16,825	17,858
chinook salmon	4,494,673	2,570,789	3,532,731	13,768,026	8,893,032	11,330,529
chum salmon	1,558,992	2,295,173	1,927,083	16,631,270	20,292,526	18,461,898
pink salmon	46,122	115	23,119	4,746,097	531	2,373,314
coho salmon	4,228,649	1,850,299	3,039,474	23,623,014	18,655,221	21,139,118
sockeye salmon	183,151	379,445	281,298	21,636,865	19,550,321	20,593,593
butter clam	0	0	0	12,760	7,133	9,947
cockles	0	0	0	1,381	2,041	1,711
horse clams	0	0	0	18,037	5,478	11,758
geoduc	0	0	0	2,900,336	2,995,738	2,948,037
Pacific littleneck	11,646	172	5,909	1,044,137	799,940	922,039
razor clam	128	117	122	128	117	122

Table E.2--Estimated values (dollars) for commercial landings ... (continued)

Species (3)	Washington's outer coast (1)			Washington in-state total (2)		
	1987	1988	Average	1987	1988	Average
Manila clam	99,153	66,768	82,960	3,239,657	2,603,081	2,921,369
softshell clams	0	5,025	2,513	286,796	113,019	199,908
blue mussel	0	0	0	333,774	292,437	313,105
California mussel	0	0	0	758	0	379
mussels spp.	88	0	44	15,141	0	7,571
Olympia oyster	0	0	0	169,982	917,639	543,811
Pacific oyster	8,117,305	6,924,242	7,520,774	12,016,084	9,903,935	10,960,009
Kumamoto oyster	0	0	0	3,245	926	2,085
European oyster	0	0	0	93,912	87,204	90,558
Dungeness crab	6,866,480	16,032,780	11,449,630	9,106,971	18,164,286	13,635,628
coonstripe shrimp	0	8	4	34,204	41,238	37,721
spot shrimp	0	0	0	23,129	27,596	25,362
sidestripe shrimp	0	0	0	677	359	518
ocean pink shrimp	8,226,109	6,155,303	7,190,706	8,249,116	6,165,703	7,207,409
scallops	0	0	0	45,394	54,109	49,751
octopus	18,113	22,363	20,238	40,284	62,100	51,192
market squid	697	173	435	3,644	1,093	2,369
sea cucumbers	0	0	0	64,035	368,360	216,198
red sea urchin	0	0	0	926,688	10,571,215	5,748,951
green sea urchin	0	0	0	77,226	1,206,957	642,091
Totals	52,319,672	52,778,510	52,547,103	139,720,101	140,887,988	140,302,057

Notes:

(1) Cape Flattery to Cape Disappointment; landings for anadromous species include harvests from coastal rivers.

(2) Includes outer coastal waters, the Strait of Juan De Fuca, Puget Sound, and Washington rivers (landings for Columbia River tributaries are incorporated).

(3) Estimates are based on 1987 and 1988 pounds landed by State of Washington statistical subarea and extrapolations of average prices per pound provided by John Bishop, Fisheries Development Div., NMFS, NW Regional Office, Seattle

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Personal communication on razor clam harvests from Terry Link, Oregon Dept. of Fisheries and Wildlife, Astoria, OR.

Personal communication on Oregon seabirds from Roy Lowe, West Oregon Refuge Complex, U.S. Fish and Wildlife Service, Newport, Oregon.

Personal communications on freshwater flow and discharge from Steve Rohmann, Strategic Assessment Branch, OMA/NOAA, Rockville, MD.

APPENDIX D: TREATY OF OLYMPIA

Stolamets, his x mark.	[L. s.]	Ash-ka-wish, his x mark.	[L. s.]
Tamayechotote, his x mark.	[L. s.]	Pasquai, his x mark.	[L. s.]
Qua-loah-kin, his x mark.	[L. s.]	Wasso-kui, his x mark.	[L. s.]
Wiska Ka, his x mark.	[L. s.]	Quaino-sath, his x mark.	[L. s.]
Che-lo-ths, his x mark.	[L. s.]	Cha-ya-tama, his x mark.	[L. s.]
Wetone-yath, his x mark.	[L. s.]	Wa-ya-lo-chol-wit, his x mark.	[L. s.]
We-ya-lo-cho-wit, his x mark.	[L. s.]	Flitch Kui Kui, his x mark.	[L. s.]
Yoka-nolth, his x mark.	[L. s.]	Walcha Kaa, his x mark.	[L. s.]
Wacha-ka-polls, his x mark.	[L. s.]	Watch-tis, his x mark.	[L. s.]
Kon-na, his x mark.	[L. s.]	Enias, his x mark.	[L. s.]

Signed in presence of—

Wm. C. McKay, secretary of treaty, O. T.
R. R. Thompson, Indian agent.
R. B. Metcalfe, Indian sub-agent.
C. Maspotia.
John Flett, interpreter.
Dominick Jondron, his x mark, interpretar.
Mathew Dofa, his x mark, interpreter.

TREATY WITH THE QUINAIELT, ETC., 1855.

July 1, 1855.
Jan. 25, 1856.

12 Stats., 971.
Ratified Mar. 8, 1859.
Proclaimed, Apr. 11, 1859.

Articles of agreement and convention made and concluded by and between Isaac I. Stevens, governor and superintendent of Indian affairs of the Territory of Washington, on the part of the United States, and the undersigned chiefs, headmen, and delegates of the different tribes and bands of the Qui-nai-elt and Quil-leh-ute Indians, on the part of said tribes and bands, and duly authorised thereto by them.

Surrender of lands to the United States.

ARTICLE 1. The said tribes and bands hereby cede, relinquish, and convey to the United States all their right, title, and interest in and to the lands and country occupied by them, bounded and described as follows: Commencing at a point on the Pacific coast, which is the southwest corner of the lands lately ceded by the Makah tribe of Indians to the United States, and running easterly with and along the southern boundary of the said Makah tribe to the middle of the coast range of mountains; thence southerly with said range of mountains to their intersection with the dividing ridge between the Chehalis and Quiniatl Rivers; thence westerly with said ridge to the Pacific coast; thence northerly along said coast to the place of beginning.

Boundaries.

Reservation within the Territory of Washington.

ARTICLE 2. There shall, however, be reserved, for the use and occupation of the tribes and bands aforesaid, a tract or tracts of land sufficient for their wants within the Territory of Washington, to be selected by the President of the United States, and hereafter surveyed or located and set apart for their exclusive use, and no white man shall be permitted to reside thereon without permission of the tribe and of the superintendent of Indian affairs or Indian agent. And the said tribes and bands agree to remove to and settle upon the same within one year after the ratification of this treaty, or sooner if the means are furnished them. In the meantime it shall be lawful for them to reside upon any lands not in the actual claim and occupation of citizens of the United States, and upon any lands claimed or occupied, if with the permission of the owner or claimant. If necessary for the public convenience, roads may be run through said reservation, on compensation being made for any damage sustained thereby.

Whites not to reside thereon, unless, etc.

Indians agree to move and settle there.

Roads may be made.

Rights and privileges secured to the Indians.

ARTICLE 3. The right of taking fish at all usual and accustomed grounds and stations is secured to said Indians in common with all citizens of the Territory, and of erecting temporary houses for the purpose of curing the same; together with the privilege of hunting, gathering roots and berries, and pasturing their horses on all open and unclaimed lands. *Provided, however,* That they shall not take

shell-fish from any beds staked or cultivated by citizens; and provided, also, that they shall alter all stallions not intended for breeding, and keep up and confine the stallions themselves.

Payment by the United States.

ARTICLE 4. In consideration of the above cession, the United States agree to pay to the said tribes and bands the sum of twenty-five thousand dollars, in the following manner, that is to say: For the first year after the ratification hereof, two thousand five hundred dollars; for the next two years, two thousand dollars each year; for the next three years, one thousand six hundred dollars each year; for the next four years, one thousand three hundred dollars each year; for the next five years, one thousand dollars each year; and for the next five years, seven hundred dollars each year. All of which sums of money shall be applied to the use and benefit of the said Indians under the directions of the President of the United States, who may from time to time, determine at his discretion upon what beneficial objects to expend the same; and the superintendent of Indian affairs, or other proper officer, shall each year inform the President of the wishes of said Indians in respect thereto.

How to be applied.

Appropriation for removal, for clearing and fencing lands, etc.

ARTICLE 5. To enable the said Indians to remove to and settle upon such reservation as may be selected for them by the President, and to clear, fence, and break up a sufficient quantity of land for cultivation, the United States further agree to pay the sum of two thousand five hundred dollars, to be laid out and expended under the direction of the President, and in such manner as he shall approve.

Indians may be removed from the reservation, etc.

ARTICLE 6. The President may hereafter, when in his opinion the interests of the Territory shall require, and the welfare of the said Indians be promoted by it, remove them from said reservation or reservations to such other suitable place or places within said Territory as he may deem fit, on remunerating them for their improvements and the expenses of their removal, or may consolidate them with other friendly tribes or bands, in which latter case the annuities, payable to the consolidated tribes respectively, shall also be consolidated; and he may further, at his discretion, cause the whole or any portion of the lands to be reserved, or of such other land as may be selected in lieu thereof, to be surveyed into lots, and assign the same to such individuals or families as are willing to avail themselves of the privilege, and will locate on the same as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be applicable. Any substantial improvements heretofore made by any Indians, and which they shall be compelled to abandon in consequence of this treaty, shall be valued under the direction of the President, and payment made accordingly therefor.

Tribe annuities may be consolidated.

Annuities of tribes not to pay debts of individuals.

ARTICLE 7. The annuities of the aforesaid tribes and bands shall not be taken to pay the debts of individuals.

Tribes to preserve friendly relations, etc.

ARTICLE 8. The said tribes and bands acknowledge their dependence on the Government of the United States, and promise to be friendly with all citizens thereof, and pledge themselves to commit no depredations on the property of such citizens; and should any one or more of them violate this pledge, and the fact be satisfactorily proven before the agent, the property taken shall be returned, or in default thereof, or if injured or destroyed, compensation may be made by the Government out of their annuities. Nor will they make war on any other tribe except in self-defence, but will submit all matters of difference between them and other Indians to the Government of the United States, or its agent, for decision and abide thereby; and if any of the said Indians commit any depredations on any other Indians within the Territory, the same rule shall prevail as is prescribed in this article in case of depredations against citizens. And the said tribes and bands agree not to shelter or conceal offenders against the laws of the United States, but to deliver them to the authorities for trial.

To pay for depredations.

Not to make war, except, etc.

To surrender offenders.

ARTICLE 9. The above tribes and bands are desirous to exclude from their reservations the use of ardent spirits, and to prevent their people from drinking the same, and therefore it is provided that any Indian belonging to said tribes who is guilty of bringing liquor into said reservations, or who drinks liquor, may have his or her proportion of the annuities withheld from him or her, for such time as the President may determine.

Annuities to be withheld from those drinking, etc., ardent spirits.

ARTICLE 10. The United States further agree to establish at the general agency for the district of Puget Sound, within one year from the ratification hereof, and to support for a period of twenty years, an agricultural and industrial school, to be free to the children of the said tribes and bands in common with those of the other tribes of said district, and to provide the said school with a suitable instructor or instructors, and also to provide a smithy and carpenter's shop, and furnish them with the necessary tools, and to employ a blacksmith, carpenter, and farmer for a term of twenty years, to instruct the Indians in their respective occupations. And the United States further agree to employ a physician to reside at the said central agency, who shall furnish medicine and advice to their sick, and shall vaccinate them; the expenses of the said school, shops, employees, and medical attendance to be defrayed by the United States, and not deducted from their annuities.

United States to establish agricultural schools, etc.

To employ mechanics, etc., a physician, etc.

ARTICLE 11. The said tribes and bands agree to free all slaves now held by them, and not to purchase or acquire others hereafter.

The tribes are to free all slaves and not to acquire others.

ARTICLE 12. The said tribes and bands finally agree not to trade at Vancouver's Island or elsewhere out of the dominions of the United States, nor shall foreign Indians be permitted to reside on their reservations without consent of the superintendent or agent.

Not to trade out of the United States.

Foreign Indians not to reside on reservation.

ARTICLE 13. This treaty shall be obligatory on the contracting parties as soon as the same shall be ratified by the President and Senate of the United States.

When treaty to take effect.

In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs, and the undersigned chiefs, headmen, and delegates of the aforesaid tribes and bands of Indians, have hereunto set their hands and seals, at Olympia, January 25, 1856, and on the Qui-nai-elt River, July 1, 1855.

Isaac I. Stevens, Governor and Sup't of Indian Affairs.

Tah-ho-lah, Head Chief Qui-nite-'l tribe, his x mark. [L. S.]
How-yat'l, Head Chief Quil-ley-yute tribe, his x mark. [L. S.]
Kal-lape, Sub-chief Quil-ley-hutes, his x mark. [L. S.]
Tah-ah-ha-wht'l, Sub-chief Quil-ley-hutes, his x mark. [L. S.]
Lay-le-whash-er, his x mark. [L. S.]
E-mah-lah-cup, his x mark. [L. S.]
Ash-chak-e-wick, his x mark. [L. S.]
Ay-e-quan, his x mark. [L. S.]
Yats-see-o-kop, his x mark. [L. S.]
Karts-co-pe-ah, his x mark. [L. S.]
Quat-a-de-tot'l, his x mark. [L. S.]
Now-ah-ism, his x mark. [L. S.]
Cla-kish-ka, his x mark. [L. S.]
Klar-way-er-hun, his x mark. [L. S.]
Quar-ter-helt'l, his x mark. [L. S.]

Hay-nee-si-cos, his x mark. [L. S.]
Hoo-e-yar'lsee, his x mark. [L. S.]
Quilt-le-se-mah, his x mark. [L. S.]
Qua-lats-kaim, his x mark. [L. S.]
Yah-le-hum, his x mark. [L. S.]
Je-tah-let-shin, his x mark. [L. S.]
Ma-ta-a-ha, his x mark. [L. S.]
Wah-kee-nah, Sub-chief Qui-nite'l tribe, his x mark. [L. S.]
Yer-ay-let'l, Sub-chief, his x mark. [L. S.]
Silley-mark'l, his x mark. [L. S.]
Cher-lark-tin, his x mark. [L. S.]
How-yat-'l, his x mark. [L. S.]
Kne-she-guartsh, Sub-chief, his x mark. [L. S.]
Klay-cumets, his x mark. [L. S.]
Kape, his x mark. [L. S.]
Hay-at-lite-'l, or John, his x mark. [L. S.]

Executed in the presence of us; the words "or tracts," in the II. article, and "next," in the IV. article, being interlined prior to execution.

M. T. Simmons, special Indian agent.
H. A. Goldsborough, commissary, &c.
B. F. Shaw, interpreter.
James Tilton, surveyor-general Washington Territory.
F. Kennedy.
J. Y. Miller.
H. D. Cock.

Jan. 31, 1855.

12 Stat., 939.
Ratified Mar. 8, 1859.
Proclaimed Apr. 18, 1859.

Articles of agreement and convention, made and concluded at Neah Bay, in the Territory of Washington, this thirty-first day of January, in the year eighteen hundred and fifty-five, by Isaac I. Stevens, governor and superintendent of Indian affairs for the said Territory, on the part of the United States, and the undersigned chiefs, head-men, and delegates of the several villages of the Makah tribe of Indians, viz: Neah Waatch, Tsoo-Yess, and Osett, occupying the country around Cape Classett or Flattery, on behalf of the said tribe and duly authorised by the same.

Surrender of lands to the United States.

ARTICLE 1. The said tribe hereby cedes, relinquishes, and conveys to the United States all their right, title, and interest in and to the lands and country occupied by it, bounded and described as follows, viz: Commencing at the mouth of the Oke-ho River, on the Straits of Fuca; thence running westwardly with said straits to Cape Classett or Flattery; thence southwardly along the coast to Osett, or the Lower Cape Flattery; thence eastwardly along the line of lands occupied by the Kwe-déh-tut or Kwill-eh-yute tribe of Indians, to the summit of the coast-range of mountains, and thence northwardly along the line of lands lately ceded to the United States by the S'Klallam tribe to the place of beginning, including all the islands lying off the same on the straits and coast.

Boundaries.

Reservation.

Boundaries.

ARTICLE 2. There is, however, reserved for the present use and occupation of the said tribe the following tract of land, viz: Commencing on the beach at the mouth of a small brook running into Neah Bay next to the site of the old Spanish fort; thence along the shore round Cape Classett or Flattery, to the mouth of another small stream running into the bay on the south side of said cape, a little above the Waatch village; thence following said brook to its source; thence in a straight line to the source of the first-mentioned brook, and thence following the same down to the place of beginning; which said tract shall be set apart, and so far as necessary surveyed and marked out for their exclusive use; nor shall any white man be permitted to reside upon the same without permission of the said tribe and of the superintendent or agent; but if necessary for the public convenience, roads may be run through the said reservation, the Indians being compensated for any damage thereby done them. It is, however, understood that should the President of the United States hereafter see fit to place upon the said reservation any other friendly tribe or band to occupy the same in common with those above mentioned, he shall be at liberty to do so.

Whites not to reside thereon unless, etc.

Roads may be made.

Other friendly bands may be placed thereon.

Indians to settle on reservation within a year.

ARTICLE 3. The said tribe agrees to remove to and settle upon the said reservation, if required so to do, within one year after the ratification of this treaty, or sooner, if the means are furnished them. In the mean time it shall be lawful for them to reside upon any land not in the actual claim and occupation of citizens of the United States, and upon any land claimed or occupied, if with the permission of the owner.

Rights and privileges secured to Indians.

ARTICLE 4. The right of taking fish and of whaling or sealing at usual and accustomed grounds and stations is further secured to said Indians in common with all citizens of the United States, and of erecting temporary houses for the purpose of curing, together with the privilege of hunting and gathering roots and berries on open and unclaimed lands: *Provided, however*, That they shall not take shell-fish from any beds staked or cultivated by citizens.

Proviso.

Payments by the United States.

ARTICLE 5. In consideration of the above cession the United States agree to pay to the said tribe the sum of thirty thousand dollars, in the following manner, that is to say: During the first year after the ratification hereof, three thousand dollars; for the next two years, twenty-

five hundred dollars each year; for the next three years, two thousand dollars each year; for the next four years, one thousand five hundred dollars each year; and for the next ten years, one thousand dollars each year; all which said sums of money shall be applied to the use and benefit of the said Indians, under the direction of the President of the United States, who may from time to time determine at his discretion upon what beneficial objects to expend the same. And the superintendent of Indian affairs, or other proper officer, shall each year inform the President of the wishes of said Indians in respect thereto.

How to be applied.

ARTICLE 6. To enable the said Indians to remove to and settle upon their aforesaid reservation, and to clear, fence, and break up a sufficient quantity of land for cultivation, the United States further agree to pay the sum of three thousand dollars, to be laid out and expended under the direction of the President, and in such manner as he shall approve. And any substantial improvements heretofore made by any individual Indian, and which he may be compelled to abandon in consequence of this treaty, shall be valued under the direction of the President and payment made therefor accordingly.

Appropriation for removal and for clearing and fencing land, etc.

ARTICLE 7. The President may hereafter, when in his opinion the interests of the Territory shall require, and the welfare of said Indians be promoted thereby, remove them from said reservation to such suitable place or places within said Territory as he may deem fit, on remunerating them for their improvements and the expenses of their removal, or may consolidate them with other friendly tribes or bands; and he may further, at his discretion, cause the whole, or any portion of the lands hereby reserved, or such other land as may be selected in lieu thereof, to be surveyed into lots, and assign the same to such individuals or families as are willing to avail themselves of the privilege, and will locate thereon as a permanent home, on the same terms and subject to the same regulations as are provided in the sixth article of the treaty with the Omahas, so far as the same may be practicable.

Indians may be removed from the reservation.

Tribes may be consolidated.

Ante, p. 412.

ARTICLE 8. The annuities of the aforesaid tribe shall not be taken to pay the debts of individuals.

Annuities of tribe not to pay individual debts.

ARTICLE 9. The said Indians acknowledge their dependence on the Government of the United States, and promise to be friendly with all citizens thereof, and they pledge themselves to commit no depredations on the property of such citizens. And should any one or more of them violate this pledge, and the fact be satisfactorily proven before the agent, the property taken shall be returned, or in default thereof, or if injured or destroyed, compensation may be made by the Government out of their annuities. Nor will they make war on any other tribe except in self-defence, but will submit all matters of difference between them and other Indians to the Government of the United States or its agent for decision and abide thereby. And if any of the said Indians commit any depredations on any other Indians within the Territory, the same rule shall prevail as that prescribed in this article in case of depredations against citizens. And the said tribe agrees not to shelter or conceal offenders against the United States, but to deliver up the same for trial by the authorities.

Indians to preserve friendly relations.

To pay for depredations.

Not to make war, except.

To surrender offenders.

ARTICLE 10. The above tribe is desirous to exclude from its reservation the use of ardent spirits, and to prevent its people from drinking the same, and therefore it is provided that any Indian belonging thereto who shall be guilty of bringing liquor into said reservation, or who drinks liquor, may have his or her proportion of the annuities withheld from him or her for such time as the President may determine.

Annuities to be withheld from those drinking ardent spirits.

ARTICLE 11. The United States further agree to establish at the general agency for the district of Puget's Sound, within one year from the ratification hereof, and to support for the period of twenty years, an agricultural and industrial school, to be free to children of the said tribe in common with those of the other tribes of said district and to

United States to establish an agricultural, etc., school for the Indians; to provide tools and employ mechanics, etc.

provide a smithy and carpenter's shop, and furnish them with the necessary tools and employ a blacksmith, carpenter and farmer for the like term to instruct the Indians in their respective occupations. *Provided, however*, That should it be deemed expedient a separate school may be established for the benefit of said tribe and such others as may be associated with it, and the like persons employed for the same purposes at some other suitable place. And the United States further agree to employ a physician to reside at the said central agency, or at such other school should one be established, who shall furnish medicine and advice to the sick, and shall vaccinate them; the expenses of the said school, shops, persons employed, and medical attendance to be defrayed by the United States and not deducted from the annuities.

A physician, etc.

The tribe is to free all slaves and not to acquire others.

ARTICLE 12. The said tribe agrees to free all slaves now held by its people, and not to purchase or acquire others hereafter.

Not to trade out of the United States.

Foreign Indians not to reside on the reservation.

ARTICLE 13. The said tribe finally agrees not to trade at Vancouver's Island or elsewhere out of the dominions of the United States, nor shall foreign Indians be permitted to reside in its reservation without consent of the superintendent or agent.

When treaty to take effect.

ARTICLE 14. This treaty shall be obligatory on the contracting parties as soon as the same shall be ratified by the President of the United States.

In testimony whereof, the said Isaac I. Stevens, governor and superintendent of Indian affairs, and the undersigned, chiefs, headmen and delegates of the tribe aforesaid have hereunto set their hands and seals at the place and on the day and year hereinbefore written.

Isaac I. Stevens, governor and superintendent. [L. s.]

Tse-kauwtl, head chief of the Makah tribe, his x mark. [L. s.]
Kal-chota, subchief of the Makahs, his x mark. [L. s.]
Tah-a-howtl, subchief of the Makahs, his x mark. [L. s.]
Kah-bach-sat, subchief of the Makahs, his x mark. [L. s.]
Kets-kus-sum, subchief of the Makahs, his x mark. [L. s.]
Haatse, subchief of the Makahs, his x mark. [L. s.]
Kah-chook, subchief of the Makahs, his x mark. [L. s.]
It-an-da-ha, subchief of the Makahs, his x mark. [L. s.]
Klah-pe-an-his, or Andrew Jackson, subchief of the Makahs, his x mark. [L. s.]
Tsal-ah-ocs, or Peter, Neah village, his x mark. [L. s.]
Tahola, Neah village, his x mark. [L. s.]
Kleht-li-quat-stl, Waatch village, his x mark. [L. s.]
Too-whaif-tan, Waatch village, his x mark. [L. s.]
Tahts-kin, Neah village, his x mark. [L. s.]
Nenchoop, Neah village, his x mark. [L. s.]
Ah-de-ak-too-ah, Ozett village, his x mark. [L. s.]
William, Neah village, his x mark. [L. s.]
Wak-kap-tup, Waatch village, his x mark. [L. s.]
Kleht-te-di-yuks, Waatch village, his x mark. [L. s.]
Oobick, Waatch village, his x mark. [L. s.]
Bich-took, Waatch village, his x mark. [L. s.]
Baht-se-ditl, Neah village, his x mark. [L. s.]
Wack-shis, Neah village, his x mark. [L. s.]
Hah-yo-hwa, Waatch village, his x mark. [L. s.]
Daht-leak, or Mines, Ozett village, his x mark. [L. s.]
Pah-hat, Neah village, his x mark. [L. s.]
Pai-yeh, Ozett village, his x mark. [L. s.]
Tsah-weh-sup, Neah village, his x mark. [L. s.]
Al-is-kah, Ozett village, his x mark. [L. s.]
Kwe-tow'tl, Neah village, his x mark. [L. s.]
Kaht-saht-wha, Neah village, his x mark. [L. s.]
Tchoo-quat-lah, or Yes Sir, Neah village, his x mark. [L. s.]
Klatte-ow-sohp, Neah village, his x mark. [L. s.]
Kai-kl-chis-sum, Neah village, his mark. [L. s.]
Kah-kwt-lit-ha, Waatch village, his x mark. [L. s.]
He-dah-titl, Neah village, his x mark. [L. s.]
Sah-dit-la-uad, Waatch village, his x mark. [L. s.]
Klah-ku-pihl, Tsoo-yess village, his x mark. [L. s.]
Billuk-whtl, Tsoo-yess village, his x mark. [L. s.]
Kwah-too-qualh, Tsoo-yess village, his x mark. [L. s.]
Yoooh-boott, Tsoo-yess village, his x mark. [L. s.]
Swell, or Jeff. Davis, Neah village, his x mark. [L. s.]

Executed in the presence of us. The words "five hundred" being first interlined in the 5th article, and erasures made in the 8th and 9th articles.

M. T. Simmons, Indian agent.
George Gibbs, secretary.
B. F. Shaw, interpreter.
C. M. Hitchcock, M. D.
E. S. Fowler.
Orrington Cushman.
Robt. Davis.

TREATY WITH THE CHIPPEWA, 1855.

Feb. 22, 1855.
10 Stat., 1165.
Ratified Mar. 3, 1855.
Proclaimed Apr. 7, 1855.

Articles of agreement and convention made and concluded at the city of Washington, this twenty-second day of February, one thousand eight hundred and fifty-five, by George W. Manypenny, commissioner, on the part of the United States, and the following-named chiefs and delegates, representing the Mississippi bands of Chippewa Indians, viz: Pug-o-na-ke-shick, or Hole-in-the-day; Que-we-sans-ish, or Bad Boy; Wand-e-kaw, or Little Hill; I-aw-shosh-we-ke-shig, or Crossing Sky; Petud-dunce, or Rat's Liver; Mun-o-min-e-kay-shein, or Rice-Maker; Mah-yah-ge-way-we-durg, or the Chorister; Kay-qua-daush, or the Attempter; Caw-caug-e-we-goon, or Crow Feather; and Show-baush-king, or He that passes under Everything, and the following-named chiefs and delegates representing the Pillager and Lake Winnibigoshish bands of Chippewa Indians, viz: Aish-ke-bug-e-kosha, or Flat Mouth; Be-sheck-kee, or Buffalo; Nay-bun-a-caush, or Young Man's Son; Maug-e-gaw-bow, or Stepping Ahead; Mi-gi-si, or Eagle, and Kaw-be-mub-bee, or North Star, they being thereto duly authorized by the said bands of Indians respectively.

Cession to the United States.

ARTICLE 1. The Mississippi, Pillager, and Lake Winnibigoshish bands of Chippewa Indians hereby cede, sell, and convey to the United States all their right, title, and interest in, and to, the lands now owned and claimed by them, in the Territory of Minnesota, and included within the following boundaries, viz: Beginning at a point where the east branch of Snake River crosses the southern boundary-line of the Chippewa country, east of the Mississippi River, as established by the treaty of July twenty-ninth, one thousand eight hundred and thirty-seven, running thence, up the said branch, to its source; thence, nearly north in a straight line, to the mouth of East Savannah River; thence, up the St. Louis River, to the mouth of East Swan River; thence, up said river, to its source; thence, in a straight line, to the most westwardly bend of Vermillion River; thence, northwestwardly, in a straight line, to the first and most considerable bend in the Big Fork River; thence, down said river, to its mouth; thence, down Rainy Lake River, to the mouth of Black River; thence, up that river, to its source; thence, in a straight line, to the northern extremity of Turtle Lake; thence, in a straight line, to the mouth of Wild Rice River; thence, up Red River of the North, to the mouth of Buffalo River; thence, in a straight line, to the southwestern extramity of Otter-Tail Lake; thence, through said lake, to the source of Leaf River; thence down said river, to its junction with Crow Wing River; thence down Crow Wing River, to its junction with the Mississippi River; thence to the commencement on said river of the southern boundary-line of the Chippewa country, as established by the treaty of July twenty-ninth, one thousand eight hundred and thirty-seven; and thence, along said line, to the place of beginning. And the said Indians do further fully and entirely relinquish and convey to the United States, any and all right, title, and

APPENDIX E: COASTAL AND OCEAN RESOURCES HISTORICALLY UTILIZED BY THE TRIBES

Coastal and Ocean Resources Historically Utilized by the Tribes

Identification of Fish, Shellfish, Waterfowl, and Plants Presently Relied on by Makah Peoples for Subsistence and Ceremonial Purposes

Species	Period of Harvest
A. Fish	
1. Flatfish	All year
2. Halibut	All year
3. Lingcod	All year
4. Bottomfish	All year
5. Rockfish	All year
6. Smelt	Summer
7. Salmon	Primarily spring & summer
B. Invertebrates	
8. Barnacles	Spring and Summer
9. Mussels	All year
10. Hardshell clams	All year
11. Razor clams	May and June
12. Sea urchins	Summer
13. Chitons	Summer
14. Crabs	All year
C. Waterfowl	
15. Ducks	Summer and fall
16. Sea Birds	Fall
D. Plants	
17. Kelp	All year

Source: Northwest Indian Fisheries Commission; Makah Tribe.

Principal Harvests of Ocean Resources by the Makah Tribe

Period of the Year	Resources Harvested
May 1st through June	■ A troll fishery is conducted in the ocean to the Makah southern boundary, and in the Straits in Area 4B to Sekiu River for chinook. Trolling for various species occurs year-round. ■ Crab may be taken. ■ Trolling for black cod and rock fish.
July 1st through the first week in September	■ Gillnet and troll fisheries for chinook, coho and pinks occur in Areas 4B, 5 and 6C. ■ In the latter part of this period, a fishery for Fraser River sockeye occurs in the same areas. ■ Taking of shellfish and sea urchins occurs on the ocean side of the reservation. ■ Trolling for black cod and rock fish.
Balance of September	■ A possible directed gillnet fishery for coho in Areas 4B, 5 and 6C, although, due to conservation requirements, this fishery has not opened for several years. ■ Shellfish harvest, including crab, continues. ■ Sooes River fishery for chinook and coho. Similar fishery planned for the Hoko River in the future. ■ Trolling for black cod and rock fish.
October and early November	■ A gillnet fishery for chum in the straits commences. ■ Take of shellfish and sea urchins continues. ■ Sooes River fishery for chinook and coho. Similar fishery planned for the Hoko and the Waatch (coho only) in the future. ■ Trolling for black cod and rock fish.
November through January	■ Winter troll fishery for blackmouth (chinook). ■ Shellfish harvesting continues. ■ Steelhead fishing begins in the Hoko, Sail, Sekiu, Ozette, Sooes and Waatch Rivers on December 1st.
February through April	■ Troll fishery for blackmouth continues. ■ Trolling for black cod. ■ Halibut fishery begins in March. ■ Shellfish harvesting through March. ■ In-river steelhead fishing continues through March.

*The Makah also harvest marine mammals for subsistence purposes.

Source: Makah Dept. of Fisheries Management, 1990. Personal communication.

Fish and Shellfish Presently Relied on by Quileute Peoples for Subsistence and Ceremonial Purposes

Species	Period of Harvest
A. Fish	
1. Halibut	-Most of year, especially summer
2. Ling cod	-Summer
3. Bottomfish	-Summer
4. Rockfish	-Summer
5. Ocean perch	-Summer
6. Smelt	-April to August
7. Salmon	-Summer
8. Sturgeon	-Summer
B. Invertebrates	
9. Goose neck barnacles	-Year round
10. Mussels	-Year round
11. Hardshell clams	-Year round
12. Razor clams	-Year round
13. Sea urchins	-Winter
14. Chitons	-Winter

Source: Northwest Indian Fisheries Commission, 1990.

Principal Harvest of Ocean Resources by the Quileute Tribe

Period	Resources Harvested
January through March	Winter steelhead fishing in-river Halibut fishing (subsistence and commercial) Goose neck barnacles, mussels, hardshell clams and razor clams Sea urchins and chitons
April	Winter steelhead fishing in-river Halibut fishing (subsistence and commercial) Goose neck barnacles, mussels, hardshell clams and razor clams Smelt
May through June	Spring Chinook in-river fishing Ocean fishing (primarily) on Columbia River chinook stocks Sockeye fishing in-river (non-directed) Halibut fishing (subsistence) Black cod and sablefish Smelt Goose neck barnacles, mussels, hardshell clams and razor clams
July	Summer chinook and coho in-river Non-directed sockeye fishing in-river Ocean fishing for chinook and coho Halibut subsistence fishing Black cod, ling cod, bottomfish, rockfish and sablefish Smelt Ocean perch Sturgeon Goose neck barnacles, mussels, hardshell clams and razor clams
August	Summer chinook and coho in-river Ocean fishing for chinook and coho Halibut subsistence fishing Black cod, ling cod, bottomfish, rockfish and sablefish Smelt Ocean perch Sturgeon Goose neck barnacles, mussels, hardshell clams and razor clams
September	Ocean fishing for chinook and coho In-river fishing for fall chinook and fall coho Halibut subsistence fishing Black cod and sablefish Goose neck barnacles, mussels, hardshell clams and razor clams
October	In-river fishing for fall chinook and fall coho Halibut subsistence fishing Black cod and sablefish Goose neck barnacles, mussels, hardshell clams and razor clams Sea urchins and chitons
November	In-river fishing for fall chinook and fall coho In-river winter steelhead Goose neck barnacles, mussels, hardshell clams and razor clams Sea urchins and chitons
December	In-river winter steelhead Goose neck barnacles, mussels, hardshell clams and razor clams Sea urchins and chitons

Sources: Quileute Fisheries Department. Northwest Indian Fisheries Commission, 1990.

Subsistence Harvest of Fish, Shellfish, Bird Eggs, and Sea Plants Hoh Tribal Members

Species	Period of Harvest
A. Fish	
1. Flatfish	Summer
2. Halibut	Summer
3. Ling cod	Summer
4. Bottomfish	Summer
5. Rockfish	Summer
6. Black bass	Summer
7. Ocean perch	Summer
8. Smelt	Spring/Summer/Fall
9. Salmon/steelhead	Year round
10. Sturgeon	Year round
B. Invertebrates	
11. Barnacles	Year round
12. Mussels	Year round
13. Hardshell clams	Year round
14. Softshell clams	Year round
15. Razor clams	Year round
16. Oysters	Year round (Puget Sound)
17. Sea urchins	Year round
18. Limpets	Year round
19. Chitons	Year round
20. Crabs	Year round
21. Shrimp	Summer
22. Scallops	Summer
23. Anemones	Year round
C. Seagull eggs	Spring
D. Sea weeds	June/July

Source: Northwest Indian Fisheries Commission, 1989.

continued

Period	Resources Harvested
September through November	River and some ocean fishing for fall Coho River and some ocean fishing for fall Chinook End of summer steelhead Start of winter steelhead Sturgeon Smelt Goose neck barnacles Mussels Clams Sea urchins, limpets and chitons Crabs Sea anemones, chinese slippers
December	In-river fall coho In-river winter steelhead Sturgeon Smelt Ling cod eggs Goose neck barnacles Mussels Clams Crabs Sea urchins, limpets and chitons Sea anemones Octopus

Sources: Northwest Indian Fisheries Commission, 1989. Mr. James Jorgensen, Hoh Tribal Biologist.

The Ocean Harvest Round for the Hoh Tribe

Period	Resources Harvested
January 1st through February	In-river winter steelhead Sturgeon in-river and estuary Goose neck barnacles Mussels Clams Sea urchins, limpets and chitons Crabs Sea anemones Ling cod eggs Smelt Octopus
March	In-river winter steelhead Sturgeon Goose neck barnacles Mussels Clams Sea urchins, limpets & chitons Crabs Sea anemones, chinese slippers Ling cod eggs Smelt Octopus
April through May	In-river summer steelhead River and ocean fishing for spring and summer chinook Sturgeon Bottom fish Rockfish Halibut Smelt Goose neck barnacles Mussels Clams Sea urchins, limpets & chitons Crabs Sea anemones, chinese slippers Sea cucumbers Seagull eggs
June through August	In-river summer steelhead River and ocean fishing for spring and summer coho Sturgeon Bottom fish and rock fish Halibut Lingcod Black bass Ocean perch Smelt Goose neck barnacles Mussels Clams Sea urchins, limpets and chitons Crabs Sea anemones, chinese slippers

Identification of Fish, Shellfish, Waterfowl and Plants Presently Relied on by the Quinault Peoples for Subsistence and Ceremonial Purposes

Species	Period of Harvest	Location
A. Fish		
1. Flatfish	Year round	-Quinault reservation.
2. Halibut	Year round	-Destruction Island/ Grays Harbor.
3. Lingcod	Summer	-Quinault reservation/ Neah Bay.
4. Bottomfish	Summer	-Quinault reservation/ Neah Bay.
5. Rockfish	Summer	-Throughout U&A area.
6. Black Bass	Summer	-Throughout U&A area.
7. Ocean Perch	Summer	-Quinault reservation.
8. Smelt	Summer	-Taholah, La Push.
9. Salmon	In seasons	-All Quinault rivers.
10. Sturgeon	Fall/Winter	-Queets/Quinault/Grays Harbor.
11. Eels	Fall	-Quinault river.
B. Invertebrates		
1. Barnacles	Year round	-Cape Elizabeth & Pt. Grenville areas.
2. Mussels	Year round	-Cape Elizabeth, Raft R., Kalaloch & Pt. Grenville areas.
3. Hardshell clams	Year round	-Pt. Grenville, Taholah and Kalaloch areas.
4. Softshell clams	Spring/summer	-Taholah area.
5. Razor clams	Spring/summer	-Taholah, Pt. Grenville and Kalaloch areas.
6. Oysters	Year round	-Southern bays/Hood Canal.
7. Sea urchins	Summer	-Taholah area.
8. Limpets	Summer	-Reservation area/Ruby Beach
9. Crabs	Year round	-Reservation shores.
10. Shrimp	Summer	-Hood Canal.
11. Sea anemone	Year round	-Pt. Grenville.
12. Sea cucumber	Year round	-Pt. Grenville.
13. Whelk	Year round	-Queets area.
14. Octopus	Fall	-Neah Bay.
15. Skate	Summer	-Queets area.
C. Waterfowl		
1. Ducks	Year round	-Quinault and Queets R. areas.
2. Seagull eggs	Spring	-Pt. Grenville area.
3. Geese	Fall	-Quinault and Queets R. areas.
D. Plants		
1. Kelp	Year round	-Taholah area.
2. Seaweed	Year round	-Taholah area.
3. Bear grass/ sweet grass/ cattails	Spring/Summer	-Quinault and Queets R. areas, Grays Harbor Bay.

Source: Northwest Indian Fisheries Commission.

Principal Harvest of Ocean Resources by the Quinault Indian Nation

Period of the Year	Resources Harvested
April	
Pangwuh?am Huhnsha?ha (time when the geese go by)	Blueback (sockeye) and spring chinook in the Quinault and Queets Rivers. Ocean halibut fishing if quota still available. Crab, razor clams, oysters, mussel, and barnacle gathering. Flatfish. Surf perch fishing. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering.
May	
Panjulashxuhtltu (time when Blueback return)	Blueback and spring chinook in the Quinault and Queets Rivers. Ocean trolling for chinook. Ocean fishing for halibut. Crab, clams, oysters, mussel, and barnacle gathering. Flatfish. Surf perch fishing. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering. Seagull egg gathering.
June	
Pankwuhla (time of salmonberries)	In-river blueback and spring chinook fishing continues. Ocean trolling for salmon and other ocean species. Fishing for smelt from the beach. Crab, clam, oyster, mussel, and barnacle gathering. Flatfish. Halibut (subsistence). Surf perch fishing. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering. Cattail and beargrass gathering. Seagull egg gathering.
July	
Panklaswha (time to gather native blackberries)	Ocean trolling for salmon and other species. River blueback and spring chinook fishing. Summer steelhead fishing in Quinault River. Fishing for flatfish, halibut, lingcod, bottomfish, rockfish, black bass, ocean perch, smelt, and skate in the ocean. Crab, clams, oysters, mussels, barnacles, sea urchins, limpets, chitons and shrimp. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering. Cattail and beargrass gathering.
August	
Panmuu?lak (time of warmth)	Ocean trolling for salmon and other species. Summer steelhead fishing in Quinault River. Fall chinook fishing in Quinault River. Fishing for flatfish, halibut, lingcod, bottomfish, rockfish, black bass, ocean perch, smelt and skate in the ocean. Harvesting crab, clams, oysters, mussels, barnacles, sea urchins, limpets, chitons, and shrimp. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering.
September	
Ts okwanpitskitl (leaves are getting red on the vine maples)	Ocean trolling for salmon and other species. Fall chinook fishing on the Queets, Quinault, Humptulips, and Chehalis Rivers. Fishing for flatfish and halibut. Harvesting crab, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering. Octopus gathering. May start catching sturgeon.

continued

Period of the Year	Resources Harvested
	Start of eel season in-river. Harvesting of ducks and geese.
October	
Pan?silpaulos (time of autumn)	Fall chinook fishing on the Queets, Quinault, Humptulips, and Chehalis Rivers. Fishing for hatchery coho on the Queets, Quinault, Humptulips, and Chehalis rivers. Fishing for flatfish and halibut. Fishing for sturgeon. Fishing for river eels. Octopus gathering. Harvesting crab, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering. Harvesting of ducks and geese.
November	
Panitpuhtuhkstista (time when the clouds are covering)	Chum and coho fishing in the Queets, Quinault, Humptulips, and Chehalis Rivers. Fishing for flatfish and halibut. Fishing for sturgeon. Fishing for river eels. Harvesting crabs, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering. Harvesting of ducks and geese.
December	
Panpamas (time of cold)	Residual in-river coho fishing. Steelhead fishing in the Queets, Quinault, Humptulips, and Chehalis Rivers. Fishing for halibut and flatfish. Fishing for sturgeon. Harvesting crabs, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering.
January	
Autxaltaanem (after the sun comes back)	Steelhead fishing in the Queets, Quinault, Humptulips, and Chehalis Rivers. Fishing for halibut and flatfish. Fishing for sturgeon. Harvesting crabs, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering.
February	
Panlaleah-kilech (time of the beach willow)	Steelhead fishing in the Queets, Quinault, Humptulips, and Chehalis Rivers. Commercial razor clam activity. Fishing for halibut and flatfish. Harvesting crabs, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering.
March	
Panjans (time of the sprouts)	Steelhead fishing in the Queets, Quinault, Humptulips, and Chehalis Rivers. Commercial razor clam activity continues. Commercial halibut fishing commences. Start of fishing for spring chinook and blueback in the Quinault and Queets Rivers. Fishing for flatfish. Harvesting crabs, clams, oysters, mussels, and barnacles. Kelp, seaweed, sea anemone, sea cucumber, and whelk gathering.

Source: Quinault Indian Nation, 1990.

APPENDIX F: SPECIES INHABITING HABITATS IN THE PROPOSED SANCTUARY

Appendix F: Species Inhabiting Habitats in the Proposed Sanctuary

HABITAT: UNPROTECTED BEACH SURF

TROPHIC LEVEL: (1) PRODUCER
INVERTEBRATES

CHAETOCEROS ARMATUM
DIATOM

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

ASTRIONELLA SOCIALIS
DIATOM

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

PHYLLOSPADIX SCOULERI
SCOULER'S SURFGRASS

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ENDEODES COLLARIS
COLEOPTERA

TROPHIC LEVEL: (2) HERBIVORE
MAMMALS

ODOCOILEUS HEMIONUS COLUMBIANO
BLACK-TAILED DEER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

GLYCERIDAE
PROBOSCIS WORM

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS HEERMANNI
HEERMAN'S GULL
LARUS PHILADELPHIA
BONAPARTE'S GULL
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATA
STELLER'S SEA LION
LYNX RUFUS
BOBCAT
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA FRENATA
LONG-TAILED WEASEL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
SPILOGALE PUTORIUS
SPOTTED SKUNK
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLONISCUS PERCONVEXUS
ISOPODS
CALLIANASSA CALIFORNIENSIS
GHOST SHRIMP
CIROLANA KINCAIDI
ISOPODS
COELOPA
KELP FLY
EUZONUS MUCRONATA
BLOOD WORMS
ORCHESTOIDEA CALIFORNIANA
SAND FLEE
SPIONIDAE
WORM

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

CRAGO NIGRACAUDA
BLACK-TAILED SHRIMP
CRAGO SPP.
-NULL-

TROPHIC LEVEL: (5) OMNIVORE
FISHES

PHANERODON FURCATUS
WHITE SEAPERCH

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

CORVUS BRACHYRHYNCHOS
COMMON CROW

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

MEPHITIS MEPHITIS
STRIPED SKUNK
PEROMYSCUS MANICULATUS
DEER MOUSE
PROCYON LOTOR
RACCOON

TROPHIC LEVEL: (6) PARASITE
INVERTEBRATES

ALEOCHARA ARENARIA
ROVE BEETLE
MALACOBDELLA SPP.
RIBBON WORM

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ARCHAEOMYSIS GREBNITZKII
MYSID
EMERITA ANALOGA
MOLE CRAB
SILIQUA PATULA
RAZOR CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

OLIVELLA BIPLICATA
PURPLE OLIVE SNAIL

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

LARUS GLAUCESCENS
GLAUCOS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

CEREBRATULUS
RIBBON WORM
EOHAUSTORIUS WASHINGTONIANUS
AMPHIPOD
PONTOMALOTA OPACA
ROVE BEETLE
STAPHYLINIDAE
ROVE BEETLES
THINOPINUS PICTUS
ROVE BEETLE
THINUSA MARITIMA
ROVE BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
AMMODYTES HEXAPTERUS
PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
REDTAIL SURFPERCH
HYPOMESUS PRETIOSUS
SURFSMELT

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

ARENARIA INTERPRES
RUDDY TURNSTONE
CALIDRIS ALBA
SANDERLING
CALIDRIS ALPINA
DUNLIN
CALIDRIS BAIRDII
BAIRD'S SANDPIPER
CALIDRIS CANUTUS
RED KNOT
CALIDRIS MAURI
WESTERN SANDPIPER
CHARADRIUS ALEXANDRINUS
SNOWY PLOVER
CHARADRIUS SEMIPALMATUS
SEMIPALMATED PLOVER
LIMNODROMUS GRISEUS
SHORT-BILLED DOWITCHER
LIMOSA FEDOA
MARBLED GODWIT

HABITAT: UNPROTECTED BEACH SURF

NUMENIUS PHAEOPUS
WHIMBREL
PLUVIALIS SQUATAROLA
BLACK-BELLIED PLOVER

TROPHIC LEVEL: (Q) UNKNOWN
INVERTEBRATES

HAUSTORIIDAE
AMPHIPOD

HABITAT: PROTECTED BEACH SURF

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

PHYLLOSPADIX SCOULIERI
SCOULER'S SURFGRASS
PLANTAGO MARITIMA
SEASIDE PLANTAIN
TENACETUM DOUGLASII
DUNE TANSY

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

LUMBRINARIS ZONATA
WORM

TROPHIC LEVEL: (2) HERBIVORE
BIRDS

BRANTA BERNICLA
BRANT

TROPHIC LEVEL: (2) HERBIVORE
MAMMALS

ODOCOILEUS HEMIONUS COLUMBIANU
BLACK-TAILED DEER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

GLYCERIDAE
PROBOSCIS WORM

TROPHIC LEVEL: (3) CARNIVORE
FISHES

MYOXOCEPHALUS POLYACANTHOCEPHA
GREAT SCULPIN
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
SEBASTES PAUCISPINIS
BOCCACIO

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

ARDEA HERODIAS
GREAT BLUE HERON
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS DELAWARENSIS
RING-BILLED GULL
LARUS HEERMANNI
HEERMAN'S GULL
LARUS PHILADELPHIA
BONAPARTE'S GULL
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE
STERNA CASPIA
CASPIAN TERN
TRINGA FLAVIPES
LESSER YELLOWLEGS

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATA
STELLER'S SEA LION
LYNX RUFUS
BOBCAT
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA FRENATA
LONG-TAILED WEASEL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
SPILOGALE PUTORIUS
SPOTTED SKUNK
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ABARENICOLA CLAPAREDII OCEANIC
LUGWORM
CALLIANASSA CALIFORNIENSIS
GHOST SHRIMP
CIROLANA KINCAIDI
ISOPODS
EUZONUS MUCRONATA
BLOOD WORM
ORCHESTIA TRASKIANA
LESSER BEACH HOPPERORCHESTOIDEA
CALIFORNIANA
SAND FLEE/GREAT BEACH HOPPER
SPIONIDAE
WORM

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

CRAGO NICRACAUDA
BLACK-TAILED SHRIMP
CRAGO SPP.
-NULL-

TROPHIC LEVEL: (5) OMNIVORE
FISHES

HYPERPROSOPON ANGENTEUM
WALLEYE SURFPERCH
HYPERPROSOPON ELLIPTICUM
SILVER SURFPERCH

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

CORVUS BRACHYRHYNCHOS
COMMON CROW

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

MEPHITIS MEPHITIS
STRIPED SKUNK
PEROMYSCUS MANICULATUS
DEER MOUSE
PROCYON LOTOR
RACCOON

TROPHIC LEVEL: (6) PARASITE
INVERTEBRATES

MALACOBDELLA SPP.
RIBBON WORM

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ARCHAEOMYSIS GREBNITZKII
MYSID
EMERITA ANALOGA
MOLE CRAB
SILIQUA PATULA
RAZOR CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

OLIVELLA BIPLICATA
PURPLE OLIVE SNAIL

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

HALIAEETUS LEUCOCEPHALUS
BALD EAGLE
LARUS GLAUCESCENS
GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

CEREBRATULUS
RIBBON WORM
EOHAUSTORIUS WASHINGTONIANUS
AMPHIPOD
PARANEMERTES PEREGRINA
NEMERTEAN
STAPHYLINIDAE
ROVE BEETLES

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
ALOSA SAPIDISSIMA
AMERICAN SHAD
AMMODYTES HEXAPTERUS
PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
REDTAIL SURFPERCH
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
CYMATOGASTER AGGREGATA
SHINER PERCH
HYPOMESUS PRETIOSUS
SURFSMELT
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN

HABITAT: PROTECTED BEACH SURF

MICROGADUS PROXIMUS
PACIFIC TOMCOD

TROPHIC LEVEL: (9) INVERTEBRATE EATER - BIRDS

ACTITIS MACULARIA
SPOTTED SANDPIPER
ARENARIA INTERPRES
RUDDY TURNSTONE
ARENARIA MELANOCEPHALA
BLACK TURNSTONE
CALIDRIS ALBA
SANDERLING
CALIDRIS ALPINA
DUNLIN
CALIDRIS BAIRDII
BAIRD'S SANDPIPER
CALIDRIS CANUTUS
RED KNOT
CALIDRIS MAURI
WESTERN SANDPIPER
CALIDRIS MINUTILLA
LEAST SANDPIPER
CHARADRIUS ALEXANDRINUS
SNOWY PLOVER
CHARADRIUS SEMIPALMATUS
SEMIPALMATED PLOVER
CHARADRIUS VOCIFERUS
KILLDEER
LIMNODROMUS GRISEUS
SHORT-BILLED DOWITCHER
LIMNODROMUS SCOLOPACEUS
LONG-BILLED DOWITCHER
LIMOSA FEDOA
MARBLED GODWIT
LOBIPES LOBATUS
NORTHERN PHALAROPE
NUMENIUS AMERICANUS
LONG-BILLED CURLEW
NUMENIUS PHAEOPUS
WHIMBREL
PLUVIALIS DOMINICA
AMERICAN GOLDEN PLOVER
PLUVIALIS SQUATAROLA
BLACK-BELLIED PLOVER
TRINGA MELANOLEUCA
GREATER YELLOWLEGS

TROPHIC LEVEL: (Q) UNKNOWN INVERTEBRATES

HAUSTORIIDAE
AMPHIPOD

HABITAT: UNPROTECTED ROCKY SURF

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

ALARIA NANA
-NULL-
BOSSEA MANZA
LEAF CORAL
BRYOPSIS CORTICULANS
SEA FERN
CALLIARTHRON MANZA
BEAD CORAL
CALLITHAMNION PIKEANUM
BEAUTY BUSH
CLADOPHORA TRICHOTOMA
GREEN BALL
CODIUM FRAGILE
SEA STAGHORN
CODIUM SETCHELLII
SPUNGY CUSHION
CORALLINA GRACILIS
GRACEFUL CORAL
COSTARIA COSTATA
SEERSUCKER
CUMAGLOIA ANDERSONII
-NULL-
CYAMATHERE TRIPLICATA
TRIPLE RIB
CYSTOSEIRA OSMUNDACEA
WOODY CHAIN BLADDER
EGREGIA MENZIESII
FEATHER BOA
ENDOCLADIA MURICATA
NAIL BRUSH
ENTEROMORPHA COMPRESSA
GREEN CONFETTI
ENTEROMORPHA INTESTINALIS
LINK CONFETTI
ENTEROMORPHA PLUMOSA
SILK CONFETTI
GRATELOUPIA PINNATA
POINTED LYNX
HALICYSTIS OVALIS
-NULL-
HEDOPHYLLUM SESSILE
SEA CABBAGE
MYMENENA FLABELLIGERA
VEINED FAN
IRIDOPHYCUS SPECIES
IRIDESCENT SEAWEED
LAMINARIA ANDERSONII
SPLIT WHIP WRACK
LAMINARIA PLATYMERIS
SEA GIRDLE OR TANGLE
LAMINARIA SETCHELII
-NULL-
LESSONIOPSIS LITTORALIS
-NULL-
LITHOTHAMNIUM SPECIES
RED ROCK CRUST
MICROCLADIA BOREALIS
COARSE SEA LACE
PELVETIOPSIS LIMITATA
-NULL-
PLEUROPHYCUS GARDNERI
SEA SPATULA
POLYSIPHONIA PACIFICA
POLLY PACIFIC
PORPHYRA LANCEOLATA
RED JABOT LABER
PORPHYRA PERFORATA
RED LAVER
POSTELSIA PALMAEFORMIS
SEA PALM
PRESIDLA MERIDIONALIS
-NULL-
PRIONITIS LANCEOLATA
-NULL-
PRIONITIS LYALLII
LYALL'S SEAWEED
PTERYGOPHORA CALIFORNICA
POMPON
PTILOTA FILICINA
RED WING
PTILOTA HYPNOIDES
-NULL-
RALFSIA PACIFICA
TAR SPOT
SCHIZYMENIA PACIFICA
SEA ROSE
SCYTOSIPHON LOMENTARIA
WHIP TUBE
SPONGOMORPHA COALITA
GREEN ROPE
UROSPORA MIRABILIS
-NULL-

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

PHYLLOSPADIX SCOULERI
SCOULER'S SURFGRASS

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA DIGITALIS
LIMPET
ACMAEA PELTA
BROWN & WHITE SHIELD LIMPET
DIDDORA ASPERA
KEYHOLE LIMPET
KATHERINA TUNICATA
BLACK CHITON
NUTTALINA CALIFORNICA
CHITON
PARACLUNIO ALASKENSIS
MIDGE
STRONGLYOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ANISODORIS NOBILIS
SEA LEMON
PISASTER GIGANTEUS
SEASTAR
PISASTER OCHRACEUS
SEASTAR
THAIS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ASCELICHTHYS RHODORUS
ROSYLIP SCULPIN
RAJA STELLULATA
STARRY SKATE
SEBASTES MELANOPS
BLACK ROCKFISH

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

AECHMOPHORUS OCCIDENTALIS
WESTERN GREBE
CEPPHUS COLUMBA
PIGEON GUILLEMOT
CERORHINCA MONOCERATA
RHINOCEROUS AUKLET
GAVIA ARCTICA
ARCTIC LOON
HAEMATOPUS BACHMANI
BLACK OYSTERCATCHER
HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS HEERMANNI
HEEERMAN'S GULL
LUNDA CIRRHATA
TUFTED PUFFIN
MELANITTA DEGLANDI
WHITE-WINGED SCOTER
PELECANUS OCCIDENTALIS
BROWN PELICAN
PHALOCROCORAX AURITUS
DOUBLE-CRESTED CORMORANT
PHALOCROCORAX PELAGICUS
PELAGIC CORMORANT
PHALOCROCORAX PENICILLATUS
BRANDT'S CORMORANT
RISSA TRIDACTYLA
BLACK-LEGGEED KITTIWAKE
URIA AALGE
COMMON MURRE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

ENHYDRA LUTRIS
SEA OTTER
EUMETOPIAS JUBATA
STELLER'S SEA LION
LUTRA CANADENSIS
RIVER OTTER
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

HABITAT: UNPROTECTED ROCKY SURF

EUDISTYLIA VANCOUVERI
 SABELLID
IDOTEA SCHMITTI
 ISOPOD
IDOTEA WOSNESENSKII
 OLIVE GREEN ISOPOD
LIGIA PALLASI
 ROCK LOUSE
SABELLARIA CEMENTARIUM
 WORM

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

PROCYON LOTOR
 RACCOON

TROPHIC LEVE;L: (6) PARASITE
INVERTEBRATES

FABIA SUBQUADRATA
 PEA CRAB
HETEROSACCUS CALIFORNICUS
 -NULL-

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BALANUS GLANDULA
 BARNACLE
MYTILUS CALIFORNIANUS
 MUSSEL
NEANTHES BRANDTI
 WORM
POLLICIPES POLYMERUS
 PACIFIC GOOSE BARNACLE
VOLSELLA MODIOLUS
 HORSE MUSSEL

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

LARUS GLAUCESCENS
 GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
 WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

AMBLOPUSA BOREALIS
 ROVE BEETLE
CEPHALOTHORIX LINEARIS
 NEMERTEAN
DIAULOTA DENSISSIMA
 ROVE BEETLE
EMPLECTONEMA GRACILE
 RIBBON WORM
LIPAROCEPHALUS CORDICOLLIS
 ROVE BEETLE
MICRURA VERRILLI
 NEMERTEAN
PARANEMERTES PEREGRINA
 NEMERTEAN
THALASSOTRECHUS BARBARAE NIGRI
 GROUND BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

AMPHISTICHUS RHODOTERUS
 REDTAIL SURFPERCH
CYMATOGASTER AGGREGATA
 SHINER PERCH

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

ACTITIS MACULARIA
 SPOTTED SANDPIPER
APHRIZA VIRGATA
 SURFBIRD
ARENARIA INTERPRES
 RUDDY TURNSTONE
ARENARIA MELANOCEPHALA
 BLACK TURNSTONE
CALIDRIS PTILOCNEMIS
 ROCK SANDPIPER
HETEROSCELUS INCANUM
 WANDERING TATTLER
NUMENIUS PHAEOPUS
 WHIMBREL

TROPHIC LEVEL: (Q) UNKNOWN
INVERTEBRATES

HAPALOGASTER CAVICAUDA
 CRAB

HABITAT: PROTECTED ROCKY SURF

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

AGARUM FIMBRIATUM
SEA COLANDER
BOSSEA MANZA
LEAF CORAL
CALLIARTHRON MANZA
BEAD CORAL
CALLITHAMNION PIKEANUM
BEAUTY BUSH
CERAMIUM CALIFORNICUM
-NULL-
CERAMIUM PACIFICUM
POTTERY SEAWEED
COILODESME CALIFORNICA
STICK BAG
COLPOMENIA SINUOSA
POCKET OR OYSTER THIEF
CORALLINA CHILENSIS
TIDE POOL CORAL
CUMAGLOIA ANDERSONII
-NULL-
CYSTOPHYLLUM GERMINATUM
BLADDER LEAF
CYSTOSEIRA OSMONDACEA
WOODY CHAIN BLADDER
DESMARESTIA ACULEATA
CRISP COLOR CHANGER
DESMARESTIA INTERMEDIA
LOOSE COLOR CHANGER
DESMARESTIA MUNDA
WIDE BRANCH COLOR CHANGER
ENTEROMORPHA COMPRESSA
GREEN CONFETTI
ENTEROMORPHA INTESTINALIS
LINK CONFETTI
ENTEROMORPHA PLUMOSA
SILK CONFETTI
FUCUS FURCATA
ROCKWEED OR POPPING WRACK
GASTROCLONIUM COULTERI
SEA BELLY
GIGARTINA EXASPERATA
TURKISH TOWEL
GIGARTINA SPECIES
GRAPESTONE
GRATELOUPIA PINNATA
POINTED LYNX
HALICYSTIS OVALIS
-NULL-
HALOSACCION GLANDIFORME
SEA SAC
HETEROCHORDARIA ABIETINA
FIR NEEDLE
LAMINARIA PLATYMERIS
SEA GIRDLE OR TANGLE
LAMINARIA SACCHARINA
SUGAR WRACK
LAURENCIA SPECTABILIS
SEA LAUREL
LITHOTHAMNIUM SPECIES
RED ROCK CRUST
MACROCYSTIS INTEGRIFOLIA
KELP
MICROCLADIA COULTERI
DELICATE SEA LACE
PELVETIOPSIS LIMITATA
-NULL-
POLYNEURA PATISSIMA
CRISSCROSS NETWORK
POLYSIPHONIA COLLINSI
POLLY COLLINS
POLYSIPHONIA PACIFICA
POLLY PACIFIC
PORPHYRA LANCEOLATA
RED JABOT LAVER
PORPHYRA PURFORATA
RED LAVER
PRASIOLA MERIDIONALIS
-NULL-
PTILOTA FILICINA
RED WING
PTILOTA HYPNOIDES
-NULL-
RALFSIA PACIFICA
TAR SPOT
RHODOMELA LARIX
BLACK PINE
RHODYMENIA PALMATA
DULSE OR RED KALE
RHODYMENIA PERTUSA
RED EYELET SILK
SCYTOSIPHON LOMENTARIA
WHIP TUBE
SPONGOMORPHA COALITA
GREEN ROPE
ULVA FENESTRATA
-NULL-
ULVA LACTUCA
SEA LETTUCE
ULVA LINZA
GREEN STRING LETTUCE

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

JAUMEA CARNOSA
JAUMEA
PHYLLOSPADIX SCOULERI
SCOULER'S SURFGRASS
TANACETUM DOUGLASII
DUNE TANSY

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA DIGITALIS
LIMPET
ACMAEA FENESTRATA
LIMPET
ACMAEA LIMATULA
FILE LIMPET
ACMAEA MITRA
DUNCE-CAP LIMPET
ACMAEA PELTA
BROWN & WHITE SHIELD LIMPET
AMPITHOE HUMERALIS
-NULL-
CALLISTOCHITON CRASSICOSTATUS
CHITON
CRYPTOCHITON STELLERI
GUM BOOT CHITON
CYANOPLAX HARTWEGI
CHITON
KATHERINA TUNICATA
BLACK CHITON
LITTORINA PLANAXIS
PERIWINKLE
LITTORINA SCUTULINA
PERIWINKLE
LITTORINA SITKANA
PERIWINKLE
LUMBRINERIS ZONATA
WORM
MOPALIA CILIATA
CHITON
MOPALIA LIGNOSA
CHITON
ODONTOSYLLIS PHOSPHOREA
WORM
PARALUNIO ALASKENSIS
MIDGE
STRONGYLOCENTROTUS FRANCISCANU
SEA URCHIN
STRONGYLOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

TONICELLA LINEATA
LINED CHITON

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

AEOLIDIA PAPILLOSA
NUDIBRANCH
AMBLOPUSA BOREALIS
ROVE BEETLE
ANISODORIS NOBILIS
SEA LEMON
CADLINA
NUDIBRANCH
CORAMBE PACIFICA
NUDIBRANCH
DIAULOTA DENSISSIMA
ROVE BEETLE
DIRONA ALBOLINEATA
NUDIBRANCH
LEPIDOZONA COOPERI
CHITON
LEPIDOZONA MERTENSI
CHITON
LIPAROCEPHALUS CORDICOLLIS
ROVE BEETLE
PISASTER GIGANTEUS
SEASTAR
PISASTER OCHRACEUS
SEASTAR
PLACIPHORELLA VELATA
CHITON
PYCNOGONUM STEARNSI
SEA SPIDER
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSTANGA PULCHRA
NUDIBRANCH
SOLASTER DAWSONI
SEASTAR
SOLASTER STIMSONI
SEASTAR
THAIS

HABITAT: PROTECTED ROCKY SURF

SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ARTEDIUS LATERALIS
SMOOTHHEAD SCULPIN
ASCELICHTHYS RHODORUS
ROSYLIP SCULPIN
HEMILEPIDOTUS HEMILEPIDOTUS
RED IRISH LORD
HEMILEPIDOTUS SPINOSIS
BROWN IRISH LORD
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS LAGOCEPHALUS
ROCK GREENLING
MYOXOCEPHALUS POLYACANTHOCEPHA
GREAT SCULPIN
PAROPHYRUS VETULUS
ENGLISH SOLE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES MELANOPS
BLACK ROCKFISH
XIPHISTER ATROPURPUREUS
BLACK PRICKLEBACK

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

AECHMOPHORUS OCCIDENTALIS
WESTERN GREBE
ARDEA HERODIAS
GREAT BLUE HERON
BUCEPHALA ALBEOLA
BUFFLEHEAD
BUCEPHALA CLANGULA
COMMON GOLDENEYE
CEPPHUS COLUMBA
PIGEON GUILLEMOT
CERORHINCA MONOCERATA
RHINOCEROS AUKLET
GAVIA ARCTICA
ARCTIC LOON
HAEMATOPUS BACHMANI
BLACK OYSTERCATCHER
HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS HEERMANNI
HEERMAN'S GULL
LUNDA CIRRHADA
TUFTED PUFFIN
MEGACERYLE ALCYON
BELTED KINGFISHER
MELANITTA DEGLANDI
WHITE-WINGED SCOTER
MELANITTA PERSPICILLATA
SURF SCOTER
PELECANUS OCCIDENTALIS
BROWN PELICAN
PHALACROCORAX AURITIS
DOUBLE-CRESTED CORMORANT
PHALACROCORAX PELAGICUS
PELAGIC CORMORANT
PHALACROCORAX PENICILLATUS
BRANDT'S CORMORANT
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE
URIA AALGE
COMMON MURRE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

ENHYDRA LUTRIS
SEA OTTER
EUMETOPIAS JUBATA
STELLER'S SEA LION
LUTRA CANADENSIS
RIVER OTTER
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRIVORE
INVERTEBRATES

AMPHIODIA OCCIDENTALIS
BRITTLE STAR
AMPHITRITE ROBUSTA
POLYCHAETE WORM
CUCUMARIA MINIATA
SEA CUCUMBER
EUDISTYLIA POLYMORPHA
SABELLID
EUDISTYLIA VANCOUVERI
SABELLID
EUPOLYMNIA HETEROBRANCHIA
TEREBELLID WORM
IDOTEA SCHMITTI
ISOPOD
IDOTEA UROTOMA
PILL BUG
LIGIA PALLASI
ROCK LOUSE
MELITA PALMATA
BEACH HOPPER
NEOAMPHITRITE ROBUSTUS
TEREBELLID WORM
OPHIOPHOLIS ACULEATA
BRITTLE STAR
ORCHESTIA TRASKIANA
LESSER BEACH HOPPER
THELEPUS CRISPUS
WORM
TIGRIOPUS CALIFORNICUS
BUG

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

MOPALIA MUSCOSA
CHITON

TROPHIC LEVEL: (5) OMNIVORE
FISHES

ANOPLARCHUS PURPURESCENS
HIGH COCKSCOMB
XIPHISTER MUCOSUS
ROCK PRICKLEBACK

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

AYTHYA MARILA
GREATER SCAUP
CORVUS BRACHYRHYNCHOS
COMMON CROW
CORVUS CORVAX
COMMON RAVEN

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

PROCYON LOTOR
RACCOON

TROPHIC LEVEL: (6) PARASITE
NON-VASCULAR PLANTS

JANCZEWSKIA GARDNERI
PARASITIC SEA LAUREL

TROPHIC LEVEL: (6) PARASITE
INVERTEBRATES

ARCTONOE PULCHRA
SCALE WORM
ARCTONOE VITTATA
SCALE WORM
FABIA SUBQUADRATA
PEA CRAB
PINNIXA TUBICOLA
PEA CRAB
SYNDESMIS FRANCISCANUS
WORM

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BALANUS CARIOSUS
BARNACLE
BALANUS GLANDULA
BARNACLE
BOCCARDIA PROBOSCIDEA
SPINOID WORM
BEGULA PACIFICA
BRYOZOAN
HALICHONDRIA PANICEA
CRUMB OF BREAD SPONGE
HENRICIA LEVIUSCULA
RED SEASTAR
HINNITES GIGANTEUS
ROCK OYSTER
HIPPODIPLOSIA INSCULPTA
BRYOZOAN
LEPRALIA BILABIATA
BRYOZOAN
MEMBRANIPORA MEMBRANACEA
BRYOZOAN
MEMBRANIPORA SERRILAMELLA
BRYOZOAN
PEDICELLINA CERNUA
ENTOPROCT
PHIDOLOPORA PACIFICA
BRYZOAN

HABITAT: PROTECTED ROCKY SURF

PLOCAMIA KARYKINA
RED SPONGE
SERPULA VEMICULARIS
WORM
SPIRORBIS
WORM
TEREBRATALIA TRANSVERSA
BRACHIOPOD
TRICELLARIA OCCIDENTALIS
BRYOZOAN
XESTOSPONGIA VANILLA
SPONGE

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

HEMIGRAPSUS NUDUS
PURPLE SHORE CRAB
PACHYCHELES RUDIS
PORCELAIN CRAB
PAGURUS GRANOSIMANUS
HERMIT CRAB
PAGURUS HEMPHILLI
HERMIT CRAB
PAGURUS SAMUELIS
HERMIT CRAB
PETROLISTHES CINCTIPES
PORCELAIN CRAB

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

HALIAEETUS LEUCOCEPHALUS
BALD EAGLE
LARUS GLAUCESCENS
GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

ALLORCHESTES ANGUSTUS
-NULL-
AMPHIPORUS BIMACULATUS
RIBBON WORM
ANTHOPLEURA ELEGANTISSIMA
AGGREGATED ANEMONE
ANTHOPLEURA XANTHOGRAMMICA
GIANT GREEN ANEMONE
CANCER ANTENNARIUS
CRAB
CANCER MAGISTER
DUNGENESS CRAB
CANCER PRODUCTUS
CRAB
CEPHALOTHRIX LINEARIS
NEMERTEAN
CERATOSTOMA
FOLIATUM MUREX
EMPLECTONEMA GRACILE
RIBBON WORM
EPIACTIS PROLIFERA
ANEMONE
GLYCERA AMERICANA
WORM
HALOSYDNA BREVISETOSA
SCALE WORM
HERMISSENDA CRASSICORNIS
NUDIBRANCH
MICRURA VERRILLI
NEMERTEAN
PARANEMERTES PEREGRINA
NEMERTEAN
PHOXICHILIDIUM FEMORATUM
SEA SPIDER
SPIRONTOCARIS BREVIROSTRIS
BROKEN BACK SHRIMP
SPIRONTOCARIS CRISTATA
BROKEN BACK SHRIMP
SPIRONTOCARIS PALUDICOLA
BROKEN BACK SHRIMP
SPIRONTOCARIS PRIONATA
BROKEN BACK SHRIMP
TEALIA CRASSICORNIS
ANEMONE
THALASSOTRECHUS BARBARAE NIGRI
GROUND BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

APODICHTHYS FLAVIDUS
PENPOINT GUNNEL
CHIROLOPHIS NUGATOR
MOSSHEAD WAR-BONNET
CLINOCOTTUS ACUTICEPS
SHARPNOSE SCULPIN
CLINOCOTTUS EMBRYUM
CALICO SCULPIN
CLINOCOTTUS GLOBICEPS
MOSSHEAD SCULPIN
CYMATOGASTER AGGREGATA
SHINER PERCH
GOBIESOX MAEANDRICUS
NORTHERN CLINGFISH
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN
LIPARIS FLORAE
TIDEPOOL SNAILFISH
OLIGOCOTTUS MACULOSUS
TIDEPOOL SCULPIN
OLIGOCOTTUS SNYDERI
FLUFFY SCULPIN
PHOLIS LAETA
CRESCENT GUNNEL
RHACOCHILUS VACCA
PILE PERCH
SPIRINCHUS STARSKI
NIGHT SMELT
XERERPES FUCORUM
ROCKWEED GUNNEL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

ACTITIS MACULARIA
SPOTTED SANDPIPER
APHRIZA VIRGATA
SURFBIRD
ARENARIA INTERPRES
RUDDY TURNSTONE
ARENARIA MELANOCEPHALA
BLACK TURNSTONE
CALIDRIS ALPINA
DUNLIN
CALIDRIS PTILOCNEMIS
ROCK SANDPIPER
HETEROSCELUS INCANUM
WANDERING TATTLER
NUMENIUS PHAEOPUS
WHIMBREL
PLUVIALIS SQUATAROLA
BLACK-BELLIED PLOVER
TRINGA MELANOLEUCA
GREATER YELLOWLEGS

TROPHIC LEVEL: (Q) UNKNOWN
INVERTEBRATES

ANAITIDES MEDIPAPILLATA
PADDLE WORM
ARABELLA IRICOLOR
WORM
ASTRAEA GIBBEROSA
SNAIL
CREPIDULA ADUNCA
HORNED SLIPPER SHELL
CRYPTOLITHODES SITCHENSIS
UMBRELLA-BACKED CRAB
DODECACERIA FISTULICOLA
CIRRATULID WORM
HAPALOGASTER CAVICAUDA
CRAB
LEPTASTERIA HEXACTIS
SEASTAR
LEPTASTERIA PUSILLA
SEASTAR
MIMULUS FOLIATUS
CRAB
DEDIGNATHUS INERMIS
CRAB
PATIRIA MINIATA
SEA BAT
PLATYNEREIS AGASSIZI
NEREID WORM
PODARKE PUGGETTENSIS
POLYCHAETE
PUGETTIA PRODUCTA
KELP CRAB
SCYRA ACUTIFRONS
MASKING CRAB
TEGULA FUNEBRALIS
BLACK TURBAN SNAIL

HABITAT: HEADLANDS AND ROCKY ISLANDS

TROPHIC LEVEL: (-)
VASCULAR PLANTS

ANTHOXANTHUM ODORATUM
SWEET VERNALGRASS
HOLCUS LANATUS
COMMON VELVET-GRASS

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

AIRA PRAECOX
LITTLE HAIRGRASS
ALNUS RUBRA
RED ALDER
ANGELICA LUCIDA
SEA-WATCH
ARCTOSTAPHYLOS COLUMBIANA
BRISTLY MANZINITA
ARCHTOSTAPHYLOS UVA-URSI
KINNIKINNIC
ARMERIA MERITIMA
THRIFT
BACCHARIS PILULARIS
CHAPARRAL BROOM
BLECHNUM SPICANI
DEER FERN
CALAMAGROSTIS NUTKAENSIS
REEDGRASS
CASTILLEJA LITORALIS
PACIFIC PAINTBRUSH
CEANOTHUS THYRSIFLORUS
BLUE BLOSSOM
CERASTIUM ARVENSE
FIELD CHICKWEED
CYTISUS SCOPARIUS
SCOTCH BROOM
DANTHONIA CALIFORNICA
OATGRASS
DESCHAMPSIA CAESPITOSA
TUFTED HAIRGRASS
DESCHAMPSIA LONGIFLORA
HAIRGRASS
DIGITALIS PURPUREA
FOXGLOVE
EMPETRUM NIGRUM
CROWBERRY
ERIGERON GLAUCUS
SEASIDE DOCK
FESTUCA MYUROS
RAT-TAIL FESCUE
FESTUCA RUBRA
RED FESCUE
FRAGARIA CHILOENSIS
COASTAL STRAWBERRY
GALIUM NUTTALII
NUTTAL'S BEDSTRAW
GAULTHERIA SHALLON
SALAL
GNAPHALIUM CHILENSE
COTTON-BATTING PLANT
GRINDELIA INTEGRIFOLIA VAR. MA
PUGET SOUND GUMWEED
HERACLEUM LANATUM
COW-PARSNIP
HOLODISCUS DISCOLOR
OCEAN-SPRAY
HYPOCHAERIS RADICATA
GOSMORE
LASTHENIA CHRYSOSTOMA
LASTHENIA
LASTHENIA MINOR VAR. MARITIMA
HAIRY LASTHENIA
LATHYRUS LITTORALIS
BEACH PEA-VINE
LEONTODON NUDICAULIS
BRISTLY HAWKBIT
LILAEOPSIS OCCIDENTALIS
LILAEOPSIS
LONICERA INVOLUCRATA
BLACK TWINBERRY
LOTUS FORMOSISSIMUS
DEERVETCH, SEASIDE LOTUS
LUPINUS ARBOREUS
TREE LUPINE
LUPINUS VARICOLOR
TWO-COLOR LUPINE
MICROSERIS BIGILOVII
COAST MICROSERIS
MYRICA GALE
SWEET GALE
PINUS CONTORTA
LODGEPOLE PINE, SHORE PINE
PLANTAGO MIRTELLA
TALL COAST PLANTAIN
PLANTAGO LANCEOLATA
BUCKHORN PLANTAIN
POA PACHYPHOLIS
SEACLIFF BLUEGRASS
POLYPODIUM GLYCYRRHIZA
LICORICE FERN
POLYSTICHUM MUNITUM
SWORDFERN
PSEUDOTSUGA MENZIESII
DOUGLAS FIR
PTERIDIUM AQUILINUM
WESTERN BRACKEN FERN
RANUNCULUS FLAMMULA
SMALL CREEPING BUTTERCUP
RHAMNUS PURSHIANA
CASCARA
RHODODENDRON MACROPHYLLUM
WESTERN RHODODENDRON
RHUS DIVERSILOBA
POISON OAK
ROMANZOFFIA TRACYI
TRACY'S MISTMAIDEN
RUBUS SPECTABILIS
SALMONBERRY
RUBUS URSINUS
DOUGLASBERRY
RUMEX MARITIMUS
SEASIDE DOCK
SAGINA CRASSICAULIS
STICK-STEMMED PEARLWORT
SALIX HOOKERIANA
COAST WILLOW
SEDUM LANCEOLATUM VAR. MESIOTI
LANCE-LEAVED STONECROP
SIDALCEA HIRTIPES
HAIRY-STEMMED CHECKER-MALLOW
STACHYS RIGIDA
HEDGE NETTLE
TANACETUM DOUGLASII
DUNE TANSY
THUJA PLICATA
WESTERN RED CEDAR
ULEX EUROPAEUS
GORSE
VACCINIUM OVATUM
EVERGREEN HUCKLEBERRY
VACCINIUM PARVIFOLIUM
RED HUCKLEBERRY
VERATRUM VIRIDE
FALSE HELLEBORE

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

PARACLUNIO ALASKENSIS
MIDGE

TROPHIC LEVEL: (2) HERBIVORE
BIRDS

BONASA UMBELLUS
RUFFED GROUSE
CARDUELIS PINUS
PINE SISKIN
CARDULIS TRISTIS
AMERICAN GOLDFINCH
CARPODACUS MEXICANUS
HOUSE FINCH
CARPODACUS PURPUREUS
PURPLE FINCH
COLUMBA FASCIATA
BAND-TAILED PIGEON
DENDRAGAPUS OBSCURUS
BLUE GROUSE
HESPERIPHONA VESPERTINA
EVENING GROSBEAK
JUNCO HYEMALIS
DARK-EYED JUNCO
LOPHORTYX CALIFORNICUS
CALIFORNIA QUAIL
LOXIA CURVIROSTRA
RED CROSSBILL
MELOSPIZA MELODIA
SONG SPARROW
MELOTHRUS ATER
BROWN-HEADED COWBIRD
OREORTYX PICTUS
MOUNTAIN QUAIL
PASSERELLA ILIACA
FOX SPARROW
PHEUCTICUS MELANOCEPHALUS
BLACK-HEADED GROSBEAK
PIPILO ERYTHROPHTHALMUS
RUFOUS-SIDED TOWHEE
SELASPHORUS RUFUS
RUFOUS HUMMINGBIRD
SPIZELLA PASSERINA
CHIPPING SPARROW
ZENAIDA MACROURA
MOURNING DOVE
ZONOTRICHIA ATRICAPILLA
GOLDEN-CROWNED SPARROW
ZONOTRICHIA LEUCOPHRYS
WHITE-CROWNED SPARROW

TROPHIC LEVEL: (2) HERBIVORE
MAMMALS

MICROTUS LONGICAUDUS
LONG-TAILED VOLE

HABITAT: HEADLANDS AND ROCKY ISLANDS

MICROTUS OREGONI
OREGON VOLE
THOMOMYS MONTICOLA
MOUNTAIN POCKET GOPHER

TROPHIC LEVEL: (3) CARNIVORE
HERPETOFAUNA

THAMNOPHIS ORDINOIDES
NORTHWESTERN GARTER SNAKE
THAMNOPHIS SIRTALIS
COMMON GARTER SNAKE

TROPHIC LEVEL: (-)
BIRDS

PANDION HALIAETUS
OSPREY

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

ACCIPITER COOPERII
COOPER'S HAWK
ACCIPITER STRIATUS
SHARP-SHINNED HAWK
AEGOLIUS ACADICUS
SAW-WHET OWL
ASIO OTUS
LONG-EARED OWL
BUBO VIRGINIANUS
GREAT HORNED OWL
BUTEO JAMAICENSIS
RED-TAILED HAWK
CEPPHUS COLUMBA
PIGEON GUILLEMOT
CERORHINCA MONOCERATA
RHINOCEROS AUKLET
FALCO PEREGRINUS
PEREGRINE FALCON
GLAUCIDIOM GNOMA
PYGMY OWL
LUNDA CIRRHATA
TUFTED PUFFIN
OCEANODROMA FURCATA
FORK-TAILED STORM PETREL
OCEANODROMA LEUCORHOA
LEACH'S STORM PETREL
OTUS ASIO
SCREECH OWL
PHALOCROCORAX AURITUS
DOUBLE-CRESTED CORMORANT
PHALOCROCORAX PELAGICUS
PELAGIC CORMORANT
PHALOCROCORAX PENICILLATUS
BRANDT'S CORMORANT
PTYCHORAMPHUS ALEUTICUS
CASSIN'S AUKLET
TYTO ALBA
BARN OWL
URIA AALGE
COMMON MURRE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

CANIS LATRANS
COYOTE
FELIS CONCOLOR
MOUNTAIN LION
LYNX RUFUS
BOBCAT
MUSTELA ERMINEA
SHORT-TAILED WEASEL
SPILOGALE PUTORIUS
SPOTTED SKUNK
UROCYON CINEROARGENTEUS
GRAY FOX
VULPES FULVA
RED FOX

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

BOMBYCILLA CEDRORUM
CEDAR WAXWING
CORVUS BRACHYRHYNCHOS
COMMON CROW
CORVUS CORVAX
COMMON RAVEN
CYANOCITTA STELLERI
STELLER'S JAY
PERIOSOREUS CANADENSIS
GRAY JAY
PIRANGA LUDOVICIANA
WESTERN TANAGER
STURNUS VULGARIS
STARLING
TURDUS MIGRATORIUS
AMERICAN ROBIN

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

DIDELPHIS MARSUPIALIS
COMMON OPPOSUM
EURACTOS AMERICANUS
BLACK BEAR
MEPHITIS MEPHITIS
STRIPED SKUNK
PEROMYSCUS MANICULATUS
DEER MOUSE
PROCYON LOTOR
RACCOON
ZAPUS TRINOTATUS
PACIFIC JUMPING MOUSE

TROPHIC LEVEL: (6) PARASITE
VASCULAR PLANTS

BOSCHNIAKIA HOOKERI
SMALL GROUND-CONE

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

CATHARTES AURA
TURKEY VULTURE
HALIAEETUS LEUCOCEPHALIS
BALD EAGLE
LARUS GLAUCESSCENS
GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

AMBLOPUSA BOREALIS
ROVE BEETLE
DIAULOTA DENSISSIMA
ROVE BEETLE
LIPAROCEPHALUS CORDICOLLIS
ROVE BEETLE
THALASSOTRECHUS BARBARAE NIGRI
GROUND BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - HERPETOFAUNA

AMBYSTOMA GRACILE
BROWN SALAMANDER
BUFO BOREAS
WESTERN TOAD

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - HERPETOFAUNA

GERRHONOTUS COERULEUS
NORTHERN ALLIGATOR LIZARD
HYLA REGILLA
PACIFIC TREEFROG
PLETHODON DUNNI
DUNNS SALAMANDER
RHYACOTRITON OLYMPICUS
OLYMPIC SALAMANDER
TARICHA GRANULOSA
ROUGH-SKINNED NEWT

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

CATHARUS GUTTATUS
HERMIT THRUSH
CATHARUS USTULATUS
SWAINSON'S THRUSH
CERTHIA FAMILIARIS
BROWN CREEPER
CHAETURA VAUXI
VAUX'S SWIFT
CHAMAEA FASCIATA
WRENTIT
CHORDEILES MINOR
COMMON NIGHTHAWK
COLAPTES AURATUS
COMMON FLICKER
CONTOPUS SORDIDULUS
WESTERN WOOD PEWEE
CYPSELOIDES NIGER
BLACK SWIFT
DENDROICA CORONATA
YELLOW-RUMPED WARBLER
DENDROICA NIGRESCENS
BLACK-THROATED GRAY WARBLER
DENDROICA OCCIDENTALIS
HERMIT WARBLER
DENDROICA PETECHIA
YELLOW WARBLER
DENDROICA TOWNSENDI
TOWNSEND'S WARBLER
DRYOCOPUS PILEATUS
PILEATED WOODPECKER
EMPIDONAX DIFFICILIS
WESTERN FLYCATCHER
EMPIDONAX HAMMONDII
HAMMOND'S FLYCATCHER
EMPIDONAX OBERHOLSERI
DUSKY FLYCATCHER
EMPIDONAX TRAILLII
WILLOW FLYCATCHER

HABITAT: HEADLANDS AND ROCKY ISLANDS

HIRUNDO RUSTICA
 BARN SWALLOW
IRIDOPROCNE BICOLOR
 TREE SWALLOW
IXOREUS NAEVIUS
 VARIED THRUSH
MYADESTES TOWNSENDI
 TOWNSEND'S SOLITAIRE
NUTTALLORNIS BOREALIS
 OLIVE-SIDED FLYCATCHER
OPORORNIS TOLMIEI
 MCGILLIVRAY'S WARBLER
PARUS ATRICAPILLUS
 BLACK-CAPPED CHICKADEE
PARUS RUFESCENS
 CHESTNUT-BACKED CHICKADEE
PETROCHELIDON PYRRHONOTA
 CLIFF SWALLOW
PICOIDES PUBESCENS
 DOWNY WOODPECKER
PICOIDES VILLOSUS
 HAIRY WOODPECKER
PROGNE SUBIS
 PURPLE MARTIN
PSALTRIPARUS MINIMUS
 BUSHTIT
REGULUS CALENDULA
 RUBY-CROWNED KINGLET
REGULUS SATRAPA
 GOLDEN-CROWNED KINGLET
SITTA CANADENSIS
 RED-BRESTED NUTHATCH
SITTA CAROLINENSIS
 WHITE-BRESTED NUTHATCH
SPHYRAPICUS VARIUS
 YELLOW-BELLIED SAPSUCKER
STELGIDOPTERYX RUFICOLLIS
 ROUGH-WINGED SWALLOW
TACHYCINETA THALASSINA
 VIOLET-GREEN SWALLOW
THRYOMANES BEWICKII
 BEWICK'S WREN
TROGLODYTES AEDON
 HOUSE WREN
TROGLODYTES TROGLODYTES
 WINTER WREN
VERMIVORA CELATA
 ORANGE-CROWNED WARBLER
VERMIVORA RUFICAPILLA
 NASHVILLE WARBLER
VIREO GILVUS
 WARBLING VIREO
VIREO HUTTONI
 HUTTON'S VIREO
VIREO SOLITARIUS
 SOLITARY VIREO
WILSONIA PUSILLA
 WILSON'S WARBLER

TROPHIC LEVEL: (9) INVERTEBRATE EATER - MAMMALS

EPTESICUS FUSCUS
 BIG BROWN BAT
MYOTIS LICIFUGUS
 LITTLE BROWN MYOTIS
NEUROTRICHUS GIBBSII
 SHREW-MOLE
SCAPANUS TOWNSENDII
 TOWNSEND'S MOLE
SOREX VAGRANS
 VAGRANT SHREW

HABITAT: HEADLANDS AND ROCKY ISLANDS

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

ASTERIONELLA FORMOSA
DIATOM
ASTERIONELLA JAPONICA
DIATOM
ASTERIONELLA KARIANA
DIATOM
BACTERIASTRUM DELICATULUM
DIATOM
CERATIUM
DINOFLAGELLATE
CHAETOCEROS COMPRESSUS
DIATOM
CHAETOCEROS CONVOLUTUS
DIATOM
CHAETOCEROS RADICANS
DIATOM
COCCOLITHOPHORES
COCCOLITHS
DACTYLIOSOLEN MEDDITERRANEUS
DIATOM
FRAGILARIA
DIATOM
GONYAULAX
DINOFLAGELLATE
LEPTOCYLINDRICUS DANICUS
DIATOM
MELOSIRA ISLANDICA
DIATOM
OTHER FLAGELLATES
FLAGELLATES
PERIDINIUM
DINOFLAGELLATE
RHIZOSOLENIA ALATA
DIATOM
RHIZOSOLENIA DELICATULA
DIATOM
RHIZOSOLENIA FRAGILISSIMA
DIATOM
SYNEDRA ULNA
DIATOM
THALASSIONEMA NITZSCHIOIDES
DIATOM

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACARTIA CLAUSI
COPEPOD
ACARTIA DANAE
COPEPOD
ACARTIA LONGIREMIS
COPEPOD
ACARTIA NEGLIGENS
COPEPOD
AETIDEOPSIS PACIFICA
COPEPOD
AETIDEUS ARMATUS
COPEPOD
AETIDEUS PACIFICUS
COPEPOD
AMALLOTHRIX VALIDA
COPEPOD
AMALLOTHRIX VORAK
COPEPOD
ARIETELLUS PLUMIFER
COPEPOD
BATHYCALANUS BRADYI
COPEPOD
BOREOMYSIS
COPEPOD
BOREOMYSIS ROSTRATA
COPEPOD
CALANUS CRISTATUS
COPEPOD
CALANUS FINMARCHICUS
COPEPOD
CALANUS PLUMCHRUS
COPEPOD
CALANUS TENUICORNIS
COPEPOD
CALOCALANUS STYLIREMIS
COPEPOD
CANDACIA BIPINNATA
COPEPOD
CAVOLINA UNCINATA
PTEROPOD
CENTRAUGAPTILUS PORCELLUS
COPEPOD
CENTROPAGES MCMURRICHI
COPEPOD
CHIRUNDINA STREETSI
COPEPOD
CLAUSOCALANUS ARCUICORNIS
COPEPOD
CLAUSOCALANUS PERGENS
COPEPOD
CLIO BALANTIUM
PTEROPOD
CLIONE LIMACINA
PTEROPOD
COROLLA SPECTABILIS
PTEROPOD
CORYCAEUS
COPEPOD
CTENOCALANUS VANUS
COPEPOD
EPILABIDOCERA AMPHITRITES
COPEPOD
EUCALANUS ATTENUATUS
COPEPOD
EUCALANUS BUNGII
COPEPOD
EUCHAETA SPINOSA
COPEPOD
EUCHIRELLA CURTICAUDA
COPEPOD
EUCOPIA
COPEPOD
EVADNE NORMANNI
CLADOCERAN
GAETANUS SECUNDUS
COPEPOD
GAETANUS SIMPLEX
COPEPOD
GADIUS BREVISPINUS
COPEPOD
GAIDIUS VARIABILIS
COPEPOD
GAUSSIA PRINCEPS
COPEPOD

HABITAT: EUPHOTIC PELAGIC

GIGANTOCYPRIS AGASSIZII
OSTRACOD
GNATHOPHAUSIA GIGAS
COPEPOD
GNATHOPHAUSIA INGENS
COPEPOD
HALOPTILUS PSEUDOXYCEPHALUS
COPEPOD
HETERORHABDUS TANNERI
COPEPOD
HETEROSTYLITES LONGICORNIS
COPEPOD
HETEROSTYLITES MAJOR
COPEPOD
LUCICUTIA BICORNUTA
COPEPOD
LUCICUTIA FLAVICORNIS
COPEPOD
METRIDEA LUCENS
COPEPOD
METRIDIA CURTICAUDA
COPEPOD
MICROCALANUS PYGMAEUS
COPEPOD
MICROSETELLA
COPEPOD
MIXTOCALANUS ROBUSTUS
COPEPOD
OITHONA
COPEPOD
ONCAEA CONIFERA
COPEPOD
PARACALANUS PARVUS
COPEPOD
PAREUCHAETA BIROSTRATA
COPEPOD
PAREUCHAETA JAPONICA
COPEPOD
PHAENNA SPINIFERA
COPEPOD
PLEUROMAMMA BOREALIS
COPEPOD
PLEUROMAMMA SCUTULLATA
COPEPOD
PODON LEUCKARTI
CLADOCERAN
PSEUDOCALANUS MINUTUS
COPEPOD
PSEUDOCHIRELLA POLYSPINA
COPEPOD
RACOVITZANUS FORRECTA
COPEPOD
RACOVITZANUS PACIFICA
COPEPOD
RHINCALANUS NASUTUS
COPEPOD
SCAPHOCALANUS MEDIUS
COPEPOD
SCAPHOCALANUS MINUTUS
COPEPOD
SCAPHOCALANUS SUBELONGATUS
COPEPOD
SCOLECITHRICELLA MINOR
COPEPOD
SCOTTOCALANUS SEDATUS
COPEPOD
TORTANIS DISCAUDATUS
COPEPOD
UNDEUCHAETA INTERMEDIA
COPEPOD
UNDEUCHAETA MAJOR
COPEPOD
UNDEUCHAETA PLUMOSA
COPEPOD

TROPHIC LEVEL: (2) HERBIVORE
BIRDS

BRANTA NIGRICANS
BLACK BRANT

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ABRALIOPSIS FELIS
SQUID
AEGINA CITREA
JELLYFISH
AEGINURA GRIMALDII
JELLYFISH
AEQUOREA
JELLYFISH
AGLANTHA DIGITALE
JELLYFISH
ATOLLA VANHOEFFENI
JELLYFISH
ATOLLA WYVELLEI
JELLYFISH
AURELIA LABIATA
JELLYFISH
BARGMANNIA
JELLYFISH
BEROE CUCUMIS
COMB JELLY
BOTRYNEMA BRUCEI
JELLYFISH
CALYCOPSIS NEMATOPHORA
JELLYFISH
CARANARIA JAPONICA
HETEROPOD
CHELOPHYES APPENDICULATA
JELLYFISH
CHELOPHYES MULTIDENTATA
JELLYFISH
CHIROTEUTHIS VERANYI
SQUID
CHUNIPHYES MOSERAE
JELLYFISH
COLOBONEMA SERVICEUM
JELLYFISH
CRANCHIA SCABRA
SQUID
CROSSOTA ALBA
JELLYFISH
CROSSOTA PEDUNCULATA
JELLYFISH
CROSSOTA RUFOBRUNNEA
JELLYFISH
CUNINA OCTONARIA
JELLYFISH
CYANEA
JELLYFISH
EUPHYSORA FURCATA
JELLYFISH
EUTONIA INDICANS
JELLYFISH
GALITEUTHIS ARMATA
SQUID
GONATOPSIS BOREALIS
SQUID
GONATUS ANONYCHUS
SQUID
GONATUS FABRICII
SQUID
GONATUS MAGISTER
SQUID
HALICREAS MINIMUM
JELLYFISH
HALISTAURA CELLULARIA
JELLYFISH
HISTIOTEUTHIS HETEROPSIS
SQUID
LENSIA CONOIDEA
JELLYFISH
LIMACINA HELACINA
PTEROPOD
LOLIGO OPALESCENS
SQUID
MOROTEUTHIS ROBUSTA
SQUID
MUGGIAEA ATLANTICA
JELLYFISH
NANOMIA CARA
JELLYFISH
OCTOPOTEUTHIS SICULA
SQUID
ONYCHOTEUTHIS BANKSI
SQUID
PANTACHOGON HAECKELI
JELLYFISH
PARAPHYLLINA RANSONI
JELLYFISH
PERIPHYLLA PERIPHYLLA
JELLYFISH
PHYSOPHORA HYDROSTATICA
JELLYFISH
PLEUROBRACHIA PILEUS
COMB JELLY
PRAYA DUBIA
JELLYFISH
PRAYA RETICULATA
JELLYFISH
PTEROTRACHEA SCUTUTA
HETEROPOD
SARSIA PRINCEPS
JELLYFISH
SARSIA TUBULOSA
JELLYFISH
SOLMISSUS INCISA
JELLYFISH
SOLMISSUS MARSHALLI
JELLYFISH
SULCULEOLARIA QUADRIVALVIS
JELLYFISH
TAONIUS PALVO
SQUID
VAMPYROTEUTHIS INFERNALIS
SQUID
VELELLA VELELLA
JELLYFISH
VOGTIA SPINOSA
JELLYFISH

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ALOPIAS VULPINUS
THRESHER SHARK
BRACHYISTIUS FRENATUS
KELP PERCH

HABITAT: EUPHOTIC PELAGIC

EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GADUS MACROCEPHALUS
PACIFIC COD
GALEORHINUS ZYOPTERUS
SOUPFIN SHARK
HEXANCHUS GRISEUS
SIXGILL SHARK
HYDROLAGUS COLLIEI
RATFISH
LAMNA DITROPSIS
SALMON SHARK
MERLUCCIUS PRODUCTUS
PACIFIC HAKE
MARONE SAXATILIS
STRIPED BASS
NOTORYNCHUS MACULATUS
SPOTTED COWSHARK OR SEVENGILL
ONCORHYNCHUS GORBUSCHA
PINK SALMON
ONCORHYNCHUS KETA
CHUM SALMON
ONCORHYNCHUS KISUTCH
COHO SALMON
ONCORHYNCHUS TSHAWYTSCHA
CHINOOK SALMON
PRIONACE GLAUCA
BLUE SHARK
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SALMO CLARKI
CUTTHROAT TROUT
SALMO GAIRDNARI
STEELHEAD TROUT
SALVALINUS MALMA
DOLLY VARDEN
SEBASTES ALUTUS
PACIFIC OCEANPERCH
SEBASTES CRAMERI
BLACKMOUTH ROCKFISH OR DARKBLOOD
SEBASTES DIPLOPROA
SPLITNOSE ROCKFISH
SEBASTES FLAVIDUS
YELLOWTAIL ROCKFISH
SEBASTES PINNEGER
CANARY ROCKFISH
SEBASTOLOBUS ALASCANUS
SHORTSPINE ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALIS ACANTHIAS
SPINY DOGFISH
THERAGRA CHALCOGRAMMA
WALLEYE POLLOCK
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY
TRIAKIS SEMIFASCIATA
LEOPARD SHARK

TROPHIC LEVEL: (-)
BIRDS

CEPPHUS COLUMBA
PIGEON GUILLEMOT
STERNA PARADISAEA
ARCTIC TERN

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

AECHMOPHORUS OCCIDENTALIS
WESTERN GREBE
BRACHYRAMPHUS MARMORATUM
MARBELED MURRELET
CERORHINCA MONOCERATA
RHINOCEROS AUKLET
CLANGULA HYMALIS
OLDSQUAW
DICMEDEA NIGRIPES
BLACK-FOOTED ALBATROSS
FULMARIS GLACIALIS
NORTHERN FULMAR
GAVIA ARCTICA
ARCTIC LOON
GAVIA IMMER
COMMON LOON
GAVIA STELLATA
RED-THROATED LOON
HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS DELAWARENSIS
RING-BILLED GULL
LARUS GLAUCESCENS
GLAUCOUS-WINGED GULL
LARUS HEERMANNI
HEERMANN'S GULL
LARUS OCCIDENTALIS
WESTERN GULL
LARUS PHILADELPHIA
BONAPARTE'S GULL
LARUS THAYERI
THAYERS GULL
LOBIPES LOBATUS
NORTHERN PHALAROPE
LUNDRA CIRRHATA
TUFTED PUFFIN
MELANITTA DEGLANDI
WHITE-WINGED SCOTER
MELANITTA NIGRA
BLACK SCOTER
MELANITTA PERSPICILLATA
SURF SCOTER
MERGUS SERRATOR
RED-BRESTED MERGANSER
OCEANODROMA FURCATA
FORK-TAILED STORM-PETREL
OCEANODROMA LEUCORHOA
LEACH'S STORM-PETREL
PELICANUS OCCIDENTALIS
BROWN PELICAN
PHALACROCORAX AURITUS
DOUBLE-CRESTED CORMORANT
PHALACROCORAX PELAGICUS
PELAGIC CORMORANT
PHALACROCORAX PENICILLATUS
BRANDT'S CORMORANT
PHALAROPUS FULICARIUS
RED PHALAROPE
PODICEPS AURITUS
HORNED GREBE
PODICEPS GRISEGENA
RED-NECKED GREBE
PTYCHORAMPHUS ALEUTICA
CASSIN'S AUKLET
PUFFINUS BULLERI
BULLER'S SHEARWATER
PUFFINUS CARNEIPES
FLESH-FOOTED SHEARWATER
PUFFINUS CREATOPUS
PINK-FOOTED SHEARWATER
PUFFINUS GRISEUS
SOOTY SHEARWATER
PUFFINUS TENUIROSTRIS
SHORT-TAILED SHEARWATER
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE
STERNA CASPIA
CASPIAN TERN
STERNA FORSTERI
FORSTER'S TERN
STERNA HIRUNDO
COMMON TERN
SYNTHLIBORAMPHUS ANTIQUUM
ANCIENT MURRELET
URIA AALGE
COMMON MURRE
XEMA SABINI
SABINE'S GULL

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

BERARDIUS BAIRDI
BAIRD'S BEAKED WHALE
CALLORHINUS URSINUS
NORTHERN FUR SEAL
DELPHINUS DELPHIS
COMMON DOLPHIN
EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
GLOBICEPHALA MACRORHYNCHUS
BLACK FISH OR SHORT-FINNED PIL
GRAMPUS GRISEUS
RISSO'S DOLPHIN
KOGIA BREVICEPS
PYGMY SPERM WHALE
LAGENORHYNCHUS OBLIQUIDENS
PACIFIC STRIPED/WT-SIDED
DOLPHIN
LISSODELPHIS BOREALIS
NORTHERN RIGHT WHALE DOLPHIN
MESOPLODON CARLHUBBSI
HUBB'S BEAKED WHALE
MESOPLODON STEJNEGERI
STEJNEGER'S BEAKED WHALE
MIROUNGA AUGUSTIROSTRIS
NORTHERN ELEPHANT SEAL
ORCINUS ORCA
KILLER WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHOCOENOIDES DALLI
DALL PORPOISE
PHYSETER CATODON
SPERM WHALE
PSEUDORCA CRASSIDENS

HABITAT: EUPHOTIC PELAGIC

FALSE KILLER WHALE
STENELLA COERULEOALBA
STRIPED DOLPHIN/GRAY'S PORPOISE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION
ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

BENTHEUPHAUSIA AMBLYOPS
EUPHASID
EUPHAUSIA PACIFICA
EUPHASID
NEMATOBRACHION FLEXIPES
EUPHASID
NEMATOCELIS DIFFICILIS
EUPHASID
STYLOCHEIRON ABBRVIATUM
EUPHASID
STYLOCHEIRON LONGICORNE
EUPHASID
STYLOCHEIRON MAXIMUM
EUPHASID
TESSARABRACHION OCULATUS
EUPHASID
THYANOESSA GREGARIA
EUPHASID
THYANOESSA INSPINATA
EUPHASID
THYANOESSA LONGIPES
EUPHASID
THYANOESSA PARVA
EUPHASID
THYANOESSA RASCHII
EUPHASID
THYANOESSA SPINIFERA
EUPHASID
THYSANOPODA ACUTIFRONS
EUPHASID
THYSANOPODA CORNUTA
EUPHASID
THYSANOPODA EGREGIA
EUPHASID

TROPHIC LEVEL: (5) OMNIVORE
FISHES

SARDINOPS SAGAX
PACIFIC SARDINE

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (6) PARASITE
BIRDS

CATHARACTA MCCORMICKI
SOUTH POLAR SKUA
STERCORARIUS LONGICAUDIS
LONG-TAILED JAEGER
STERCORARIUS PARASITICUS
PARASITIC JAEGER
STERCORARIUS POMARINUS
POMARINE JAEGER

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

DOLIOLUM
SALP
HELIOSCALPA VIRGULA
SALP
IASIS ZONARIA
SALP
OIKOPLEURA
LARVACEAN
PEGEA CONFOEDERATA
SALP
SALPA FUSIFORMIS
SALP
THALIA DEMOCRATICA
SALP
THETYS VAGINA
SALP

TROPHIC LEVEL: (7) FILTER FEEDER
MAMMALS

BALAENA GLACIALIS
BLACK OR PACIFIC RIGHT WHALE
BALAENOPTERA ACUTOROSTRATA
MINKE WHALE
BALAENOPTERA BOREALIS
SEI WHALE
BALAENOPTERA MUSCULUS
BLUE WHALE
BALAENOPTERA PHYSALUS
FINBACK OR FIN WHALE
MEGAPTERA NOVEANGLIAE
HUMPBACK WHALE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

ACANTHEPHYRA CURTIROSTRIS
SHRIMP
BENTHEOGENNEMA
SHRIMPBENTHEOGENNEMA BOREALIS
SHRIMP
CYSTISOMA FABRICII
AMPHIPOD
DAIRELLA CALIFORNICA
AMPHIPOD
EUKROHNIA BATHYPELAGICA
ARROW-WORM
EUKROHNIA FOWLERI
ARROW-WORM
EUKROHNIA HAMATA
ARROW-WORM
GENNADUS INCERATUS
SHRIMP
GENNADAS PROPINQUUS
SHRIMP
HYMENODORA FRONTALIS
SHRIMP
HYMENODORA GLACIALIS
SHRIMP
HYMENODORA GRACILIS
SHRIMP
HYPERIA HYSTRIX
AMPHIPOD
HYPEROCHE DEDUSARUM
AMPHIPOD
LANCEOLA LOVENI
AMPHIPOD
LYCAEA PULEX
AMPHIPOD
MENINGODORA MOLLIS
SHRIMP
NINOE GEMMA
POLYCHAETE WORM
NOTOSTOMUS JAPONICUS
SHRIMP
OXYCEPHALUS CLAUSI
AMPHIPOD
PARAPASIPHAE CRISTATA
SHRIMP
PARAPASIPHAE SUICATIFRONS
SHRIMP
PARAPHRONIMA CRASSIPES
AMPHIPOD
PARAPHRONIMA GRACILIS
AMPHIPOD
PARATHERMISTO PACIFICA
AMPHIPOD
PASIPHAEA CHACET
SHRIMP
PASIPHAEA MAGNA
SHRIMP
PASIPHAEA PACIFICA
SHRIMP
PETALIDIUM SUSPIRIOSUM
SHRIMP
PHRONIMA SEDENTARIA
AMPHIPOD
PHRONIMOPSIS SPINIFERA
AMPHIPOD
POEOBIUS MESERES
POLYCHAETE WORM
PRIMNO ABYSSALIS
AMPHIPOD
PRIMNO MACROPA
AMPHIPOD
RHYNCHONOREELLA ANGELINI
POLYCHAETE WORM
SAGITTA BIERII
ARROW-WORM
SAGITTA DECIPIENS
ARROW-WORM
SAGITTA ELEGANS
ARROW-WORM
SAGITTA EUNERITICA
ARROW-WORM
SAGITTA MACROCEPHALA
ARROW-WORM
SAGITTA MAXIMA
ARROW-WORM
SAGITTA MINIMA
ARROW-WORM
SAGITTA SCRIPPSAE
ARROW-WORM
SAGITTA ZETESIOS
ARROW-WORM
SCINA CRASSICORNIS BURMUDENSIS
AMPHIPOD
SEGESTES SIMILIS
SHRIMP
SERGIA TENUIREMIS
SHRIMP
STREETSIA CHALLENGERI
AMPHIPOD
SYSTELLAPSIS BRAUERI
SHRIMP

HABITAT: EUPHOTIC PELAGIC

SYSTELLAPSIS CRISTATA
SHRIMP
TOMOPTERIS CAVALLII
POLYCHAETE WORM
TOMOPTERIS NISSENI
POLYCHAETE WORM
TOMOPTERIS PACIFICA
POLYCHAETE WORM
TRYPHANA MALMI
AMPHIPOD
VIBILIA ARMATA
AMPHIPOD
VIBILIA PROQUINQUA
AMPHIPOD
VIBILIA WOLTERECKI
AMPHIPOD

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
ALOSA SAPIDISSIMA
AMERICAN SHAD
AMMODYTES HEXAPTERUS
PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
REDTAIL SURFPERCH
ATHERINOPS AFFINIS
TOPSMELT
CETORHINUS MAXIMUS
BASKING SHARK
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
COLOLABIS SAIRA
PACIFIC SAURY
CYMATOGASTER AGGREGATA
SHINER PERCH
EMBIOTOCA LATERALIS
STRIPED SEAPERCH
ENGRAULIS MORDAX
NORTHERN ANCHOVY
HYPOMESUS PRETIOSUS
SURFSMELT
MICROGADUS PROXIMUS
PACIFIC TOMCOD
ONCORHYNCHUS NERKA
SOCKEYE SALMON
PSYCHROLUTES PARADOXUS
TADPOLE SCULPIN
SPIRINCHUS STARKSI
NIGHT SURF SMELT
SPIRINCHUS THALEICHTHYS
LONGFIN SMELT
THALEICHTHYS PACIFICUS
EULACHON OR COLUMBIA RIVER SMELT

TROPHIC LEVEL (9) INVERTEBRATE EATER - BIRDS

AYTHIA MARILA
GREATER SCAUP

TROPHIC LEVEL: (2) HERBIVORE INVERTEBRATES

ACARTIA CLAUSI
COPEPOD
ACARTIA DANAE
COPEPOD
ACARTIA LONGERIMIS
COPEPOD
ACARTIA NEGLIGENS
COPEPOD
AEGISTHUS MUCRONATUS HARPACTIC
COPEPOD
AETIDEOPSIS PACIFICA
COPEPOD
AETIDEUS ARMATUS
COPEPOD
AETIDEUS PACIFICUS
COPEPOD
AMALLOTHRIX VALIDA
COPEPOD
AMALLOTHRIX VORAK
COPEPOD
ARIETELLUS PLUMIFER
COPEPOD
BATHYCALANUS BRADYI
COPEPOD
BOREOMYSIS
COPEPOD
BOREOMYSIS ROSTRATA
COPEPOD
CALANUS CRISTATUS
COPEPOD
CALANUS FINMARCHICUS
COPEPOD
CALANUS PLUMCHRUS
COPEPOD
CALANUS TENUICORNIS
COPEPOD
CALOCALANUS STYLIREMIS
COPEPOD
CANDACIA BIPINNATA
COPEPOD
CAVOLINA UNCINATA
PTEROPOD
CENTRAUGAPTILUS PORCELLUS
COPEPOD
CENTROPAGES MCMURRICHI
COPEPOD
CHIRUNDINA STREETSI
COPEPOD
CLAUSOCALANUS ARCUICORNIS
COPEPOD
CLAUSOCALANUS PERGENS
COPEPOD
CLIO BALANTIUM
PTEROPOD
CLIONE LIMOCINA
PTEROPOD
COROLLA SPECTABILIS
PTEROPOD
CORYCHAEUS
COPEPOD
CTENOCALANUS VANUS
COPEPOD
EPILABIDOCERA AMPHITRITES
COPEPOD
EUCALANUS ATTENUATUS
COPEPOD
EUCALANUS BUNGII
COPEPOD
EUCHAETA SPINOSA
COPEPOD
EUCHIRELLA CURTICAUDA
COPEPOD
EUCOPIA
COPEPOD
EVADNE NORMANNI
CLADOCERAN
GAETANUS SECUNDUS
COPEPOD
GAETANUS SIMPLEX
COPEPOD
GAIDIUS BREVISPINUS
COPEPOD
GAIDIUS VARIABILIS
COPEPOD
GAUSSIA PRINCEPS
COPEPOD
GIGANTOCYPRIS AGASSIZII
OSTRACOD
GNATHOPHAUSIA GIGAS
COPEPOD
GNATHOPHAUSIA INGENS
COPEPOD
HALOPTILUS PSEUDOOXYCEPHALUS
COPEPOD
HETERORHABDUS TANNERI
COPEPOD
HETEROSTYLITES LONGICORNIS
COPEPOD
HETEROSTYLITES MAJOR
COPEPOD
LUCICUTIA BICORNUTA
COPEPOD
LUCICUTIA FLAVICORNIS
COPEPOD
METRIDEA LULCENS
COPEPOD
METRIDIA CURTICAUDA
COPEPOD
MICROCALANUS PYGMAEUS
COPEPOD
MICROSETELLA
COPEPOD
MIXTOCALANUS ROBUSTUS
COPEPOD
OITHONA
COPEPOD
ONCAEA CONIFERA
COPEPOD
PARACALANUS PARVUS
COPEPOD
PAREUCHAETA BIROSTRATA
COPEPOD
PAREUCHAETA JAPONICA
COPEPOD
PHAENNA SPINIFERA
COPEPOD
PLEUROMAMMA BOREALIS
COPEPOD
PLEUROMAMMA SCUTULLATA
COPEPOD
PODON LEUCKARTI
CLADOCERAN

HABITAT: DISPHOTIC PELAGIC

PSEUDOCALANUS MINUTHUS
COPEPOD
PSEUDOCHIRELLA POLYSPINA
COPEPOD
RACOVITZANUS FORRECTA
COPEPOD
RACOVITZANUS PACIFICUS
COPEPOD
RHINCALANUS NASUTUS
COPEPOD
SCAPHOCALANUS MEDIUS
COPEPOD
SCAPHOCALANUS MINUTUS
COPEPOD
SCAPHOCALANUS SUBELONGATUS
COPEPOD
SCOLECITHRICELLA MINOR
COPEPOD
SCOTTOCALANUS SEDATUS
COPEPOD
TORTANIS DISCAUDATUS
COPEPOD
UNDEUCHAETA INTERMEDIA
COPEPOD
UNDEUCHAETA MAJOR
COPEPOD
UNDUCHAETA PLUMOSA
COPEPOD

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ABRALIOPSIS FELIS
SQUID
AEGINA CITREA
JELLYFISH
AEGINURA GRIMALDII
JELLYFISH
AEQUOREA
JELLYFISH
AGLANTHA DIGITALE
JELLYFISH
ATOLLA VANHOEFFENI
JELLYFISH
ATOLLA WYVILLEI
JELLYFISH
AURELIA LABIATA
JELLYFISH
BARGMANNIA
JELLYFISH
BEROE CUCUMIS
COMB JELLY
BOTRYNEMA BRUCEI
JELLYFISH
CALYCOPSIS NAMATOPHORA
CARANARIA JAPONICA
HETEROPOD
CHELOPHYES APPENDICULATA
JELLYFISH
CHELOPHYES MULTIDENTATA
JELLYFISH
CHIROTEUTHIS VERANYI
SQUID
CHUNIPHYES MOSERAE
JELLYFISH
COLOBONEMA SERVICEUM
JELLYFISH
CRANCHIA SCABRA
SQUID
CROSSOTA ALBA
JELLYFISH
CROSSOTA PEDUNCULATA
JELLYFISH
CROSSOTA RUFOBRUNNEA
JELLYFISH
CUNINA OCTONARIA
JELLYFISH
CYANEA
JELLYFISH
EUPHYSORA FURCATA
JELLYFISH
EUTONIA INDICANS
JELLYFISH
GALITEUTHIS ARMATA
SQUID
GONATOPSIS BOREALIS
SQUID
GONATUS ANONYCHUS
SQUID
GONATUS FABRICII
SQUID
GONATUS MAGISTER
SQUID
HALICREAS MINIMUM
JELLYFISH
HALISTAURA CELLULARIA
JELLYFISH
HISTIOTEUTHIS HETEROPSIS
SQUID
JAPETELLA HEATHI
OCTOPUS
LENSIA CONOIDEA
JELLYFISH
LIMACINA HELACINA
PTEROPOD
LOLIGO OPALESCENS
SQUID
MOROTEUTHIS ROBUSTA
SQUID
MUGGIAEA ATLANTICA
JELLYFISH
NANOMIA CARA
JELLYFISH
OCTOPOTEUTHIS SICULA
SQUID
OCTOPUS
OCTOPUS
ONYCHOTEUTHIS BANKSI
SQUID
PANTACHOGON HAECKELI
JELLYFISH
PARAPHYLLINA RANSONI
JELLYFISH
PERIPHYLLA PERIPHYLLA
JELLYFISH
PHYSOPHORA HYDROSTATICA
JELLYFISH
PLEUROBRACHIA PILEUS
COMB JELLY
PRAYA DUBIA
JELLYFISH
PRAYA RETICULATA
JELLYFISH
PTEROTRACHEA SCUTUTA
HETEROPOD
ROSSIA PACIFICA
SQUID
SARSIA PRINCEPS
JELLYFISH
SARSIA TUBULOSA
JELLYFISH
SOLMISSUS INCISA
JELLYFISH
SOLMISSUS MARSHALLI
JELLYFISH
SULCULEOLARIA QUADRIVALIS
JELLYFISH
TAONIUS PAVO
SQUID
VAMPYROTEUTHIS INFERNALIS
SQUID
VOGTIA SPINOSA
JELLYFISH

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ALOPIAS VULPINUS
THRESHER SHARK
ANOPLOPOMA FIMBRIA
SABLEFISH
CHAULIODUS MACOUNI
PACIFIC VIPERFISH
CORYPHAENOIDES ACROLEPIS
ROUGHSCALE RATTAIL
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GALEORHINUS ZYOPTERUS
SOUPFIN SHARK
HEXANCHUS GRISEUS
SIXGILL SHARK
HYDROLAGUS COLLIEI
RATFISH
LAMNA DITROPIS
SALMON SHARK
MERLUCCIUS PRODUCTUS
PACIFIC HAKE
NOTORYNCHUS MACULATUS
SPOTTED COWSHARK OR SEVENGILL
ONCORHYNCHUS GORBUSCHA
PINK SALMON
ONCORHYNCHUS KETA
CHUM SALMON
ONCORHYNCHUS KISUTCH
COHO SALMON
ONCORHYNCHUS TSHAWYTSCHA
CHINOOK SALMON
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PRIONACE GLAUCA
BLUE SHARK
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SALMO CLARKI
CUTTHROAT TROUT
SALMO GAIRDNERI
STEELHEAD TROUT
SALVELINUS MALMA
DOLLY VARDEN
SEBASTES ALUTUS
PACIFIC OCEAN PERCH
SEBASTES CRAMERI
BLACKMOUTH ROCKFISH OR
DARKBLOOD

HABITAT: DISPHOTIC PELAGIC

SEBASTES DIPLOPROA
SPLITNOSE ROCKFISH
SEBASTES ELONGATUS
GREENSTRIPED ROCKFISH
SEBASTES FLAVIDUS
YELLOWTAIL ROCKFISH
SEBASTES PINNIGER
CANARY ROCKFISH
SEBASTOLOBUS ALASCANUS
SHORTSPINE ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH
TACTOSTOMA MACROPUS
LONGFIN DRAGONFISH
THERAGRA CHALCOGRAMMA
WALLEYE POLLOCK
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY
TRIAKIS SEMIFASCIATA
LEOPARD SHARK

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

BERARDIUS BAIRDI
BAIRD'S BEAKED WHALE
CALLORHINUS URSINUS
NORTHERN FUR SEAL
KOGIA BREVICEPS
PYGMY SPERM WHALE
LISSODELPHIS BOREALIS
NORTHERN RIGHT WHALE DOLPHIN
MESOPLODON STEJNEGERI
STEJNEGER'S BEAKED WHALE
ORCINUS ORCA
KILLER WHALE
PHOCOENA PHOCOENA
HARBOR PORPOISE
RHOCOENOIDES DALLI
DALL PORPOISE
PHYSETER CATODON
SPERM WHALE
STENELLA COERULEOALBA
STRIPED DOLPHIN/GRAY'S PORPOISE
ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

BENTHEOPAUSIA AMBLYOPS
EUPHASID
EUPHAUSIA PACIFICA
EUPHASID
NEMATOBRACHION FLEXIPES
EUPHASID
NEMATOCELIS DIFFICILIS
EUPHASID
STYLOCHEIRON ABBREVIATUM
EUPHASID
STYLOCHEIRON LONGICORNE
EUPHASID
STYLOCHEIRON MAXIMUM
EUPHASID
TESSARABRACHION OCULATUS
EUPHASID
THYANOESSA GREGARIA
EUPHASID
THYANOESSA INSPINATA
EUPHASID
THYANOESSA LONGIPES
EUPHASID
THYANOESSA PARVA
EUPHASID
THYANOESSA RASCHII
EUPHASID
THYANOESSA SPINIFERA EUPHASID
THYSANOPODA ACUTIFRONS
EUPHASID
THYSANOPODA CORNUTA
EUPHASID
THYSANOPODA EGREGIA
EUPHASID

TROPHIC LEVEL: (5) OMNIVORE
FISHES

SARDINOPS SAGAX
PACIFIC SARDINE

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

DOLIOLUM
SALP
HELIOSCALPA VIRGULA
SALP
IASIS ZONARIA
SALP
OIKOPLEURA
LARVACEAN
PEGEA CONFOEDERATA
SALP
SALPA FUSIFORMIS
SALP
THALIA DEMOCRATICA
SALP
THETYS VAGINA
SALP

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

ACANTHEPHYRA CURTIROSTRIS
SHRIMP
BENTHEOGENNEMA
SHRIMP
BENTHEOGENNEMA BOREALIS
SHRIMP
CYSTISOMA FABRICII
AMPHIPOD
DAIRELLA CALIFORNICA
AMPHIPOD
EUKROHNIA BATHYPELAGICA
ARROW-WORM
EUKROHNIA FOWLERI
ARROW-WORM
EUKROHNIA HAMATA
ARROW-WORM
GENNADAS INCERTUS
SHRIMP
GENNADAS PROPINQUUS
SHRIMP
HYMENODORA FRONTALIS
SHRIMP
HYMENODORA GLACIALIS
SHRIMP
HYMENODORA GRACILIS
SHRIMP
HYPERIA HYSTRIX
AMPHIPOD
HYPEROCHE DEDUSARUM
AMPHIPOD
LANCEOLA LOVENI
AMPHIPOD
LYCAEA PULEX
AMPHIPOD
MENINGODORA MOLLIS
SHRIMP
NINOE GEMMA
POLYCHAETE WORM
NOTOSTOMUS JAPONICUS
SHRIMP
OXYCEPHALUS CLAUSI
AMPHIPOD
PANDALUS JORDANI
OCEAN PINK SHRIMP
PARAPASIPHAE CRISTATA
SHRIMP
PARAPISIPHAE SUICATIFRONS
SHRIMP
PARAPHRONIMA CRASSIPES
AMPHIPOD
PARAPHRONIMA GRACILIS
AMPHIPOD
PARATHERMISTO PACIFICA
AMPHIPOD
PASIPHAEA CHACEI
SHRIMP
PASIPHAEA MAGNA
SHRIMP
PASIPHAEA PACIFICA
SHRIMP
PETALIDIUM SUSPIRIOSUM
SHRIMP
PHRONIMA SEDENTARIA
AMPHIPOD
PHRONIMOPSIS SPINIFERA
AMPHIPOD
POEOBIUS MESERES
POLYCHAETE WORM
PRIMNO ABYSSALIS
AMPHIPOD
PRIMNO MACROPA
AMPHIPOD
RHYNCHONEREELLA ANGELINI
POLYCHAETE WORM
SAGITTA BIERII
ARROW-WORM
SAGITTA DECIPIENS
ARROW-WORM
SAGITTA ELEGANS
ARROW-WORM
SAGITTA EUNERITICA
ARROW-WORM
SAGITTA MACROCEPHALA
ARROW-WORM
SAGITTA MAXIMA
ARROW-WORM
SAGITTA MINIMA

HABITAT: DISPHOTIC PELAGIC

ARROW-WORM
SAGITTA SCRIPPSAE
ARROW-WORM
SAGITTA ZETESIOS
ARROW-WORM
SCINA CRASSICORNIS BURMUDENSIS
AMPHIPOD
SERGESTES SIMILIS
SHRIMP
SERGIA TENUIREMIS
SHRIMP
STREETSIA CHALLENGERI
AMPHIPOD
SYSTELLASPIS BRAUERI
SHRIMP
SYSTELLASPIS CRISTATA
SHRIMP
TOMOPTERIS CAVALLII
POLYCHAETE WORM
TOMOPTERIS NISSENI
POLYCHAETE WORM
TOMOPTERIS PACIFICA
POLYCHAETE WORM
TRYPHANA MALMI
AMPHIPOD
VIBILIA ARMATA
AMPHIPOD
VIBILIA PROQUINQUA
AMPHIPOD
VIBILIA WOLTERECKI
AMPHIPOD

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
ALOSA SAPIDISSIMA
AMERICAN SHAD
ATHERINOPS AFFINIS
TOPSMELT
CERATOSCOPELUS TOWNSENDI
DOGTOOTH LAMPFISH
CETORHINUS MAXIMUS
BASKING SHARK
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
COLOLABIS SAIRA
PACIFIC SAURY
DIAPHUS THETA
CALIFORNIA HEADLIGHTFISH
ENGRAULIS MORDAX
NORTHERN ANCHOVY
ONCORHYNCHUS NERKA
SOCKEYE SALMON
SPIRINCHUS STARKSI
NIGHT SURF SMELT
SPIRINCHUS THALEICHTHYS
LONGFIN SMELT
STENOBRACHIUS LEUCOPSARUS
NORTHERN LAMPFISH
TARLETONBEANIA CRENULARIS
BLUE LANTERNFISH
THALEICHTHYS PACIFICUS
EULACHON OR COLUMBIA R. SMELT

TROPHIC LEVEL: (2) HERBIVORE INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET
STRONGYLOCENTROTUS FRANSISCANU
GIANT RED URCHIN
STRONGYLOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ARCHIDORIS MONTEREYENSIS
NUDIBRANCH
ARMINA CALIFORNICA
NUDIBRANCH
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SNAIL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON
LISCHKIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SCYRA ACUTIFRONS
MASKING CRAB
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE FISHES

ANARRHICHTHYS OCELLATUS
WOLF EEL
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETIS STOUTI
PACIFIC HAGFISH
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
OPHIODON ELONGATUS
LINGCOD

HABITAT: ROCKY NON-VEGETATED BENTHIC

RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES CAURINUS
COPPER ROCKFISH
SEBASTES MALIGER
QUILLBACK ROCKFISH
SEBASTES MYSTINUS
BLUE ROCKFISH
SEBASTES RUBERRIMUS
YELLOWEYE ROCKFISH
SEBASTODES MELANOPS
BLACK SEABASS
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
MESOPLODON STEJNEGERI
STEJNEGER'S BEAKED WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION
ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
STRONGYLOCENTROTUS ECHINOIDES
SEA URCHIN
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
ONCOSOECIA
BRYOZOAN
PSEUDARCHASTER PARELLI ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
BALANUS CRENATUS
BARNACLE
BALANUS HESPERIUS
BARNACLE
BEGULA FLABELLATA
BRYOZOAN
CABEREA ELLISI
BRYOZOAN
CALLAPORA CORNICULIFERA
BRYOZOAN
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CELLARIA DIFFUSA
BRYOZOAN
CELLARIA MANDIBULATA
BRYOZOAN
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S SCALLOP
CLINOCARDIUM NUTALLI
BASKET COCKLE
HALOCYNTHIA IGABOJA
SEA SQUIRT
LAGENIPORA PUNCTULATA
BRYOZOAN
LAQUEUS CALIFORNICUS
LAMP SHELL
MYRIOZOUM COARCTATUM
BRYOZOAN
MYRIOZOUM TENUE
BRYOZOAN
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
SCALPELLUM
BARNACLE
SOLEMYA AGASSIZI
AWNING CLAM
TEREBRATALIA TRANSVERSA
LAMP SHELL
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

CANCER MAGISTER
DUNGENESS CRAB
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB
PHYLLOLITHOIDES PAPILLOSUS
PAPILLA CRAB

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

ARCTONOE PULCHRA
POLYCHAETE
BALANOPHYLLA ELEGANS
STONY CORAL
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
DAIRELLA CALIFORNICA
AMPHIPOD
ENIPO GRACILIS
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS DANAE
DOCK SHRIMP
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PARAGORGIA ARBOREA
SOFT CORAL
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

AGONOPSIS EMMELANE
NORTHERN SPEARNOSE POACHER
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
LEPIDOPSETTA BILINEATA
ROCK SOLE
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN

HABITAT: ROCKY NON-VEGETATED BENTHIC

RADULINUS ASPRELLUS
SLIM SCULPIN

TROPHIC LEVEL (-)
INVERTEBRATES

ANCISTROLEPSIS
SNAIL
COLUS HALIDONUS
SNAIL

TROPHIC LEVEL: (Q)
INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
ALLOPORA VERRILLI
HYDROCORAL
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
HIPPASTERIA SPINOSA
SEA STAR
LAFOEA ADNATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
SNAIL
PLUMULARIA ALICIA
HYDROID
PUGETTIA ARACILLIS
KELP CRAB
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET

TROPHIC LEVEL: (2) HERBIVORE
FISHES

ASTEROTHECA PENTACANTHUS
BIGEYE POACHER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CADULUS STEARNSII
TOOTH SHELL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SHELL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON
LISCHKEIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NATICA CLAUSA
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLINICES LEWISII
MOON SNAIL
POLINICES PALLIDUS
MOON SNAIL
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
THRISSACANTHIAS PENCILATUS
SEA STAR
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ANOPLOPOMA FIMBRIA
SABLEFISH
ATHERESTHES STOMIAS
TURBOT OR ARROWTOOTH FLOUNDER
BROSMOPHYCIS MARGINATA
RED BROTULA
CHITONOTUS PUGETENSIS
ROUGHBACK SCULPIN
CITHARICHTHYS SORDIDUS
PACIFIC SANDDAB
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
DELOLEPIS GIGANTEA
GIANT WRYMOUTH

HABITAT: MUD NON-VEGETATED BENTHIC

EOPSETTA JORDANI
PETRALE SOLE
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GADUS MACROCEPHALUS
PACIFIC COD
GLYPTOCEPHALUS ZACHIRUS
REX SOLE
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HIPPOGLOSSOIDES ELASSODON
FLATHEAD SOLE
HIPPOGLOSSUS STENCLEPIS
PACIFIC HALIBUT
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
ISOPSETTA ISOLEPIS
BUTTER SOLE
LYCODOPSIS PACIFICA
BALCKBELLY EELPOUT
LYOPSETTA EXILIS
SLENDER SOLE
MICROSTOMUS PACIFICUS
DOVER SOLE
OPHIODON ELONGATUS
LINGCOD
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES CAURINUS
COPPER ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
AMPHIOPLUS STRONGYLOPLAX
BRITTLE STAR
APHIURA SARSII
BRITTLE STAR
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
LEPTOSYNAPTA
SEA CUCUMBER
LISTRIOLOBUS HEXAMYOTUS
ECHIURID WORM
LOPHOLITHOIDES FORAMINATUS
BOX CRAB
LOPHOLITHOIDES MANDTII
PUGET SOUND KING CRAB
LUMBRINERIS BICIRRATA
POLYCHAETE
LUMBRINERIS SIMILABRIS
POLYCHAETE
MACOMA ALCAREA
CHALKY CLAM
MAGELONA JAPONICA
POLYCHAETE
MOLPADIA INTERMEDIA
SEA CUCUMBER
OPHIOPHOLIS BAKERI
BRITTLE STAR
OPHIURA LUTKENI
BRITTLE STAR
PARASTICHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
TELLINA BUTTONI
BUTTON'S TELLIN CLAM
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
PSEUDARCHASTER PARELII ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
AXINOPSIDA SERICATA
CLAM
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CARDIOMYA PLANETICA
CLAM
CARDITA STEARNSII
CLAM
CARDITA VENTICOSA
CLAM
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S CLAM
CLINOCARDIUM NUTALLI
BASKET COCKLE
COMPSOMYAX SUBDIAPHANA
CLAM
CRENELLA COLUMBIANA
CLAM
EUPLEXAURA MARKI
SEA PEN
HUXLEYIA MUNITA
CLAM
LIEOPTULUS QUADRANGULARIS
SEA PEN
LYONSIA STRIATA
CLAM
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
NUCULA TENUIS
CLAM
NUCULANA AUSTINI
CLAM
NUCULANA PERNULS
CLAM
PATINOPECTIN CAURINUS
WEATHERVANE SCALLOP
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
PSEPHIDIA LORDI
CLAM
SAXICAVA ARCTICA
ARCTIC SAXICLAVE CLAM
SCLEROPTILUM
SEA PEN
SOLEMYA AGASSIZI
AWNING CLAM
STYLATULA ELONGATA
SEA PEN
THRACIA CURTA
CLAM
THRACIA TRAPEZOIDES
CLAM
THYASIRA BARBARENSIS
CLAM
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

HABITAT: MUD NON-VEGETATED BENTHIC

CANCER MAGISTER
DUNGENESS CRAB
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB

TROPHIC LEVEL: (9) INVERTEBRATE EATER - INVERTEBRATES

APHRODITE JAPONICA
POLYCHAETE
ARCTONOE PULCHRA
POLYCHAETE
CARINOMELLA LACTEA
RIBBON WORM
CEREBRATULUS CALIFORNIENSIS
RIBBON WORM
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
ENIPO GRACILIS
POLYCHAETE
GLYCERA AMERICANA
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CACOIDES
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS CORNUTA
POLYCHAETE
NEPHTYS FERRUGINEA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

AGONOPSIS EMMELANE
NORTHERN SPEARNOSE POACHER
AGONUS ACIPENSERINUS
STURGEON POACHER
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN
LIPARIS PULCHELLUS
SHOWY SNAILFISH
LUMPENUS SAGITTA
SNAKE PRICKLEBACK
LYCONECTES ALEUTENSIS
DWARF WRYMOUTH
MICROGADUS PROXIMUS
PACIFIC TOMCOD
POROCLINIS ROTHROCKI
WHITEBARRED BLENNY
PSYCHROLUTES PARADOXUS
TADPOLE SCULPIN
RADULINUS ASPRELLUS
SLIM SCULPIN
XENERETMUS LATIFRONS
BLACKTIP POACHER

TROPHIC LEVEL: (-) INVERTEBRATES

ANCISTROLEPSIS
SNAIL
COLUS HALIDONUS
SNAIL

TROPHIC LEVEL: (Q) INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
HIPPASTERIA SPINOSA
SEA STAR
LAFOEA ADNATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
SNAIL
PLUMULARIA ALICIA
HYDROID
RATHBUNASTER CALIFORNICUS
SEA STAR
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

TROPHIC LEVEL: (Q) FISHES

PLEURONICHTHYS COENOSUS
C-O SOLE

HABITAT: MUD NON-VEGETATED BENTHIC

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET

TROPHIC LEVEL: (2) HERBIVORE
FISHES

ASTEROTHECA PENTACANTHUS
BIGEYE POACHER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CADULUS STEARNSII
TOOTH SHELL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SHELL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON

HABITAT: MUDDY SAND NON-VEGETATED BENTHIC

LISCHKEIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NATICA CLAUSA
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLINICES LEWISII
MOON SNAIL
POLINICES PALLIDUS
MOON SNAIL
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
THRISSACANTHIAS PENCILATUS
SEA STAR
TRITONIA
NUDIBRANCH
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ACIPENSER TRANSMONTANUS
WHITE STURGEON
ATHERESTHES STOMIAS
TURBOT OR ARROWTOOTH FLOUNDER
CHITONOTUS PUGETENSIS
ROUGHBACK SCULPIN
CITHARICHTHYS SORDIDUS
PACIFIC SANDDAB
CITHARICHTHYS STIGMAEUS
SPECKLED SANDDAB
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
DELOLEPIS GIGANTEA
GIANT WRYMOUTH
EOPSETTA JORDANI
PETRALE SOLE
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GADUS MACROCEPHALUS
PACIFIC COD
GLYPTOCEPHALUS ZACHIRUS
REX SOLE
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HIPPOGLOSSOIDES ELASSODON
FLATHEAD SOLE
HIPPOGLOSSUS STENCLEPIS
PACIFIC HALIBUT
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
ISOPSETTA ISOLEPIS
BUTTER SOLE
LYOPSETTA EXILIS
SLENDER SOLE
MICROSTOMUS PACIFICUS
DOVER SOLE
OPHIODON ELONGATUS
LINGCOD
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES CAURINUS
COPPER ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
AMPHIOPLUS STRONGYLOPLAX
BRITTLE STAR
APHIURA SARSII
BRITTLE STAR
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
DENDRASTER EXCENTRICUS
SAND DOLLAR
LEPTOSYNAPTA
SEA CUCUMBER
LISTRIOLOBUS HEXAMYOTUS
ECHIURID WORM
LOPHOLITHOIDES FORAMINATUS
BOX CRAB
LOPHOLITHOIDES MANDTII
PUGET SOUND KING CRAB
LUMBRINERIS BICIRRATA
POLYCHAETE
LUMBRINERIS SIMILABRIS
POLYCHAETE
MACOMA ALCAREA
CHALKY CLAM
MAGELONA JAPONICA
POLYCHAETE
MOLPADIA INTERMEDIA
SEA CUCUMBER
OPHIOPHOLIS BAKERI
BRITTLE STAR
OPHIURA LUTKENI
BRITTLE STAR
PARASTICHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
TELLINA BUTTONI
BUTTON'S TELLIN CLAM
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
PSEUDARCHASTER PARELII ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY

HABITAT: MUDDY SAND NON-VEGETATED BENTHIC

LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
AXINOPSIDA SERICATA
CLAM
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CARDIOMYA PLANETICA
CLAM
CARDITA STEARNSII
CLAM
CARDITA VENTICOSA
CLAM
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S CLAM
CLINOCARDIUM NUTALLI
BASKET COCKLE
COMPSOMYAX SUBDIAPHANA
CLAM
CRENELLA COLUMBIANA
CLAM
EUPLEXAURA MARKI
SEA PEN
HUXLEYIA MUNITA
CLAM
LIEOPTULUS QUADRANGULARIS
SEA PEN
LYONSIA STRIATA
CLAM
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
NUCULA TENUIS
CLAM
NUCULANA AUSTINI
CLAM
NUCULANA PERNULS
CLAM
PATINOPECTIN CAURINUS
WEATHERVANE SCALLOP
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
PSEPHIDIA LORDI
CLAM
PSOLUS SQUAMATUS
SEA CUCUMBER
SAXICAVA ARCTICA
ARCTIC SAXICLAVE CLAM
SCLEROPTILUM
SEA PEN
SOLEMYA AGASSIZI
AWNING CLAM
STYLATULA ELONGATA
SEA PEN
THRACIA CURTA
CLAM
THRACIA TRAPEZOIDES
CLAM
THYASIRA BARBARENSIS
CLAM
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

CANCER MAGISTER
DUNGENESS CRAB
OLIVELLA
OLIVE SNAIL
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

APHRODITE JAPONICA
POLYCHAETE
ARCTONOE PULCHRA
POLYCHAETE
CARINOMELLA LACTEA
RIBBON WORM
CEREBRATULUS CALIFORNIENSIS
RIBBON WORM
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
ENIPO GRACILIS
POLYCHAETE
GLYCERA AMERICANA
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CACOIDES
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS CORNUTA
POLYCHAETE
NEPHTYS FERRUGINEA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

AGONOPSIS EMMELANE
NORTHERN SPEARNOSE POACHER
AGONUS ACIPENSERINUS
STURGEON POACHER
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN
LIPARIS PULCHELLUS
SHOWY SNAILFISH
LUMPENUS SAGITTA
SNAKE PRICKLEBACK
LYCONECTES ALEUTENSIS
DWARF WRYMOUTH
MICROGADUS PROXIMUS
PACIFIC TOMCOD
POROCLINIS ROTHROCKI
WHITEBARRED BLENNY
PSYCHROLUTES PARADOXUS
TADPOLE SCULPIN
RADULINUS ASPRELLUS
SLIM SCULPIN
XENERETMUS LATIFRONS
BLACKTIP POACHER

TROPHIC LEVEL: (-)
INVERTEBRATES

ANCISTROLEPSIS
SNAIL
COLUS HALIDONUS
SNAIL

TROPHIC LEVEL: (Q)
INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
HIPPASTERIA SPINOSA
SEA STAR
LAFOEA ADNATA
HYDROID
LAFOEA DUMOSA

HABITAT: MUDDY SAND NON-VEGETATED BENTHIC

HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
SNAIL
PLUMULARIA ALICIA
HYDROID
RATHBUNASTER CALIFORNICUS
SEA STAR
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

TROPHIC LEVEL: (Q)
FISHES

PLEURONICHTHYS COENOSUS
C-O SOLE

HABITAT: SAND NON-VEGETATED BENTHIC

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET

TROPHIC LEVEL: (2) HERBIVORE
FISHES

ASTEROTHECA PENTACANTHUS
BIGEYE POACHER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CADULUS STEARNSII
TOOTH SHELL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SHELL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
EVASTERIAS TROSCHELI
SEA STAR
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON
LISCHKEIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NATICA CLAUSA
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLINICES LEWISII
MOON SNAIL
POLINICES PALLIDUS
MOON SNAIL
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
THRISSACANTHIAS PENCILATUS
SEA STAR
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ACIPENSER TRANSMONTANUS
WHITE STURGEON
BROSMOPHYCIS MARGINATA
RED BROTULA
CHITONOTUS PUGETENSIS
ROUGHBACK SCULPIN
CITHARICHTHYS SORDIDUS
PACIFIC SANDDAB
CITHARICHTHYS STIGMAEUS
SPECKLED SANDDAB
DASYATIS DIPTERURA
DIAMOND STINGRAY
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
EOPSETTA JORDANI
PETRALE SOLE
GADUS MACROCEPHALUS
PACIFIC COD
GLYPTOCEPHALUS ZACHIRUS
REX SOLE
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HIPPOGLOSSOIDES ELASSODON
FLATHEAD SOLE
HIPPOGLOSSUS STENOLEPIS
PACIFIC HALIBUT
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
ISOPSETTA ISOLEPIS
BUTTER SOLE
LYOPSETTA EXILIS
SLENDER SOLE
MICROSTOMUS PACIFICUS
DOVER SOLE
OPHIODON ELONGATUS
LINGCOD
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SQUALUS ACANTHIAS
SPINY DOGFISH
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY
TRIAKIS SEMIFASCIATA
LEOPARD SHARK

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

HABITAT: SAND NON-VEGETATED BENTHIC

ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
AMPHIOPLUS STRONGYLOPLAX
BRITTLE STAR
APHIURA SARSII
BRITTLE STAR
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
DENDRASTER EXCENTRICUS
SAND DOLLAR
LOPHOLITHOIDES FORAMINATUS
BOX CRAB
LOPHOLITHOIDES MANDTII
PUGET SOUND KING CRAB
LUMBRINERIS BICIRRATA
POLYCHAETE
LUMBRINERIS SIMILABRIS
POLYCHAETE
MACOMA ALCAREA
CHALKY CLAM
MAGELONA JAPONICA
POLYCHAETE
MOLPADIA INTERMEDIA
SEA CUCUMBER
OPHIOPHOLIS BAKERI
BRITTLE STAR
OPHIURA LUTKENI
BRITTLE STAR
PARASTICHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
STRONGYLOCENTROTUS ECHINOIDES
SEA URCHIN
TELLINA BUTTONI
BUTTON'S TELLIN CLAM
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
PSEUDARCHASTER PARELII ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
AXINOPSIDA SERICATA
CLAM
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CARDIOMYA PLANETICA
CLAM
CARDITA STEARNSII
CLAM
CARDITA VENTICOSA
CLAM
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S CLAM
CLINOCARDIUM NUTALLI
BASKET COCKLE
COMPSOMYAX SUBDIAPHANA
CLAM
CRENELLA COLUMBIANA
CLAM
EUPLEXAURA MARKI
SEA PEN
HUXLEYIA MUNITA
CLAM
LIEOPTULUS QUADRANGULARIS
SEA PEN
LYONSIA STRIATA
CLAM
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
NUCULA TENUIS
CLAM
NUCULANA AUSTINI
CLAM
NUCULANA PERNULS
CLAM
PATINOPECTIN CAURINUS
WEATHERVANE SCALLOP
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
PSEPHIDIA LORDI
CLAM
PSOLUS SQUAMATUS
SEA CUCUMBER
SAXICAVA ARCTICA
ARCTIC SAXICLAVE CLAM
SCLEROPTILUM
SEA PEN
SILIQUA PATULA
PACIFIC RAZOR CLAM
SILIQUA SLOATI
SLOAT'S RAZOR CLAM
SOLEMYA AGASSIZI
AWNING CLAM
STYLATULA ELONGATA
SEA PEN
THRACIA CURTA
CLAM
THRACIA TRAPEZOIDES
CLAM
THYASIRA BARBARENSIS
CLAM
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

CANCER MAGISTER
DUNGENESS CRAB
OLIVELLA
OLIVE SNAIL
OLIVELLA BIPLICATA
PURPLE OLIVE SNAIL
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

APHRODITE JAPONICA
POLYCHAETE
ARCTONOE PULCHRA
POLYCHAETE
CARINOMELLA LACTEA
RIBBON WORM
CEREBRATULUS CALIFORNIENSIS
RIBBON WORM
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
ENIPO GRACILIS
POLYCHAETE
GLYCERA AMERICANA
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CACOIDES
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS CORMUTA
POLYCHAETE
NEPHTYS FERRUGINEA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS DANAE
DOCK SHRIMP
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

HABITAT: SAND NON-VEGETATED BENTHIC

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

AGONOPSIS EMMELANE
 NORTHERN SPEARNOSE POACHER
AGONUS ACIPENSERINUS
 STURGEON POACHER
AMMODYTES HEXAPTERUS
 PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
 REDTAIL SURFPERCH
CLUPEA HARENGUS PALLASI
 PACIFIC HERRING
CYMATOGASTER AGGREGATA
 SHINER PERCH
EMBIOTOCA LATERALIS
 STRIPED SEAPERCH
LEPTOCOTTUS ARMATUS
 PACIFIC STAGHORN SCULPIN
LIPARIS PULCHELLUS
 SHOWY SNAILFISH
MICROGADUS PROXIMUS
 PACIFIC TOMCOD
POROCLINIS ROTHROCKI
 WHITEBARRED BLENNY
PSYCHROLUTES PARADOXUS
 TADPOLE SCULPIN
RADULINUS ASPRELLUS
 SLIM SCULPIN
XENERETMUS LATIFRONS
 BLACKTIP POACHER

TROPHIC LEVEL: (-) INVERTEBRATES

ANCISTROLEPSIS
 SNAIL
COLUS HALIDONUS
 SNAIL

TROPHIC LEVEL: (Q) INVERTEBRATES

ABIETINARIA
 HYDROID
ABIETINARIA ABIETINA
 HYDROID
ABIETINARIA ALEXANDERI
 HYDROID
ABIETINARIA TRASKI
 HYDROID
ACRYPTOLARIA
 HYDROID
AGLAOPHENIA
 HYDROID
AGLAOPHENIA DIEGENSIS
 HYDROID
AGLAOPHENIA INCONSPICUA
 HYDROID
AGLAOPHENIA OCTOCARPA
 HYDROID
CAMPANULARIA
 HYDROID
CAMPANULARIA VERTICILLATA
 HYDROID
CAMPANULARIA VOLUBILIS
 HYDROID
HALECIUM CORRUGATUM
 HYDROID
HIPPASTERIA SPINOSA
 SEA STAR
LAFOEA ADNATA
 HYDROID
LAFOEA DUMOSA
 HYDROID
LAFOEA FRUTICOSA
 HYDROID
LAFOEA GRACILLIMA
 HYDROID
MEDIASTER AEQUALIS
 VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
 SNAIL
PLUMULARIA ALICIA
 HYDROID
SERTULARELLA TURGIDA
 HYDROID
THUIARA ROBUSTA
 HYDROID

TROPHIC LEVEL: (Q) FISHES

PLEURONICHTHYS COENOSUS
 C-O SOLE

HABITAT: SURFGRASS VEGETATED BENTHIC

TROPHIC LEVEL: (1) PRODUCER
PLANTS

AHNFELTIA CONCINNA
RED ALGAE
AHNFELTIA PLICATA
RED ALGAE
ALARIA MARGINATA
KELP
ANTITHAMNION PACIFICUM
RED ALGAE
BOSSIELLA CALIFORNICA
CORALLINE RED ALGAE
BOSSIELLA PLUMOSA
CORALLINE RED ALGAE
BOTRYOCLADIA PSEUDODICHOTOMA
RED ALGAE
CALLIARTHRON REGENERANS
CORALLINE RED ALGAE
CALLIARTHRON SCHMITTII
CORALLINE RED ALGAE
CALLOPHYLLIS EDENTATA
RED ALGAE
CERAMIUM CALIFORNICUM
RED ALGAE
CONSTANTINEA SIMPLEX
RED ALGAE
CONSTANTINEA SUBULIFERA
RED ALGAE
CORALLINA VANCOUVERIENSIS
CORALLINE RED ALGAE
CRYPTOPLEURA RUPRECHTIANA
RED ALGAE
CYSTOSEIRA GEMINATA
KELP
DELESSERIA DECIPIENS
RED ALGAE
DILSEA CALIFORNICA
RED ALGAE
EGREGIA MENZIESII
KELP
EISENIA ARBOREA
KELP
ERYTHROPHYLLUM DELESSERIOIDES
RED ALGAE
GASTROCLONIUM COULTERI
RED ALGAE
GELIDIUM ROBUSTUM
RED ALGAE
GIGARTINA EXASPERATA
RED ALGAE
GLOIOSIPHONIA VERTICILLARIS
RED ALGAE
GRACILARIOPSIS SJOESTEDII
RED ALGAE
GRATELOUPIA CALIFORNICA
RED ALGAE
GYMNOGONGRUS PLATYPHYLLUS
RED ALGAE
HYMENENA FLABELLIGERA
RED ALGAE
HYMENENA SETCHELLII
RED ALGAE
IRIAOEA CORDATA
RED ALGAE
LAMINARIA GROENLANDICA
KELP
LAMINARIA SACCHARINA
KELP
LAMINARIA SETCHELLII
KELP
LAURENCIA SPECTABILIS
RED ALGAE
MACROCYSTIS INTEGRIFOLIA
GIANT KELP
MEMBRANOPTERA PLATYPHYLLA
RED ALGAE
MICROCLAUDIA COULTARI
RED ALGAE
OPUNTIELLA CALIFORNICA
RED ALGAE
PHYLOSPADIX SCOULERI
SEA GRASS
PHYLOSPADIX TORREYI
SEA GRASS
PLOCAMIUM PACIFICUM
RED ALGAE
POLYNEURA LATISSINA
RED ALGAE
PORPHYRA PERFORATA
RED ALGAE
PRIONITIS LANCEOLATA
RED ALGAE
PTEROSIPHONIA BIPIUNATA
RED ALGAE
PTERYGOPHORA CALIFORNICA
KELP
PTILOTA ASPLENIOIDES
RED ALGAE
RHODOGLOSSUM LATISSIMUM
RED ALGAE
RHODOMENIA PALMATA
RED ALGAE
RHODOMENIA PERTUSA
RED ALGAE
RHODOPTILUM PLUMOSUM
RED ALGAE
SARGASSUM MUTICUM
KELP
SCHIZYMENIA PACIFICA
RED ALGAE
SMITHORA NAIADUM
RED ALGAE
STENOGRAMME INTERUPTA
RED ALGAE

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET
STRONGYLOCENTROTUS FRANSISCANU
GIANT RED URCHIN
STRONGYLOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES PERVERSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CALLIOSTOMA ANNULATUM
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DERMASTERIAS IMBRICATA
LEATHER STAR
LISCHKEIA CIDARIS
SNAIL
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
SOLASTER STIMPSONI
SUN STAR

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

BANKIA SETACEA
TEREDO
PARASITCHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
OENOPOTA
SNAIL
ONCOSOECIA
BRYOZOAN

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BUGULA FLABELLATA
BRYOZOAN
CELLARIA MANDIBULATA
BRYOZOAN
CLINOCARDIUM NUTALLI
BASKET COCKLE
LAGENIPORA PUNCTULATA
BRYOZOAN
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
TEREBRATALIA TRANSVERSA
LAMP SHELL

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

HABITAT: SURFGRASS VEGETATED BENTHIC

PHYLLOLITHOIDES PAPILLOSUS
PAPILLA CRAB

TROPHIC LEVEL: (Q)
INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
LAFOEA ADHATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
PLUMULARIA ALICIA
HYDROID
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

HABITAT: UNPROTECTED BEACH SURF

TROPHIC LEVEL: (1) PRODUCER
INVERTEBRATES

CHAETOCEROS ARMATUM
DIATOM

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

ASTRIONELLA SOCIALIS
DIATOM

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

PHYLLOSPADIX SCOULERI
SCOULER'S SURFGRASS

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ENDEODES COLLARIS
COLEOPTERA

TROPHIC LEVEL: (2) HERBIVORE
MAMMALS

ODOCOILEUS HEMIONUS COLUMBIANO
BLACK-TAILED DEER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

GLYCERIDAE
PROBOSCIS WORM

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS HEERMANNI
HEERMAN'S GULL
LARUS PHILADELPHIA
BONAPARTE'S GULL
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATA
STELLER'S SEA LION
LYNX RUFUS
BOBCAT
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA FRENATA
LONG-TAILED WEASEL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
SPILOGALE PUTORIUS
SPOTTED SKUNK
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLONISCUS PERCONVEXUS
ISOPODS
CALLIANASSA CALIFORNIENSIS
GHOST SHRIMP
CIROLANA KINCAIDI
ISOPODS
COELOPA
KELP FLY
EUZONUS MUCRONATA
BLOOD WORMS
ORCHESTOIDEA CALIFORNIANA
SAND FLEE
SPIONIDAE
WORM

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

CRAGO NIGRACAUDA
BLACK-TAILED SHRIMP
CRAGO SPP.
-NULL-

TROPHIC LEVEL: (5) OMNIVORE
FISHES

PHANERODON FURCATUS
WHITE SEAPERCH

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

CORVUS BRACHYRHYNCHOS
COMMON CROW

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

MEPHITIS MEPHITIS
STRIPED SKUNK
PEROMYSCUS MANICULATUS
DEER MOUSE
PROCYON LOTOR
RACCOON

TROPHIC LEVEL: (6) PARASITE
INVERTEBRATES

ALEOCHARA ARENARIA
ROVE BEETLE
MALACOBDELLA SPP.
RIBBON WORM

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ARCHAEOMYSIS GREBNITZKII
MYSID
EMERITA ANALOGA
MOLE CRAB
SILIQUA PATULA
RAZOR CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

OLIVELLA BIPLICATA
PURPLE OLIVE SNAIL

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

LARUS GLAUCESCENS
GLAUCOS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

CEREBRATULUS
RIBBON WORM
EOHAUSTORIUS WASHINGTONIANUS
AMPHIPOD
PONTOMALOTA OPACA
ROVE BEETLE
STAPHYLINIDAE
ROVE BEETLES
THINOPINUS PICTUS
ROVE BEETLE
THINUSA MARITIMA
ROVE BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
AMMODYTES HEXAPTERUS
PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
REDTAIL SURFPERCH
HYPOMESUS PRETIOSUS
SURFSMELT

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

ARENARIA INTERPRES
RUDDY TURNSTONE
CALIDRIS ALBA
SANDERLING
CALIDRIS ALPINA
DUNLIN
CALIDRIS BAIRDII
BAIRD'S SANDPIPER
CALIDRIS CANUTUS
RED KNOT
CALIDRIS MAURI
WESTERN SANDPIPER
CHARADRIUS ALEXANDRINUS
SNOWY PLOVER
CHARADRIUS SEMIPALMATUS
SEMIPALMATED PLOVER
LIMNODROMUS GRISEUS
SHORT-BILLED DOWITCHER
LIMOSA FEDOA
MARBLED GODWIT

HABITAT: UNPROTECTED BEACH SURF

NUMENIUS PHAEOPUS
WHIMBREL
PLUVIALIS SQUATAROLA
BLACK-BELLIED PLOVER

TROPHIC LEVEL: (Q) UNKNOWN
INVERTEBRATES

HAUSTORIIDAE
AMPHIPOD

HABITAT: PROTECTED BEACH SURF

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

PHYLLOSPADIX SCOULIERI
SCOULER'S SURFGRASS
PLANTAGO MARITIMA
SEASIDE PLANTAIN
TENACETUM DOUGLASII
DUNE TANSY

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

LUMBRINARIS ZONATA
WORM

TROPHIC LEVEL: (2) HERBIVORE
BIRDS

BRANTA BERNICLA
BRANT

TROPHIC LEVEL: (2) HERBIVORE
MAMMALS

ODOCOILEUS HEMIONUS COLUMBIANU
BLACK-TAILED DEER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

GLYCERIDAE
PROBOSCIS WORM

TROPHIC LEVEL: (3) CARNIVORE
FISHES

MYOXOCEPHALUS POLYACANTHOCEPHA
GREAT SCULPIN
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
SEBASTES PAUCISPINIS
BOCCACIO

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

ARDEA HERODIAS
GREAT BLUE HERON
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS DELAWARENSIS
RING-BILLED GULL
LARUS HEERMANNI
HEERMAN'S GULL
LARUS PHILADELPHIA
BONAPARTE'S GULL
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE
STERNA CASPIA
CASPIAN TERN
TRINGA FLAVIPES
LESSER YELLOWLEGS

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATA
STELLER'S SEA LION
LYNX RUFUS
BOBCAT
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA FRENATA
LONG-TAILED WEASEL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
SPILOGALE PUTORIUS
SPOTTED SKUNK
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ABARENICOLA CLAPAREDII OCEANIC
LUGWORM
CALLIANASSA CALIFORNIENSIS
GHOST SHRIMP
CIROLANA KINCAIDI
ISOPODS
EUZONUS MUCRONATA
BLOOD WORM
ORCHESTIA TRASKIANA
LESSER BEACH HOPPERORCHESTOIDEA
CALIFORNIANA
SAND FLEE/GREAT BEACH HOPPER
SPIONIDAE
WORM

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

CRAGO NICRACAUDA
BLACK-TAILED SHRIMP
CRAGO SPP.
-NULL-

TROPHIC LEVEL: (5) OMNIVORE
FISHES

HYPERPROSOPON ANGENTEUM
WALLEYE SURFPERCH
HYPERPROSOPON ELLIPTICUM
SILVER SURFPERCH

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

CORVUS BRACHYRHYNCHOS
COMMON CROW

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

MEPHITIS MEPHITIS
STRIPED SKUNK
PEROMYSCUS MANICULATUS
DEER MOUSE
PROCYON LOTOR
RACCOON

TROPHIC LEVEL: (6) PARASITE
INVERTEBRATES

MALACOBDELLA SPP.
RIBBON WORM

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ARCHAEOMYSIS GREBNITZKII
MYSID
EMERITA ANALOGA
MOLE CRAB
SILIQUA PATULA
RAZOR CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

OLIVELLA BIPLICATA
PURPLE OLIVE SNAIL

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

HALIAEETUS LEUCOCEPHALUS
BALD EAGLE
LARUS GLAUCESCENS
GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

CEREBRATULUS
RIBBON WORM
EOHAUSTORIUS WASHINGTONIANUS
AMPHIPOD
PARANEMERTES PEREGRINA
NEMERTEAN
STAPHYLINIDAE
ROVE BEETLES

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
ALOSA SAPIDISSIMA
AMERICAN SHAD
AMMODYTES HEXAPTERUS
PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
REDTAIL SURFPERCH
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
CYMATOGASTER AGGREGATA
SHINER PERCH
HYPOMESUS PRETIOSUS
SURFSMELT
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN

HABITAT: PROTECTED BEACH SURF

MICROGADUS PROXIMUS
PACIFIC TOMCOD

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

ACTITIS MACULARIA
SPOTTED SANDPIPER
ARENARIA INTERPRES
RUDDY TURNSTONE
ARENARIA MELANOCEPHALA
BLACK TURNSTONE
CALIDRIS ALBA
SANDERLING
CALIDRIS ALPINA
DUNLIN
CALIDRIS BAIRDII
BAIRD'S SANDPIPER
CALIDRIS CANUTUS
RED KNOT
CALIDRIS MAURI
WESTERN SANDPIPER
CALIDRIS MINUTILLA
LEAST SANDPIPER
CHARADRIUS ALEXANDRINUS
SNOWY PLOVER
CHARADRIUS SEMIPALMATUS
SEMIPALMATED PLOVER
CHARADRIUS VOCIFERUS
KILLDEER
LIMNODROMUS GRISEUS
SHORT-BILLED DOWITCHER
LIMNODROMUS SCOLOPACEUS
LONG-BILLED DOWITCHER
LIMOSA FEDOA
MARBLED GODWIT
LOBIPES LOBATUS
NORTHERN PHALAROPE
NUMENIUS AMERICANUS
LONG-BILLED CURLEW
NUMENIUS PHAEOPUS
WHIMBREL
PLUVIALIS DOMINICA
AMERICAN GOLDEN PLOVER
PLUVIALIS SQUATAROLA
BLACK-BELLIED PLOVER
TRINGA MELANOLEUCA
GREATER YELLOWLEGS

TROPHIC LEVEL: (Q) UNKNOWN
INVERTEBRATES

HAUSTORIIDAE
AMPHIPOD

HABITAT: UNPROTECTED ROCKY SURF

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

ALARIA NANA
-NULL-
BOSSEA MANZA
LEAF CORAL
BRYOPSIS CORTICULANS
SEA FERN
CALLIARTHRON MANZA
BEAD CORAL
CALLITHAMNION PIKEANUM
BEAUTY BUSH
CLADOPHORA TRICHOTOMA
GREEN BALL
CODIUM FRAGILE
SEA STAGHORN
CODIUM SETCHELLII
SPUNGY CUSHION
CORALLINA GRACILIS
GRACEFUL CORAL
COSTARIA COSTATA
SEERSUCKER
CUMAGLOIA ANDERSONII
-NULL-
CYAMATHERE TRIPLICATA
TRIPLE RIB
CYSTOSEIRA OSMUNDACEA
WOODY CHAIN BLADDER
EGREGIA MENZIESII
FEATHER BOA
ENDOCLADIA MURICATA
NAIL BRUSH
ENTEROMORPHA COMPRESSA
GREEN CONFETTI
ENTEROMORPHA INTESTINALIS
LINK CONFETTI
ENTEROMORPHA PLUMOSA
SILK CONFETTI
GRATELOUPIA PINNATA
POINTED LYNX
HALICYSTIS OVALIS
-NULL-
HEDOPHYLLUM SESSILE
SEA CABBAGE
MYMENENA FLABELLIGERA
VEINED FAN
IRIDOPHYCUS SPECIES
IRIDESCENT SEAWEED
LAMINARIA ANDERSONII
SPLIT WHIP WRACK
LAMINARIA PLATYMERIS
SEA GIRDLE OR TANGLE
LAMINARIA SETCHELII
-NULL-
LESSONIOPSIS LITTORALIS
-NULL-
LITHOTHAMNIUM SPECIES
RED ROCK CRUST
MICROCLADIA BOREALIS
COARSE SEA LACE
PELVETIOPSIS LIMITATA
-NULL-
PLEUROPHYCUS GARDNERI
SEA SPATULA
POLYSIPHONIA PACIFICA
POLLY PACIFIC
PORPHYRA LANCEOLATA
RED JABOT LABER
PORPHYRA PERFORATA
RED LAVER
POSTELSIA PALMAEFORMIS
SEA PALM
PRESIDLA MERIDIONALIS
-NULL-
PRIONITIS LANCEOLATA
-NULL-
PRIONITIS LYALLII
LYALL'S SEAWEED
PTERYGOPHORA CALIFORNICA
POMPON
PTILOTA FILICINA
RED WING
PTILOTA HYPNOIDES
-NULL-
RALFSIA PACIFICA
TAR SPOT
SCHIZYMENIA PACIFICA
SEA ROSE
SCYTOSIPHON LOMENTARIA
WHIP TUBE
SPONGOMORPHA COALITA
GREEN ROPE
UROSPORA MIRABILIS
-NULL-

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

PHYLLOSPADIX SCOULERI
SCOULER'S SURFGRASS

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA DIGITALIS
LIMPET
ACMAEA PELTA
BROWN & WHITE SHIELD LIMPET
DIDDORA ASPERA
KEYHOLE LIMPET
KATHERINA TUNICATA
BLACK CHITON
NUTTALINA CALIFORNICA
CHITON
PARACLUNIO ALASKENSIS
MIDGE
STRONGLYOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ANISODORIS NOBILIS
SEA LEMON
PISASTER GIGANTEUS
SEASTAR
PISASTER OCHRACEUS
SEASTAR
THAIS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ASCELICHTHYS RHODORUS
ROSYLIP SCULPIN
RAJA STELLULATA
STARRY SKATE
SEBASTES MELANOPS
BLACK ROCKFISH

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

AECHMOPHORUS OCCIDENTALIS
WESTERN GREBE
CEPPHUS COLUMBA
PIGEON GUILLEMOT
CERORHINCA MONOCERATA
RHINOCEROUS AUKLET
GAVIA ARCTICA
ARCTIC LOON
HAEMATOPUS BACHMANI
BLACK OYSTERCATCHER
HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS HEERMANNI
HEEERMAN'S GULL
LUNDA CIRRHATA
TUFTED PUFFIN
MELANITTA DEGLANDI
WHITE-WINGED SCOTER
PELECANUS OCCIDENTALIS
BROWN PELICAN
PHALOCROCORAX AURITUS
DOUBLE-CRESTED CORMORANT
PHALOCROCORAX PELAGICUS
PELAGIC CORMORANT
PHALOCROCORAX PENICILLATUS
BRANDT'S CORMORANT
RISSA TRIDACTYLA
BLACK-LEGGEED KITTIWAKE
URIA AALGE
COMMON MURRE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

ENHYDRA LUTRIS
SEA OTTER
EUMETOPIAS JUBATA
STELLER'S SEA LION
LUTRA CANADENSIS
RIVER OTTER
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

HABITAT: UNPROTECTED ROCKY SURF

EUDISTYLIA VANCOUVERI
 SABELLID
IDOTEA SCHMITTI
 ISOPOD
IDOTEA WOSNESENSKII
 OLIVE GREEN ISOPOD
LIGIA PALLASI
 ROCK LOUSE
SABELLARIA CEMENTARIUM
 WORM

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

PROCYON LOTOR
 RACCOON

TROPHIC LEVE;L: (6) PARASITE
INVERTEBRATES

FABIA SUBQUADRATA
 PEA CRAB
HETEROSACCUS CALIFORNICUS
 -NULL-

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BALANUS GLANDULA
 BARNACLE
MYTILUS CALIFORNIANUS
 MUSSEL
NEANTHES BRANDTI
 WORM
POLLICIPES POLYMERUS
 PACIFIC GOOSE BARNACLE
VOLSELLA MODIOLUS
 HORSE MUSSEL

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

LARUS GLAUCESCENS
 GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
 WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

AMBLOPUSA BOREALIS
 ROVE BEETLE
CEPHALOTHORIX LINEARIS
 NEMERTEAN
DIAULOTA DENSISSIMA
 ROVE BEETLE
EMPLECTONEMA GRACILE
 RIBBON WORM
LIPAROCEPHALUS CORDICOLLIS
 ROVE BEETLE
MICRURA VERRILLI
 NEMERTEAN
PARANEMERTES PEREGRINA
 NEMERTEAN
THALASSOTRECHUS BARBARAE NIGRI
 GROUND BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

AMPHISTICHUS RHODOTERUS
 REDTAIL SURFPERCH
CYMATOGASTER AGGREGATA
 SHINER PERCH

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

ACTITIS MACULARIA
 SPOTTED SANDPIPER
APHRIZA VIRGATA
 SURFBIRD
ARENARIA INTERPRES
 RUDDY TURNSTONE
ARENARIA MELANOCEPHALA
 BLACK TURNSTONE
CALIDRIS PTILOCNEMIS
 ROCK SANDPIPER
HETEROSCELUS INCANUM
 WANDERING TATTLER
NUMENIUS PHAEOPUS
 WHIMBREL

TROPHIC LEVEL: (Q) UNKNOWN
INVERTEBRATES

HAPALOGASTER CAVICAUDA
 CRAB

HABITAT: PROTECTED ROCKY SURF

TROPHIC LEVEL: (1) PRODUCER
NON-VASCULAR PLANTS

AGARUM FIMBRIATUM
 SEA COLANDER
BOSSEA MANZA
 LEAF CORAL
CALLIARTHRON MANZA
 BEAD CORAL
CALLITHAMNION PIKEANUM
 BEAUTY BUSH
CERAMIUM CALIFORNICUM
 -NULL-
CERAMIUM PACIFICUM
 POTTERY SEAWEED
COILODESME CALIFORNICA
 STICK BAG
COLPOMENIA SINUOSA
 POCKET OR OYSTER THIEF
CORALLINA CHILENSIS
 TIDE POOL CORAL
CUMAGLOIA ANDERSONII
 -NULL-
CYSTOPHYLLUM GERMINATUM
 BLADDER LEAF
CYSTOSEIRA OSMONDACEA
 WOODY CHAIN BLADDER
DESMARESTIA ACULEATA
 CRISP COLOR CHANGER
DESMARESTIA INTERMEDIA
 LOOSE COLOR CHANGER
DESMARESTIA MUNDA
 WIDE BRANCH COLOR CHANGER
ENTEROMORPHA COMPRESSA
 GREEN CONFETTI
ENTEROMORPHA INTESTINALIS
 LINK CONFETTI
ENTEROMORPHA PLUMOSA
 SILK CONFETTI
FUCUS FURCATA
 ROCKWEED OR POPPING WRACK
GASTROCLONIUM COULTERI
 SEA BELLY
GIGARTINA EXASPERATA
 TURKISH TOWEL
GIGARTINA SPECIES
 GRAPESTONE
GRATELOUPIA PINNATA
 POINTED LYNX
HALICYSTIS OVALIS
 -NULL-
HALOSACCION GLANDIFORME
 SEA SAC
HETEROCHORDARIA ABIETINA
 FIR NEEDLE
LAMINARIA PLATYMERIS
 SEA GIRDLE OR TANGLE
LAMINARIA SACCHARINA
 SUGAR WRACK
LAURENCIA SPECTABILIS
 SEA LAUREL
LITHOTHAMNIUM SPECIES
 RED ROCK CRUST
MACROCYSTIS INTEGRIFOLIA
 KELP
MICROCLADIA COULTERI
 DELICATE SEA LACE
PELVETIOPSIS LIMITATA
 -NULL-
POLYNEURA PATISSIMA
 CRISSCROSS NETWORK
POLYSIPHONIA COLLINSI
 POLLY COLLINS
POLYSIPHONIA PACIFICA
 POLLY PACIFIC
PORPHYRA LANCEOLATA
 RED JABOT LAVER
PORPHYRA PURFORATA
 RED LAVER
PRASIOLA MERIDIONALIS
 -NULL-
PTILOTA FILICINA
 RED WING
PTILOTA HYPNOIDES
 -NULL-
RALFSIA PACIFICA
 TAR SPOT
RHODOMELA LARIX
 BLACK PINE
RHODYMENIA PALMATA
 DULSE OR RED KALE
RHODYMENIA PERTUSA
 RED EYELET SILK
SCYTOSIPHON LOMENTARIA
 WHIP TUBE
SPONGOMORPHA COALITA
 GREEN ROPE
ULVA FENESTRATA
 -NULL-
ULVA LACTUCA
 SEA LETTUCE
ULVA LINZA
 GREEN STRING LETTUCE

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

JAUMEA CARNOSA
 JAUMEA
PHYLLOSPADIX SCOULERI
 SCOULER'S SURFGRASS
TANACETUM DOUGLASII
 DUNE TANSY

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA DIGITALIS
 LIMPET
ACMAEA FENESTRATA
 LIMPET
ACMAEA LIMATULA
 FILE LIMPET
ACMAEA MITRA
 DUNCE-CAP LIMPET
ACMAEA PELTA
 BROWN & WHITE SHIELD LIMPET
AMPITHOE HUMERALIS
 -NULL-
CALLISTOCHITON CRASSICOSTATUS
 CHITON
CRYPTOCHITON STELLERI
 GUM BOOT CHITON
CYANOPLAX HARTWEGI
 CHITON
KATHERINA TUNICATA
 BLACK CHITON
LITTORINA PLANAXIS
 PERIWINKLE
LITTORINA SCUTULINA
 PERIWINKLE
LITTORINA SITKANA
 PERIWINKLE
LUMBRINERIS ZONATA
 WORM
MOPALIA CILIATA
 CHITON
MOPALIA LIGNOSA
 CHITON
ODONTOSYLLIS PHOSPHOREA
 WORM
PARALUNIO ALASKENSIS
 MIDGE
STRONGYLOCENTROTUS FRANCISCANU
 SEA URCHIN
STRONGYLOCENTROTUS PURPURATUS
 PURPLE SEA URCHIN

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

TONICELLA LINEATA
 LINED CHITON

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

AEOLIDIA PAPILLOSA
 NUDIBRANCH
AMBLOPUSA BOREALIS
 ROVE BEETLE
ANISODORIS NOBILIS
 SEA LEMON
CADLINA
 NUDIBRANCH
CORAMBE PACIFICA
 NUDIBRANCH
DIAULOTA DENSISSIMA
 ROVE BEETLE
DIRONA ALBOLINEATA
 NUDIBRANCH
LEPIDOZONA COOPERI
 CHITON
LEPIDOZONA MERTENSI
 CHITON
LIPAROCEPHALUS CORDICOLLIS
 ROVE BEETLE
PISASTER GIGANTEUS
 SEASTAR
PISASTER OCHRACEUS
 SEASTAR
PLACIPHORELLA VELATA
 CHITON
PYCNOGONUM STEARNSI
 SEA SPIDER
PYCNOPODIA HELIANTHOIDES
 SUNFLOWER STAR
ROSTANGA PULCHRA
 NUDIBRANCH
SOLASTER DOWSONI
 SEASTAR
SOLASTER STIMSONI
 SEASTAR
THAIS

HABITAT: PROTECTED ROCKY SURF

SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ARTEDIUS LATERALIS
SMOOTHHEAD SCULPIN
ASCELICHTHYS RHODORUS
ROSYLIP SCULPIN
HEMILEPIDOTUS HEMILEPIDOTUS
RED IRISH LORD
HEMILEPIDOTUS SPINOSIS
BROWN IRISH LORD
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS LAGOCEPHALUS
ROCK GREENLING
MYOXOCEPHALUS POLYACANTHOCEPHA
GREAT SCULPIN
PAROPHYRUS VETULUS
ENGLISH SOLE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES MELANOPS
BLACK ROCKFISH
XIPHISTER ATROPURPUREUS
BLACK PRICKLEBACK

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

AECHMOPHORUS OCCIDENTALIS
WESTERN GREBE
ARDEA HERODIAS
GREAT BLUE HERON
BUCEPHALA ALBEOLA
BUFFLEHEAD
BUCEPHALA CLANGULA
COMMON GOLDENEYE
CEPPHUS COLUMBA
PIGEON GUILLEMOT
CERORHINCA MONOCERATA
RHINOCEROS AUKLET
GAVIA ARCTICA
ARCTIC LOON
HAEMATOPUS BACHMANI
BLACK OYSTERCATCHER
HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS HEERMANNI
HEERMAN'S GULL
LUNDA CIRRHADA
TUFTED PUFFIN
MEGACERYLE ALCYON
BELTED KINGFISHER
MELANITTA DEGLANDI
WHITE-WINGED SCOTER
MELANITTA PERSPICILLATA
SURF SCOTER
PELECANUS OCCIDENTALIS
BROWN PELICAN
PHALACROCORAX AURITIS
DOUBLE-CRESTED CORMORANT
PHALACROCORAX PELAGICUS
PELAGIC CORMORANT
PHALACROCORAX PENICILLATUS
BRANDT'S CORMORANT
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE
URIA AALGE
COMMON MURRE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

ENHYDRA LUTRIS
SEA OTTER
EUMETOPIAS JUBATA
STELLER'S SEA LION
LUTRA CANADENSIS
RIVER OTTER
MIROUNGA ANGUSTIROSTRIS
ELEPHANT SEAL
MUSTELA VISON
MINK
PHOCA VITULINA
HARBOR SEAL
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRIVORE
INVERTEBRATES

AMPHIODIA OCCIDENTALIS
BRITTLE STAR
AMPHITRITE ROBUSTA
POLYCHAETE WORM
CUCUMARIA MINIATA
SEA CUCUMBER
EUDISTYLIA POLYMORPHA
SABELLID
EUDISTYLIA VANCOUVERI
SABELLID
EUPOLYMNIA HETEROBRANCHIA
TEREBELLID WORM
IDOTEA SCHMITTI
ISOPOD
IDOTEA UROTOMA
PILL BUG
LIGIA PALLASI
ROCK LOUSE
MELITA PALMATA
BEACH HOPPER
NEOAMPHITRITE ROBUSTUS
TEREBELLID WORM
OPHIOPHOLIS ACULEATA
BRITTLE STAR
ORCHESTIA TRASKIANA
LESSER BEACH HOPPER
THELEPUS CRISPUS
WORM
TIGRIOPUS CALIFORNICUS
BUG

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

MOPALIA MUSCOSA
CHITON

TROPHIC LEVEL: (5) OMNIVORE
FISHES

ANOPLARCHUS PURPURESCENS
HIGH COCKSCOMB
XIPHISTER MUCOSUS
ROCK PRICKLEBACK

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

AYTHYA MARILA
GREATER SCAUP
CORVUS BRACHYRHYNCHOS
COMMON CROW
CORVUS CORVAX
COMMON RAVEN

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

PROCYON LOTOR
RACCOON

TROPHIC LEVEL: (6) PARASITE
NON-VASCULAR PLANTS

JANCZEWSKIA GARDNERI
PARASITIC SEA LAUREL

TROPHIC LEVEL: (6) PARASITE
INVERTEBRATES

ARCTONOE PULCHRA
SCALE WORM
ARCTONOE VITTATA
SCALE WORM
FABIA SUBQUADRATA
PEA CRAB
PINNIXA TUBICOLA
PEA CRAB
SYNDESMIS FRANCISCANUS
WORM

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BALANUS CARIOSUS
BARNACLE
BALANUS GLANDULA
BARNACLE
BOCCARDIA PROBOSCIDEA
SPINOID WORM
BEGULA PACIFICA
BRYOZOAN
HALICHONDRIA PANICEA
CRUMB OF BREAD SPONGE
HENRICIA LEVIUSCULA
RED SEASTAR
HINNITES GIGANTEUS
ROCK OYSTER
HIPPODIPLOSIA INSCULPTA
BRYOZOAN
LEPRALIA BILABIATA
BRYOZOAN
MEMBRANIPORA MEMBRANACEA
BRYOZOAN
MEMBRANIPORA SERRILAMELLA
BRYOZOAN
PEDICELLINA CERNUA
ENTOPROCT
PHIDOLOPORA PACIFICA
BRYZOAN

HABITAT: PROTECTED ROCKY SURF

PLOCAMIA KARYKINA
RED SPONGE
SERPULA VEMICULARIS
WORM
SPIRORBIS
WORM
TEREBRATALIA TRANSVERSA
BRACHIOPOD
TRICELLARIA OCCIDENTALIS
BRYOZOAN
XESTOSPONGIA VANILLA
SPONGE

TROPHIC LEVEL: (8) SCAVENGER INVERTEBRATES

HEMIGRAPSUS NUDUS
PURPLE SHORE CRAB
PACHYCHELES RUDIS
PORCELAIN CRAB
PAGURUS GRANOSIMANUS
HERMIT CRAB
PAGURUS HEMPHILLI
HERMIT CRAB
PAGURUS SAMUELIS
HERMIT CRAB
PETROLISTHES CINCTIPES
PORCELAIN CRAB

TROPHIC LEVEL: (8) SCAVENGER BIRDS

HALIAEETUS LEUCOCEPHALUS
BALD EAGLE
LARUS GLAUCESCENS
GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE EATER - INVERTEBRATES

ALLORCHESTES ANGUSTUS
-NULL-
AMPHIPORUS BIMACULATUS
RIBBON WORM
ANTHOPLEURA ELEGANTISSIMA
AGGREGATED ANEMONE
ANTHOPLEURA XANTHOGRAMMICA
GIANT GREEN ANEMONE
CANCER ANTENNARIUS
CRAB
CANCER MAGISTER
DUNGENESS CRAB
CANCER PRODUCTUS
CRAB
CEPHALOTHRIX LINEARIS
NEMERTEAN
CERATOSTOMA
FOLIATUM MUREX
EMPLECTONEMA GRACILE
RIBBON WORM
EPIACTIS PROLIFERA
ANEMONE
GLYCERA AMERICANA
WORM
HALOSYDNA BREVISETOSA
SCALE WORM
HERMISSENDA CRASSICORNIS
NUDIBRANCH
MICRURA VERRILLI
NEMERTEAN
PARANEMERTES PEREGRINA
NEMERTEAN
PHOXICHILIDIUM FEMORATUM
SEA SPIDER
SPIRONTOCARIS BREVIROSTRIS
BROKEN BACK SHRIMP
SPIRONTOCARIS CRISTATA
BROKEN BACK SHRIMP
SPIRONTOCARIS PALUDICOLA
BROKEN BACK SHRIMP
SPIRONTOCARIS PRIONATA
BROKEN BACK SHRIMP
TEALIA CRASSICORNIS
ANEMONE
THALASSOTRECHUS BARBARAE NIGRI
GROUND BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

APODICHTHYS FLAVIDUS
PENPOINT GUNNEL
CHIROLOPHIS NUGATOR
MOSSHEAD WAR-BONNET
CLINOCOTTUS ACUTICEPS
SHARPNOSE SCULPIN
CLINOCOTTUS EMBRYUM
CALICO SCULPIN
CLINOCOTTUS GLOBICEPS
MOSSHEAD SCULPIN
CYMATOGASTER AGGREGATA
SHINER PERCH
GOBIESOX MAEANDRICUS
NORTHERN CLINGFISH
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN
LIPARIS FLORAE
TIDEPOOL SNAILFISH
OLIGOCOTTUS MACULOSUS
TIDEPOOL SCULPIN
OLIGOCOTTUS SNYDERI
FLUFFY SCULPIN
PHOLIS LAETA
CRESCENT GUNNEL
RHACOCHILUS VACCA
PILE PERCH
SPIRINCHUS STARSKI
NIGHT SMELT
XERERPES FUCORUM
ROCKWEED GUNNEL

TROPHIC LEVEL: (9) INVERTEBRATE EATER - BIRDS

ACTITIS MACULARIA
SPOTTED SANDPIPER
APHRIZA VIRGATA
SURFBIRD
ARENARIA INTERPRES
RUDDY TURNSTONE
ARENARIA MELANOCEPHALA
BLACK TURNSTONE
CALIDRIS ALPINA
DUNLIN
CALIDRIS PTILOCNEMIS
ROCK SANDPIPER
HETEROSCELUS INCANUM
WANDERING TATTLER
NUMENIUS PHAEOPUS
WHIMBREL
PLUVIALIS SQUATAROLA
BLACK-BELLIED PLOVER
TRINGA MELANOLEUCA
GREATER YELLOWLEGS

TROPHIC LEVEL: (Q) UNKNOWN INVERTEBRATES

ANAITIDES MEDIPAPILLATA
PADDLE WORM
ARABELLA IRICOLOR
WORM
ASTRAEA GIBBEROSA
SNAIL
CREPIDULA ADUNCA
HORNED SLIPPER SHELL
CRYPTOLITHODES SITCHENSIS
UMBRELLA-BACKED CRAB
DODECACERIA FISTULICOLA
CIRRATULID WORM
HAPALOGASTER CAVICAUDA
CRAB
LEPTASTERIA HEXACTIS
SEASTAR
LEPTASTERIA PUSILLA
SEASTAR
MIMULUS FOLIATUS
CRAB
DEDIGNATHUS INERMIS
CRAB
PATIRIA MINIATA
SEA BAT
PLATYNEREIS AGASSIZI
NEREID WORM
PODARKE PUGGETTENSIS
POLYCHAETE
PUGETTIA PRODUCTA
KELP CRAB
SCYRA ACUTIFRONS
MASKING CRAB
TEGULA FUNEBRALIS
BLACK TURBAN SNAIL

HABITAT: HEADLANDS AND ROCKY ISLANDS

TROPHIC LEVEL: (-)
VASCULAR PLANTS

ANTHOXANTHUM ODORATUM
SWEET VERNALGRASS
HOLCUS LANATUS
COMMON VELVET-GRASS

TROPHIC LEVEL: (1) PRODUCER
VASCULAR PLANTS

AIRA PRAECOX
LITTLE HAIRGRASS
ALNUS RUBRA
RED ALDER
ANGELICA LUCIDA
SEA-WATCH
ARCTOSTAPHYLOS COLUMBIANA
BRISTLY MANZINITA
ARCHTOSTAPHYLOS UVA-URSI
KINNIKINNIC
ARMERIA MERITIMA
THRIFT
BACCHARIS PILULARIS
CHAPARRAL BROOM
BLECHNUM SPICANI
DEER FERN
CALAMAGROSTIS NUTKAENSIS
REEDGRASS
CASTILLEJA LITORALIS
PACIFIC PAINTBRUSH
CEANOTHUS THYRSIFLORUS
BLUE BLOSSOM
CERASTIUM ARVENSE
FIELD CHICKWEED
CYTISUS SCOPARIUS
SCOTCH BROOM
DANTHONIA CALIFORNICA
OATGRASS
DESCHAMPSIA CAESPITOSA
TUFTED HAIRGRASS
DESCHAMPSIA LONGIFLORA
HAIRGRASS
DIGITALIS PURPUREA
FOXGLOVE
EMPETRUM NIGRUM
CROWBERRY
ERIGERON GLAUCUS
SEASIDE DOCK
FESTUCA MYUROS
RAT-TAIL FESCUE
FESTUCA RUBRA
RED FESCUE
FRAGARIA CHILOENSIS
COASTAL STRAWBERRY
GALIUM NUTTALII
NUTTAL'S BEDSTRAW
GAULTHERIA SHALLON
SALAL
GNAPHALIUM CHILENSE
COTTON-BATTING PLANT
GRINDELIA INTEGRIFOLIA VAR. MA
PUGET SOUND GUMWEED
HERACLEUM LANATUM
COW-PARSNIP
HOLODISCUS DISCOLOR
OCEAN-SPRAY
HYPOCHAERIS RADICATA
GOSMORE
LASTHENIA CHRYSOSTOMA
LASTHENIA
LASTHENIA MINOR VAR. MARITIMA
HAIRY LASTHENIA
LATHYRUS LITTORALIS
BEACH PEA-VINE
LEONTODON NUDICAULIS
BRISTLY HAWKBIT
LILAEOPSIS OCCIDENTALIS
LILAEOPSIS
LONICERA INVOLUCRATA
BLACK TWINBERRY
LOTUS FORMOSISSIMUS
DEERVETCH, SEASIDE LOTUS
LUPINUS ARBOREUS
TREE LUPINE
LUPINUS VARICOLOR
TWO-COLOR LUPINE
MICROSERIS BIGILOVII
COAST MICROSERIS
MYRICA GALE
SWEET GALE
PINUS CONTORTA
LODGEPOLE PINE, SHORE PINE
PLANTAGO HIRTELLA
TALL COAST PLANTAIN
PLANTAGO LANCEOLATA
BUCKHORN PLANTAIN
POA PACHYPHOLIS
SEACLIFF BLUEGRASS
POLYPODIUM GLYCYRRHIZA
LICORICE FERN
POLYSTICHUM MUNITUM
SWORDFERN
PSEUDOTSUGA MENZIESII
DOUGLAS FIR
PTERIDIUM AQUILINUM
WESTERN BRACKEN FERN
RANUNCULUS FLAMMULA
SMALL CREEPING BUTTERCUP
RHAMNUS PURSHIANA
CASCARA
RHODODENDRON MACROPHYLLUM
WESTERN RHODODENDRON
RHUS DIVERSILOBA
POISON OAK
ROMANZOFFIA TRACYI
TRACY'S MISTMAIDEN
RUBUS SPECTABILIS
SALMONBERRY
RUBUS URSINUS
DOUGLASBERRY
RUMEX MARITIMUS
SEASIDE DOCK
SAGINA CRASSICAULIS
STICK-STEMMED PEARLWORT
SALIX HOOKERIANA
COAST WILLOW
SEDUM LANCEOLATUM VAR. MESIOTI
LANCE-LEAVED STONECROP
SIDALCEA HIRTIPES
HAIRY-STEMMED CHECKER-MALLOW
STACHYS RIGIDA
HEDGE NETTLE
TANACETUM DOUGLASII
DUNE TANSY
THUJA PLICATA
WESTERN RED CEDAR
ULEX EUROPAEUS
GORSE
VACCINIUM OVATUM
EVERGREEN HUCKLEBERRY
VACCINIUM PARVIFOLIUM
RED HUCKLEBERRY
VERATRUM VIRIDE
FALSE HELLEBORE

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

PARACLUNIO ALASKENSIS
MIDGE

TROPHIC LEVEL: (2) HERBIVORE
BIRDS

BONASA UMBELLUS
RUFFED GROUSE
CARDUELIS PINUS
PINE SISKIN
CARDULIS TRISTIS
AMERICAN GOLDFINCH
CARPODACUS MEXICANUS
HOUSE FINCH
CARPODACUS PURPUREUS
PURPLE FINCH
COLUMBA FASCIATA
BAND-TAILED PIGEON
DENDRAGAPUS OBSCURUS
BLUE GROUSE
HESPERIPHONA VESPERTINA
EVENING GROSBEAK
JUNCO HYEMALIS
DARK-EYED JUNCO
LOPHORTYX CALIFORNICUS
CALIFORNIA QUAIL
LOXIA CURVIROSTRA
RED CROSSBILL
MELOSPIZA MELODIA
SONG SPARROW
MELOTHRUS ATER
BROWN-HEADED COWBIRD
OREORTYX PICTUS
MOUNTAIN QUAIL
PASSERELLA ILIACA
FOX SPARROW
PHEUCTICUS MELANOCEPHALUS
BLACK-HEADED GROSBEAK
PIPILO ERYTHROPHTHALMUS
RUFOUS-SIDED TOWHEE
SELASPHORUS RUFUS
RUFOUS HUMMINGBIRD
SPIZELLA PASSERINA
CHIPPING SPARROW
ZENAIDA MACROURA
MOURNING DOVE
ZONOTRICHIA ATRICAPILLA
GOLDEN-CROWNED SPARROW
ZONOTRICHIA LEUCOPHRYS
WHITE-CROWNED SPARROW

TROPHIC LEVEL: (2) HERBIVORE
MAMMALS

MICROTUS LONGICAUDUS
LONG-TAILED VOLE

HABITAT: HEADLANDS AND ROCKY ISLANDS

MICROTUS OREGONI
OREGON VOLE
THOMOMYS MONTICOLA
MOUNTAIN POCKET GOPHER

TROPHIC LEVEL: (3) CARNIVORE
HERPETOFAUNA

THAMNOPHIS ORDINOIDES
NORTHWESTERN GARTER SNAKE
THAMNOPHIS SIRTALIS
COMMON GARTER SNAKE

TROPHIC LEVEL: (-)
BIRDS

PANDION HALIAETUS
OSPREY

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

ACCIPITER COOPERII
COOPER'S HAWK
ACCIPITER STRIATUS
SHARP-SHINNED HAWK
AEGOLIUS ACADICUS
SAW-WHET OWL
ASIO OTUS
LONG-EARED OWL
BUBO VIRGINIANUS
GREAT HORNED OWL
BUTEO JAMAICENSIS
RED-TAILED HAWK
CEPPHUS COLUMBA
PIGEON GUILLEMOT
CERORHINCA MONOCERATA
RHINOCEROS AUKLET
FALCO PEREGRINUS
PEREGRINE FALCON
GLAUCIDIOM GNOMA
PYGMY OWL
LUNDA CIRRHATA
TUFTED PUFFIN
OCEANODROMA FURCATA
FORK-TAILED STORM PETREL
OCEANODROMA LEUCORHOA
LEACH'S STORM PETREL
OTUS ASIO
SCREECH OWL
PHALOCROCORAX AURITUS
DOUBLE-CRESTED CORMORANT
PHALOCROCORAX PELAGICUS
PELAGIC CORMORANT
PHALOCROCORAX PENICILLATUS
BRANDT'S CORMORANT
PTYCHORAMPHUS ALEUTICUS
CASSIN'S AUKLET
TYTO ALBA
BARN OWL
URIA AALGE
COMMON MURRE

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

CANIS LATRANS
COYOTE
FELIS CONCOLOR
MOUNTAIN LION
LYNX RUFUS
BOBCAT
MUSTELA ERMINEA
SHORT-TAILED WEASEL
SPILOGALE PUTORIUS
SPOTTED SKUNK
UROCYON CINEROARGENTEUS
GRAY FOX
VULPES FULVA
RED FOX

TROPHIC LEVEL: (5) OMNIVORE
BIRDS

BOMBYCILLA CEDRORUM
CEDAR WAXWING
CORVUS BRACHYRHYNCHOS
COMMON CROW
CORVUS CORVAX
COMMON RAVEN
CYANOCITTA STELLERI
STELLER'S JAY
PERIOSOREUS CANADENSIS
GRAY JAY
PIRANGA LUDOVICIANA
WESTERN TANAGER
STURNUS VULGARIS
STARLING
TURDUS MIGRATORIUS
AMERICAN ROBIN

TROPHIC LEVEL: (5) OMNIVORE
MAMMALS

DIDELPHIS MARSUPIALIS
COMMON OPPOSUM
EURACTOS AMERICANUS
BLACK BEAR
MEPHITIS MEPHITIS
STRIPED SKUNK
PEROMYSCUS MANICULATUS
DEER MOUSE
PROCYON LOTOR
RACCOON
ZAPUS TRINOTATUS
PACIFIC JUMPING MOUSE

TROPHIC LEVEL: (6) PARASITE
VASCULAR PLANTS

BOSCHNIAKIA HOOKERI
SMALL GROUND-CONE

TROPHIC LEVEL: (8) SCAVENGER
BIRDS

CATHARTES AURA
TURKEY VULTURE
HALIAEETUS LEUCOCEPHALIS
BALD EAGLE
LARUS GLAUCESSCENS
GLAUCOUS-WINGED GULL
LARUS OCCIDENTALIS
WESTERN GULL

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

AMBLOPUSA BOREALIS
ROVE BEETLE
DIAULOTA DENSISSIMA
ROVE BEETLE
LIPAROCEPHALUS CORDICOLLIS
ROVE BEETLE
THALASSOTRECHUS BARBARAE NIGRI
GROUND BEETLE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - HERPETOFAUNA

AMBYSTOMA GRACILE
BROWN SALAMANDER
BUFO BOREAS
WESTERN TOAD

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - HERPETOFAUNA

GERRHONOTUS COERULEUS
NORTHERN ALLIGATOR LIZARD
HYLA REGILLA
PACIFIC TREEFROG
PLETHODON DUNNI
DUNNS SALAMANDER
RHYACOTRITON OLYMPICUS
OLYMPIC SALAMANDER
TARICHA GRANULOSA
ROUGH-SKINNED NEWT

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - BIRDS

CATHARUS GUTTATUS
HERMIT THRUSH
CATHARUS USTULATUS
SWAINSON'S THRUSH
CERTHIA FAMILIARIS
BROWN CREEPER
CHAETURA VAUXI
VAUX'S SWIFT
CHAMAEA FASCIATA
WRENTIT
CHORDEILES MINOR
COMMON NIGHTHAWK
COLAPTES AURATUS
COMMON FLICKER
CONTOPUS SORDIDULUS
WESTERN WOOD PEWEE
CYPSELOIDES NIGER
BLACK SWIFT
DENDROICA CORONATA
YELLOW-RUMPED WARBLER
DENDROICA NIGRESCENS
BLACK-THROATED GRAY WARBLER
DENDROICA OCCIDENTALIS
HERMIT WARBLER
DENDROICA PETECHIA
YELLOW WARBLER
DENDROICA TOWNSENDI
TOWNSEND'S WARBLER
DRYOCOPUS PILEATUS
PILEATED WOODPECKER
EMPIDONAX DIFFICILIS
WESTERN FLYCATCHER
EMPIDONAX HAMMONDII
HAMMOND'S FLYCATCHER
EMPIDONAX OBERHOLSERI
DUSKY FLYCATCHER
EMPIDONAX TRAILLII
WILLOW FLYCATCHER

HABITAT: HEADLANDS AND ROCKY ISLANDS

HIRUNDO RUSTICA
 BARN SWALLOW
IRIDOPROCNE BICOLOR
 TREE SWALLOW
IXOREUS NAEVIUS
 VARIED THRUSH
MYADESTES TOWNSENDI
 TOWNSEND'S SOLITAIRE
NUTTALLORNIS BOREALIS
 OLIVE-SIDED FLYCATCHER
OPORORNIS TOLMIEI
 MCGILLIVRAY'S WARBLER
PARUS ATRICAPILLUS
 BLACK-CAPPED CHICKADEE
PARUS RUFESCENS
 CHESTNUT-BACKED CHICKADEE
PETROCHELIDON PYRRHONOTA
 CLIFF SWALLOW
PICOIDES PUBESCENS
 DOWNY WOODPECKER
PICOIDES VILLOSUS
 HAIRY WOODPECKER
PROGNE SUBIS
 PURPLE MARTIN
PSALTRIPARUS MINIMUS
 BUSHTIT
REGULUS CALENDULA
 RUBY-CROWNED KINGLET
REGULUS SATRAPA
 GOLDEN-CROWNED KINGLET
SITTA CANADENSIS
 RED-BRESTED NUTHATCH
SITTA CAROLINENSIS
 WHITE-BRESTED NUTHATCH
SPHYRAPICUS VARIUS
 YELLOW-BELLIED SAPSUCKER
STELGIDOPTERYX RUFICOLLIS
 ROUGH-WINGED SWALLOW
TACHYCINETA THALASSINA
 VIOLET-GREEN SWALLOW
THRYOMANES BEWICKII
 BEWICK'S WREN
TROGLODYTES AEDON
 HOUSE WREN
TROGLODYTES TROGLODYTES
 WINTER WREN
VERMIVORA CELATA
 ORANGE-CROWNED WARBLER
VERMIVORA RUFICAPILLA
 NASHVILLE WARBLER
VIREO GILVUS
 WARBLING VIREO
VIREO HUTTONI
 HUTTON'S VIREO
VIREO SOLITARIUS
 SOLITARY VIREO
WILSONIA PUSILLA
 WILSON'S WARBLER

TROPHIC LEVEL: (9) INVERTEBRATE EATER - MAMMALS

EPTESICUS FUSCUS
 BIG BROWN BAT
MYOTIS LICIFUGUS
 LITTLE BROWN MYOTIS
NEUROTRICHUS GIBBSII
 SHREW-MOLE
SCAPANUS TOWNSENDII
 TOWNSEND'S MOLE
SOREX VAGRANS
 VAGRANT SHREW

HABITAT: HEADLANDS AND ROCKY ISLANDS

TROPHIC LEVEL: (1) PRODUCER

NON-VASCULAR PLANTS

ASTERIONELLA FORMOSA
DIATOM
ASTERIONELLA JAPONICA
DIATOM
ASTERIONELLA KARIANA
DIATOM
BACTERIASTRUM DELICATULUM
DIATOM
CERATIUM
DINOFLAGELLATE
CHAETOCEROS COMPRESSUS
DIATOM
CHAETOCEROS CONVOLUTUS
DIATOM
CHAETOCEROS RADICANS
DIATOM
COCCOLITHOPHORES
COCCOLITHS
DACTYLIOSOLEN MEDDITERRANEUS
DIATOM
FRAGILARIA
DIATOM
GONYAULAX
DINOFLAGELLATE
LEPTOCYLINDRICUS DANICUS
DIATOM
MELOSIRA ISLANDICA
DIATOM
OTHER FLAGELLATES
FLAGELLATES
PERIDINIUM
DINOFLAGELLATE
RHIZOSOLENIA ALATA
DIATOM
RHIZOSOLENIA DELICATULA
DIATOM
RHIZOSOLENIA FRAGILISSIMA
DIATOM
SYNEDRA ULNA
DIATOM
THALASSIONEMA NITZSCHIOIDES
DIATOM

TROPHIC LEVEL: (2) HERBIVORE

INVERTEBRATES

ACARTIA CLAUSI
COPEPOD
ACARTIA DANAE
COPEPOD
ACARTIA LONGIREMIS
COPEPOD
ACARTIA NEGLIGENS
COPEPOD
AETIDEOPSIS PACIFICA
COPEPOD
AETIDEUS ARMATUS
COPEPOD
AETIDEUS PACIFICUS
COPEPOD
AMALLOTHRIX VALIDA
COPEPOD
AMALLOTHRIX VORAK
COPEPOD
ARIETELLUS PLUMIFER
COPEPOD
BATHYCALANUS BRADYI
COPEPOD
BOREOMYSIS
COPEPOD
BOREOMYSIS ROSTRATA
COPEPOD
CALANUS CRISTATUS
COPEPOD
CALANUS FINMARCHICUS
COPEPOD
CALANUS PLUMCHRUS
COPEPOD
CALANUS TENUICORNIS
COPEPOD
CALOCALANUS STYLIREMIS
COPEPOD
CANDACIA BIPINNATA
COPEPOD
CAVOLINA UNCINATA
PTEROPOD
CENTRAUGAPTILUS PORCELLUS
COPEPOD
CENTROPAGES MCMURRICHI
COPEPOD
CHIRUNDINA STREETSI
COPEPOD
CLAUSOCALANUS ARCUICORNIS
COPEPOD
CLAUSOCALANUS PERGENS
COPEPOD
CLIO BALANTIUM
PTEROPOD
CLIONE LIMACINA
PTEROPOD
COROLLA SPECTABILIS
PTEROPOD
CORYCAEUS
COPEPOD
CTENOCALANUS VANUS
COPEPOD
EPILABIDOCERA AMPHITRITES
COPEPOD
EUCALANUS ATTENUATUS
COPEPOD
EUCALANUS BUNGII
COPEPOD
EUCHAETA SPINOSA
COPEPOD
EUCHIRELLA CURTICAUDA
COPEPOD
EUCOPIA
COPEPOD
EVADNE NORMANNI
CLADOCERAN
GAETANUS SECUNDUS
COPEPOD
GAETANUS SIMPLEX
COPEPOD
GADIUS BREVISPINUS
COPEPOD
GAIDIUS VARIABILIS
COPEPOD
GAUSSIA PRINCEPS
COPEPOD

HABITAT: EUPHOTIC PELAGIC

GIGANTOCYPRIS AGASSIZII
OSTRACOD
GNATHOPHAUSIA GIGAS
COPEPOD
GNATHOPHAUSIA INGENS
COPEPOD
HALOPTILUS PSEUDOXYCEPHALUS
COPEPOD
HETERORHABDUS TANNERI
COPEPOD
HETEROSTYLITES LONGICORNIS
COPEPOD
HETEROSTYLITES MAJOR
COPEPOD
LUCICUTIA BICORNUTA
COPEPOD
LUCICUTIA FLAVICORNIS
COPEPOD
METRIDEA LUCENS
COPEPOD
METRIDIA CURTICAUDA
COPEPOD
MICROCALANUS PYGMAEUS
COPEPOD
MICROSETELLA
COPEPOD
MIXTOCALANUS ROBUSTUS
COPEPOD
OITHONA
COPEPOD
ONCAEA CONIFERA
COPEPOD
PARACALANUS PARVUS
COPEPOD
PAREUCHAETA BIROSTRATA
COPEPOD
PAREUCHAETA JAPONICA
COPEPOD
PHAENNA SPINIFERA
COPEPOD
PLEUROMAMMA BOREALIS
COPEPOD
PLEUROMAMMA SCUTULLATA
COPEPOD
PODON LEUCKARTI
CLADOCERAN
PSEUDOCALANUS MINUTUS
COPEPOD
PSEUDOCHIRELLA POLYSPINA
COPEPOD
RACOVITZANUS FORRECTA
COPEPOD
RACOVITZANUS PACIFICA
COPEPOD
RHINCALANUS NASUTUS
COPEPOD
SCAPHOCALANUS MEDIUS
COPEPOD
SCAPHOCALANUS MINUTUS
COPEPOD
SCAPHOCALANUS SUBELONGATUS
COPEPOD
SCOLECITHRICELLA MINOR
COPEPOD
SCOTTOCALANUS SEDATUS
COPEPOD
TORTANIS DISCAUDATUS
COPEPOD
UNDEUCHAETA INTERMEDIA
COPEPOD
UNDEUCHAETA MAJOR
COPEPOD
UNDEUCHAETA PLUMOSA
COPEPOD

TROPHIC LEVEL: (2) HERBIVORE
BIRDS

BRANTA NIGRICANS
BLACK BRANT

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ABRALIOPSIS FELIS
SQUID
AEGINA CITREA
JELLYFISH
AEGINURA GRIMALDII
JELLYFISH
AEQUOREA
JELLYFISH
AGLANTHA DIGITALE
JELLYFISH
ATOLLA VANHOEFFENI
JELLYFISH
ATOLLA WYVELLEI
JELLYFISH
AURELIA LABIATA
JELLYFISH
BARGMANNIA
JELLYFISH
BEROE CUCUMIS
COMB JELLY
BOTRYNEMA BRUCEI
JELLYFISH
CALYCOPSIS NEMATOPHORA
JELLYFISH
CARANARIA JAPONICA
HETEROPOD
CHELOPHYES APPENDICULATA
JELLYFISH
CHELOPHYES MULTIDENTATA
JELLYFISH
CHIROTEUTHIS VERANYI
SQUID
CHUNIPHYES MOSERAE
JELLYFISH
COLOBONEMA SERVICEUM
JELLYFISH
CRANCHIA SCABRA
SQUID
CROSSOTA ALBA
JELLYFISH
CROSSOTA PEDUNCULATA
JELLYFISH
CROSSOTA RUFOBRUNNEA
JELLYFISH
CUNINA OCTONARIA
JELLYFISH
CYANEA
JELLYFISH
EUPHYSORA FURCATA
JELLYFISH
EUTONIA INDICANS
JELLYFISH
GALITEUTHIS ARMATA
SQUID
GONATOPSIS BOREALIS
SQUID
GONATUS ANONYCHUS
SQUID
GONATUS FABRICII
SQUID
GONATUS MAGISTER
SQUID
HALICREAS MINIMUM
JELLYFISH
HALISTAURA CELLULARIA
JELLYFISH
HISTIOTEUTHIS HETEROPSIS
SQUID
LENSIA CONOIDEA
JELLYFISH
LIMACINA HELACINA
PTEROPOD
LOLIGO OPALESCENS
SQUID
MOROTEUTHIS ROBUSTA
SQUID
MUGGIAEA ATLANTICA
JELLYFISH
NANOMIA CARA
JELLYFISH
OCTOPOTEUTHIS SICULA
SQUID
ONYCHOTEUTHIS BANKSI
SQUID
PANTACHOGON HAECKELI
JELLYFISH
PARAPHYLLINA RANSONI
JELLYFISH
PERIPHYLLA PERIPHYLLA
JELLYFISH
PHYSOPHORA HYDROSTATICA
JELLYFISH
PLEUROBRACHIA PILEUS
COMB JELLY
PRAYA DUBIA
JELLYFISH
PRAYA RETICULATA
JELLYFISH
PTEROTRACHEA SCUTUTA
HETEROPOD
SARSIA PRINCEPS
JELLYFISH
SARSIA TUBULOSA
JELLYFISH
SOLMISSUS INCISA
JELLYFISH
SOLMISSUS MARSHALLI
JELLYFISH
SULCULEOLARIA QUADRIVALVIS
JELLYFISH
TAONIUS PALVO
SQUID
VAMPYROTEUTHIS INFERNALIS
SQUID
VELELLA VELELLA
JELLYFISH
VOGTIA SPINOSA
JELLYFISH

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ALOPIAS VULPINUS
THRESHER SHARK
BRACHYISTIUS FRENATUS
KELP PERCH

HABITAT: EUPHOTIC PELAGIC

EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GADUS MACROCEPHALUS
PACIFIC COD
GALEORHINUS ZYOPTERUS
SOUPFIN SHARK
HEXANCHUS GRISEUS
SIXGILL SHARK
HYDROLAGUS COLLIEI
RATFISH
LAMNA DITROPSIS
SALMON SHARK
MERLUCCIUS PRODUCTUS
PACIFIC HAKE
MARONE SAXATILIS
STRIPED BASS
NOTORYNCHUS MACULATUS
SPOTTED COWSHARK OR SEVENGILL
ONCORHYNCHUS GORBUSCHA
PINK SALMON
ONCORHYNCHUS KETA
CHUM SALMON
ONCORHYNCHUS KISUTCH
COHO SALMON
ONCORHYNCHUS TSHAWYTSCHA
CHINOOK SALMON
PRIONACE GLAUCA
BLUE SHARK
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SALMO CLARKI
CUTTHROAT TROUT
SALMO GAIRDNARI
STEELHEAD TROUT
SALVALINUS MALMA
DOLLY VARDEN
SEBASTES ALUTUS
PACIFIC OCEANPERCH
SEBASTES CRAMERI
BLACKMOUTH ROCKFISH OR DARKBLOOD
SEBASTES DIPLOPROA
SPLITNOSE ROCKFISH
SEBASTES FLAVIDUS
YELLOWTAIL ROCKFISH
SEBASTES PINNEGER
CANARY ROCKFISH
SEBASTOLOBUS ALASCANUS
SHORTSPINE ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALIS ACANTHIAS
SPINY DOGFISH
THERAGRA CHALCOGRAMMA
WALLEYE POLLOCK
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY
TRIAKIS SEMIFASCIATA
LEOPARD SHARK

TROPHIC LEVEL: (-)
BIRDS

CEPPHUS COLUMBRA
PIGEON GUILLEMOT
STERNA PARADISAEA
ARCTIC TERN

TROPHIC LEVEL: (3) CARNIVORE
BIRDS

AECHMOPHORUS OCCIDENTALIS
WESTERN GREBE
BRACHYRAMPHUS MARMORATUM
MARBELED MURRELET
CERORHINCA MONOCERATA
RHINOCEROS AUKLET
CLANGULA HYMALIS
OLDSQUAW
DICMEDEA NIGRIPES
BLACK-FOOTED ALBATROSS
FULMARIS GLACIALIS
NORTHERN FULMAR
GAVIA ARCTICA
ARCTIC LOON
GAVIA IMMER
COMMON LOON
GAVIA STELLATA
RED-THROATED LOON
HISTRIONICUS HISTRIONICUS
HARLEQUIN DUCK
LARUS ARGENTATUS
HERRING GULL
LARUS CALIFORNICUS
CALIFORNIA GULL
LARUS CANUS
MEW GULL
LARUS DELAWARENSIS
RING-BILLED GULL
LARUS GLAUCESCENS
GLAUCOUS-WINGED GULL
LARUS HEERMANNI
HEERMANN'S GULL
LARUS OCCIDENTALIS
WESTERN GULL
LARUS PHILADELPHIA
BONAPARTE'S GULL
LARUS THAYERI
THAYERS GULL
LOBIPES LOBATUS
NORTHERN PHALAROPE
LUNDRA CIRRHATA
TUFTED PUFFIN
MELANITTA DEGLANDI
WHITE-WINGED SCOTER
MELANITTA NIGRA
BLACK SCOTER
MELANITTA PERSPICILLATA
SURF SCOTER
MERGUS SERRATOR
RED-BRESTED MERGANSER
OCEANODROMA FURCATA
FORK-TAILED STORM-PETREL
OCEANODROMA LEUCORHOA
LEACH'S STORM-PETREL
PELICANUS OCCIDENTALIS
BROWN PELICAN
PHALACROCORAX AURITUS
DOUBLE-CRESTED CORMORANT
PHALACROCORAX PELAGICUS
PELAGIC CORMORANT
PHALACROCORAX PENICILLATUS
BRANDT'S CORMORANT
PHALAROPUS FULICARIUS
RED PHALAROPE
PODICEPS AURITUS
HORNED GREBE
PODICEPS GRISEGENA
RED-NECKED GREBE
PTYCHORAMPHUS ALEUTICA
CASSIN'S AUKLET
PUFFINUS BULLERI
BULLER'S SHEARWATER
PUFFINUS CARNEIPES
FLESH-FOOTED SHEARWATER
PUFFINUS CREATOPUS
PINK-FOOTED SHEARWATER
PUFFINUS GRISEUS
SOOTY SHEARWATER
PUFFINUS TENUIROSTRIS
SHORT-TAILED SHEARWATER
RISSA TRIDACTYLA
BLACK-LEGGED KITTIWAKE
STERNA CASPIA
CASPIAN TERN
STERNA FORSTERI
FORSTER'S TERN
STERNA HIRUNDO
COMMON TERN
SYNTHLIBORAMPHUS ANTIQUUM
ANCIENT MURRELET
URIA AALGE
COMMON MURRE
XEMA SABINI
SABINE'S GULL

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

BERARDIUS BAIRDI
BAIRD'S BEAKED WHALE
CALLORHINUS URSINUS
NORTHERN FUR SEAL
DELPHINUS DELPHIS
COMMON DOLPHIN
EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
GLOBICEPHALA MACRORHYNCHUS
BLACK FISH OR SHORT-FINNED PIL
GRAMPUS GRISEUS
RISSO'S DOLPHIN
KOGIA BREVICEPS
PYGMY SPERM WHALE
LAGENORHYNCHUS OBLIQUIDENS
PACIFIC STRIPED/WT-SIDED
DOLPHIN
LISSODELPHIS BOREALIS
NORTHERN RIGHT WHALE DOLPHIN
MESOPLODON CARLHUBBSI
HUBB'S BEAKED WHALE
MESOPLODON STEJNEGERI
STEJNEGER'S BEAKED WHALE
MIROUNGA AUGUSTIROSTRIS
NORTHERN ELEPHANT SEAL
ORCINUS ORCA
KILLER WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHOCOENOIDES DALLI
DALL PORPOISE
PHYSETER CATODON
SPERM WHALE
PSEUDORCA CRASSIDENS

HABITAT: EUPHOTIC PELAGIC

FALSE KILLER WHALE
STENELLA COERULEOALBA
STRIPED DOLPHIN/GRAY'S PORPOISE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION
ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

BENTHEUPHAUSIA AMBLYOPS
EUPHASID
EUPHAUSIA PACIFICA
EUPHASID
NEMATOBRACHION FLEXIPES
EUPHASID
NEMATOCELIS DIFFICILIS
EUPHASID
STYLOCHEIRON ABBRVIATUM
EUPHASID
STYLOCHEIRON LONGICORNE
EUPHASID
STYLOCHEIRON MAXIMUM
EUPHASID
TESSARABRACHION OCULATUS
EUPHASID
THYANOESSA GREGARIA
EUPHASID
THYANOESSA INSPINATA
EUPHASID
THYANOESSA LONGIPES
EUPHASID
THYANOESSA PARVA
EUPHASID
THYANOESSA RASCHII
EUPHASID
THYANOESSA SPINIFERA
EUPHASID
THYSANOPODA ACUTIFRONS
EUPHASID
THYSANOPODA CORNUTA
EUPHASID
THYSANOPODA EGREGIA
EUPHASID

TROPHIC LEVEL: (5) OMNIVORE
FISHES

SARDINOPS SAGAX
PACIFIC SARDINE

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (6) PARASITE
BIRDS

CATHARACTA MCCORMICKI
SOUTH POLAR SKUA
STERCORARIUS LONGICAUDIS
LONG-TAILED JAEGER
STERCORARIUS PARASITICUS
PARASITIC JAEGER
STERCORARIUS POMARINUS
POMARINE JAEGER

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

DOLIOLUM
SALP
HELIOSCALPA VIRGULA
SALP
IASIS ZONARIA
SALP
OIKOPLEURA
LARVACEAN
PEGEA CONFOEDERATA
SALP
SALPA FUSIFORMIS
SALP
THALIA DEMOCRATICA
SALP
THETYS VAGINA
SALP

TROPHIC LEVEL: (7) FILTER FEEDER
MAMMALS

BALAENA GLACIALIS
BLACK OR PACIFIC RIGHT WHALE
BALAENOPTERA ACUTOROSTRATA
MINKE WHALE
BALAENOPTERA BOREALIS
SEI WHALE
BALAENOPTERA MUSCULUS
BLUE WHALE
BALAENOPTERA PHYSALUS
FINBACK OR FIN WHALE
MEGAPTERA NOVEANGLIAE
HUMPBACK WHALE

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

ACANTHEPHYRA CURTIROSTRIS
SHRIMP
BENTHEOGENNEMA
SHRIMPBENTHEOGENNEMA BOREALIS
SHRIMP
CYSTISOMA FABRICII
AMPHIPOD
DAIRELLA CALIFORNICA
AMPHIPOD
EUKROHNIA BATHYPELAGICA
ARROW-WORM
EUKROHNIA FOWLERI
ARROW-WORM
EUKROHNIA HAMATA
ARROW-WORM
GENNADUS INCERATUS
SHRIMP
GENNADAS PROPINQUUS
SHRIMP
HYMENODORA FRONTALIS
SHRIMP
HYMENODORA GLACIALIS
SHRIMP
HYMENODORA GRACILIS
SHRIMP
HYPERIA HYSTRIX
AMPHIPOD
HYPEROCHE DEDUSARUM
AMPHIPOD
LANCEOLA LOVENI
AMPHIPOD
LYCAEA PULEX
AMPHIPOD
MENINGODORA MOLLIS
SHRIMP
NINOE GEMMA
POLYCHAETE WORM
NOTOSTOMUS JAPONICUS
SHRIMP
OXYCEPHALUS CLAUSI
AMPHIPOD
PARAPASIPHAE CRISTATA
SHRIMP
PARAPASIPHAE SUICATIFRONS
SHRIMP
PARAPHRONIMA CRASSIPES
AMPHIPOD
PARAPHRONIMA GRACILIS
AMPHIPOD
PARATHERMISTO PACIFICA
AMPHIPOD
PASIPHAEA CHACET
SHRIMP
PASIPHAEA MAGNA
SHRIMP
PASIPHAEA PACIFICA
SHRIMP
PETALIDIUM SUSPIRIOSUM
SHRIMP
PHRONIMA SEDENTARIA
AMPHIPOD
PHRONIMOPSIS SPINIFERA
AMPHIPOD
POEOBIUS MESERES
POLYCHAETE WORM
PRIMNO ABYSSALIS
AMPHIPOD
PRIMNO MACROPA
AMPHIPOD
RHYNCHONOREELLA ANGELINI
POLYCHAETE WORM
SAGITTA BIERII
ARROW-WORM
SAGITTA DECIPIENS
ARROW-WORM
SAGITTA ELEGANS
ARROW-WORM
SAGITTA EUNERITICA
ARROW-WORM
SAGITTA MACROCEPHALA
ARROW-WORM
SAGITTA MAXIMA
ARROW-WORM
SAGITTA MINIMA
ARROW-WORM
SAGITTA SCRIPPSAE
ARROW-WORM
SAGITTA ZETESIOS
ARROW-WORM
SCINA CRASSICORNIS BURMUDENSIS
AMPHIPOD
SEGESTES SIMILIS
SHRIMP
SERGIA TENUIREMIS
SHRIMP
STREETSIA CHALLENGERI
AMPHIPOD
SYSTELLAPSIS BRAUERI
SHRIMP

HABITAT: EUPHOTIC PELAGIC

SYSTELLAPSIS CRISTATA
SHRIMP
TOMOPTERIS CAVALLII
POLYCHAETE WORM
TOMOPTERIS NISSENI
POLYCHAETE WORM
TOMOPTERIS PACIFICA
POLYCHAETE WORM
TRYPHANA MALMI
AMPHIPOD
VIBILIA ARMATA
AMPHIPOD
VIBILIA PROQUINQUA
AMPHIPOD
VIBILIA WOLTERECKI
AMPHIPOD

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
ALOSA SAPIDISSIMA
AMERICAN SHAD
AMMODYTES HEXAPTERUS
PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
REDTAIL SURFPERCH
ATHERINOPS AFFINIS
TOPSMELT
CETORHINUS MAXIMUS
BASKING SHARK
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
COLOLABIS SAIRA
PACIFIC SAURY
CYMATOGASTER AGGREGATA
SHINER PERCH
EMBIOTOCA LATERALIS
STRIPED SEAPERCH
ENGRAULIS MORDAX
NORTHERN ANCHOVY
HYPOMESUS PRETIOSUS
SURFSMELT
MICROGADUS PROXIMUS
PACIFIC TOMCOD
ONCORHYNCHUS NERKA
SOCKEYE SALMON
PSYCHROLUTES PARADOXUS
TADPOLE SCULPIN
SPIRINCHUS STARKSI
NIGHT SURF SMELT
SPIRINCHUS THALEICHTHYS
LONGFIN SMELT
THALEICHTHYS PACIFICUS
EULACHON OR COLUMBIA RIVER SMELT

TROPHIC LEVEL (9) INVERTEBRATE EATER - BIRDS

AYTHIA MARILA
GREATER SCAUP

TROPHIC LEVEL: (2) HERBIVORE INVERTEBRATES

ACARTIA CLAUSI
COPEPOD
ACARTIA DANAE
COPEPOD
ACARTIA LONGERIMIS
COPEPOD
ACARTIA NEGLIGENS
COPEPOD
AEGISTHUS MUCRONATUS HARPACTIC
COPEPOD
AETIDEOPSIS PACIFICA
COPEPOD
AETIDEUS ARMATUS
COPEPOD
AETIDEUS PACIFICUS
COPEPOD
AMALLOTHRIX VALIDA
COPEPOD
AMALLOTHRIX VORAK
COPEPOD
ARIETELLUS PLUMIFER
COPEPOD
BATHYCALANUS BRADYI
COPEPOD
BOREOMYSIS
COPEPOD
BOREOMYSIS ROSTRATA
COPEPOD
CALANUS CRISTATUS
COPEPOD
CALANUS FINMARCHICUS
COPEPOD
CALANUS PLUMCHRUS
COPEPOD
CALANUS TENUICORNIS
COPEPOD
CALOCALANUS STYLIREMIS
COPEPOD
CANDACIA BIPINNATA
COPEPOD
CAVOLINA UNCINATA
PTEROPOD
CENTRAUGAPTILUS PORCELLUS
COPEPOD
CENTROPAGES MCMURRICHI
COPEPOD
CHIRUNDINA STREETSI
COPEPOD
CLAUSOCALANUS ARCUICORNIS
COPEPOD
CLAUSOCALANUS PERGENS
COPEPOD
CLIO BALANTIUM
PTEROPOD
CLIONE LIMOCINA
PTEROPOD
COROLLA SPECTABILIS
PTEROPOD
CORYCHAEUS
COPEPOD
CTENOCALANUS VANUS
COPEPOD
EPILABIDOCERA AMPHITRITES
COPEPOD
EUCALANUS ATTENUATUS
COPEPOD
EUCALANUS BUNGII
COPEPOD
EUCHAETA SPINOSA
COPEPOD
EUCHIRELLA CURTICAUDA
COPEPOD
EUCOPIA
COPEPOD
EVADNE NORMANNI
CLADOCERAN
GAETANUS SECUNDUS
COPEPOD
GAETANUS SIMPLEX
COPEPOD
GAIDIUS BREVISPINUS
COPEPOD
GAIDIUS VARIABILIS
COPEPOD
GAUSSIA PRINCEPS
COPEPOD
GIGANTOCYPRIS AGASSIZII
OSTRACOD
GNATHOPHAUSIA GIGAS
COPEPOD
GNATHOPHAUSIA INGENS
COPEPOD
HALOPTILUS PSEUDOOXYCEPHALUS
COPEPOD
HETERORHABDUS TANNERI
COPEPOD
HETEROSTYLITES LONGICORNIS
COPEPOD
HETEROSTYLITES MAJOR
COPEPOD
LUCICUTIA BICORNUTA
COPEPOD
LUCICUTIA FLAVICORNIS
COPEPOD
METRIDEA LULCENS
COPEPOD
METRIDIA CURTICAUDA
COPEPOD
MICROCALANUS PYGMAEUS
COPEPOD
MICROSETELLA
COPEPOD
MIXTOCALANUS ROBUSTUS
COPEPOD
OITHONA
COPEPOD
ONCAEA CONIFERA
COPEPOD
PARACALANUS PARVUS
COPEPOD
PAREUCHAETA BIROSTRATA
COPEPOD
PAREUCHAETA JAPONICA
COPEPOD
PHAENNA SPINIFERA
COPEPOD
PLEUROMAMMA BOREALIS
COPEPOD
PLEUROMAMMA SCUTULLATA
COPEPOD
PODON LEUCKARTI
CLADOCERAN

HABITAT: DISPHOTIC PELAGIC

PSEUDOCALANUS MINUTHUS
COPEPOD
PSEUDOCHIRELLA POLYSPINA
COPEPOD
RACOVITZANUS FORRECTA
COPEPOD
RACOVITZANUS PACIFICUS
COPEPOD
RHINCALANUS NASUTUS
COPEPOD
SCAPHOCALANUS MEDIUS
COPEPOD
SCAPHOCALANUS MINUTUS
COPEPOD
SCAPHOCALANUS SUBELONGATUS
COPEPOD
SCOLECITHRICELLA MINOR
COPEPOD
SCOTTOCALANUS SEDATUS
COPEPOD
TORTANIS DISCAUDATUS
COPEPOD
UNDEUCHAETA INTERMEDIA
COPEPOD
UNDEUCHAETA MAJOR
COPEPOD
UNDUCHAETA PLUMOSA
COPEPOD

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ABRALIOPSIS FELIS
SQUID
AEGINA CITREA
JELLYFISH
AEGINURA GRIMALDII
JELLYFISH
AEQUOREA
JELLYFISH
AGLANTHA DIGITALE
JELLYFISH
ATOLLA VANHOEFFENI
JELLYFISH
ATOLLA WYVILLEI
JELLYFISH
AURELIA LABIATA
JELLYFISH
BARGMANNIA
JELLYFISH
BEROE CUCUMIS
COMB JELLY
BOTRYNEMA BRUCEI
JELLYFISH
CALYCOPSIS NAMATOPHORA
CARANARIA JAPONICA
HETEROPOD
CHELOPHYES APPENDICULATA
JELLYFISH
CHELOPHYES MULTIDENTATA
JELLYFISH
CHIROTEUTHIS VERANYI
SQUID
CHUNIPHYES MOSERAE
JELLYFISH
COLOBONEMA SERVICEUM
JELLYFISH
CRANCHIA SCABRA
SQUID
CROSSOTA ALBA
JELLYFISH
CROSSOTA PEDUNCULATA
JELLYFISH
CROSSOTA RUFOBRUNNEA
JELLYFISH
CUNINA OCTONARIA
JELLYFISH
CYANEA
JELLYFISH
EUPHYSORA FURCATA
JELLYFISH
EUTONIA INDICANS
JELLYFISH
GALITEUTHIS ARMATA
SQUID
GONATOPSIS BOREALIS
SQUID
GONATUS ANONYCHUS
SQUID
GONATUS FABRICII
SQUID
GONATUS MAGISTER
SQUID
HALICREAS MINIMUM
JELLYFISH
HALISTAURA CELLULARIA
JELLYFISH
HISTIOTEUTHIS HETEROPSIS
SQUID
JAPETELLA HEATHI
OCTOPUS
LENSIA CONOIDEA
JELLYFISH
LIMACINA HELACINA
PTEROPOD
LOLIGO OPALESCENS
SQUID
MOROTEUTHIS ROBUSTA
SQUID
MUGGIAEA ATLANTICA
JELLYFISH
NANOMIA CARA
JELLYFISH
OCTOPOTEUTHIS SICULA
SQUID
OCTOPUS
OCTOPUS
ONYCHOTEUTHIS BANKSI
SQUID
PANTACHOGON HAECKELI
JELLYFISH
PARAPHYLLINA RANSONI
JELLYFISH
PERIPHYLLA PERIPHYLLA
JELLYFISH
PHYSOPHORA HYDROSTATICA
JELLYFISH
PLEUROBRACHIA PILEUS
COMB JELLY
PRAYA DUBIA
JELLYFISH
PRAYA RETICULATA
JELLYFISH
PTEROTRACHEA SCUTUTA
HETEROPOD
ROSSIA PACIFICA
SQUID
SARSIA PRINCEPS
JELLYFISH
SARSIA TUBULOSA
JELLYFISH
SOLMISSUS INCISA
JELLYFISH
SOLMISSUS MARSHALLI
JELLYFISH
SULCULEOLARIA QUADRIVALIS
JELLYFISH
TAONIUS PAVO
SQUID
VAMPYROTEUTHIS INFERNALIS
SQUID
VOGTIA SPINOSA
JELLYFISH

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ALOPIAS VULPINUS
THRESHER SHARK
ANOPLOPOMA FIMBRIA
SABLEFISH
CHAULIODUS MACOUNI
PACIFIC VIPERFISH
CORYPHAENOIDES ACROLEPIS
ROUGHSCALE RATTAIL
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GALEORHINUS ZYOPTERUS
SOUPFIN SHARK
HEXANCHUS GRISEUS
SIXGILL SHARK
HYDROLAGUS COLLIEI
RATFISH
LAMNA DITROPIS
SALMON SHARK
MERLUCCIUS PRODUCTUS
PACIFIC HAKE
NOTORYNCHUS MACULATUS
SPOTTED COWSHARK OR SEVENGILL
ONCORHYNCHUS GORBUSCHA
PINK SALMON
ONCORHYNCHUS KETA
CHUM SALMON
ONCORHYNCHUS KISUTCH
COHO SALMON
ONCORHYNCHUS TSHAWYTSCHA
CHINOOK SALMON
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PRIONACE GLAUCA
BLUE SHARK
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SALMO CLARKI
CUTTHROAT TROUT
SALMO GAIRDNERI
STEELHEAD TROUT
SALVELINUS MALMA
DOLLY VARDEN
SEBASTES ALUTUS
PACIFIC OCEAN PERCH
SEBASTES CRAMERI
BLACKMOUTH ROCKFISH OR
DARKBLOOD

HABITAT: DISPHOTIC PELAGIC

SEBASTES DIPLOPROA
SPLITNOSE ROCKFISH
SEBASTES ELONGATUS
GREENSTRIPED ROCKFISH
SEBASTES FLAVIDUS
YELLOWTAIL ROCKFISH
SEBASTES PINNIGER
CANARY ROCKFISH
SEBASTOLOBUS ALASCANUS
SHORTSPINE ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH
TACTOSTOMA MACROPUS
LONGFIN DRAGONFISH
THERAGRA CHALCOGRAMMA
WALLEYE POLLOCK
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY
TRIAKIS SEMIFASCIATA
LEOPARD SHARK

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

BERARDIUS BAIRDI
BAIRD'S BEAKED WHALE
CALLORHINUS URSINUS
NORTHERN FUR SEAL
KOGIA BREVICEPS
PYGMY SPERM WHALE
LISSODELPHIS BOREALIS
NORTHERN RIGHT WHALE DOLPHIN
MESOPLODON STEJNEGERI
STEJNEGER'S BEAKED WHALE
ORCINUS ORCA
KILLER WHALE
PHOCOENA PHOCOENA
HARBOR PORPOISE
RHOCOENOIDES DALLI
DALL PORPOISE
PHYSETER CATODON
SPERM WHALE
STENELLA COERULEOALBA
STRIPED DOLPHIN/GRAY'S PORPOISE
ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

BENTHEOPAUSIA AMBLYOPS
EUPHASID
EUPHAUSIA PACIFICA
EUPHASID
NEMATOBRACHION FLEXIPES
EUPHASID
NEMATOCELIS DIFFICILIS
EUPHASID
STYLOCHEIRON ABBREVIATUM
EUPHASID
STYLOCHEIRON LONGICORNE
EUPHASID
STYLOCHEIRON MAXIMUM
EUPHASID
TESSARABRACHION OCULATUS
EUPHASID
THYANOESSA GREGARIA
EUPHASID
THYANOESSA INSPINATA
EUPHASID
THYANOESSA LONGIPES
EUPHASID
THYANOESSA PARVA
EUPHASID
THYANOESSA RASCHII
EUPHASID
THYANOESSA SPINIFERA EUPHASID
THYSANOPODA ACUTIFRONS
EUPHASID
THYSANOPODA CORNUTA
EUPHASID
THYSANOPODA EGREGIA
EUPHASID

TROPHIC LEVEL: (5) OMNIVORE
FISHES

SARDINOPS SAGAX
PACIFIC SARDINE

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

DOLIOLUM
SALP
HELIOSCALPA VIRGULA
SALP
IASIS ZONARIA
SALP
OIKOPLEURA
LARVACEAN
PEGEA CONFOEDERATA
SALP
SALPA FUSIFORMIS
SALP
THALIA DEMOCRATICA
SALP
THETYS VAGINA
SALP

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

ACANTHEPHYRA CURTIROSTRIS
SHRIMP
BENTHEOGENNEMA
SHRIMP
BENTHEOGENNEMA BOREALIS
SHRIMP
CYSTISOMA FABRICII
AMPHIPOD
DAIRELLA CALIFORNICA
AMPHIPOD
EUKROHNIA BATHYPELAGICA
ARROW-WORM
EUKROHNIA FOWLERI
ARROW-WORM
EUKROHNIA HAMATA
ARROW-WORM
GENNADAS INCERTUS
SHRIMP
GENNADAS PROPINQUUS
SHRIMP
HYMENODORA FRONTALIS
SHRIMP
HYMENODORA GLACIALIS
SHRIMP
HYMENODORA GRACILIS
SHRIMP
HYPERIA HYSTRIX
AMPHIPOD
HYPEROCHE DEDUSARUM
AMPHIPOD
LANCEOLA LOVENI
AMPHIPOD
LYCAEA PULEX
AMPHIPOD
MENINGODORA MOLLIS
SHRIMP
NINOE GEMMA
POLYCHAETE WORM
NOTOSTOMUS JAPONICUS
SHRIMP
OXYCEPHALUS CLAUSI
AMPHIPOD
PANDALUS JORDANI
OCEAN PINK SHRIMP
PARAPASIPHAE CRISTATA
SHRIMP
PARAPISIPHAE SUICATIFRONS
SHRIMP
PARAPHRONIMA CRASSIPES
AMPHIPOD
PARAPHRONIMA GRACILIS
AMPHIPOD
PARATHERMISTO PACIFICA
AMPHIPOD
PASIPHAEA CHACEI
SHRIMP
PASIPHAEA MAGNA
SHRIMP
PASIPHAEA PACIFICA
SHRIMP
PETALIDIUM SUSPIRIOSUM
SHRIMP
PHRONIMA SEDENTARIA
AMPHIPOD
PHRONIMOPSIS SPINIFERA
AMPHIPOD
POEOBIUS MESERES
POLYCHAETE WORM
PRIMNO ABYSSALIS
AMPHIPOD
PRIMNO MACROPA
AMPHIPOD
RHYNCHONEREELLA ANGELINI
POLYCHAETE WORM
SAGITTA BIERII
ARROW-WORM
SAGITTA DECIPIENS
ARROW-WORM
SAGITTA ELEGANS
ARROW-WORM
SAGITTA EUNERITICA
ARROW-WORM
SAGITTA MACROCEPHALA
ARROW-WORM
SAGITTA MAXIMA
ARROW-WORM
SAGITTA MINIMA

HABITAT: DISPHOTIC PELAGIC

ARROW-WORM
SAGITTA SCRIPPSAE
ARROW-WORM
SAGITTA ZETESIOS
ARROW-WORM
SCINA CRASSICORNIS BURMUDENSIS
AMPHIPOD
SERGESTES SIMILIS
SHRIMP
SERGIA TENUIREMIS
SHRIMP
STREETSIA CHALLENGERI
AMPHIPOD
SYSTELLASPIS BRAUERI
SHRIMP
SYSTELLASPIS CRISTATA
SHRIMP
TOMOPTERIS CAVALLII
POLYCHAETE WORM
TOMOPTERIS NISSENI
POLYCHAETE WORM
TOMOPTERIS PACIFICA
POLYCHAETE WORM
TRYPHANA MALMI
AMPHIPOD
VIBILIA ARMATA
AMPHIPOD
VIBILIA PROQUINQUA
AMPHIPOD
VIBILIA WOLTERECKI
AMPHIPOD

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

ALLOSMERUS ELONGATUS
WHITEBAIT SMELT
ALOSA SAPIDISSIMA
AMERICAN SHAD
ATHERINOPS AFFINIS
TOPSMELT
CERATOSCOPELUS TOWNSENDI
DOGTOOTH LAMPFISH
CETORHINUS MAXIMUS
BASKING SHARK
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
COLOLABIS SAIRA
PACIFIC SAURY
DIAPHUS THETA
CALIFORNIA HEADLIGHTFISH
ENGRAULIS MORDAX
NORTHERN ANCHOVY
ONCORHYNCHUS NERKA
SOCKEYE SALMON
SPIRINCHUS STARKSI
NIGHT SURF SMELT
SPIRINCHUS THALEICHTHYS
LONGFIN SMELT
STENOBRACHIUS LEUCOPSARUS
NORTHERN LAMPFISH
TARLETONBEANIA CRENULARIS
BLUE LANTERNFISH
THALEICHTHYS PACIFICUS
EULACHON OR COLUMBIA R. SMELT

TROPHIC LEVEL: (2) HERBIVORE INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET
STRONGYLOCENTROTUS FRANSISCANU
GIANT RED URCHIN
STRONGYLOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ARCHIDORIS MONTEREYENSIS
NUDIBRANCH
ARMINA CALIFORNICA
NUDIBRANCH
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SNAIL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON
LISCHKIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SCYRA ACUTIFRONS
MASKING CRAB
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATONUM
SNAIL
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE FISHES

ANARRHICHTHYS OCELLATUS
WOLF EEL
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETIS STOUTI
PACIFIC HAGFISH
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
OPHIODON ELONGATUS
LINGCOD

HABITAT: ROCKY NON-VEGETATED BENTHIC

RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES CAURINUS
COPPER ROCKFISH
SEBASTES MALIGER
QUILLBACK ROCKFISH
SEBASTES MYSTINUS
BLUE ROCKFISH
SEBASTES RUBERRIMUS
YELLOWEYE ROCKFISH
SEBASTODES MELANOPS
BLACK SEABASS
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
MESOPLODON STEJNEGERI
STEJNEGER'S BEAKED WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION
ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
STRONGYLOCENTROTUS ECHINOIDES
SEA URCHIN
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
ONCOSOECIA
BRYOZOAN
PSEUDARCHASTER PARELLI ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
BALANUS CRENATUS
BARNACLE
BALANUS HESPERIUS
BARNACLE
BEGULA FLABELLATA
BRYOZOAN
CABEREA ELLISI
BRYOZOAN
CALLAPORA CORNICULIFERA
BRYOZOAN
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CELLARIA DIFFUSA
BRYOZOAN
CELLARIA MANDIBULATA
BRYOZOAN
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S SCALLOP
CLINOCARDIUM NUTALLI
BASKET COCKLE
HALOCYNTHIA IGABOJA
SEA SQUIRT
LAGENIPORA PUNCTULATA
BRYOZOAN
LAQUEUS CALIFORNICUS
LAMP SHELL
MYRIOZOUM COARCTATUM
BRYOZOAN
MYRIOZOUM TENUE
BRYOZOAN
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
SCALPELLUM
BARNACLE
SOLEMYA AGASSIZI
AWNING CLAM
TEREBRATALIA TRANSVERSA
LAMP SHELL
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

CANCER MAGISTER
DUNGENESS CRAB
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB
PHYLLOLITHOIDES PAPILLOSUS
PAPILLA CRAB

TROPHIC LEVEL: (9) INVERTEBRATE EATER - INVERTEBRATES

ARCTONOE PULCHRA
POLYCHAETE
BALANOPHYLLA ELEGANS
STONY CORAL
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
DAIRELLA CALIFORNICA
AMPHIPOD
ENIPO GRACILIS
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS DANAE
DOCK SHRIMP
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PARAGORGIA ARBOREA
SOFT CORAL
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

AGONOPSIS EMMELANE
NORTHERN SPEARNOSE POACHER
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
LEPIDOPSETTA BILINEATA
ROCK SOLE
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN

HABITAT: ROCKY NON-VEGETATED BENTHIC

RADULINUS ASPRELLUS
SLIM SCULPIN

TROPHIC LEVEL (-)
INVERTEBRATES

ANCISTROLEPSIS
SNAIL
COLUS HALIDONUS
SNAIL

TROPHIC LEVEL: (Q)
INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
ALLOPORA VERRILLI
HYDROCORAL
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
HIPPASTERIA SPINOSA
SEA STAR
LAFOEA ADNATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
SNAIL
PLUMULARIA ALICIA
HYDROID
PUGETTIA ARACILLIS
KELP CRAB
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET

TROPHIC LEVEL: (2) HERBIVORE
FISHES

ASTEROTHECA PENTACANTHUS
BIGEYE POACHER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CADULUS STEARNSII
TOOTH SHELL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SHELL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON
LISCHKEIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NATICA CLAUSA
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLINICES LEWISII
MOON SNAIL
POLINICES PALLIDUS
MOON SNAIL
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
THRISSACANTHIAS PENCILATUS
SEA STAR
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ANOPLOPOMA FIMBRIA
SABLEFISH
ATHERESTHES STOMIAS
TURBOT OR ARROWTOOTH FLOUNDER
BROSMOPHYCIS MARGINATA
RED BROTULA
CHITONOTUS PUGETENSIS
ROUGHBACK SCULPIN
CITHARICHTHYS SORDIDUS
PACIFIC SANDDAB
OASYCOTTUS SETIGER
SPINYHEAD SCULPIN
DELOLEPIS GIGANTEA
GIANT WRYMOUTH

HABITAT: MUD NON-VEGETATED BENTHIC

EOPSETTA JORDANI
PETRALE SOLE
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GADUS MACROCEPHALUS
PACIFIC COD
GLYPTOCEPHALUS ZACHIRUS
REX SOLE
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HIPPOGLOSSOIDES ELASSODON
FLATHEAD SOLE
HIPPOGLOSSUS STENCLEPIS
PACIFIC HALIBUT
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
ISOPSETTA ISOLEPIS
BUTTER SOLE
LYCODOPSIS PACIFICA
BALCKBELLY EELPOUT
LYOPSETTA EXILIS
SLENDER SOLE
MICROSTOMUS PACIFICUS
DOVER SOLE
OPHIODON ELONGATUS
LINGCOD
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES CAURINUS
COPPER ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
AMPHIOPLUS STRONGYLOPLAX
BRITTLE STAR
APHIURA SARSII
BRITTLE STAR
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
LEPTOSYNAPTA
SEA CUCUMBER
LISTRIOLOBUS HEXAMYOTUS
ECHIURID WORM
LOPHOLITHOIDES FORAMINATUS
BOX CRAB
LOPHOLITHOIDES MANDTII
PUGET SOUND KING CRAB
LUMBRINERIS BICIRRATA
POLYCHAETE
LUMBRINERIS SIMILABRIS
POLYCHAETE
MACOMA ALCAREA
CHALKY CLAM
MAGELONA JAPONICA
POLYCHAETE
MOLPADIA INTERMEDIA
SEA CUCUMBER
OPHIOPHOLIS BAKERI
BRITTLE STAR
OPHIURA LUTKENI
BRITTLE STAR
PARASTICHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
TELLINA BUTTONI
BUTTON'S TELLIN CLAM
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
PSEUDARCHASTER PARELII ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY
LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
AXINOPSIDA SERICATA
CLAM
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CARDIOMYA PLANETICA
CLAM
CARDITA STEARNSII
CLAM
CARDITA VENTICOSA
CLAM
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S CLAM
CLINOCARDIUM NUTALLI
BASKET COCKLE
COMPSOMYAX SUBDIAPHANA
CLAM
CRENELLA COLUMBIANA
CLAM
EUPLEXAURA MARKI
SEA PEN
HUXLEYIA MUNITA
CLAM
LIEOPTULUS QUADRANGULARIS
SEA PEN
LYONSIA STRIATA
CLAM
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
NUCULA TENUIS
CLAM
NUCULANA AUSTINI
CLAM
NUCULANA PERNULS
CLAM
PATINOPECTIN CAURINUS
WEATHERVANE SCALLOP
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
PSEPHIDIA LORDI
CLAM
SAXICAVA ARCTICA
ARCTIC SAXICLAVE CLAM
SCLEROPTILUM
SEA PEN
SOLEMYA AGASSIZI
AWNING CLAM
STYLATULA ELONGATA
SEA PEN
THRACIA CURTA
CLAM
THRACIA TRAPEZOIDES
CLAM
THYASIRA BARBARENSIS
CLAM
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

HABITAT: MUD NON-VEGETATED BENTHIC

CANCER MAGISTER
DUNGENESS CRAB
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB

TROPHIC LEVEL: (9) INVERTEBRATE EATER - INVERTEBRATES

APHRODITE JAPONICA
POLYCHAETE
ARCTONOE PULCHRA
POLYCHAETE
CARINOMELLA LACTEA
RIBBON WORM
CEREBRATULUS CALIFORNIENSIS
RIBBON WORM
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
ENIPO GRACILIS
POLYCHAETE
GLYCERA AMERICANA
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CACOIDES
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS CORNUTA
POLYCHAETE
NEPHTYS FERRUGINEA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

AGONOPSIS EMMELANE
NORTHERN SPEARNOSE POACHER
AGONUS ACIPENSERINUS
STURGEON POACHER
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN
LIPARIS PULCHELLUS
SHOWY SNAILFISH
LUMPENUS SAGITTA
SNAKE PRICKLEBACK
LYCONECTES ALEUTENSIS
DWARF WRYMOUTH
MICROGADUS PROXIMUS
PACIFIC TOMCOD
POROCLINIS ROTHROCKI
WHITEBARRED BLENNY
PSYCHROLUTES PARADOXUS
TADPOLE SCULPIN
RADULINUS ASPRELLUS
SLIM SCULPIN
XENERETMUS LATIFRONS
BLACKTIP POACHER

TROPHIC LEVEL: (-) INVERTEBRATES

ANCISTROLEPSIS
SNAIL
COLUS HALIDONUS
SNAIL

TROPHIC LEVEL: (Q) INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
HIPPASTERIA SPINOSA
SEA STAR
LAFOEA ADHATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
SNAIL
PLUMULARIA ALICIA
HYDROID
RATHBUNASTER CALIFORNICUS
SEA STAR
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

TROPHIC LEVEL: (Q) FISHES

PLEURONICHTHYS COENOSUS
C-O SOLE

HABITAT: MUD NON-VEGETATED BENTHIC

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET

TROPHIC LEVEL: (2) HERBIVORE
FISHES

ASTEROTHECA PENTACANTHUS
BIGEYE POACHER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CADULUS STEARNSII
TOOTH SHELL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SHELL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON

HABITAT: MUDDY SAND NON-VEGETATED BENTHIC

LISCHKEIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NATICA CLAUSA
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLINICES LEWISII
MOON SNAIL
POLINICES PALLIDUS
MOON SNAIL
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
THRISSACANTHIAS PENCILATUS
SEA STAR
TRITONIA
NUDIBRANCH
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ACIPENSER TRANSMONTANUS
WHITE STURGEON
ATHERESTHES STOMIAS
TURBOT OR ARROWTOOTH FLOUNDER
CHITONOTUS PUGETENSIS
ROUGHBACK SCULPIN
CITHARICHTHYS SORDIDUS
PACIFIC SANDDAB
CITHARICHTHYS STIGMAEUS
SPECKLED SANDDAB
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
DELOLEPIS GIGANTEA
GIANT WRYMOUTH
EOPSETTA JORDANI
PETRALE SOLE
EPTATRETUS DEANI
BLACK HAGFISH
EPTATRETUS STOUTI
PACIFIC HAGFISH
GADUS MACROCEPHALUS
PACIFIC COD
GLYPTOCEPHALUS ZACHIRUS
REX SOLE
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HIPPOGLOSSOIDES ELASSODON
FLATHEAD SOLE
HIPPOGLOSSUS STENCLEPIS
PACIFIC HALIBUT
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
ISOPSETTA ISOLEPIS
BUTTER SOLE
LYOPSETTA EXILIS
SLENDER SOLE
MICROSTOMUS PACIFICUS
DOVER SOLE
OPHIODON ELONGATUS
LINGCOD
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SEBASTES CAURINUS
COPPER ROCKFISH
SOMNIOSUS PACIFICUS
PACIFIC SLEEPER SHARK
SQUALUS ACANTHIAS
SPINY DOGFISH
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
AMPHIOPLUS STRONGYLOPLAX
BRITTLE STAR
APHIURA SARSII
BRITTLE STAR
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
DENDRASTER EXCENTRICUS
SAND DOLLAR
LEPTOSYNAPTA
SEA CUCUMBER
LISTRIOLOBUS HEXAMYOTUS
ECHIURID WORM
LOPHOLITHOIDES FORAMINATUS
BOX CRAB
LOPHOLITHOIDES MANDTII
PUGET SOUND KING CRAB
LUMBRINERIS BICIRRATA
POLYCHAETE
LUMBRINERIS SIMILABRIS
POLYCHAETE
MACOMA ALCAREA
CHALKY CLAM
MAGELONA JAPONICA
POLYCHAETE
MOLPADIA INTERMEDIA
SEA CUCUMBER
OPHIOPHOLIS BAKERI
BRITTLE STAR
OPHIURA LUTKENI
BRITTLE STAR
PARASTICHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
TELLINA BUTTONI
BUTTON'S TELLIN CLAM
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
PSEUDARCHASTER PARELII ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

ENTOSPHENUS TRIDENTATUS
PACIFIC LAMPREY

HABITAT: MUDDY SAND NON-VEGETATED BENTHIC

LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
AXINOPSIDA SERICATA
CLAM
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CARDIOMYA PLANETICA
CLAM
CARDITA STEARNSII
CLAM
CARDITA VENTICOSA
CLAM
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S CLAM
CLINOCARDIUM NUTALLI
BASKET COCKLE
COMPSOMYAX SUBDIAPHANA
CLAM
CRENELLA COLUMBIANA
CLAM
EUPLEXAURA MARKI
SEA PEN
HUXLEYIA MUNITA
CLAM
LIEOPTULUS QUADRANGULARIS
SEA PEN
LYONSIA STRIATA
CLAM
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
NUCULA TENUIS
CLAM
NUCULANA AUSTINI
CLAM
NUCULANA PERMULS
CLAM
PATINOPECTIN CAURINUS
WEATHERVANE SCALLOP
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
PSEPHIDIA LORDI
CLAM
PSOLUS SQUAMATUS
SEA CUCUMBER
SAXICAVA ARCTICA
ARCTIC SAXICLAVE CLAM
SCLEROPTILUM
SEA PEN
SOLEMYA AGASSIZI
AWNING CLAM
STYLATULA ELONGATA
SEA PEN
THRACIA CURTA
CLAM
THRACIA TRAPEZOIDES
CLAM
THYASIRA BARBARENSIS
CLAM
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM

YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

CANCER MAGISTER
DUNGENESS CRAB
OLIVELLA
OLIVE SNAIL
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

APHRODITE JAPONICA
POLYCHAETE
ARCTONOE PULCHRA
POLYCHAETE
CARINOMELLA LACTEA
RIBBON WORM
CEREBRATULUS CALIFORNIENSIS
RIBBON WORM
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
ENIPO GRACILIS
POLYCHAETE
GLYCERA AMERICANA
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CACOIDES
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS CORNUTA
POLYCHAETE
NEPHTYS FERRUGINEA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LAMELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - FISHES

AGONOPSIS EMMELANE
NORTHERN SPEARNOSE POACHER
AGONUS ACIPENSERINUS
STURGEON POACHER
CLUPEA HARENGUS PALLASI
PACIFIC HERRING
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN
LIPARIS PULCHELLUS
SHOWY SNAILFISH
LUMPENUS SAGITTA
SNAKE PRICKLEBACK
LYCONECTES ALEUTENSIS
DWARF WRYMOUTH
MICROGADUS PROXIMUS
PACIFIC TOMCOD
POROCLINIS ROTHROCKI
WHITEBARRED BLENNY
PSYCHROLUTES PARADOXUS
TADPOLE SCULPIN
RADULINUS ASPRELLUS
SLIM SCULPIN
XENERETMUS LATIFRONS
BLACKTIP POACHER

TROPHIC LEVEL: (-)
INVERTEBRATES

ANCISTROLEPSIS
SNAIL
COLUS HALIDONUS
SNAIL

TROPHIC LEVEL: (Q)
INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
HIPPASTERIA SPINOSA
SEA STAR
LAFOEA ADHATA
HYDROID
LAFOEA DUMOSA

HABITAT: MUDDY SAND NON-VEGETATED BENTHIC

HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
SNAIL
PLUMULARIA ALICIA
HYDROID
RATHBUNASTER CALIFORNICUS
SEA STAR
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

TROPHIC LEVEL: (Q)
FISHES

PLEURONICHTHYS COENOSUS
C-O SOLE

HABITAT: SAND NON-VEGETATED BENTHIC

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET

TROPHIC LEVEL: (2) HERBIVORE
FISHES

ASTEROTHECA PENTACANTHUS
BIGEYE POACHER

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES ABARBAREA
SNAIL
ANTIPLANES PERVERSA
SNAIL
ANTIPLANES VINOSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BENTHOCTOPUS
OCTOPUS
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CADULUS STEARNSII
TOOTH SHELL
CALLIOSTOMA ANNULATUM
SNAIL
CHIONECTES BAIRDI
TANNER CRAB
CHIONECTES OPILIO
TANNER CRAB
CHIONECTES TANNERI
TANNER CRAB
COLUS ROSEUS
SNAIL
COLUS SERVINUS
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DENTALIUM
TOOTH SHELL
DERMASTERIAS IMBRICATA
LEATHER STAR
EPITONIUM INDIANORUM
SNAIL
EVASTERIAS TROSCHELI
SEA STAR
FUSITRITION OREGONENSIS
OREGON TRITON
HENRICIA LEVISCULA
BLOOD STAR
ISCHNOCHITON
CHITON
LEPIDAZONA
CHITON
LEPIDAZONA GOLISCHI
CHITON
LEPTOCHITON
CHITON
LISCHKEIA CIDARIS
SNAIL
LUIDIA FOLIATA
SAND STAR
METRIDIUM FIMBRIATUM
SEA ANEMONE
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
NATICA CLAUSA
SNAIL
NEPTUNEA LYRATA
SNAIL
OCTOPUS DOLFEINI
OCTOPUS
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
POLINICES LEWISII
MOON SNAIL
POLINICES PALLIDUS
MOON SNAIL
POLYPUS
OCTOPUS
PTERASTER TESSELATUS ARCUATUS
SLIME STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
ROSSIA PACIFICA
SQUID
SOLASTER DAWSONI
MORNING SUN STAR
SOLASTER STIMPSONI
SUN STAR
STYLASTERIAL FORRERI
SEA STAR
TACHYRHYNCHUS LACTEOLUM
SNAIL
TACHYRHYNCHUS PRATOMUM
SNAIL
THRISSACANTHIAS PENCILATUS
SEA STAR
TROPHON TRIPHERUS
SNAIL

TROPHIC LEVEL: (3) CARNIVORE
FISHES

ACIPENSER TRANSMONTANUS
WHITE STURGEON
BROSMOPHYCIS MARGINATA
RED BROTULA
CHITONOTUS PUGETENSIS
ROUGHBACK SCULPIN
CITHARICHTHYS SORDIDUS
PACIFIC SANDDAB
CITHARICHTHYS STIGMAEUS
SPECKLED SANDDAB
DASYATIS DIPTERURA
DIAMOND STINGRAY
DASYCOTTUS SETIGER
SPINYHEAD SCULPIN
EOPSETTA JORDANI
PETRALE SOLE
GADUS MACROCEPHALUS
PACIFIC COD
GLYPTOCEPHALUS ZACHIRUS
REX SOLE
HEXAGRAMMOS DECAGRAMMUS
KELP GREENLING
HEXAGRAMMOS STELLERI
WHITESPOTTED GREENLING
HEXANCHUS GRISEUS
SIXGILL SHARK
HIPPOGLOSSOIDES ELASSODON
FLATHEAD SOLE
HIPPOGLOSSUS STENCLEPIS
PACIFIC HALIBUT
HYDROLAGUS COLLIEI
RATFISH
ICELINUS FILAMENTOSUS
THREADFIN SCULPIN
ISOPSETTA ISOLEPIS
BUTTER SOLE
LYOPSETTA EXILIS
SLENDER SOLE
MICROSTOMUS PACIFICUS
DOVER SOLE
OPHIODON ELONGATUS
LINGCOD
PAROPHRYS VETULUS
ENGLISH SOLE
PLATICHTHYS STELLATUS
STARRY FLOUNDER
PORICHTHYS NOTATUS
PLAINFIN MIDSHIPMEN
PSETTICHTHYS MELANOSTICTUS
SAND SOLE
RAJA BINOCULATA
BIG SKATE
RAJA KINCAIDI
BLACK SKATE
RAJA RHINA
LONGNOSE SKATE
RAJA STELLULATA
STARRY SKATE
SCORPAENICHTHYS MARMORATUS
CABEZON
SQUALUS ACANTHIAS
SPINY DOGFISH
TORPEDO CALIFORNICA
PACIFIC ELECTRIC RAY
TRIAKIS SEMIFASCIATA
LEOPARD SHARK

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

EUMETOPIAS JUBATUS
NORTHERN OR STELLAR SEA LION
KOGIA BREVICEPS
PYGMY SPERM WHALE
PHOCA VITULINA
HARBOR SEAL
PHOCOENA PHOCOENA
HARBOR PORPOISE
PHYSETER CATODON
SPERM WHALE
ZALOPHUS CALIFORNIANUS
CALIFORNIA SEA LION

HABITAT: SAND NON-VEGETATED BENTHIC

ZIPHEUS CAVIROSTRIS
CUVIER'S OR GOOSE BEAKED WHALE

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

ALLOCENTROTUS FRAGILIS
SEA URCHIN
AMPHIOPLUS STRONGYLOPLAX
BRITTLE STAR
APHIURA SARSII
BRITTLE STAR
BANKIA SETACEA
TEREDO
BRISASTER LATIFRONS
SEA URCHIN
DENDRASTER EXCENTRICUS
SAND DOLLAR
LOPHOLITHOIDES FORAMINATUS
BOX CRAB
LOPHOLITHOIDES MANDTII
PUGET SOUND KING CRAB
LUMBRINERIS BICIRRATA
POLYCHAETE
LUMBRINERIS SIMILABRIS
POLYCHAETE
MACOMA ALCAREA
CHALKY CLAM
MAGELONA JAPONICA
POLYCHAETE
MOLPADIA INTERMEDIA
SEA CUCUMBER
OPHIOPHOLIS BAKERI
BRITTLE STAR
OPHIURA LUTKENI
BRITTLE STAR
PARASTICHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
PENTAMERA PSEUDOCALCIGERA
SEA CUCUMBER
STRONGYLOCENTROTUS ECHINOIDES
SEA URCHIN
TELLINA BUTTONI
BUTTON'S TELLIN CLAM
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
GORGONOCEPHALUS CARYI
BASKET STAR
OENOPOTA
SNAIL
PSEUDARCHASTER PARELII ALASCEN
SEA STAR

TROPHIC LEVEL: (6) PARASITE
FISHES

LAMPETRA AYRESI
RIVER LAMPREY

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

ACILIA CASTRENSIS
DIVARICATE NUT CLAM
AXINOPSIDA SERICATA
CLAM
CARDIOMYA OLDROYDI
CUSPIDARIA CLAM
CARDIOMYA PLANETICA
CLAM
CARDITA STEARNSII
CLAM
CARDITA VENTICOSA
CLAM
CHLAMYS HASTATUS HERICIUS
PACIFIC PEAR SCALLOP
CHLAMYS HINDSI
HIND'S CLAM
CLINOCARDIUM NUTALLI
BASKET COCKLE
COMPSOMYAX SUBDIAPHANA
CLAM
CRENELLA COLUMBIANA
CLAM
EUPLEXAURA MARKI
SEA PEN
HUXLEYIA MUNITA
CLAM
LIEOPTULUS QUADRANGULARIS
SEA PEN
LYONSIA STRIATA
CLAM
NEMOCARDIUM CENTRIFILOSUM
HUNDRED-LINED COCKLE
NUCULA TENUIS
CLAM
NUCULANA AUSTINI
CLAM
NUCULANA PERNULS
CLAM
PATINOPECTIN CAURINUS
WEATHERVANE SCALLOP
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
PROTOTHACA STAMINEA
ROCK COCKLE
PSEPHIDIA LORDI
CLAM
PSOLUS SQUAMATUS
SEA CUCUMBER
SAXICAVA ARCTICA
ARCTIC SAXICLAVE CLAM
SCLEROPTILUM
SEA PEN
SILIQUA PATULA
PACIFIC RAZOR CLAM
SILIQUA SLOATI
SLOAT'S RAZOR CLAM
SOLEMYA AGASSIZI
AWNING CLAM
STYLATULA ELONGATA
SEA PEN
THRACIA CURTA
CLAM
THRACIA TRAPEZOIDES
CLAM
THYASIRA BARBARENSIS
CLAM
VENERICARDIA VENTRICOSA
STOUT CARDITA CLAM
YOLDIA LIMATULA GAIRDERI
FILE YOLDIA CLAM

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

CANCER MAGISTER
DUNGENESS CRAB
OLIVELLA
OLIVE SNAIL
OLIVELLA BIPLICATA
PURPLE OLIVE SNAIL
PAGURISTES TURGIDUS
HERMIT CRAB
PAGURUS ALEUTICUS
HERMIT CRAB
PAGURUS OCHOTENSIS
HERMIT CRAB
PAGURUS TANNERI
HERMIT CRAB

TROPHIC LEVEL: (9) INVERTEBRATE
EATER - INVERTEBRATES

APHRODITE JAPONICA
POLYCHAETE
ARCTONOE PULCHRA
POLYCHAETE
CARINOMELLA LACTEA
RIBBON WORM
CEREBRATULUS CALIFORNIENSIS
RIBBON WORM
CHORILLIA LONGIPES
SHRIMP
CRANGON COMMUNIS
SHRIMP
CRANGON FRANCISORUM
SHRIMP
ENIPO GRACILIS
POLYCHAETE
GLYCERA AMERICANA
POLYCHAETE
HAPLOSCOLOPUOS ELONGATUS
POLYCHAETE
MAGELONA PAPILLICORNIS
POLYCHAETE
MAGELONA PITELKAI
POLYCHAETE
NEPHTYS CACOIDES
POLYCHAETE
NEPHTYS CILIATA
POLYCHAETE
NEPHTYS CORNUTA
POLYCHAETE
NEPHTYS FERRUGINEA
POLYCHAETE
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS DANAE
DOCK SHRIMP
PANDALUS JORDANI
OCEAN PINK SHRIMP
PANDALUS PLATYCEROS
SPOT SHRIMP
PISTA CRISTATA
POLYCHAETE
PISTA FIMBRIATA
POLYCHAETE
PRAXILELLA GRACILIS
POLYCHAETE
SPIRONTOCARIS LANELLICORNIS
SHRIMP
SPIRONTOCARUS HOLMESI
SHRIMP

HABITAT: SAND NON-VEGETATED BENTHIC

TROPHIC LEVEL: (9) INVERTEBRATE EATER - FISHES

AGONOPSIS EMMELANE
 NORTHERN SPEARNOSE POACHER
AGONUS ACIPENSERINUS
 STURGEON POACHER
AMMODYTES HEXAPTERUS
 PACIFIC SAND LANCE
AMPHISTICHUS RHODOTERUS
 REDTAIL SURFPERCH
CLUPEA HARENGUS PALLASI
 PACIFIC HERRING
CYMATOGASTER AGGREGATA
 SHINER PERCH
EMBIOTOCA LATERALIS
 STRIPED SEAPERCH
LEPTOCOTTUS ARMATUS
 PACIFIC STAGHORN SCULPIN
LIPARIS PULCHELLUS
 SHOWY SNAILFISH
MICROGADUS PROXIMUS
 PACIFIC TOMCOD
POROCLINIS ROTHROCKI
 WHITEBARRED BLENNY
PSYCHROLUTES PARADOXUS
 TADPOLE SCULPIN
RADULINUS ASPRELLUS
 SLIM SCULPIN
XENERETMUS LATIFRONS
 BLACKTIP POACHER

TROPHIC LEVEL: (-) INVERTEBRATES

ANCISTROLEPSIS
 SNAIL
COLUS HALIDONUS
 SNAIL

TROPHIC LEVEL: (Q) INVERTEBRATES

ABIETINARIA
 HYDROID
ABIETINARIA ABIETINA
 HYDROID
ABIETINARIA ALEXANDERI
 HYDROID
ABIETINARIA TRASKI
 HYDROID
ACRYPTOLARIA
 HYDROID
AGLAOPHENIA
 HYDROID
AGLAOPHENIA DIEGENSIS
 HYDROID
AGLAOPHENIA INCONSPICUA
 HYDROID
AGLAOPHENIA OCTOCARPA
 HYDROID
CAMPANULARIA
 HYDROID
CAMPANULARIA VERTICILLATA
 HYDROID
CAMPANULARIA VOLUBILIS
 HYDROID
HALECIUM CORRUGATUM
 HYDROID
HIPPASTERIA SPINOSA
 SEA STAR
LAFOEA ADNATA
 HYDROID
LAFOEA DUMOSA
 HYDROID
LAFOEA FRUTICOSA
 HYDROID
LAFOEA GRACILLIMA
 HYDROID
MEDIASTER AEQUALIS
 VERMILLON STAR
NEPTUNEA PRIBILOFFENSIS
 SNAIL
PLUMULARIA ALICIA
 HYDROID
SERTULARELLA TURGIDA
 HYDROID
THUIARA ROBUSTA
 HYDROID

TROPHIC LEVEL: (Q) FISHES

PLEURONICHTHYS COENOSUS
 C-O SOLE

HABITAT: KELP FORESTS VEGETATED BENTHIC

TROPHIC LEVEL: (1) PRODUCER
PLANTS

AGARDHIELLA TENERA
 RED ALGAE
AGARUM FIMBRIATUM
 KELP
ANTITHAMNION PACIFICUM
 RED ALGAE
BOTRYOCLADIA PSEUDODICHOTOMA
 RED ALGAE
CALLOPHYLLIS EDENTATA
 RED ALGAE
CERAMIUM CALIFORNICUM
 RED ALGAE
CONSTANTINEA SUBULIFERA
 RED ALGAE
CRYPTOPLEURA RUPRECHTIANA
 RED ALGAE
DELESSERIA DECIPIENS
 RED ALGAE
DILSEA CALIFORNICA
 RED ALGAE
EGREGIA MENZIESII
 KELP
EISENIA ARBOREA
 KELP
GELIDIUM ROBUSTUM
 RED ALGAE
GIGARTINA EXASPERATA
 RED ALGAE
GRATELOUPIA CALIFORNICA
 RED ALGAE
HYMENENA SETCHELLII
 RED ALGAE
LAMINARIA GROENLANDICA
 KELP
LAMINARIA SACCHARINA
 KELP
LAMINARIA SETCHELLII
 KELP
MACROCYSTIS INTEGRIFOLIA
 GIANT KELP
NEREOCYSTIS LUETKEANA
 GIANT KELP
OPUNTIELLA CALIFORNICA
 RED ALGAE
PHYLOSPADIX TORREYI
 SEA GRASS
PLOCAMIUM PACIFICUM
 RED ALGAE
POLYNEURA LATISSIMA
 RED ALGAE
PORPHYRA PERFORATA
 RED ALGAE
PRIONITIS LANCEOLATA
 RED ALGAE
PTERYGOPHORA CALIFORNICA
 KELP
RHODOMENIA PERTUSA
 RED ALGAE
RHODOPTILUM PLUMOSUM
 RED ALGAE
SMITHORA NAIADUM
 RED ALGAE
STENOGRAMME INTERUPTA
 RED ALGAE

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
 DUNCECAP LIMPET
STRONGYLOCENTROTUS FRANSISCANU
 GIANT RED URCHIN
STRONGYLOCENTROTUS PURPURATUS
 PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
 FILE LIMPET
ANTIPLANES PERVERSA
 SNAIL
ASTROPECTIN ARMATUS
 SAND STAR
BORETROPHON STUARTI
 SNAIL
BUCCINUM STRIGILLATUM
 SNAIL
CALLIOSTOMA ANNULATUM
 SNAIL
CROSSASTER PAPOSUS
 ROSE STAR
DERMASTERIAS IMBRICATA
 LEATHER STAR
EVASTERIAS TROSCHELI
 SEA STAR
FUSITRITION OREGONENSIS
 OREGON TRITON
HENRICIA LEVISCULA
 BLOOD STAR
LISCHKEIA CIDARIS
 SNAIL
LUIDIA FOLIATA
 SAND STAR
MITRELLA GOULDI
 SNAIL
NASSARIUS FOSSATUS
 SNAIL
NASSARIUS MENDICUS
 SNAIL
PISASTER BREVISPINOUS
 SHORT-SPINED PISASTER
PISASTER GIGANTEUS
 GIANT STAR
PISASTER OCHRACEOUS
 PURPLE STAR
PTERASTER TESSELATUS ARCUATUS
 SLIME STAR
PUNCTURELLA CUCULATA
 LIMPET
PYCNOPODIA HELIANTHOIDES
 SUNFLOWER STAR
SCYRA ACUTIFRONS
 MASKING CRAB
SOLASTER DAWSONI
 MORNING SUN STAR
SOLASTER STIMPSONI
 SUN STAR

TROPHIC LEVEL: (3) CARNIVORE
FISHES

BRACHYISTIUS FRENATUS
 KELP PERCH
HEXAGRAMMOS DECAGRAMMUS
 KELP GREENLING
HEXAGRAMMOS STELLERI
 WHITESPOTTED GREENLING
OPHIODON ELONGATUS
 LINGCOD
SCORPAENICHTHYS MARMORATUS
 CEBEZON
SEBASTES CAURINUS
 COPPER ROCKFISH
SEBASTES MALIGER
 QUILLBACK ROCKFISH
SEBASTES MYSTINUS
 BLUE ROCKFISH

SEBASTODES MELANOPS
 BLACK SEABASS
SQUALUS ACANTHIAS
 SPINY DOGFISH

TROPHIC LEVEL: (3) CARNIVORE
MAMMALS

ENHYDRA LUTRIS
 SEA OTTER
EUMETOPIAS JUBATUS
 NORTHERN OR STELLAR SEA LION
PHOCA VITULINA
 HARBOR SEAL
ZALOPHUS CALIFORNIANUS
 CALIFORNIA SEA LION

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

BANKIA SETACEA
 TEREDO
PARASITCHOPUS CALIFORNICUS
 GIANT RED SEA CUCUMBER
XYLOPHAGA WASHINGTONA
 WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
 SNAIL
OENOPOTA
 SNAIL
ONCOSOECIA
 BRYOZOAN

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BALANUS CRENATUS
 BARNACLE
BUGULA FLABELLATA
 BRYOZOAN
CELLARIA MANDIBULATA
 BRYOZOAN
CLINOCARDIUM NUTALLI
 BASKET COCKLE
LAGENIPORA PUNCTULATA
 BRYOZOAN
NEMOCARDIUM CENTRIFILOSUM
 HUNDRED-LINED COCKLE
PECTEN CAURINUS

HABITAT: KELP FORESTS VEGETATED BENTHIC

GIANT PACIFIC SCALLOP
PSOLUS SQUAMATUS
SEA CUCUMBER
SAXICAVA ARCTICA
ARCTIC SAXICAVE CLAM
TEREBRATALIA TRANSVERSA
LAMP SHELL

TROPHIC LEVEL: (8) SCAVENGER INVERTEBRATES

PHYLLOLITHOIDES PAPILLOSUS
PAPILLA CRAB

TROPHIC LEVEL: (9) INVERTEBRATE EATER - INVERTEBRATES

BALANOPHYLLA ELEGANS
STONY CORAL
NEPHTYS LONGOSETOSA
POLYCHAETE
PANDALUS DANAE
DOCK SHRIMP

TROPHIC LEVEL (9) INVERTEBRATE EATER - FISHES

CLUPEA HARENGUS PALLASI
PACIFIC HERRING
CYMATOGASTER AGGREGATA
SHINER PERCH
EMBIOTOCA LATERALIS
STRIPED SEAPERCH
LEPTOCOTTUS ARMATUS
PACIFIC STAGHORN SCULPIN

TROPHIC LEVEL: (Q) INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
ALLOPORA VERRILLI
HYDROCORAL
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
LAFOEA ADNATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
PLUMULARIA ALICIA
HYDROID
PUGETTIA ARACILLIS
KELP CRAB
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

HABITAT: SURFGRASS VEGETATED BENTHIC

TROPHIC LEVEL: (1) PRODUCER
PLANTS

AHNFELTIA CONCINNA
RED ALGAE
AHNFELTIA PLICATA
RED ALGAE
ALARIA MARGINATA
KELP
ANTITHAMNION PACIFICUM
RED ALGAE
BOSSIELLA CALIFORNICA
CORALLINE RED ALGAE
BOSSIELLA PLUMOSA
CORALLINE RED ALGAE
BOTRYOCLADIA PSEUDODICHOTOMA
RED ALGAE
CALLIARTHRON REGENERANS
CORALLINE RED ALGAE
CALLIARTHRON SCHMITTII
CORALLINE RED ALGAE
CALLOPHYLLIS EDENTATA
RED ALGAE
CERAMIUM CALIFORNICUM
RED ALGAE
CONSTANTINEA SIMPLEX
RED ALGAE
CONSTANTINEA SUBULIFERA
RED ALGAE
CORALLINA VANCOUVERIENSIS
CORALLINE RED ALGAE
CRYPTOPLEURA RUPRECHTIANA
RED ALGAE
CYSTOSEIRA GEMINATA
KELP
DELESSERIA DECIPIENS
RED ALGAE
DILSEA CALIFORNICA
RED ALGAE
EGREGIA MENZIESII
KELP
EISENIA ARBOREA
KELP
ERYTHROPHYLLUM DELESSERIOIDES
RED ALGAE
GASTROCLONIUM COULTERI
RED ALGAE
GELIDIUM ROBUSTUM
RED ALGAE
GIGARTINA EXASPERATA
RED ALGAE
GLOIOSIPHONIA VERTICILLARIS
RED ALGAE
GRACILARIOPSIS SJOESTEDII
RED ALGAE
GRATELOUPIA CALIFORNICA
RED ALGAE
GYMNOGONGRUS PLATYPHYLLUS
RED ALGAE
HYMENENA FLABELLIGERA
RED ALGAE
HYMENENA SETCHELLII
RED ALGAE
IRIAOEA CORDATA
RED ALGAE
LAMINARIA GROENLANDICA
KELP
LAMINARIA SACCHARINA
KELP
LAMINARIA SETCHELLII
KELP
LAURENCIA SPECTABILIS
RED ALGAE
MACROCYSTIS INTEGRIFOLIA
GIANT KELP
MEMBRANOPTERA PLATYPHYLLA
RED ALGAE
MICROCLAUDIA COULTARI
RED ALGAE
OPUNTIELLA CALIFORNICA
RED ALGAE
PHYLOSPADIX SCOULERI
SEA GRASS
PHYLOSPADIX TORREYI
SEA GRASS
PLOCAMIUM PACIFICUM
RED ALGAE
POLYNEURA LATISSINA
RED ALGAE
PORPHYRA PERFORATA
RED ALGAE
PRIONITIS LANCEOLATA
RED ALGAE
PTEROSIPHONIA BIPIUNATA
RED ALGAE
PTERYGOPHORA CALIFORNICA
KELP
PTILOTA ASPLENIOIDES
RED ALGAE
RHODOGLOSSUM LATISSIMUM
RED ALGAE
RHODOMENIA PALMATA
RED ALGAE
RHODOMENIA PERTUSA
RED ALGAE
RHODOPTILUM PLUMOSUM
RED ALGAE
SARGASSUM MUTICUM
KELP
SCHIZYMENIA PACIFICA
RED ALGAE
SMITHORA NAIADUM
RED ALGAE
STENOGRAMME INTERUPTA
RED ALGAE

TROPHIC LEVEL: (2) HERBIVORE
INVERTEBRATES

ACMAEA MITRA
DUNCECAP LIMPET
STRONGYLOCENTROTUS FRANSISCANU
GIANT RED URCHIN
STRONGYLOCENTROTUS PURPURATUS
PURPLE SEA URCHIN

TROPHIC LEVEL: (3) CARNIVORE
INVERTEBRATES

ACMAEA LIMATULA
FILE LIMPET
ANTIPLANES PERVERSA
SNAIL
ASTROPECTIN ARMATUS
SAND STAR
BORETROPHON STUARTI
SNAIL
BUCCINUM STRIGILLATUM
SNAIL
CALLIOSTOMA ANNULATUM
SNAIL
CROSSASTER PAPOSUS
ROSE STAR
DERMASTERIAS IMBRICATA
LEATHER STAR
LISCHKEIA CIDARIS
SNAIL
MITRELLA GOULDI
SNAIL
NASSARIUS FOSSATUS
SNAIL
NASSARIUS MENDICUS
SNAIL
PISASTER BREVISPINOUS
SHORT-SPINED PISASTER
PISASTER GIGANTEUS
GIANT STAR
PISASTER OCHRACEOUS
PURPLE STAR
PUNCTURELLA CUCULATA
LIMPET
PYCNOPODIA HELIANTHOIDES
SUNFLOWER STAR
SOLASTER STIMPSONI
SUN STAR

TROPHIC LEVEL: (4) DETRITIVORE
INVERTEBRATES

BANKIA SETACEA
TEREDO
PARASITCHOPUS CALIFORNICUS
GIANT RED SEA CUCUMBER
XYLOPHAGA WASHINGTONA
WASHINGTON WOODEATER

TROPHIC LEVEL: (5) OMNIVORE
INVERTEBRATES

AMPHISSA VERSICOLOR
SNAIL
OENOPOTA
SNAIL
ONCOSOECIA
BRYOZOAN

TROPHIC LEVEL: (7) FILTER FEEDER
INVERTEBRATES

BUGULA FLABELLATA
BRYOZOAN
CELLARIA MANDIBULATA
BRYOZOAN
CLINOCARDIUM NUTALLI
BASKET, COCKLE
LAGENIPORA PUNCTULATA
BRYOZOAN
PECTEN CAURINUS
GIANT PACIFIC SCALLOP
TEREBRATALIA TRANSVERSA
LAMP SHELL

TROPHIC LEVEL: (8) SCAVENGER
INVERTEBRATES

HABITAT: SURFGRASS VEGETATED BENTHIC

PHYLLOLITHOIDES PAPILLOSUS
PAPILLA CRAB

TROPHIC LEVEL: (Q)
INVERTEBRATES

ABIETINARIA
HYDROID
ABIETINARIA ABIETINA
HYDROID
ABIETINARIA ALEXANDERI
HYDROID
ABIETINARIA TRASKI
HYDROID
ACRYPTOLARIA
HYDROID
AGLAOPHENIA
HYDROID
AGLAOPHENIA DIEGENSIS
HYDROID
AGLAOPHENIA INCONSPICUA
HYDROID
AGLAOPHENIA OCTOCARPA
HYDROID
CAMPANULARIA
HYDROID
CAMPANULARIA VERTICILLATA
HYDROID
CAMPANULARIA VOLUBILIS
HYDROID
HALECIUM CORRUGATUM
HYDROID
LAFOEA ADNATA
HYDROID
LAFOEA DUMOSA
HYDROID
LAFOEA FRUTICOSA
HYDROID
LAFOEA GRACILLIMA
HYDROID
MEDIASTER AEQUALIS
VERMILLON STAR
PLUMULARIA ALICIA
HYDROID
SERTULARELLA TURGIDA
HYDROID
THUIARA ROBUSTA
HYDROID

APPENDIX G: INVERTEBRATE SPECIES IN THE COASTAL AREAS OF THE OLYMPIC NATIONAL PARK

Invertebrate Species in the Coastal Areas of the Olympic National Park

Prionitis lanceolata
Prionitis lyallii
Prionitis filiformis
Erythrophyllum delesserioides
Schizymenia pacifica
Mastocarpus jardinii
Mastocarpus papillatus
"Petrocelis"
Peyssonnelia pacifica
Ahnfeltia gigartinoides
Ahnfeltia plicata
Gymnogongrus chiton
Gymnogongrus linearis
Plocamium cartilagineum
Plocamium tenue

Order Rhodymeniales
Gastroclonium subartculatum
Fauchea laciniata
Rhodymenia californica
Order Ceramiales
Callithamnion pikeanum
Ceramium pacificum
Ceramium washingtoniense
Griffithsia pacifica
Microcladia borealis
Microcladia coulteri
Ptilota asplenioides
Ptilota hypnoides
Cryptopleura ruprechtiana
Cryptopleura lobulifera
Cryptopleura violacea
Delesseria decipiens
Polyneuropsis latissima
Polyneuropsis stolonifera
Laurencia spectabilis
Neorhodomela larix
Odonthalia washingtoniensis
Polysiphonia hendryi
Polysiphonia pacifica

LICHENS
Verrucaria spp.
Arthopyrenia halodytes

ANIMALS
PH. PORIFERA (SPONGES)
Leucosolenia sp.
Halichondria panicea
Ophiltaspongia pennata
Haliclona spp.

Leptasterias hexactis
Pynopodia helianthoides
Henricia leviuscula
Evasterias troschelii

BRITTLE STARS

Amphipholis squamata

PH. UROCHORDATA: TUNICATES

Stvela spp.
Perophora annectens
Metandrocarpa sp.
Clavelina huntsmani
Aplidium spp.
Didemnum sp.

VERTEBRATES: FISHES

Gobies
Blennies
Cottids (sculpins)

APPENDIX H: NAVY ANALYSIS OF ALTERNATIVES TO SEALION ROCK

DEPARTMENT OF THE NAVY
COMMANDER MEDIUM ATTACK
TACTICAL ELECTRONIC WARFARE WING
U.S. PACIFIC FLEET
NAVAL AIR STATION, WHIDBEY ISLAND
OAK HARBOR, WASHINGTON 98278-6000

IN REPLY REFER TO:
5800
Ser 016/0510
14 February 1

From: Commander, Medium Attack Tactical Electronic Warfare Wing, U.S. Pacific Fleet
To: Commander in Chief, U.S. Pacific Fleet
Via: Commander, Naval Air Force, U.S. Pacific Fleet

Subj: SEA LION ROCK

Ref: (a) P.L. 91-504. 84 STAT 1104
(b) 16 U.S.C. 1132
(c) COMMATVAQWINGPAC ltr ser 016/3778 of 24 Dec 1990
(d) P.L. 100-627, 102 STAT 3217
(e) 16 U.S.C. 1401
(f) 16 U.S.C. 1362
(g) 16 U.S.C. 1372
(h) 16 U.S.C. 1531 et. seq.
(i) 16 U.S.C. 1536 (2)
(j) 16 U.S.C. 701 et. seq.

Encl: (1) Alternatives to Sea Lion Rock (R-6707)
(2) 1986-1990 Scheduling of Sea Lion Rock
(3) COMNAVAIRPAC ltr 5800 ser 011/7040 of 31 Aug 1989
(4) NOAA ltr (Tippie ltr) dtd 8 April 1990
(5) Draft Marine Mammal ltr (Twiss ltr) undated
(6) USFWS ltr (Martin ltr) dtd 9 April 1990

1. In the last several months, it has become increasingly apparent that the Navy's use of Sea Lion Rock will be challenged by both other federal agencies and environmentalists. As the only sea-based bombing target in the Pacific Northwest, Sea Lion Rock is considered an important training option for current and future Navy requirements.

2. SEA LION ROCK. Sea Lion Rock is an exposed reef of rock approximately 80 feet long and 30 feet wide and is located slightly more than three miles off the coast of Washington. Awash at high tide, Sea Lion Rock has no soil or vegetation and is not used by sea birds for nesting or egg laying. Despite its name (a misnomer), Sea Lion Rock is only used by sea lions and harbor seals as an occasional haul out site for resting. No sea lions live on the rock. During a period of observation from 1984 to 1985, no sea lions and only sporadically, harbor seals were observed on Sea Lion Rock.

18. ALTERNATIVES TO SEA LION ROCK. During discussions over the last two years, USFWS has proposed several possible alternatives to Sea Lion Rock. USFWS readily concedes that this is the Navy's only sea based target in the Northern Pacific. In addition, they acknowledge that there are no other rocks which could be used for the same purpose. Instead, USFWS suggested certain alternatives which we rejected as infeasible for financial, practical, environmental and scheduling reasons. These alternatives included towed targets, floating targets (including moored targets), out-of-area training and simulation (including cockpit simulation). Enclosure (1) was presented to USFWS as our opposition but they have persisted to state that we have not given serious consideration to these alternatives. On the contrary, these suggestions were seriously considered, but do not warrant more detailed and costly study.

19. OTHER ENVIRONMENTAL ISSUES. Continued use of Sea Lion Rock by naval aircraft as a bombing target will depend upon not only the outcome of the current negotiations with USFWS but will be affected and influenced by several other environmental issues. These issues are discussed below.

20. By reference (d), Congress directed the Secretary of Commerce to designate an area off the coast of western Washington as a National Marine Sanctuary. Sea Lion Rock is located within the area now being referred to as the Olympic National Marine Sanctuary. To date, the National Oceanic and Atmosphere Administration (NOAA) has submitted a preliminary draft Management Plan to concerned agencies, including the Navy. The proposed prohibitions would appear to ban the bombing of Sea Lion Rock. Other Navy activities which may or may not be affected by the designation are described in enclosure (3). Currently, the proposed management plan is being reviewed by OP-44EP1 (POC: Mr. Tom Reeling), and Office of the Assistant Secretary of the Navy (I&E) (POC: Cdr Tim Schnoor), and Office of the General Counsel, (POC: Capt R. M. Mollison). It should be noted that in April 1990, by enclosure (4), NOAA expressed concern about Navy's use of Sea Lion Rock.

21. The Marine Mammal Commission established by reference (e) has also recently raised questions concerning the Navy's use of Sea Lion Rock. In an unsigned draft of a letter addressed to Assistant Secretary of the Navy (I&E), Jacqueline E. Schafer,

R-6707 - SEA LION ROCK

REQUIREMENTS

The U.S. Navy has the requirement for a readily accessible target for use with practice and heavy inert ordnance, near or within the confines of a Warning area or Military Operating Area (MOA), so as to accomplish multiple mission training. The primary training to be conducted in this area is as follows:

-War at Sea exercises;
-Heavy ordnance carriage and release; and
-Multiple aircraft tactical maneuvering.

In addition, this target will serve as the primary alternate target for routine weapons delivery training when the Navy's primary instrumented target (NTRF BOARDMAN, OREGON) is not usable. In this regard, historical data for NTRF Boardman indicates that the target is closed on an average of six days per month due to maintenance, upkeep and training, and 3 days per month due to weather conditions such as high winds, fog and snow. Closure of NTRF BOARDMAN due to fog is more frequent during the Summer. Training requirements for aircrews of Naval Air Station, Whidbey Island, require a year round alternative to NTRF BOARDMAN. Delays in bombing training when squadrons are preparing for carrier deployments have a direct adverse impact on military

readiness. Due to operating requirements and schedules, carrier based aircrews have even less flexibility in scheduling bombing practice.

CURRENT CAPABILITIES:

Sea Lion Rock is an unmanned target located off the West coast of Washington, approximately 17 NM North of Pacific Beach Washington and 85 NM from Naval Air Station, Whidbey Island. Scheduling of Sea Lion Rock is controlled by the Operations Office, Commander Medium Attack Tactical Electronic Warfare Wing, U.S. Pacific Fleet, with at least two and one half hours advance notice. The rock is located within the confines of R-6707 and within the Olympic MOA, to the East and contiguous with Warning Area W-237A. Sea Lion Rock is the western-most rock offshore in the area. It is approximately 80 feet long by 30 feet wide, and at high tide it is either submerged or awash.

POSSIBLE ALTERNATIVES:

Towed targets: Navy aircraft have used ship towed targets while operating at sea in the vicinity of surface combatants. These targets are pontoon mounted, rigid structures, approximately 15 feet long, which are towed 1000 to 1500 feet behind a host ship. Utilization of a towed target in the outer coast of the Pacific Northwest would require a minimum of 30 days advance

notice to task a dedicated surface vessel. Storing the target on the outer coast would reduce the time required, but a considerable time would still be required, several days to over a week, to arrange for a towing craft from the Puget Sound area, for it to transit to the area, and for it to prepare and tow the target. Scheduling would depend on the availability and operating requirements of surface vessels. The lack of predictability and flexibility in scheduling a towed target would preclude the use of this alternative as a viable training target and as a weather backup for NTRF BOARDMAN. This need for a readily available alternative to Boardman and a sea based target is a year round requirement. The lack of predictability and reliability in utilizing a towed target precludes its use, even on a seasonal basis. Although conceivably carriers could carry and tow targets, carrier operating requirements, including the launching and recovery of aircraft, preclude this as a reliable training option.

Floating targets: This alternative would require the preparation and mooring of a target barge in the Pacific Ocean off the coast of Washington, within the confines of W-237A. Deep water mooring of a barge would require that it be able to withstand the heavy seas and storms of this area. It would not be feasible to moor such a barge year round as the hazard to navigation and the danger to the environment should the barge break free of its moorage would be too great. Instead a tug would be required to tow the barge to its target location. At least two

to three days would be required for the target barge to be towed and moored. The initial and recurring costs would be substantial. At a minimum the estimated costs would entail the following:

-Preparation of a target barge	$ 50,000.00
-Installation of Deep Water Mooring	$250,000.00
-Environmental documentation	$ 50,000.00
-Towing ($9000 to $10,000 per day)	$ 60,000.00(recur -ring)
-TOTAL COST OF A SINGLE MOORAGE	$410,000.00

A moored target is not considered feasible. Besides the considerable cost, the very real possibility that the barge could break free of its mooring presents an unacceptable risk to navigation and the environment. A moored target vessel used off the Pacific Missile Test Center, Point Mugu, California, broke free of its mooring became a hazard to navigation, and cost in excess of 3 million dollars to remove from San Miguel Island where it had washed ashore.

A buoy-sized target has been suggested, but is also not an acceptable alternative. While the costs would be substantially less, the size would render it an unsuitable target. Target location, bombing and bomb scoring would be unworkable. In addition, a successful bomb strike could either sink the target, or break it free of its mooring, presenting a hazard to

navigation. Finally, buoys and similar moored and marked objects in navigable waters would be used as a reference point by fishermen.

Other target rocks: Based on the Navy's review of the area and discussion with U.S. Fish and Wildlife Service representatives, no other rocks so ideally suited for a target have been located off the Western Coast of Washington. The location of the rock relative to Naval Air Station, Whidbey Island, its distance from the coast and populated areas, and the fact that Sea Lion Rock is not used by marine mammals or sea birds for breeding and nesting, are factors in combination not characteristic of any other rock in the area.

Simulation: A Weapons System Training flight simulator is available for A-6 aircrew training at Naval Air Station, Whidbey Island. Although this simulator is used for basic weapons delivery procedures, it cannot be used for multi-plane, tactical maneuvering or coordinated target timing. Use of computer generated technology will not simulate the actual conditions of bomb carriage and release, such as 'G's' and aircraft handling associated with heavy ordnance. The current system is too old to be updated and no new A-6 trainer is planned as the plane itself will be phased out over the next 15 years. In addition, flight simulation is only one portion of the training required for aircrew bombing proficiency. To adequately train an aircrew, it is

necessary to actually drop bombs from the airplane. Even target simulation in an A-6, if the technology existed in the A-6 which it does not, would fail to train the crew for the real life scenario of dropping bombs on target. Moreover, cockpit bombing simulation in an A-6 would still require a real target, and would not obviate the need for Sea Lion Rock.

Out of area training and targets: The fundamental need is for a target to be used by Whidbey Island based aircrews. To integrate over the sea bombing training with all other phases of aircrew training, a target within the range of the A-6 must be available. When Whidbey based aircrews are deployed to other areas such as Southern California, they do use the targets available in that operating area. Such training is limited by the availability of these targets and higher priority Battle Group training commitments that can only be accomplished in these areas.

CONCLUSION

The Navy must have access to Sea Lion Rock on a continuing basis for over the sea bombing practice.

DEPARTMENT OF THE NAVY

THE ASSISTANT SECRETARY OF THE NAVY
(INSTALLATIONS AND ENVIRONMENT)
WASHINGTON, D.C. 20360-5000

29 APR 1992

faxed copy to
Rob Shallenberger,
Division of
Refuges / FWS
5/4/92

Mr. Richard Smith
Deputy Director
U.S. Fish and Wildlife Service
Department of Interior
Washington, D.C. 20240

Dear Mr. Smith:

We were pleased to meet with you on 3 March 1992 to discuss the Department of the Navy's (DoN) use of Sea Lion Rock within Copalis National Wildlife Refuge as an inert bombing target. As explained below, the DoN believes that the public interest is best served by allowing continued use of Sea Lion rock for training vital to the national defense pursuant to the existing letter of permission from the Secretary of the Interior. The careful studies already conducted do not reveal any significant impact. There is simply no site specific evidence that the DoN activities have materially impaired the purposes of the refuge. Although we expect that both the DoN and the U.S. Fish and Wildlife Service will continue to monitor the situation carefully, we do not believe any change to the existing letter of permission is required at this time.

A DoN review conducted as a result of our meeting concludes that Sea Lion Rock remains an essential training asset because it is the only inert bombing target off the Northwest Coast available when conditions at land-based targets are unfavorable or when a sea-based target is required. To aircrews, the closer the training approaches the mission requirements under actual conditions, the higher the quality of training. Training requirements for A-6 aircrews include practice weapons deliveries against sea based targets, consisting of coordinated strikes against ships or task groups. Using Sea Lion Rock as a target, aircraft operating in coordination can attack an actual sea based fixed object. Thus, aircrews are able to experience approaching a sea based target and releasing ordnance under ocean wind/weather conditions and water/land contrast.

Sea Lion Rock also serves as a land based backup target when Naval Weapons System Training Facility (NWSTF) Boardman is not available, providing a readily accessible target within range of aircraft taking off from Naval Air Station (NAS) Whidbey Island. NWSTF Boardman is unavailable an average of nine days per month due to weather or other conditions. Sea Lion Rock, as an alternate target, allows aircrews to complete training of a particular evolution within a limited period of time. In times of national crisis when the tempo of deployment training increases and adhering to schedules becomes even more critical, a backup target becomes invaluable.

The unique location of Sea Lion Rock along the Northwest Coast permits ideal bombing practice involving evasion tactics training because of its proximity to Warning Area W-237A and the Olympic Military Operating Area (MOA). Aircraft can release their inert weapons and, before returning to NAS Whidbey Island, engage in defensive air combat maneuvering critical to survivability. The airspace required for such training is not available at NWSTF Boardman, but is available at Sea Lion Rock within the Olympic MOA. Sea Lion Rock is also ideally situated for aircraft carriers conducting training in the waters off the Northwest Coast. NWSTF Boardman usually is not within range of the embarked aircraft, however, Sea Lion Rock is available within the cyclic flight operations schedule of the aircraft carrier with no requirement for inflight refueling or Federal Aviation Administration interface. The importance of Sea Lion Rock is further enhanced by the homeporting of the USS NIMITZ in the Pacific Northwest and the likelihood that fleet operations will continue to require a sea based target.

Efforts have been made to investigate alternative bombing options, including the use of towed targets, floating targets (barges and buoys), smoke floats, small reflector targets, other target rocks, simulation, and out of area training and targets. These alternatives are not feasible because of logistics and/or cost constraints. As budget reductions become greater, the cost of maintaining and operating alternate portable targets becomes very important.

Sea Lion Rock is part of a diminishing supply of assets available for DoN training. If Sea Lion Rock is given up outright or its use so limited that it is essentially forfeited, the training opportunities it provides will be forever lost.

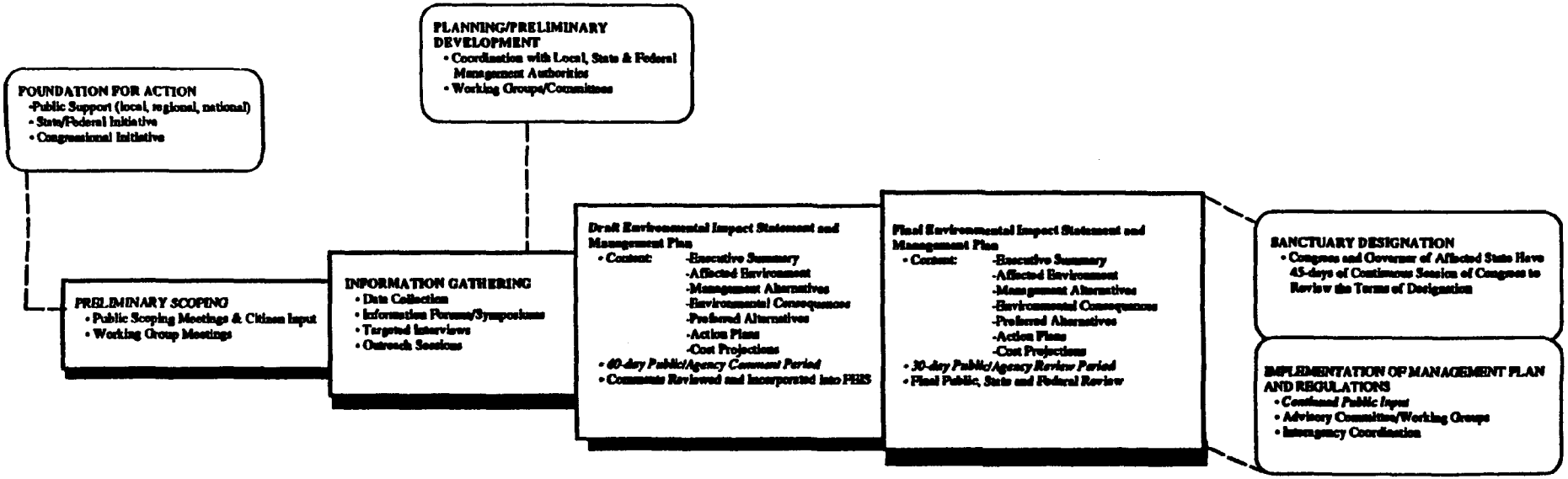
The DoN shares your concerns over protection of the refuge. We believe, however, that the results of the 1984-85 study conducted by the Washington Department of Game for DoN supports our conclusion that A-6 aircraft operations, conducted according to the Operations Plan, do not significantly impact the resources associated with Sea Lion Rock. The DoN will continue to ensure compliance with the Operations Plan and is exploring additional measures to ensure compliance. I have requested that personnel at NAS Whidbey Island meet with representatives of your regional office at their request to discuss these additional measures. The DoN point of contact is Commander J.J. Stonier at 206/257-2470. We look forward to working together to solve our mutual concerns.

Sincerely,

JACQUELINE E. SCHAFER

APPENDIX I: SANCTUARY DESIGNATION PROCESS

Sanctuary Development Process



APPENDIX J: FEDERAL, STATE, LOCAL, TRIBAL AND INTERNATIONAL AUTHORITIES APPLICABLE TO THE SANCTUARY AREA

Federal, State, Local, Tribal and International Authorities Applicable to the Sanctuary Area

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I. INTRODUCTION

Presented below is an overview of various State, Federal, Tribal and international management authorities which have statutory responsibility for protecting marine resources in the Olympic Coast National Marine Sanctuary study area. This discussion includes a description of relevant legislative mandates and, in some cases, the administrative measures taken to accomplish them (Some additional information is provided in the FEIS/MP).

II. STATE JURISDICTION

A. State Statutes

1. The **Aquatic Lands Act** (ALA, RCW 79.90) provides the policies under which the Department of Natural Resources manages all state-owned aquatic lands, emphasizing a balance of benefits to all state citizens, water-dependent uses, and environmental concerns. ALA establishes the multiple use concept, which provides for several uses, either simultaneously or in planned rotation, on a single tract of aquatic land. The Act governs sales and leases of state aquatic lands, aquaculture, property rights and easements, administration of tidelands and harbor areas, rents and fees, dredge disposal, and archaeological research.

2. The **Clean Air Washington Act** (CAWA, RCW 70.94) declares that air pollution is the state's most serious environmental problem. The Act establishes a statewide program (1) to prevent the deterioration of air quality in areas with clean air and (2) to return the air quality in other areas to levels that protect human health and the environment. In some respects, CAWA is more stringent than the federal Clean Air Act. A State Air Pollution Control Board and Local Air Pollution Control Authorities are established and, together with the Department of Ecology, are empowered to regulate activities such as outdoor burning (of any kind), industrial emissions, commercial/residential burning, and motor vehicle emissions. This is a broad-ranging act that extends state jurisdiction over such coastal activities as offshore oil production emissions, slash burning in coastal areas, controlled burns of marine oil spills, at-sea incineration, concentrated vessel emissions, coastal industrial emissions, etc. The act also assures protection of scenic, aesthetic, and cultural aspects of the natural environment, including marine vistas, that are threatened by air pollution.

3. The **Energy Facility Siting Act** (EFSA, RCW 80.50) creates and authorizes the Energy Facility Site Evaluation Council, a quasi-judicial regulatory body. The council serves as a one-stop agency for permitting major energy facilities within the state. This act would also pertain to energy facilities in the coastal zone and potential discharges from those facilities into the air and marine environments. Legislative policy states a desire to protect the ecology of state waters and their aquatic life through responsible site planning.

4. The **Environmental Coordination Procedures Act** (ECPA, RCW 90.62) establishes a procedural option to reduce the burden and confusion associated with multiple environmental permit requirements for certain private or corporate project proposals. It directs the Department of Ecology to develop and administer a "master application" process and, upon applicant request, coordinate all permit requirements for any project affecting the state's air, land or water resources. This, in effect, provides permit applicants the opportunity for one-stop-shopping. The Act also requires DOE and all county governments to establish environmental permit information centers (EPICs) to provide information to the public regarding federal, state, and local permits which govern the use of natural resources and to assist applicants in the preparation of master applications. Note: No applicant has filed a master application since the early 1980s because the changing nature of most project proposals complicates and nullifies efforts to coordinate permit procedures.

5. The **Fisheries Code** (RCW 75) provides management guidelines for food fish and shellfish and authorizes the Department of Fisheries (WDF) to protect and manage recreational and commercial salt-water fisheries. The Act also authorizes the Department of Fisheries, jointly with the Department of Wildlife (WDW), to administer the **Hydraulic Code** (RCW 75.20), requiring that construction projects in state waters obtain a permit from either WDF or WDW to ensure protection of fish, shellfish, and wildlife resources of the state.

6. The **Growth Management Act** (GMA, RCW 36.70A) mandates coordinated and comprehensive land-use planning by municipalities and counties to provide for future growth and protect air and water quality. One planning goal of the act is to maintain and enhance natural resource-based industries, including fisheries. Each coastal community must include in its comprehensive land use plan provisions for the preservation and conservation of coastal resources and water quality.

7. The **Hazardous Waste Management Act** (HWMA, RCW 70.105) establishes "a comprehensive state-wide framework for the planning, regulation, control, and management of hazardous waste [to] prevent land, air, and water pollution and conserve the

natural, economic, and energy resources of the state." HWMA grants broad powers of regulation to the Department of Ecology in matters related to hazardous waste regulation, management and disposal. The Act also gives DOE "preemptive authority" for the siting of hazardous waste treatment, storage, disposal, and incineration facilities. This law affects the 3-mile offshore jurisdiction of the state and regulates any activities that introduce hazardous materials into that area.

8. The **Marine Recreation Land Act** (MRLA, RCW 43.99) allocates funds from the state marine fuel tax assessment for the acquisition and improvement of marine recreational land and for the preservation and conservation of open space in the coastal zone.

9. The **Noise Control Act** (NCA, RCW 70.107) authorizes the Department of Ecology to establish maximum permissible noise levels for identified environments "in order to protect against adverse effects of noise on the health, safety and welfare of the people, the value of property, and the quality of environment." DOE can implement performance standards, evaluation criteria, and rules
to carry out this chapter. The department can also establish use standards, regulating the time and place of occurrence for an operation that produces noise above specified levels.

10. The **Ocean Resources Management Act** (ORMA, RCW 43.143) recognizes conflicting use demands in Washington marine waters and directs that "priority shall be given to resource uses and activities that will not adversely impact renewable resources over uses which are likely to have an adverse impact on renewable resources." ORMA establishes planning and project review criteria to evaluate uses and activities that adversely impact renewable resources and associated industries in coastal waters. The Act further states that "there is not enough information available to adequately assess the potential adverse effects of oil and gas exploration and production off Washington's coast." In accordance with this finding, it directs the Department of Ecology (DOE) to produce an oil and gas leasing analysis and places a moratorium on the leasing of state marine lands for oil or gas activities until July 1, 1995. At that time the Legislature will decide whether to continue or terminate the moratorium based on the analysis provided by DOE. Other provisions of the Act are codified in the Revised Code of Washington (RCW) as follows:

Transport of Petroleum Products - Financial Responsibility (RCW 88.40) prescribes financial responsibility requirements for vessels that transport petroleum products across the waters of the state." Oil cargo vessels exceeding 300 gross tons must provide evidence to the Department of Ecology of financial liability and responsibility for a potential spill in the marine waters of the state.

11. The **Oil and Gas Conservation Act** (OGCA, RCW 78.52) provides for extensive regulation of oil and gas drilling, production, storage, transportation and refining operations within Washington State. The Act requires preparation of an environmental impact statement (EIS) for any proposed drilling operation through or under any surface waters of the state. The Department of Ecology is directed to review EIS documentation and submit recommendations for approval or denial of drilling permits to the Oil and Gas Conservation Committee.

12. The **Oil and Hazardous Substance Spill Prevention and Response Act** (RCW 90.56) superceded and consolidated previous legislation concerning oil spill prevention and response. It also expanded state authority over spill prevention and response and granted additional powers to the Department of Ecology to enforce the provisions of this act. The provisions of the Act are codified in the Revised Code of Washington (RCW) as follows:

Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56) This chapter includes the major themes and core provisions of the original Act. It is based on the Legislature's determination that prevention is the best method to protect the marine environment from oil and hazardous substance spills. In order to establish a comprehensive prevention and response program to protect the state's waters and natural resources from spills of oil, the chapter (a) provides broad powers to the Department of Ecology relating to spill prevention and response; (b) supports and compliments the federal Oil Pollution Act; (c) requires the development, adoption, and execution of a state-wide master spill prevention and contingency plan; (d) requires spill prevention and contingency plans from oil storage and transfer facility operators; (e) provides for state spill response and wildlife rescue planning and implementation; (f) ensures that responsible parties are liable and have the resources and ability to respond to spills and provide compensation for all costs and damages; (g) establishes the Oil Marine Oversight Board as an independent authority to assess adequacy of prevention and contingency planning; and (h) establishes a state oil spill response account.

Office of Marine Safety (RCW 43.21I) This chapter creates the Office of Marine Safety as a state agency to "provide leadership and coordination in identifying and resolving [a] threats to the safety of marine transportation and [b] the impact of marine transportation on the environment." The Office is to serve as a center for expertise in marine transportation issues.

Vessel Oil Spill Prevention and Response (RCW 88.46) This chapter assigns specific duties and powers to the Office of Marine Safety (OMS). It directs OMS (a) to establish a state tank vessel inspection program; (b) to establish and enforce standards for tank vessel spill prevention plans; (c) to establish and enforce rules and standards for the preparation of contingency plans concerning the containment and cleanup of oil spills from covered vessels (tank, cargo, and passenger vessels);

(d) to establish and supervise Regional Marine Safety Committees for the purpose of planning for the safe navigation and operation of all vessel traffic in state waters; (e) to develop an emergency response system for the Strait of Juan de Fuca and the Pacific Coast; and (f) to define requirements for containment and recovery equipment aboard tanker vessels and at refueling, bunkering, and lightering stations. The chapter abolishes the Office of Marine Safety effective July 1, 1997 and transfers all its powers, duties and functions to the Department of Ecology.

13. **The Oil Spill Response System - Maritime Commission Act** (RCW 88.44) creates the Washington State Maritime Commission to prepare comprehensive oil spill response plans for all state waters. The Act also requires the development of a data base from existing information sources of accidents, groundings, near misses, and oil discharges of all cargo and passenger vessels entering state waters and report such information to the Office of Marine Safety. The Commission is granted broad powers to make rules, and enter into contracts to assure a complete response in the first 24 hours following a spill event. The Commission is also given authority to assess vessels transiting the waters of the state, to collect such assessments, investigate violations, and enforce the provisions of the act.

14. The **Planning Enabling Act** (PEA, RCW 36.70) enables counties to form planning commissions and counties, cities and others to form regional planning commissions. Comprehensive planning and zoning requirements are established. Among the elements of the comprehensive plan are land use, circulation, conservation, recreation, transportation, and public services and facilities.

15. The **Public Lands Act** (PLA, RCW 79) authorizes the Commissioner of Public Lands to lease or not lease state-owned lands (including those within 3 miles of shore); the Act sets terms and conditions of leases, provides for conservation areas and natural area preserves, and defines property rights and governmental authority over tidelands and shorelands of the state. Within the Public Lands Title of the Revised Code of Washington (RCW 79) are sections governing oil and gas leases on state lands, natural area preserves, natural resources conservation areas, marine plastic debris, and aquatic lands.

16. The **Puget Sound Water Quality Management Act** (PSWQMA, RCW 90.70) restructured the Puget Sound Water Quality Authority (PSWQA - originally established in 1983) and directed it to develop and oversee a comprehensive plan for the restoration and protection of the biological health and diversity of Puget Sound waters. The Puget Sound Water Quality Management Plan primarily addresses issues that impact water quality. The scope of planning includes all the waters of Puget Sound north to

the Canadian border, the Strait of Juan de Fuca, and, to the extent that they affect water quality in Puget Sound, all waters flowing into the Sound, and adjacent lands. Lead state agencies and local governments are responsible for implementing individual plan components. These existing governmental authorities are required to evaluate and incorporate applicable provisions of the plan into their policies and activities. The Puget Sound Water Quality Board is responsible for setting goals and policy for the PSWQA. The Board is chaired by the Director of the Department of Ecology.

17. The **Seashore Conservation Area** law (RCW 43.51.650) declares all Washington Pacific Coast beaches (under state ownership or control) to be a conservation area for public recreation. The law restricts non-recreational uses of Pacific beaches and assigns priority consideration to preserving such areas in a natural condition. Recreation management plans are required for ocean beaches within the conservation area. The law is administered by the Washington State Parks and Recreation Commission.

18. The **Shellfish Sanitary Control Act** (RCW 69.30) instructs the State Board of Health to monitor the sanitation of shellfish growing areas, processing facilities and operations and to establish health requirements for the safe harvesting and processing of shellfish. The State Department of Health has authority to enforce the standards established by the Board and issues certificates of approval for all commercial growing, harvesting, and processing operations and facilities. The department has authority to revoke operating permits and close shellfish beds from harvest when it determines that unhealthy conditions exist.

19. The **Shoreline Management Act** (SMA, RCW 90.58) is administered by the Department of Ecology (DOE) and stands as benchmark legislation for the conservation of marine resources in Washington State. The Act provides a framework and a uniform set of rules to guide planning and management of human activities and development in the coastal zone. SMA emphasizes governmental protection in the management of state-owned aquatic lands, with a preference for long-term over short-term benefits. It applies from the shoreline seaward 3 miles and inland for 200 feet. Detailed zoning, implementation, and enforcement is a local governmental responsibility. Shoreline municipalities and counties develop local master plans that must be reviewed and approved by DOE. These plans are then incorporated into state law as components of the state Coastal Zone Management Plan. The Department of Ecology maintains supervisory authority and monitors permits issued by local governments. In 1983, the SMA was amended to provide DOE with authority for issuing permits for oil or natural gas exploration activities conducted from state marine waters. The SMA is an approved program under the federal

Coastal Zone Management Act and is therefore protected by federal consistency requirements (i.e., no federal activity can violate any provision of an approved shoreline master plan).

20. The **State Environmental Policy Act** (SEPA, RCW 43.21) requires that an environmental impact statement (EIS) be conducted for any proposed legislation or activity that has a probable, significant adverse impact upon the natural environment. The Act is intended to ensure that government makes informed environmental decisions before issuing approval for any project. It requires government agencies to "utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision making which may have an impact on [the] environment". The Act is binding on all state agencies and is usually administered and enforced through local governmental permit authorities such as city and county planning departments.

21. The **Water Pollution Control Act** (WPCA, RCW 90.48) designates the Department of Ecology as lead state agency for implementation of federal Clean Water Act provisions. DOE is given extensive rule-making and enforcement authority to control and prevent the pollution of all surface and underground waters of the state. The Act authorizes the department to (a) regulate various types of discharge (e.g. oil, chlorinated organics, and agricultural runoff); (b) issue waste disposal permits and regulate treatment facilities; (c) delineate and monitor sewage drainage basins; (d) issue water quality protection grants; and (f) regulate forest practices that affect water quality. The department is also authorized to recover damages for the destruction of any natural resource(s) due to violations of the Act. This act, together with the Puget Sound Water Quality Management Act and the federal Clean Water Act, form the basis of a comprehensive Water Quality Program at DOE.

22. The **Wildlife Code** (Also referred to as the *Game Code*, RCW 77) is the assimilation of all state laws that directly regulate fresh-water fisheries and upland wildlife resources in the State of Washington. WDW is given paramount responsibility by the Legislature "to preserve, protect, and perpetuate all wildlife species" in the state - both game and non-game. In addition to its primary authority over fresh-water fisheries, WDW regulates all non-game marine invertebrates (e.g. snails and barnacles) and some anadromous fish species. It is also the lead state agency with oversight responsibility for marine mammals. The Wildlife Code regulates fishing; hunting; trapping; transfer, transportation, and importation of game; sale of wildlife; and wild land and wildlife restoration. Section 16.120 of the code authorizes the State Wildlife Commission to extend special protection to individual fish and wildlife species. This section is the basis of authority for the state **"Endangered" and**

"Threatened" Species Lists. The Code also regulates tidelands used as public shooting grounds, protects bald eagles, and extends WDW enforcement jurisdiction throughout all marine areas of the state.

B. Landmark Judicial Decisions

1. **United States v. State of Washington, 1974** (The Boldt Decision, 384 F. Supp. 312, 1974) was a landmark case in the State of Washington concerning the State's ability to condition or limit tribal fishing rights. This is an expansive and complex case. Several important supplemental judgements have been issued since the 1974 decision and, as of February 1993, forty subproceedings of this case were still outstanding. The original suit was filed by the United States, on its own behalf and as trustee for several Washington native tribes, against the State of Washington and others, seeking declaratory and injunctive relief concerning off-reservation treaty fishing rights. Judge Boldt (Senior District Judge of the US District Court, Western District of Washington) ruled that (1) Washington State has the legal authority to regulate the exercise of native tribes' off-reservation treaty right fishing only to the extent necessary for conservation of fishery resources, (2) any one of the plaintiff tribes was entitled to exercise its governmental powers by regulating the treaty right fishing of its members without any state regulation thereof, provided the tribe had and maintained certain specified qualifications and accepted and abided by certain delineated conditions, and (3) certain Washington statutes and regulations, delineated in the opinion, failed to meet the standards governing their applicability to the native exercise of treaty fishing rights and therefore could not lawfully be applied to restrict members of tribes having such rights from exercising same. A significant result of this case is the guarantee that treaty right fishermen may take up to 50% of the harvestable number of fish at usual and accustomed grounds and stations. (West's Federal Supplement)

C. Cooperative Agreements

1. The **Crabber-Towboat Agreement**, formally termed the "Towboat/Fishing Lane Negotiations," applies to most of the west coast of the United States. Due to mutual interference between West Coast crab fishermen and towboats with tows, a non-binding agreement was reached in 1971 to provide towing lanes for towboats along a major portion of the West Coast. Almost every year since, a meeting has been held to review these towboat lanes; some significant changes have been made.

The general agreement is that crab fishermen will not put crab pots in the designated lanes. If they choose to do so, they forfeit the right to complain if tugs and tows destroy their pots. The towboaters agree to stay within the designated lanes, or well outside the fishing areas, as long as weather and ship

safety allow. The facilitator of negotiations publishes and distributes a series of charts delineating the towboat lanes in the affected areas and issues revisions when negotiated changes are made. Regulatory authorities recognize the existence of this voluntary agreement and have elected not to regulate the activity as long as the two industries - fishing and towing - can resolve conflicts through mutual agreement.

Prior to 1990, negotiations were led by the Oregon State University Sea Grant Extension Program. In January 1990, the Northwest Towboat Association agreed to organize annual lane negotiation meetings and assume responsibility for chart production and distribution. The costs of the mutual agreement are shared by the towboat and crab fishing industries.

2. The **Timber, Fish, and Wildlife Agreement** (TFW) of 1987 was a non-binding mediated resource management plan between forest land owners, native tribes, natural resource management agencies, and environmental groups. Following passage of the Forest Practices Act of 1974 (RCW 76.09) by the Washington State Legislature, conflict over timber harvests escalated dramatically. TFW evolved to break the deadlock of litigation and conflict surrounding forest practices on non-federal land in Washington State. It has no formal or legal status, and thus depends on the good faith of the TFW cooperators and the adopted rules. The agreement establishes "interdisciplinary (ID) teams" to assess proposed timber harvest sites on a case-by-case basis to determine the harvest method and conditions that best minimize environmental, ecological, and cultural damage. Teams consist of resource managers, harvesters, biologists, and tribal representatives to develop integrated, balanced plans for each site. The Department of Natural Resources retains final authority for approving all harvest plans but coordinates with the ID teams to work out problems. TFW is designed to resolve such conflicts as clear cutting and over-siltation of rivers and estuaries. The agreement identifies and protects spawning areas, wildlife corridors and other sensitive habitat through land set-asides known as Riparian Management Zones and Upland Management Areas. It also contains a research component to investigate impacts of forest practices on the environment. TFW indirectly affects the marine zone through its impact on anadromous fisheries and through reduction of siltation in estuaries. The TFW Agreement has a stated lifetime of eight years, at which time the parties will assess the effectiveness of the program and decide whether or not to continue the agreement.

D. State Agencies and Local Authorities

1. **Cities and Counties** have primary responsibility for administering shorelines master programs and adopting other land use regulations. Counties and cities protect marine resources through shoreline development permitting; development of comprehensive growth management plans; and ordinances

regulating zoning, sensitive areas protection, grading and clearing, and drainage. In addition, local governments may use SEPA to protect wetlands and other sensitive areas.

2. **Department of Agriculture** coordinates aquaculture interests in the state.

3. **Department of Ecology** is the state's primary environmental agency to manage, protect, and enhance the state's air, land, and water resources. The responsibilities and opportunities for protecting habitat are legislatively mandated as well as delegated by the federal government. DOE administers permit programs under the Clean Water Act and the Clean Air Act. The Department has extensive authority in all matters concerning pollution and hazardous waste in the state and monitors the health and welfare of the state's natural resources. DOE also administers the Shoreline Management Program at the state level, conducts environmental research and investigations, and provides expert advice to the Governor and Legislature on environmental matters.

4. **Department of Fisheries** protects and manages the state's food fish and shellfish resources. Under that general authority, the Department manages major recreational and commercial marine fisheries and protects fishery habitat. WDF reviews all proposed construction plans in coastal waters for impacts to fisheries and fishery habitats and may approve, condition or deny such projects through the Hydraulics Permit program. The Department's Habitat Investigation Division is responsible for the pro-active assessment and protection of marine habitats critical to the marine fish resources of Washington. The Shellfish Program is responsible for management and protection of classified shellfish resources on public lands. WDF has a marine law enforcement division to assure compliance with the provisions of the state fisheries code.

5. **Department of Health** has authority over shellfish beds, processing, and distribution. The Department monitors shellfish beds for signs of contamination that pose a health risk to the public and has the authority to order closures when unsanitary conditions exist.

6. **Department of Natural Resources** manages most of the state's marine and upland property holdings. The properties are managed as a public trust. Marine lands are managed for maximum public benefit, while uplands are managed to provide revenue to the state's schools. The state owns approximately 11 square miles of harbor area, 140 square miles of shorelands, and 206 square miles of tidelands. The state also owns the beds of all navigable waters (marine lands below mean lower-low water to three miles offshore, and navigable lakes and rivers). DNR administers aquatic lands under a variety of programs. DNR is

authorized to issue leases, rights of way, and easements. It also may sell resources from aquatic lands.

7. **Department of Transportation**, Marine Division manages the state's ferry fleet. The director of the Marine Division also serves as chair of the State Board of Pilotage Commissioners which prescribes requirements for pilotage and licensing of marine pilots in Washington.

8. **Department of Wildlife** is given paramount responsibility by the Legislature "to preserve, protect, and perpetuate all wildlife species" in Washington State - both game and non-game. The Department has primary authority over fresh-water fisheries, but also regulates all non-game marine invertebrates (e.g. snails and barnacles) and some anadromous fish species. It is also the lead state agency with oversight responsibility for marine mammals and administers a bald eagle protection program. WDW reviews the status of all wildlife species in Washington and selects certain species for special protection under state law by including them on state endangered and threatened species lists. The Department's Habitat Administration Program maintains information bases on upland habitat, stream habitat, and critical habitat areas. WDW, together with the Department of Fisheries, evaluates proposed water-side construction projects for impacts to fisheries habitats and grants, conditions or denies Hydraulics Permits based on its findings. The Department regulates fishing; hunting; trapping; transfer, transportation, and importation of wildlife; sale of wildlife; and wild land and wildlife restoration.

9. **Energy Facility Site Evaluation Council** includes representatives from 13 state agencies. The Council was created as a one-stop agency for permitting major energy facilities within the state. It is a formal regulatory body which acts as the lead agency for the state EIS process for energy facilities, conducts quasi-judicial reviews of project proposals, and makes formal recommendations for gubernatorial action on these matters.

10. **Office of Marine Safety** was created by the Legislature to "provide leadership and coordination in identifying and resolving threats to the safety of marine transportation and the impact of marine transportation on the environment." OMS is responsible for developing standards and programs for oil tank vessel inspection, maritime oil spill prevention and response, and safe transport of oil through Washington waters. The Office is to provide expert analysis of marine transportation issues to the executive and legislative branches of government.

11. **Parks and Recreation Commission** provides recreation opportunities for Washington citizens, preserves

natural heritage areas and conservation areas, and manages 104 developed park properties. The Commission manages several developed state parks in the coastal area for recreation and preservation and is the managing agency for the seashore conservation area - a recreation zone that protects the Pacific Coast beaches of Washington for public enjoyment. The agency has three divisions - Administrative Services, Operations, and Resources Development - which are responsible for land acquisition, park development, scenic rivers, and environmental protection programs.

12. **Puget Sound Water Quality Authority** was established by the Legislature to develop and oversee a comprehensive plan for the restoration and protection of the biological health and diversity of Puget Sound waters. The Authority also co-manages the Puget Sound Estuary Plan with the US Environmental Protection Agency. PSWQA's primary mandate is to collect data on the status of the inland waters of Washington, monitor water quality in the Sound and adjacent waters, to prepare a comprehensive plan to address water quality degradation from point source and non-point source emissions, to educate the public about threats to watersheds and the marine environment, and to coordinate with existing state, federal, and tribal authorities to implement and enforce the provisions of the comprehensive management plan for the Puget Sound Basin. The Director of the Department of Ecology chairs the Puget Sound Water Quality Board; however, the Authority maintains a great degree of autonomy

III. FEDERAL JURISDICTION

A. Federal Statutes

Like State authorities, Federal programs vary greatly in approach and scope, ranging from fairly broad-based legislation for resource conservation and environmental protection (e.g., The National Environmental Policy Act and Magnuson Fishery Conservation and Management Act) to regulation of specific activities and resources.

1. The **Act to Prevent Pollution from Ships** (APPS, 33 USC § 1901 et seq.) The International Convention for the Prevention of Pollution of the Sea by Oil, 1954, and the Oil Pollution Act of 1961 have been superseded by the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 Protocol relating thereto (MARPOL 73/78) and implemented by the Act to Prevent Pollution from Ships, 1980, as amended in 1982, 1987 (APPS). APPS, in implementing Annex I of MARPOL 73/78, regulates the discharge of oil and oily mixtures from seagoing ships, including oil tankers. APPS, in implementing Annex II of MARPOL 73/78, regulates the discharge of noxious liquid substances from seagoing ships. Enforcement of

the Act is the responsibility of the USCG.

When more than 12 nautical miles from the nearest land, any discharge of oil or oily mixtures into the sea from a ship subject to APPS other than an oil tanker or from machinery space bilges of an oil tanker subject to APPS is prohibited except when: 1) the oil or oily mixture does not originate from cargo pump room bilges; 2) the oil or oily mixture is not mixed with oil cargo residues; 3) the ship is not within a Special Area (the study area is not a Special Area for purposes of APPS); 4) the ship is proceeding en route; 5) the oil content of the effluent without dilution is less than 1000 parts per million (ppm); and 6) the ship has in operation oily-water separating equipment, a bilge monitor, bilge alarm or combination thereof (33 CFR 151.10(a).

The restriction on discharges 12 nautical miles or less from the nearest land are more stringent. When within 12 nautical miles of the nearest land, any discharge of oil or oily mixtures into the sea from a ship other than an oil tanker or from machinery space bilges of an oil tanker is prohibited except when: 1) the oil or oily mixture does not originate from cargo pump room bilges; 2) the oil or oily mixture is not mixed with oil cargo residues; 3) the oil content of the effluent without dilution does not exceed 15 ppm; 4) the ship has in operation oily-water separating equipment, a bilge monitor, bilge alarm, or combination thereof; and 5) the oily-water separating equipment is equipped with a 15 ppm bilge alarm. NOTE: In the navigable waters of the U.S., the CWA, section 311(b)(3) and 40 CFR 110 govern all discharges of oil and oily mixtures (33 CFR 151.10(b).

A tank vessel subject to APPS may not discharge an oily mixture into the sea from a cargo tank, slop tank or cargo pump bilge unless the vessel: 1) is more than 50 nautical miles from the nearest land; 20 is proceeding en route; 3) is discharging at an instantaneous rate of oil content not exceeding 60 liters per nautical mile; 4) is an existing vessel and the total quantity of oil discharged into the sea does not exceed 1/15,000 of the total quantity of the cargo that the discharge formed a par (1/30,000 for new vessels); 5) discharges, with certain exceptions, through the above waterline discharge point; 6) has in operation a cargo monitor and control system that is designed for use with the oily mixture being discharged; and 7) is outside the Special Areas (33 CFR 157.37.)

APPS is amended by the Marine Plastic Pollution Research and Control Act of 1987 (MPPRCA), which implements Annex V of MARPOL 73/78 in the U.S. The MPPRCA and implementing regulations at 33 CFR 151.51 to 151.77 apply to U.S. Ships (except warships and ships owned or operated by the U.S.) everywhere, including recreational vessels, and to other ships subject to MARPOL 73/78 while in the navigable waters or the Exclusive Economic Zone of the U.S. They prohibit the discharge of plastic or garbage mixed with plastic into any waters and the discharge of dunnage, lining and packing materials that float within 25 nautical miles of the nearest land. Other unground garbage may be discharged beyond 12

nautical miles from the nearest land. Other garbage ground to less than one inch may be discharged beyond three nautical miles of the nearest land. Fixed and floating platforms and associated vessels are subject to more stringent restrictions. "Garbage" is defined as all kinds of victual, domestic and operational waste, excluding fresh fish and parts thereof, generated during the normal operations of the ship and liable to the disposed of continuously or periodically except dishwater, graywaters and certain substances (33 CFR 151.05).

2. The **Clean Air Act** (CAA, 42 USC § 7401 et seq.) sets general guidelines and minimal air quality standards on a nationwide basis in order to protect and enhance the quality of the Nation's air resources. States are responsible for developing comprehensive plans for all regions within their boundaries. Thus, as noted above, discharges of air pollutants over Washington State waters are subject to the control of the Washington Air Quality Control Board.

Per the CAA Amendments of 1990, section 328(a)(1) of the CAA provides that the Administrator of the EPA, following consultation with the Secretary of the Interior and the Commandant of the United States Coast Guard, "by rule, shall establish requirements to control air pollution from OCS sources located offshore of the States along the Pacific...Coast...to attain and maintain Federal and State ambient air quality standards and to comply with part C of title I...New OCS sources shall comply with such requirements on the date of promulgation."

3. The **Clean Water Act** (CWA, (The Federal Water Pollution Control Act) 33 USC § 1251 et seq.) was passed by Congress to restore and maintain the chemical, physical, and biological integrity of the nation's waters. To varying degrees, navigable waters of the United States, the contiguous zone, and the oceans beyond are subject to requirements of the CWA.

The CWA's chief mechanism for preventing and reducing water pollution is the National Pollutant Discharge Elimination System (NPDES), administered by the Environmental Protection Agency (EPA). Under the NPDES program, a permit is required for the discharge of any pollutant from a point source into the navigable waters of the United States, the waters of the contiguous zone, or ocean waters. Within Washington State waters, EPA has delegated NPDES permitting authority to the Washington Department of Ecology. Indian Tribes, however, attain permits directly from EPA.

Since oil and gas development pursuant to Federal lease sales occur beyond State waters, an NPDES permit from EPA is required for discharges associated with this activity. EPA generally grants NPDES permits for offshore oil and gas developments based on published effluent guidelines (40 CFR Part 435). Other conditions beyond these guidelines may, however, be imposed by the Regional Administrator on a case-by-case basis.

The CWA prohibits the discharge of oil or hazardous

substances in quantities that may be harmful to the public health or welfare or the environment, including but not limited to fish, shellfish, wildlife, and public and private property, shorelines and beaches into or upon the navigable waters of the U.S., adjoining shorelines, or into or upon the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the U.S., except, in the case of such discharges into or upon the waters of the contiguous zone or which may affect the above-mentioned natural resources, where permitted under the Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from ships.

When harmful discharges do take place, the National Contingency Plan (NCP) for the removal of oil and hazardous substance discharges (40 CFR Part 300), which is designed to minimize the impacts on marine resources takes effect. The USCG, in cooperation with EPA, administers the NCP. The NCP establishes the organizational framework whereby oil and hazardous substance spills are to be cleaned up. To carry out the NCP, regional plans have been established; the USCG has issued such a plan for Federal Region IX which encompasses the study area. Under the plan, Coast Guard personnel are to investigate all reported offshore spills, notify the party responsible (if known) of its obligation to clean up the spill, and supervise the clean-up operation. The Coast Guard retains final authority over the procedures and equipment used in the cleanup. If the party responsible for the spill does not promptly begin cleanup operations, the Coast Guard may hire private organizations.

The CWA also requires that publicly owned sewage treatment works meet effluent limitations based on effluent reductions attainable through the application of secondary treatment by July 1, 1977 (33 USC § 1311(b)(1)). EPA does have authority, however, to waive the July 1, 1977 deadline for secondary treatment for discharges into marine waters under certain circumstances (33 USC §1311(h)). There are no wastewater effluents currently being discharged into the Olympic Coast Sanctuary study area. However, the Makah Bay Tribe is studying alternatives for discharging effluents from a planned sewage treatment facility located at Makah Bay.

Permits from the Army Corps of Engineers, (COE) which are based on EPA guidelines, are required prior to the discharge of dredged or fill materials into navigable waters that lie inside the baseline from which the territorial sea (defined to be three nautical miles of shore) is measured and fill materials into the territorial sea (33 USC § 1344; 40 CFR 230.2).

Finally, the CWA requires vessels to comply with marine sanitation regulations issued by EPA and enforced by the USCG (33 USC § 1322).

4. The **Coastal Zone Management Act** (CZMA, 16 USC § 1451 et seq.) was designed to protect the environmental integrity of coastal areas by providing for state and local planning and management of human alterations to the coastal zone. The Act requires that federal actions be consistent with approved state coastal management programs. The consistency review provision of the law gives states a powerful tool to influence federal activities that impact state waters and coastal areas (e.g. offshore oil development). The Act is administered by the Office of Ocean and Coastal Resource Management (OCRM), National Oceanic and Atmospheric Administration (NOAA). The Act uses financial incentives to encourage states to develop coastal zone management plans, then guarantees that all federal activities that directly affect a state's coastal zone will have to be consistent with the federally approved state coastal programs. In 1976, the State of Washington was the first state to have a Coastal Zone Management Plan approved under this Act.

5. The **Comprehensive Environmental Response, Compensation, and Liability Act** (CERCLA, 42 USC § 9601 et seq.), whose principal purpose is the cleanup of hazardous waste sites, consists of four fundamental elements. First, it creates an information-gathering and evaluation system to help Federal and state governments categorize hazardous waste sites and prioritize responses. Second, CERCLA provides Federal authority to respond to releases of hazardous substances. Response actions are carried out pursuant to the National Contingency Plan (NCP). Third, CERCLA establishes a Hazardous Substance Trust Fund to pay for removal and remedial actions and related costs. Finally, CERCLA makes persons responsible for hazardous substance releases liable for costs of removal or remedial action incurred by the Federal or state government; other necessary costs of response incurred by others; damages for injury, destruction or loss of natural resources; and costs of any health assessment or health effects study carried out pursuant to the Act.

6. The **Endangered Species Act** (ESA, 16 U.S.C. § 1531 et seq.) provides protection for listed species of animals and plants in both State waters and the waters beyond. The U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) determine which species need protection and maintain a list of endangered and threatened species. One of the most protective provisions of the Endangered Species Act is the prohibition against takings. The term "take" is defined broadly to mean "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct" (16 USC § 1532 (19)). The FWS regulations define the term "harm" to mean an act which actually kills or injures wildlife, including significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. The regulations define the term "harass" to mean "an intentional

or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering" (50 CFR 17.3).

The ESA also provides for the indirect protection of endangered species and their habitats by establishing a consultation process designed to insure that projects authorized, funded or carried out by Federal agencies are not likely to jeopardize the continued existence of endangered or threatened species, or "result in the destruction or adverse modification of habitat of such species which is determined... to be critical" (16 USC §1536). Critical habitat areas for endangered species are designated by the FWS and NMFS. The 1978 amendments to the Act establish a Cabinet level committee authorized to exempt Federal agencies (through an elaborate review process) from compliance with their responsibilities with regard to the jeopardy standard and critical habitat.

Several species of marine mammals found in the study area are listed as endangered or threatened species. These include: 1) sea otter; 2) gray whale; 3) fin whale; 4) right whale; 5) sei whale; 6) blue whale; 7) humpback whale; and 8) sperm whale.

Species of birds listed as endangered or threatened found in the study area include: 1) California brown pelican; 2) American peregrin falcon; 3) short tailed albatross; 4) Aleutian Canada goose; 5) American bald eagle. In addition the State of Washington lists the snowy plover as an endangered species, as well as the marbled murrelet.

7. The **Federal Aviation Act** (49 USC § 1301 et seq.) gives the Secretary of Transportation broad powers to promote air commerce and to regulate the use of navigable airspace to ensure aircraft safety and efficient use of such airspace. In furtherance of the mandate, the Federal Aviation Administration, within the Department of Transportation publishes aeronautical charts which provide a variety of information to pilots, including the location of sensitive areas which should be avoided.

8. The **Fish and Wildlife Act** of 1956 (16 USC §§ 742a-742j; 70 Stat. 119 as amended) Public Law 84-1024 initially established the Fish and Wildlife Service under the Assistant Secretary for Fish and Wildlife and a Commissioner for Fish and Wildlife. The Service consisted of the Bureau of Sport Fisheries and Wildlife and a Bureau of Commercial Fisheries, each having a Director. In 1970, the Bureau of Commercial Fisheries was transferred to the Department of Commerce. The Act was amended by P.L. 93-271 to abolish the office of Commissioner and establish the U.S. Fish and Wildlife Service under a Director. Under this Act, the Secretary is authorized to take such steps as may be required for the development, advancement, management, conservation, and protection of fish and wildlife resources

including but not limited to research, development of existing facilities, and acquisition by purchase or exchange of land and water or interest therein. The Act also authorizes the Service to accept gifts of real or personal property for its benefit and use in performing its activities and services.

9. The **Fish and Wildlife Coordination Act** (16 U.S.C. § 661 et seq.) authorizes the Secretary of the Interior to, among other things: (1) provide assistance to, and cooperate with, Federal, State, and public or private agencies and organizations in the development, protection, rearing, and stocking of all species of wildlife, resources thereof, and their habitat, in controlling losses of the same from disease or other causes, in minimizing damages from overabundant species, in providing public ... fishing areas, including easements across public lands for access thereto, and in carrying out other measures necessary to effectuate the purposes of this Act; (2) make surveys and investigations of the wildlife of the public domain, including lands and waters or interests therein acquired or controlled by any agency of the United States; and (3) accept donations of land and contributions of funds in furtherance of the purposes of this Act.

Such areas made available to the Secretary of the Interior pursuant to this Act are administered by the Secretary directly or in pursuant to cooperative agreements in accordance with such rules and regulations for the conservation, maintenance, and management of wildlife, resources thereof, and its habitat thereon, as may be adopted by the Secretary of the Interior and the head of the department or agency exercising primary administration of such areas.

10. The **Magnuson Fishery Conservation and Management Act** (MFCMA, 16 USC § 1801 et seq.) provides for the conservation and management of all fishery resources between 3 and 200 nm (5.6-370 KM) offshore. The National Marine Fisheries Service (NMFS) of the Department of Commerce is charged with establishing guidelines for and approving fishery management plans (FMPs) prepared by regional fishery management councils for selected fisheries. These plans determine the levels of commercial, sport and tribal fishing consistent with achieving and maintaining the optimum yield of each fishery. The waters of the study area are within the jurisdiction of the Pacific Fishery Management Council (PFMC).

In addition to non-benthic fishery resources located outside state waters, benthic continental shelf fishery resources located outside state waters such as crabs and sea urchins are also subject to management under the MFCMA. Within Federal waters the MFCMA is enforced by the U.S. Coast Guard (USCG) and NMFS. The Act empowers the Secretary of Commerce to enter into agreements with any State agency for enforcement purposes in State waters. Such an agreement exists between the WDF and NMFS whereby both parties have been deputized to enforce each other's laws. As a

result, PFMC fishery plan enforcement personnel can now enforce State law within 3 nm (5.6 km) and State officers can enforce Federal laws between 3-200 nm (5.6-370 km).

11. The **Marine Mammal Protection Act** (MMPA, 16 USC § 1361 et seq.) provides protection to marine mammals in both state waters and the waters beyond. It is designed to protect all species of marine mammals. As specified in the MMPA, the Department of Interior, U.S. Fish and Wildlife Service (FWS), is responsible for the management of polar bears, walrus (a pinniped), northern and southern sea otters, three species of manatees, and dugong; and Department of Commerce, National Marine Fisheries Service (NMFS), is responsible for all other marine mammals. The Marine Mammal Commission advises these implementing agencies and sponsors relevant scientific research. The primary management features of the Act include: 1) a moratorium on "taking" of marine mammals; 2) the development of a management approach designed to achieve an "optimum sustainable population" (OSP) for all species or population stocks of marine mammals; and 3) protection of populations determined to be "depleted."

MMPA defines "take" broadly to include "harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 USC § 1362(12)). The term "harass" has been interpreted to encompass acts unintentionally adversely affecting marine mammals, such as operation of motor boats in waters in which these animals are found. The MMPA allows certain exceptions to the moratorium. First, the Secretary may issue permits for public display or scientific research. Second, the Secretary may grant exemptions for takes of small numbers of marine mammals incidental to their lawful activities. Third, the Secretary may make a special waiver of the moratorium on taking for particular species of populations of marine mammals provided that the species or population being considered is at or above its determined optimum sustainable population. No such waiver, however, has been granted concerning any marine mammal found in the area under consideration.

Marine mammal species whose population is determined to be depleted receive additional protection. Under only limited circumstances may permits be issued for the taking of any marine mammal determined to be depleted, including but not limited to scientific research and enhancing the survival or recovery of a species or stock of depleted species. Marine mammals listed on the Federal threatened and endangered list include grey, right, fin, sei, blue, humpback, and sperm whales, and the northern (Stellar) sea lion.

The 1988 amendments to the MMPA added requirements that observers be carried aboard commercial fishing vessels to determine levels of incidental take of marine mammals. Commercial fishing activities are divided into categories on the basis of gear-type and associated levels of potential incidental take of marine mammals. For example, Category 1 vessels such as gillnetters may have to carry an observer if requested by NMFS

and the Secretary of Commerce may place observers on vessels in Categories 2 and 3 with the consent of the vessel owner. This observer program has been in operation since early 1990 and although the authority for its management is with the NMFS the day-to-day operational management may be delegated to state and local authorities.

12. The **Marine Protection, Research, and Sanctuaries Act (Title I)** (MPRSA, 16 USC 1431 § et seq.), also known as the Dumping Act, prohibits 1) any person from transporting, without a permit, from the US any material for the purpose of dumping it into ocean waters (defined to mean those waters of the ocean seas lying seaward of the baseline from which the territorial sea is measured) and 2) in the case of a vessel or aircraft registered in the US or flying the US flag or in the case of a US agency, any person from transporting, without a permit, from any location any material for the purpose of dumping it into ocean waters. Title 1 also prohibits any person from dumping, without a permit, into the territorial sea or the contiguous zone extending 12 nautical miles seaward from the baseline of the territorial sea to the extent that it may affect the territorial sea or the territory of the US, any material transported from a location outside of the US. EPA regulates, through the issuance of permits, the transportation for the purpose of dumping, and the dumping of all materials except dredged material; COE regulates the transportation, for the purpose of dumping, of dredged material. The COE permits are subject to EPA review and approval. Title I also makes it unlawful for any person to dump into ocean waters, or to transport for the purposes of dumping into ocean waters, sewage sludge or industrial waste.

13. The **Migratory Bird Treaty Act** (MBTA, 16 USC § 703 et seq.) The essential provision of the Migratory Bird Treaty Act, which implements conventions with Great Britain, Mexico, the USSR, and Japan, makes it unlawful, except as permitted by regulations, "to pursue, hunt, take, capture, kill...any migratory bird, any part, nest or egg" or any product of any such bird protected by the Convention (16 USC § 703). The Secretary of the Interior is charged with determining when, and to what extent, if at all, and by what means to permit these activities. Each treaty establishes a "closed season" during which no hunting is permitted. A distinction is made between game and nongame birds. The closed season for migratory birds other than game birds is year-round. The game birds found in the study area are ducks, geese, mergansers, and brants. As specifically permitted by the Act, the Washington Department of Wildlife has supplemented this authority with its own regulations (see Fish and Game Code Discussion above).

14. The **National Aquaculture Act** (16 USC § 2801 et seq.), as amended, encourages the development of aquaculture in the US by 1) declaring a national aquaculture policy, 2)

establishing and implementing a national aquaculture development plan, 3) directing the Department of Agriculture to act as the lead federal agency for promoting and assisting aquaculture development in the public and private sectors of the economy, and 4) establishing a National Aquaculture Information Center within the Department of Agriculture. The Act primarily instructs USDA to collect information through various means on the status and needs of the aquaculture industry in the US and prepare recommendations to the Congress on actions necessary for the growth and expansion of this industry.

15. The **National Environmental Policy Act** (NEPA, 42 USC § 4321 et seq.) was enacted "to ensure that environmental considerations are considered and weighed appropriately in government planning, policy making, and action." NEPA directs federal agencies to use an interdisciplinary approach in making decisions that may have an impact on the environment.

In proposing a major federal action that significantly affects environmental quality, a federal agency must consult with other federal agencies that have jurisdiction over any environmental aspect of the proposed action. The agency must prepare a detailed Environmental Impact Statement (EIS) describing the anticipated effects of the proposed action, any adverse environmental effects that cannot be avoided, and alternatives to the proposed action. The EIS must discuss the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. It must also describe any irreversible and irretrievable resource commitments that the proposed action would entail.

One of the Act's most important features is that it provides substantial opportunities for the public to review and comment on actions by federal agencies that have significant environmental impacts. Federal agencies are required to circulate NEPA documents for review and comment to federal, state, and local environmental agencies as well as to the President, the Council on Environmental Quality, and the public. In addition, federal agencies are required to hold public hearings in the affected area to receive public testimony, and formally respond to all comments received on EISs.

16. The **National Historic Preservation Act** (NHPA, 16 USC § 470 et seq.) authorizes the Secretary of the Interior to maintain a National Register of "districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, and culture." Sites have been listed on the National Register which include or are composed entirely of ocean waters and submerged lands within state waters or on the Outer Continental Shelf.

Any federal agency conducting, licensing, or assisting an undertaking which may affect a property listed or eligible for listing on the National Register must prior to the action take into account the effect of the undertaking on the property and

provide the Advisory Council on Historic Preservation a reasonable opportunity to comment on the proposed action (16 USC § 470f). The Basic criteria applied by the Council is whether the undertaking will change the quality of the site's historic, architectural, archeological, or cultural character (36 CFR Part 800).

17. The **National Park Service Organic Act** of 1916 (16 USC §§ 1, 2-4) established the National Park Service within the Department of Interior to "promote and regulate the use of the federal areas known as national parks, monuments, and reservations." The Act states that the purpose of national parks is to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The Olympic National Park was established and placed under the governance of this act by a legislative amendment of 1938.

18. The **National Wildlife Refuge System Administration Act** of 1966 (16 USC §§ 668dd-668ee; 80 Stat. 927, as amended) Public Law 89-669 defines the National Wildlife Refuge System as including wildlife refuges, areas for the protection and conservation of fish and wildlife which are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, and waterfowl production areas. The Secretary is authorized to permit any use of an area provided such use is compatible with the major purposes for which such area was established. The purchase consideration for rights-of-way go into the Migratory Bird Conservation Fund for the acquisition of lands. By regulation, up to 40 percent of an area acquired for a migratory bird sanctuary may be opened to migratory bird hunting unless the Secretary finds that the taking of any species of migratory game birds in more than 40 percent of such area would be beneficial to the species. The Act requires an Act of Congress for the divestiture of lands in the system, except (1) lands acquired with migratory bird funds may be divested upon approval of the Migratory Bird Conservation Commission; and (2) any lands can be removed from the system by land exchange, or if brought into the system by a cooperative agreement then pursuant to the terms of the agreement.

19. The **Oil Pollution Act** of 1990 (OPA, P.L. 101-380, 33 USC § 2701 et seq.) creates a comprehensive prevention, response, liability, and compensation regime for dealing with vessel and facility-based oil pollution. The OPA provides for environmental safeguards in oil transportation greater than those existing before its passage by: setting new standards for vessel construction, crew licensing, and manning; providing for better contingency planning; enhancing Federal response capability; broadening enforcement authority; increasing penalties; and authorizing multi-agency research and development. A one billion

dollar trust fund is available to cover clean-up costs and damages not compensated by the spiller.

Title I creates a liability and compensation regime for vessel and facility-source oil pollution. Any party responsible for the discharge, or the substantial threat of discharge, of oil into navigable waters or adjoining shorelines or the Exclusive Economic Zone is liable for the removal costs and damages, including assessment costs; for injury, destruction, loss or loss of use of natural resources, injury to, or economic losses resulting from destruction or real or personal property; subsistence use of natural resources, net lost government revenues, lost profits or impairment of earning capacity; and net costs of providing increased or additional public services during or after removal activities. NOAA has the responsibility for promulgating damage assessment regulations and following the regulations will create a rebuttable presumption in favor of a given assessment. Sums recovered by a trustee for natural resource damages will be retained in a revolving trust account to reimburse or pay costs incurred by the trustee with respect to those resources.

Title II makes numerous amendments to conform other Federal statutes, particularly section 311 of the Clean Water Act, to the provisions of the Oil Pollution Act.

Title III encourages the establishment of an international inventory of spill removal equipment and personnel.

Title IV is divided into three subtitles: A) Prevention; B) Removal; and C) Penalties and Miscellaneous. Subtitle A gives added responsibility to the Coast Guard regarding merchant marine personnel, including the review of alcohol and drug abuse and review of criminal records prior to issuance and renewal of documentation. It also amends the Ports and Waterways Safety Act to: require the Coast Guard to "require appropriate vessels which operate in an area of a vessel traffic service to utilize or comply with that service," and 2) authorize the construction, improvement, and expansion of vessel traffic services.

Further, Subtitle A establishes double hull requirements for tank vessels. Most tank vessels over 5,000 gross tons will be required to have double hulls by 2010, while vessels under 5,000 gross tons will be required to have a double hull or double containment systems by 2015. All newly constructed tankers must contain a double hull (or double containment systems if under 5,000 gross tons), while existing vessels are phased out over a period of years.

Subtitle B amends subsection 311(c) of the Clean Water Act, requiring the Federal Government to ensure effective and immediate removal of a discharge, and mitigation or prevention of a substantial threat of a discharge, of oil or a hazardous substance into or on the navigable waters, on the adjoining shorelines, into or on the waters of the Exclusive Economic Zone, or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the U.S. It also requires a revision and republication of the National

Contingency Plan within one year which will include, among other things, a Fish and Wildlife response plan developed in consultation with NOAA and U.S. Fish and Wildlife Service. Nothing in Subtitle B preempts the rights of States to require stricter standards for removal action.

Subtitle C alters and increases civil and administrative penalties for illegal discharges and violations of regulations promulgated under the Clean Water Act.

Title VII authorizes an oil pollution research and technology development program, including the establishment of an interagency coordinating committee that is chaired by Department of Transportation and composed of representatives from the Departments of Energy, the Interior, Transportation, Commerce (including NOAA), and Defense, Environmental Protection Agency, Federal Emergency Management Agency, National Aeronautics and Space Administration, as well as such other Federal agencies as the President may designate.

Title IX amends the Oil Spill Liability Trust Fund and increases from $500 million to $1 billion the amount that can be spent on any single oil spill incident, of which no more than $500 million may be spent on natural resource damage, assessments and claims.

20. The **Outer Continental Shelf Lands Act** (OCSLA, 14 USC § 1331 et seq.), as amended in 1978 and 1985, establishes federal jurisdiction over the mineral resources of the Outer Continental Shelf (OCS) beyond 3 nm (5.6 km) of shore and gives the Secretary of Interior primary responsibility for managing OCS mineral exploration and development. The Secretary's responsibility has been delegated to the Minerals Management Service (MMS).

MMS is charged with supervising OCS oil operations, including approval of exploration, development and production plans and applications for pipeline rights of way on the OCS. Lessees are required to include in exploration, development and production plans specific information concerning emissions and their potential impacts on coastal areas. Such authority includes the enforcement of regulations made pursuant to the OCSLA (30 CFR Parts 250 and 256) and the enforcement of stipulations applicable to particular leases.

In unique or special areas, the MMS may impose special lease stipulations designed to protect specific geological and biological phenomena. These stipulations may vary among lease sale tracts and sales.

In addition to DOI, both the Army Corps of Engineers (COE) and the US Coast Guard (USCG) have responsibility over OCS mineral development to the extent that such development affects navigation (43 USC 1333). COE is responsible for ensuring, through a permit system, that OCS structures, including pipelines, platforms, drill ships and semi-submersibles do not obstruct navigation. USCG assures that structures on the OCS are properly marked and that safe working conditions are maintained

onboard.

21. The **Ports and Waterways Safety Act** (PWSA, 33 USC § 1231 et seq.) as amended by the Port and Tanker Safety Act of 1978 (and the Oil Pollution Act of 1990), is designed to promote navigation and vessel safety and the protection of the marine environment. The PWSA applies both in state waters and the waters beyond out to 200 nautical miles.

The PWSA authorizes the U.S. Coast Guard to construct, operate, maintain, improve or expand vessel traffic services and control vessel traffic in ports, harbors, and other waters subject to congested vessel traffic. The Oil Pollution Act of 1990 amends the PWSA to mandate that the USCG "require appropriate vessels which operate in the area of a vessel traffic service to utilize or comply with that service." The USCG, in conjunction with the Canadian Coast Guard operates a Traffic Separation Scheme (TSS) and a Vessel Traffic Service (VTS) in the Strait of Juan de Fuca to service the tankers, barges, fishing vessels and ferries.

In addition to vessel traffic control, the USCG regulates other navigational and shipping activities. It has promulgated numerous regulations relating to vessel design, construction, and operation designed to minimize the likelihood of an accident and reduce vessel source pollution.

The 1978 amendments of the PWSA establish a comprehensive program for regulating the design, construction, operation, equipping, and banning of all tankers using U.S. ports to transfer oil and hazardous materials. These requirements are, for the most part, in agreement with protocols (passed in 1978) to the International Convention for the Prevention of Pollution from Ships, 1973, and the International Convention on Safety of life at Sea, 1974.

The USCG is also vested with the primary responsibility for maintaining boater safety, including the tasks of conducting routine vessel inspections and coordinating rescue operations.

22. The **Rivers and Harbors Act** (33 USC § 401 et seq.) prohibits the unauthorized obstruction of navigable waters of the United States. The construction of any structure or any excavation or fill activity in the navigable waters of the U.S. is prohibited without a permit from the COE. Section 13 (33 USC § 407) prohibits the discharge of refuse into navigable waters of the U.S., but has been largely superseded by the CWA, discussed above.

23. The **Submerged Lands Act** (SLA, 43 USC § 1301 et seq.) distributes between the states and the federal government title to offshore lands and natural resources (including minerals and all living resources). The Act grants to the states title and ownership of the seabed from the coastline to 3 geographical miles (nautical miles) offshore in the Atlantic and Pacific Oceans and to 3 marine leagues (approximately 10 miles) in the

Gulf of Mexico. States thus have "the right and power to manage, administer, lease, develop and use the said lands and natural resources all in accordance with applicable state law..." The federal government retains the constitutional right "to regulate or improve navigation, [and] to provide for flood control or the production of power..." within state waters.

24. The **Wilderness Act** of 1964 (16 USC §§ 1131-1136; 78 Stat. 890) directs the Secretary of the Interior to review, within ten years every roadless area of 5,000 acres or more and every roadless island regardless of size within the National Wildlife Refuge System and to recommend to the President the suitability of each such area for formal preservation under a special act of Congress.

The Wilderness Act stipulates that management of designated areas should be such as to "leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas,..." To this end, the Act generally prohibits any construction of roads or facilities, logging, any use of motorized vehicles, motorized equipment or motorboats. The Act also provided for termination within designated Wilderness areas of any new entry under the Mining Law of 1872 after December 31, 1983, although valid mineral rights existing as of that date are maintained.

The Act's definition states, in Part that "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Further, the definition lists as one of an area's attributes that it "has outstanding opportunities for solitude or a primitive and unconfined type of recreation." Wilderness is the most protective form of designation that can be applied to Federal resource lands, given the prohibitions spelled out in the authorizing Act.(Siehl, George. 1991. "Natural Resource Issues in National Defense Programs. Congressional Research Service Report for Congress. The Library of Congress.)

B. Federal Agencies and Authorities

1. **Army Corps of Engineers** (COE) must approve any plans for development within navigable waters of the United States. This authority was granted by the Rivers and Harbors Act of 1899 and was primarily intended to assure efficient and safe commerce through the nation's waters. The review process now involves socio-economic and environmental impact reviews. The Corps thus has authority over such activities as dredging, ocean dumping, offshore oil platform installation, breakwater construction, marina construction, harbor development, marine outfall installation, etc.

2. **Coastal States Organization** (CSO) promotes the

interests of 35 coastal state and territorial governors in United States coastal affairs.

3. **Department of Commerce** (DOC) regulates international maritime trade through the sanctuary area. However, the Department's most direct influence in the marine sector is through the activities of the National Oceanic and Atmospheric Administration (NOAA). NOAA conducts oceanic and atmospheric research and monitoring on behalf of the federal government, charts the nation's coastal waterways, operates the National Weather Service, manages fishery resources within the nation's 200-mile Exclusive Economic Zone (EEZ), provides expertise in marine pollution prevention and clean-up, administers the federal Coastal Zone Management Program, and enforces marine mammal and fishery protection laws. The National Marine Fishery Service (NMFS) is the branch of NOAA responsible for enforcing US fishery regulations and tracking the health and population status of commercial fishery stocks. NMFS also inspects seafood products and processing facilities for compliance with health standards and enforces the Marine Mammal Protection Act.

4. **Department of Defense** (DOD) conducts on-going activities in the sanctuary area - primarily surface and air military exercises. Some testing and underwater research is also conducted in the area. DOD is exempt from certain regulatory requirements due to national security reasons.

5. **Department of the Interior** (DOI) manages for the federal government a significant amount of tidelands and coastal uplands abutting the eastern sanctuary boundary. The National Park Service manages federal coastal lands on the western Olympic Peninsula and the US Fish and Wildlife Service manages all coastal islands and rocks in the area. The Department has complete police power over the lands of the Olympic National Park and the Washington Islands National Wildlife Refuge.

In addition to the above lands, the Department manages all submerged lands and mineral resources from 3 nautical miles offshore to the edge of the continental shelf. The Minerals Management Service has authority to lease federal offshore tracts for oil exploration and development; however, the 1992 reauthorization of the Marine Protection, Research, and Sanctuaries Act permanently banned all oil extraction activities within the final boundaries of the sanctuary.

6. **Department of Transportation** (DOT) regulates occupational safety and health on commercial offshore structures. Through the US Coast Guard, it responds to maritime emergencies, inspects vessels, recommends shipping lanes and "areas to be avoided" to the International Maritime Organization, and officiates as on-scene coordinator for oil spills at sea. The Coast Guard regulates and administers vessel licensing, maintains

aids to navigation, conducts maritime law enforcement, and provides coastal defense to the nation. The Coast Guard has broad authority to enforce many laws within the marine environment, including wildlife protection.

7. **Environmental Protection Agency** (EPA) is responsible for the control and abatement of pollution in the categories of air, water, solid waste, pesticides, radiation, and toxic substances. The Agency uses a variety of research, monitoring, regulatory and enforcement activities to carry out its mission. It has direct regulatory authority nationwide for many aspects of waste treatment and disposal. EPA is the lead federal agency for implementing and enforcing the provisions of the Clean Water Act and the Clean Air Act. The Agency has authority over offshore dredge disposal, marine sewage outfalls, point source effluent discharges, air pollution in nearshore areas, and hazardous spills on land in the coastal zone.

8. **Federal Aviation Administration** (FAA) has authority over commercial and civil aviation matters in the sanctuary area and regulates such factors as minimum flight altitude and landing areas.

9. **Federal Maritime Commission** (FMC) regulates the waterborne foreign and domestic offshore commerce of the United States, assures that United States international trade is open to all nations on fair and equitable terms, and protects against unauthorized, concerted activity in the waterborne commerce of the United States. This is accomplished by maintaining surveillance over steamship conferences and common carriers by water; assuring that only the rates on file with the Commission are charged; reviewing agreements between persons subject to the Shipping Act of 1984 and the Shipping Act of 1916; guaranteeing equal treatment to shippers, carriers, and other persons subject to the shipping statutes; and assuring that adequate levels of financial responsibility are maintained for indemnification of passengers.

10. **National Oceanic and Atmospheric Administration** (NOAA) See Department of Commerce.

11. **National Park Service** (NPS) See Department of Interior.

12. **US Coast Guard** (USCG) See Department of Transportation.

13. **US Fish and Wildlife Service** (USFWS) See Department of Interior.

IV. TRIBAL AUTHORITIES

A. Treaty of Neah Bay and the Treaty of Olympia (1855)

The Stevens Treaties of 1855 include the Treaty of Neah Bay (January 31, 1855. 12 Stat. 939) with the Makah Indians and the Treaty of Olympia (July 1, 1855. 12 Stat. 971) whose signatories include the Quinault, Quileute and Hoh Tribes. These treaties secure for these coastal Indian tribes the right to fish and hunt in their usual and accustomed fishing grounds. The Treaty of Neah Bay included the guaranteed right of the Makah to hunt and collect whales in their usual and accustomed harvesting areas. The Treaties also secure access to Tribal lands for Treaty Tribes.

The usual and accustomed fishing areas were delineated by the Boldt Decision in 1974 which concluded that indian tribes of Puget Sound and coastal Washington have the right to an opportunity to take up to 50 percent of the total number of harvestable salmonids, as well as the right to regulate their own fishers (United States v. Washington, 384 F. Supp. 312, 1974). All of the Olympic Coast National Marine Sanctuary waters are designated as Usual and Accustomed Fishing areas.

Aboriginal and treaty-secured rights can only be abrogated if there is clear evidence that Congress actually considered both the conflict between its intended action and Indian treaty rights and chose to resolve the conflict by abrogating the treaty. Regulations which restrict the exercise of treaty-secured hunting and fishing rights are lawful only if they are "reasonable and necessary" to "prevent demonstrable harm" to a harvested species or stock (United States v. Washington, 384 F. Supp. 312,342, 415 (W.D.Wash. 1974) aff'd, 520 F.2d 676 (9th Cir. 1975) and are the least restrictive alternative for achieving this purpose (United States v. Washington, 384 F. Supp. at 342.

V. INTERNATIONAL AUTHORITIES

A. The U.S.-Canada Pacific Salmon Interception Treaty (Pacific Salmon Treaty)

The Pacific Salmon Treaty was signed on January 28, 1985 to provide a means to manage, conserve and rebuild stocks of the five species of salmon that inhabit coastal waters of Oregon, Washington, Alaska and Canada. The primary purpose of the Treaty is to equitably address the problem of "interceptions" -- that is, the harvest of one country's salmon by foreign fishermen. The Treaty requires the U.S. and Canada to prevent overfishing and to provide for optimum production while ensuring that each country receives compensation equal to the salmon originating in its waters. The Treaty does not affect or modify existing aboriginal rights established by treaty or Federal law.

The Treaty established the Pacific Salmon Commission as its decision-making body. Implementing the Treaty involves international rules, numerous parties and several competing interests. The Commission deals with five species of salmon, three major commercial gear groups, plus sport and Indian fishermen. In addition, the Commission deals with four governments and various Indian tribes with a treaty right to a share of the harvestable fish passing their traditional fishing grounds. The Commission itself does not regulate the salmon fisheries, but provides regulatory advice and recommendations to the two countries. Pursuant to the Treaty, each party is required to conduct joint research on migratory and exploitation patterns and extent of interceptions. Further, the parties must share data on proposed enhancement programs.

B. The 1979 Protocol to the Halibut Convention of 1953

The International Pacific Halibut Commission (IPHC), formerly the International Fisheries Commission (IFC), was established in 1923 by a Convention between Canada and the United States for the preservation of the Pacific halibut fishery of the North Pacific Ocean and the Bering Sea. The Commission's authority was gradually expanded and revised by successive Conventions: namely the 1930, 1937, and 1953 Conventions. The 1953 Convention was amended by the Protocol of 1979. In the spring of 1982, the United States passed the necessary legislation to give effect to the 1979 protocol and to repeal the previous enabling legislation; the amended Northern Pacific Halibut Act of 1937.

The Halibut Convention requires that the Commission allocate halibut between U.S. and Canadian fisheries, but in not explicit on domestic allocation. The Commission assumed limited allocative responsibility, but made allocative decisions only after consulting with representatives of the national governments. In 1987, the U.S. National Oceanic and Atmospheric Administration determined that regional fishery management councils should undertake allocating halibut among various domestic user groups.

The Commissions jurisdiction is divided into statistical areas or units delineated by lines spaced 60 nautical miles apart. The Olympic Coast National Marine Sanctuary lies in subarea 2A. Allocation recommendations for area 2A are made to the Secretary of Commerce by the Pacific Fishery Management Council (PFMC) for treaty Indian fisheries and non-treaty sport and commercial fisheries. Representatives of the tribes, the states of Washington and Oregon, the U.S. government, and the IPHC participate in work groups to develop recommendations to the Council. Council recommendations pass through the IPHC for approval. (Trumble, Robert et. al. 1991. "Evaluation of Pacific Halibut Management for Regulatory Area 2A)." Scientific Report No. 74. International Pacific Halibut Commission, Seattle Washington).

C. Cooperative Vessel Traffic Management System (CVTMS)

The Cooperative Vessel Traffic Management System (CVTMS) is a maritime traffic control program jointly managed and operated by the United States and Canada in the Strait of Juan de Fuca and San Juan Island areas. The system is designed to enhance safe and expeditious vessel traffic movement, to prevent groundings and collisions, and to minimize risk of property damage and pollution to the marine environment. It is operated by the US Coast Guard and the Canadian Coast Guard. Vessel Traffic Management Centers of the CVTMS monitor ship movements using radar and radio equipment and issue directions and warnings to control and supervise traffic.

The CVTMS area is divided into zones, each of which is administered solely by the United States or Canada. The appropriate Vessel Traffic Management Center administers, within its zone, the regulations issued by both nations. Each set of regulations applies only to the waters over which the issuing nation has jurisdiction and each nation will enforce only its own set of regulations. The United States regulations (33 CFR 161.200-.266) apply in the CVTMS area to 1) each vessel of 30 meters or more in length and 2) each vessel that is engaged in towing alongside or astern, or in pushing ahead, one or more vessels or objects, other than fishing gear (where the combined length of the vessel and tow exceeds 44 meters, or the vessel or tow individually exceeds 19 meters). Participation with CVTMS is mandatory for most vessels.

A critical component of the system is the joint designation by US and Canadian authorities of a vessel traffic separation scheme to route inbound and outbound traffic. The vessel traffic lanes are printed on both US and Canadian navigational charts. The Vessel Traffic Management Centers can thus issue instructions to keep traffic within the appropriate lanes and reduce congestion and the risk of collision.

The CVTMS - through its use of regulation, vessel surveillance, traffic control, and separation lanes - has been quite successful in averting collisions and groundings. It also contributes valuable assistance during emergency and search-and-rescue operations.

APPENDIX K: MEMORANDUM OF UNDERSTANDING BETWEEN ASSISTANT ADMINISTRATOR FOR FISHERIES AND ASSISTANT ADMINISTRATOR FOR OCEAN SERVICES AND COASTAL ZONE MANAGEMENT CONCERNING THE NATIONAL MARINE SANCTUARY PROGRAM

Memorandum of Understanding between Assistant Administrator for Fisheries and Assistant Administrator for Ocean Services and Coastal Zone Management Concerning the National Marine Sanctuary Program

Memorandum of Understanding

between

Assistant Administrator for Fisheries

and

Assistant Administrator for Ocean Services and
Coastal Zone Management

Concerning the National Marine Sanctuary Program

January 1992

William W. Fox, Jr.
Assistant Administrator for
Fisheries

John J. Carey 1/22/92

John J. Carey
Assistant Administrator
for Ocean Services and
Coastal Zone Management

AN AGREEMENT

INTRODUCTION

The National Marine Fisheries Service (NMFS) and the National Ocean Service (NOS) play important roles in the conservation of the Nation's living marine resources. The National Marine Sanctuary Program (NMSP), administered by the Sanctuaries and Reserves Division (SRD) of NOS, seeks to identify and conserve areas of the marine environment of special national significance due to their resource or human-use values through coordinated management, research, and monitoring of these areas. NMFS conducts research on living marine resources and their habitats, seeks to protect marine habitats, and manages fisheries in federal waters in collaboration with eight Regional Fishery Management Councils ("Councils").

NMFS and NOS hereby agree to a process by which they can collaborate in achieving the goals and objectives of Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA), the Magnuson Fishery Conservation and Management Act (MFCMA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Fish and Wildlife Coordination Act (FWCA).

A. NOS ROLE

In order to facilitate NMFS assistance, NOS agrees to do the following in administering the National Marine Sanctuary Program:

1) Notify and provide NMFS with the opportunity to comment and/or concur at the following stages of the sanctuary designation process:

   a) review of the Site Evaluation List (SEL);
   b) selection of sites for elevation to Active Candidate status;
   c) development of draft and final environmental impact statements and management plans, particularly with respect to the following elements of these documents:

      i) consideration of present and potential activities affecting sanctuary resources;
      ii) evaluation of the adequacy of existing

management authorities;

iii) evaluation of the manageability of the area and enforceability of managment measures;

iv) assessment of the negative impact of management restrictions;

v) preparation of the resource assessment report;

vi) estimation of enforcement costs.

2) Cooperate with NMFS in the consideration of fishing regulations in proposed national marine sanctuaries by doing the following:

a) Before elevation of a site to Active Candidate status, consult with NMFS regarding the living marine resources, management measures, and living marine resource issues in the sanctuary study area;

b) Upon elevation of a site to Active Candidate status, request NMFS assistance in briefing the relevant Fishery Management Council(s) regarding the site and the need for fishing regulations at the earliest opportunity and on a continuing basis as required;

c) Request NMFS participation in discussions regarding living marine resource and habitat issues with the site and request that NMFS secure the participation of appropriate representation by the relevant Fishery Management Council(s);

d) Provide a reasonable opportunity for comment and seek NMFS concurrence in recommendations to the Secretary regarding findings, determinations, and preparation of regulations as described in 16 U.S.C. 1434(a) (5).

3) Cooperate with NMFS in the consideration of management measures for species protected by the MMPA and/or the ESA ("protected species") in proposed national marine sanctuaries by doing the following:

a) Before elevation of a site to Active Candidate status, consult with NMFS regarding protected species, existing management measures, and protected species issues in the sanctuary study area;

b) Upon elevation of a site to Active Candidate status, seek NMFS concurrence in proposing sanctuary management measures for protected species;

c) Request NMFS participation in discussions on protected species and habitat issues in the site;

d) Provide a reasonable opportunity for comment and seek concurrence from NMFS on Secretarial decisions to list activities as subject to sanctuary regulation that may also be subject to regulation under the MMPA and/or ESA. NOS will cooperate and seek concurrence from NMFS in the preparation of any regulations pertaining to

such activities.

4) In implementing sanctuary management plans, NOS will do the following:

a) Cooperate with NMFS in the preparation of emergency response and contingency plans for national marine sanctuaries as these plans affect living marine resources and habitats of particular concern to species managed under the MFCMA, MMPA and ESA;
b) Cooperate with NMFS in the evaluation of management measures in existing national marine sanctuaries in relation to the management of living marine resources under the MFCMA, MMPA and ESA;
c) Cooperate with NMFS regarding amendments to the lists of species under the ESA;
d) Review applications for permits issued under the MMPA or ESA for activities that may also be subject to prohibitions in national marine sanctuaries;
e) Grant, condition, or deny permission for proposed activities in national marine sanctuaries under the MPRSA in coordination with NMFS denial, conditioning, or granting of requested permits under the authority of the MMPA or ESA.

5) NMFS concurrence or disagreement with NOS recommendations to the Under Secretary for Oceans and Atmosphere described in A(2)(d) and A(3)(d) shall be noted in corresponding memoranda by the Assistant Administrator for Fisheries.

6) The NOS transmittal memorandum shall attach any NMFS concurrence or disagreement provided in accordance with section 5 above. NOS shall indicate on the transmittal memorandum a) the amount of time afforded to NMFS for review and response, and b) where disagreement is indicated, reference to an attached statement of the reasons therefor as provided by NMFS.

7) NOS will cooperate with NMFS in insuring that recovery plans for species listed under the Endangered Species Act, conservation plans under the Marine Mammal Protection Act, fishery management plans, and sanctuary management plans are mutually supportive to the greatest extent possible.

B. NMFS ROLE

In carrying out its role, NMFS agrees to do the following:

1) Cooperate with and provide information and recommendations to NOS at the stages of the sanctuary designation process identified in item A(1).

2) Cooperate with NOS in the consideration of fishing regulations in proposed national marine sanctuaries by doing the following:

   a) Before elevation of a site to Active Candidate status, provide NOS with information regarding the living marine resources, managment measures, and living marine resource issues in the sanctuary study area;
   b) Upon elevation of a site to Active Candidate status, assist NOS in briefing the relevant Fishery Management Council(s) regarding the site and the need for fishing regulations at the earliest opportunity and on a continuing basis as required;
   c) Participate in discussions regarding living marine resource and habitat issues with the site;
   d) Consult with NOS on its recommendations to the Secretary regarding findings, determinations, and preparation of regulations as described in 16 U.S.C. 1434(a)(5).

3) Cooperate with NOS in the consideration of management measures for species protected by the ESA and/or MMPA ("protected species") occurring in proposed sanctuary sites by doing the following:

   a) Before elevation of a site to Active Candidate status, provide NOS with information regarding the protected species, existing management measures, and protected species issues in the sanctuary study area;
   b) Participate in discussions with NOS regarding protected species and habitat issues with the site;
   c) If the Secretary decides to list as subject to sanctuary regulation activities that may be subject to regulation under the MMPA and/or ESA, cooperate with NOS in the preparation of any regulations pertaining to such activities.

4) In assisting NOS in the implementation of sanctuary management plans, NMFS shall do the following:

   a) Cooperate with NOS in the preparation of emergency response and contingency plans for national marine

sanctuaries as these plans affect living marine resources and habitats of particular concern to species managed under the MFCMA, MMPA and ESA;

b) Cooperate with NOS in the evaluation of management measures in existing national marine sanctuaries in relation to the management of living marine resources under the MFCMA, MMPA and ESA;

c) Consult with NOS regarding amendments to the lists of species under the ESA;

d) Provide NOS with copies of applications for permits issued under the ESA and MMPA for activities that may occur in national marine sanctuaries;

e) Issue, condition, or deny requested permits under the authority of the ESA or MMPA in coordination with NOS denial, conditioning or granting permission for proposed activities in national marine sanctuaries under the MPRSA.

5) In cooperation with NOS, periodically brief the relevant Fishery Management Councils regarding the national marine sanctuary program.

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