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U.S. DEPARTMENT OF COMMERCE NOAA  
COASTAL SERVICES CENTER  
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# LAMPREY RIVER HARBOR MANAGEMENT PLAN

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Prepared For:

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Strafford Regional Planning Commission

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COASTAL ZONE

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*New Hampshire Coastal Zone Management Program*

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## I. INTRODUCTION

### A. Plan Purposes

A plan is a proposed or intended course of action! Plans should enumerate the reasons for their need, what they intend to accomplish, and how they intend to accomplish it. Assuming those obligations are discharged adequately, there remains a problem. Plans don't accomplish themselves! People must be reasonably convinced a plan is needed and is appropriate. Plans need support in order to be successful. Persuasion then is an active part of the planning process, and one of the purposes of this plan for the Lamprey River.

There may be a strongly shared feeling, or even a consensus, that existing conditions are not good. However, even inadequate existing conditions will be tolerated in preference to either uncertain future conditions, or unacceptable future conditions. People are suspicious of planners, especially planners in government. Combined with an activist - wanting to get something done - predisposition, a proposed set of future conditions may constitute the real risk of both an uncertain and unacceptable change to inadequate existing conditions. Proposed change can be, or seem to be, very threatening. One of the purposes of this plan is to try to reduce the perceived risk associated with proposed recommendations.

The Lamprey River is a natural feature of real beauty, important to its riparian property owners, to boaters, fishermen, conservationists, historians, and residents of the Town of Newmarket, in which the tidal river wholly lies. Can anyone who genuinely cares for the river, or the estuarine (salt and fresh water environment) system of which it is part, imagine Newmarket without the Lamprey? Can anyone who genuinely cares for the river imagine the possibility of changes so profound that river uses like fishing or boating may no longer be possible or pleasurable? The realization we seek to convey is that collective inaction, failure to assume responsibility for what is happening in the river, can result in the above-described degradation process. Enlightened self-interest and the collective understanding of what has been happening to the river is another plan purpose.

Questions like "how much boating traffic can the Lamprey Harbor and River carry before that traffic becomes, or threatens to become, excessive" are important to discuss. The same can be said of water quality conditions in the river. Will the Lamprey River's "cleansing capacity" be exceeded by pollution conditions for which we all bear some responsibility?

A harbor management plan is intended to provide policy direction through a process of analysis and active public participation.

It is the water-side equivalent to a municipal land use plan, but with an important-to-understand legal difference. Understanding that difference makes the public participation process a very serious commitment and responsibility.

New Hampshire's municipalities are legally empowered to effectuate land use regulations under constitutional law (police power) doctrines of public health, safety, and welfare protection. These police powers, in the form of land use regulations, represent a balancing of private property rights in the public interest. However, municipal land use regulations do not extend to tidal waters like the Lamprey River.

The Lamprey from Moody's and Shackford Points to the Macallen Dam in Newmarket is owned by the people of the State of New Hampshire, and is held in trust for the people by the State Legislature up to the river's natural mean high water mark. The law (New Hampshire Constitution, Article 5, Part 2), which developed under the English Crown, is commonly called the Public Trust Doctrine.

The New Hampshire Supreme Court (in case law) has defined these "public ownership" rights to include the right to "boat, bathe, fish, fowl, skate, and cut ice" (Hartford v. Gilmanton, 101 NH at 425-426), but not necessarily the right to water access over abutting shoreland. The "right" to adequate environmental

protection, under the Public Trust Doctrine, has not yet been addressed by the Supreme Court. Therefore, by implication, the people of the State of New Hampshire are the constituency for this plan, while the New Hampshire State Port Authority is the implicit trustee for the planning process. For this reason, the Port Authority established the following criteria for plan development:

1. to strike a balance between river/harbor use and protection;
2. to strike a balance between competing recreational uses;
3. to present a plan that is perceived as necessary and fair; and
4. to present a plan that is perceived as practical and implementable.

Both balance and practicality are needed to achieve desired results.

#### B. Plan Organization

The Lamprey River Harbor Management Plan's organization is

substantially similar to that of a municipal land use plan. Like a municipal land use plan, the harbor management plan has sections on existing conditions, on major problems and issues, on plan goals, on plan recommendations, and on proposed implementation methods. The significant differences between a typical land use plan and a harbor management plan relate to subject matter treated and the harbor management plan's typically greater degree of emphasis on implementation.

### C. Plan Summary

The Lamprey River is a small, circuitous, narrow and shallow tidal river which is part of the Great Bay estuary. Notwithstanding its history as an important commercial transportation conduit, today the river serves recreational boaters, fishermen, and conservationists/historians. There are no significant water-related industries or commercial activities relying on the river.

Recreational boating, its need for berthing opportunities, shelter from storms, access to points of interest and to occasional marine-related services is important. However, the size of the river and the harbor precludes the location there of substantial numbers of boats. Additionally, the harbor is a good 20 minutes at "headway speed" to the Great Bay and another 30-45 minutes to the Piscataqua River and beyond, so the Lamprey would

not appear to be the harbor of choice for vessels which must frequently journey the 18 miles to the ocean.

Essentially a river which needs a flood tide for larger draft vessels to safely navigate its length, it is also a river with a history of bacterial water quality problems. These bacterial problems have closed shellfishing in the Lamprey, and together with similar problems in the Squamscott River, has closed shellfishing in much of Great Bay as well.

This planning effort is an objective of some importance to the Port Authority, the Town of Newmarket, many Newmarket residents, and "Friends of the Lamprey" who attended meetings to discuss river/harbor problems and options. The authors of this report take this task no less seriously.

We always have choices, even if they are not acceptable and/or illegal. The precipitating factor for this planning effort is the number of boat slips granted several property owners in the harbor area recently. With the prospect of a harbor/river filled with boats, and the potential for more, it became more urgent to define inter-relationships and to articulate standards.

The river, we have argued, should have a moratorium on additional boats (slips and moorings) until it is possible to assess the impacts of those already approved but not yet located there. In

order to achieve such a moratorium, it must be perceived as justified by people in Newmarket, at the Port Authority, and in Concord at the Wetlands Board.

The river should also be marked by a Coast Guard approved set of can and nun buoys which will measurably improve boating safety and convenience. The channel is narrow and the river has submerged obstructions, in addition to mudflats so that a navigational system is simply indispensable to boating safety.

Other recommendations relate to personnel and management issues which we believe would assist in establishing needed governmental cooperation respecting river use and protection. Ultimately, the river and harbor will either be managed in the interest of a balance between use and resource protection, or river and harbor management will continue to be largely driven by demands of the various user groups. The general choices are very clear, but the decisions which will need to be made are not fully clear.

## II. EXISTING CONDITIONS

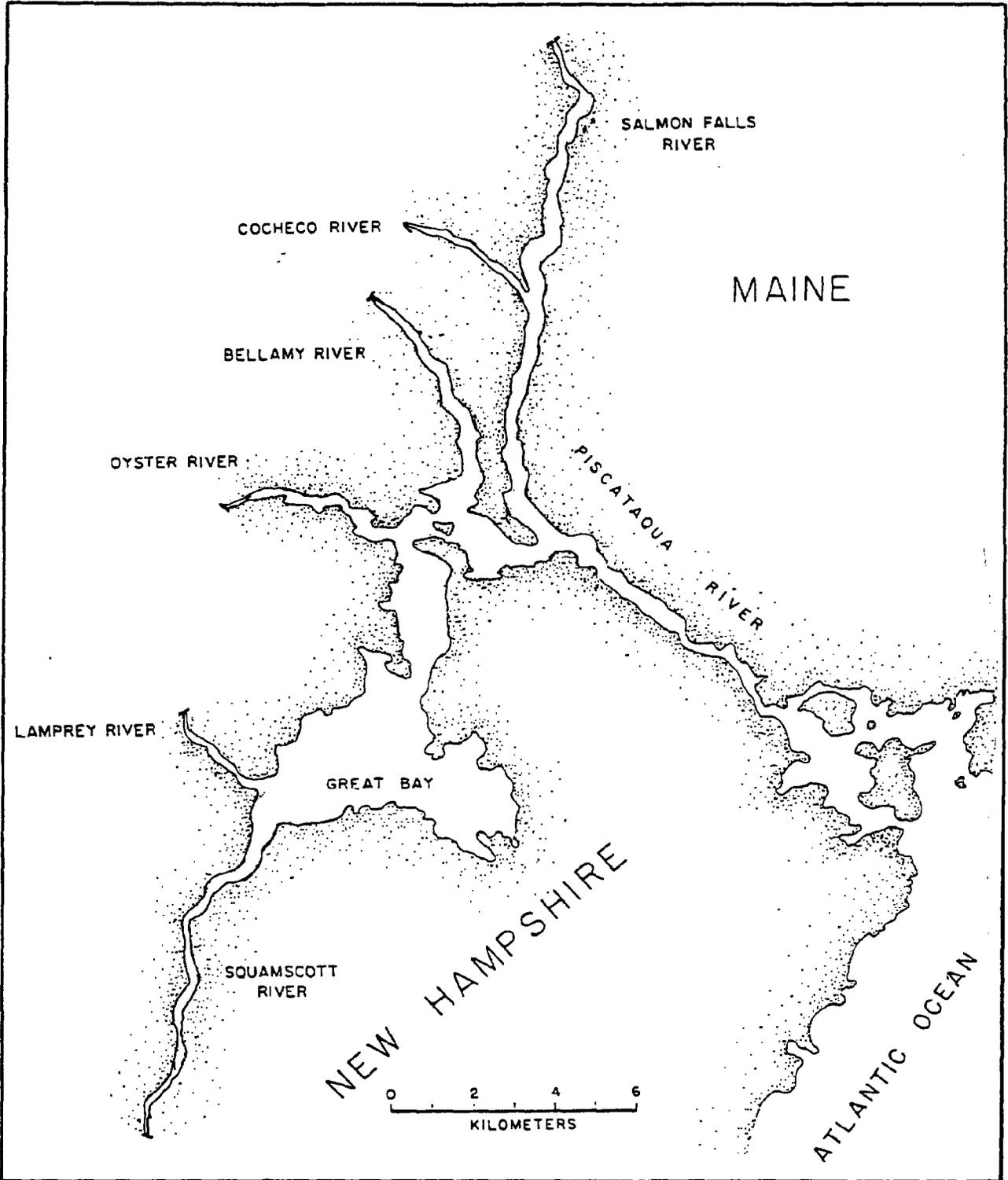
### A. Great Bay Estuarine System/NH Coastal Program

The Lamprey River is one of seven rivers, including the Oyster, Squamscott, Winnicut, Salmon Falls, Cocheco, and Bellamy, which drain into Great Bay. The Great Bay hydrologic system, with a watershed of 930 square miles and a surface water area of 17 square miles, is one of the largest on the east coast.

Great Bay derives its fresh water largely from the above-mentioned rivers. Comprised of salt marsh, tidal creeks, islands, open fields, and woodlands, the Great Bay is a shallow estuarine system with an average depth of 9 feet, one-half of which is exposed mudflat at low tide. The normal tidal range is between 6.5 - 6.8 feet.

The Great Bay estuary has been the object of many investigations and analyses by researchers, students, and others. It has also been the object of a management planning program (National Estuarine Research Reserve Program, 15 CFR, Part 921) now being published in final form called Great Bay National Estuarine Research Reserve Management Plan. The objectives of this management plan are to develop a program of education, research, and natural resource protection. The principal means by which

FIGURE 1:



GREAT BAY AND TIDAL RIVERS

these objectives are proposed to be implemented are through public education, land acquisition, and coordination among State and municipal levels of government.

Program administration is to be largely the responsibility of the New Hampshire Department of Fish and Game. The New Hampshire Office of State Planning has prime responsibility for planning and finalization of key land and water area conservation easements. These conservation easements, negotiated with public and private land owners, are intended to better protect unique or critically important resource areas. The thrust of research and education efforts is likewise directed at natural resource protection.

The "umbrella" program for this Great Bay ... Management Plan and the Lamprey River Harbor Management Plan is the New Hampshire Coastal Program. The Coastal Program is to, by improving the administration of existing State laws, "condition, restrict or prohibit various (land) uses in part of the coastal zone, and to encourage development in other parts\*".

\* See New Hampshire Coastal Program U.S. Department of Commerce, National Oceanic and Atmospheric Administration and NH Office of State Planning, July, 1988.

Coastal natural resource protection lies at the center of the program's purpose, as well. This protection extends to coastal and estuarine waters, tidal and freshwater wetlands, beaches and sand dunes, and rocky shores. A two-tiered "zonal" approach to resource protection puts the Lamprey River in both zones. First tier areas are perceived to have direct and significant impacts on coastal waters. Second tier areas impact coastal waters less substantially since the marine (salt water) nature of tidal rivers diminishes as one moves inland. The six topics around which the Coastal Program is organized are:

1. Natural resources.
2. Recreation and public areas.
3. Managing coastal development.
4. Coastal dependent uses.
5. Historic and cultural resources.
6. Marine/estuarine research and education.

#### B. Study Area Description

The Lamprey River Harbor Management Plan includes the tidal portion of the river (Moody's Point to Macallen Dam). The study area also includes the shoreland abutting either side of the

river, particularly where that shoreland may have a potential impact on river use or conditions. The study area does not include the Town of Newmarket, nor non-tidal portions of the river.

### C. Sketch Harbor History

Old Newmarket by Nellie Palmer George provides a concise historical overview of life in Newmarket from its early settlement by Europeans to about 1930, the date of the book's publication. Our interest is in elements of that history relating to the river and harbor area.

The earliest references to the river make clear how well-endowed the Lamprey was with fish, and how abundant game was in abutting oak and pine woods. The earliest uses of the river were obviously for fishing and transportation for both indigenous Indian tribes and European settlers.

At the end of the period characterized by warfare between European settlers and Indian tribes (1672-1725) like the Ossipees, the Wampanogs, the Pequakets and the Tarranteens, the Lamprey River began to be more extensively used for commerce, in addition to fishing and transportation.

Saw and grist mills were shipping planks, boards and staves, real necessities in that or any other time, by water as well as wagon.

The Falls at Newmarket provided power for the saws and stones, and the river also provided access to Great Bay and beyond. Additionally, salted alewives (as well as other river herring) were sent to the West Indies in exchange for molasses and rum, obviously a commerce using the river to good effect.

In the early 1900's, a Newmarket sewer project uncovered conclusive evidence that the harbor, for some time prior to the Revolutionary War, had been the scene of major shipbuilding activities. In fact, 21 ships were built one year, and one ship, at 74 guns, was then the largest ever to be constructed on this side of the Atlantic. Interestingly, a 1752 town Warrant Article complained that the shipyards were encroaching on the Town Landing, a Town Landing then in continuous use for over 100 years. Obviously, the issue of public water access is not only a phenomenon of the 1980's.

After the Revolutionary War with England, shipbuilding's profitability on the Lamprey River declined. Subsequently, fishing houses began to replace the shipbuilding yards. A saw and grist mill continued to do business in the harbor.

In 1823, the saw and grist mills were sold with other property in the harbor to individuals who subsequently formed the Newmarket Manufacturing Company, a cotton cloth manufacturing operation that would grow to several large buildings and a predominant

position in Newmarket's economic and social life for many years. The Newmarket Manufacturing Company would build homes, lay out streets, and make other significant public investments. Newmarket, at this time, saw other industrial development take place largely as a result of the investments made by the Newmarket Manufacturing Company.

Cotton was the raw material for the company's cloth manufacturing. Cotton came to Boston by sea from the Port of New Orleans. From Boston, the product came to Portsmouth, then to Newmarket through Great Bay and the Lamprey River. Prior to the railroad, of course, water was the inexpensive transportation alternative. Boat design confronted the need to negotiate shallowness of depth, narrowness of channels and transport of cargo in bulk. Packets and then Gundalows (or gunlows) were boat designs created by those needs.

Packets were in regular service from Portsmouth to Newmarket at the time. They were approximately 30 feet by 10 feet wide with short keels and a lanteen (collapsible) sail which could be lowered for passing under low bridges. Very "beamy" (wide), they could be loaded with as much as 15 tons of cargo. However, they were not very stable, and capsize potential led to alternative design. Gundalows were the alternative of choice. Flat-bottomed, with a lee board and a lanteen sail, they were poled out of the rivers, but often towed by tugs in the bay. Gundalows

proved to be a more stable and reliable solution to commerce's shipping needs.

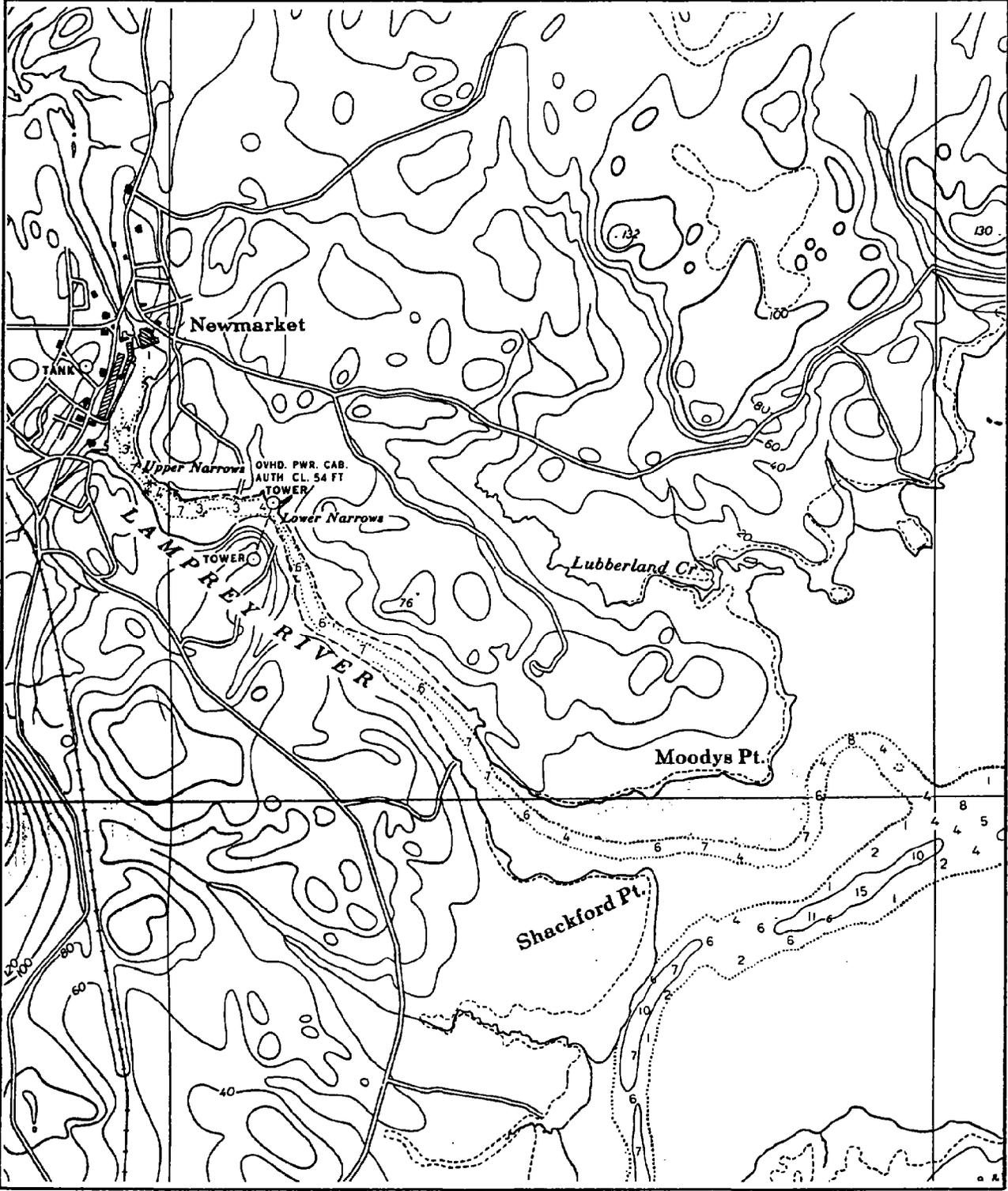
With the subsequent development of rail transportation and a lessening of the economic importance of water-borne commerce from Newmarket, the Lamprey River's importance as a resource for commercial fisheries was again predominant. Much later, of course, the river again became a transportation link, but this time for recreational boaters.

#### D. Physical Characteristics

At one time large ships negotiated the narrow Lamprey River channel from Great Bay to the harbor. Obviously, they did so with the flood tides, and just as obviously they were likely to be piloted by experienced sailors who know the river. The same cannot, of course, be said of all the recreational boaters who might now wish to traverse the river.

The Lamprey, for much of its length, has a narrow channel with little opportunity for maneuvering larger vessels. There are variations in channel width and depth, of course, and channel meandering is particularly noticeable at the entrance to Great Bay, so it can be unequivocally argued "local knowledge" is very important, especially now without Coast Guard-approved navigational aids.

FIGURE 2:



LAMPREY RIVER: APPROXIMATE CHANNEL LOCATION

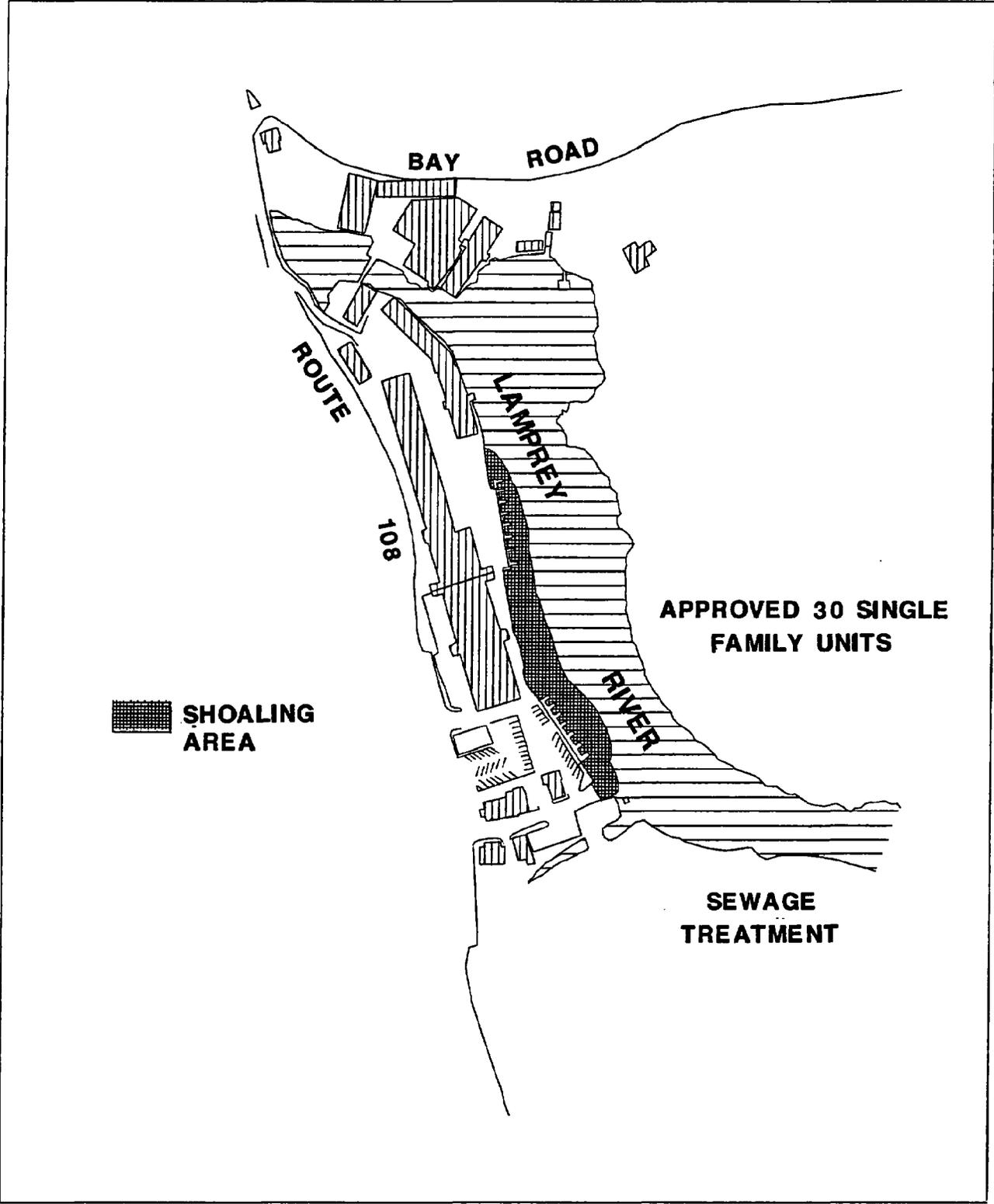
### Channel Characteristics

Depth at mean low water in the channel and harbor varies between 3-9 feet, with shallower depths up-river near the town. The rest of the river varies in depth from 0-2 feet at mean low water, making boating use prudent for only those boats which draw 6 inches or less and have experienced pilots. Even at high tide, the Lamprey River can present difficulties for boats which might strike unmarked, submerged obstructions due to their draft.

Channel width varies as well. In the Upper and Lower Narrows, the channel is no more than 25 feet wide between submerged rocks while in the lower portion of the river, the channel width can be as much as 75 feet (+/-).

Historically, shoaling has been a problem in the river and harbor since it has been traversed by boats drawing sufficient water to potentially run aground. For many years, prior to current Corps of Engineers dredging regulations, the harbor and river were periodically dredged with, in some cases, monies appropriated by the U.S. Congress. Maintenance dredging has been necessary in the past due to up-watershed soil destabilization, erosion, suspension of fine soil particles in the water column and subsequent deposition downstream in the tidal river.

**FIGURE 3:**



**LAMPREY RIVER HARBOR: SHOALING AREAS**

There is a current shoaling "problem", particularly noticeable at the ebb tide, in the vicinity of the Town landing and Bob's Marina. Launching of boats at a low tide is difficult at best for even small craft due to these shallow water conditions.

Environmental concerns, particularly those relating to disposal of dredged materials, the potential turbidity caused by dredging, and the potential water quality problems associated with "release" of sediment-trapped pollutants, can now make extremely difficult and time consuming any dredging effort. In addition, given the importance of Lamprey River fisheries, any, even minimal maintenance dredging, would have to be tightly scheduled to avoid disturbance of spring fish releases or autumn fish runs.

#### Marine Conditions

Prevailing winds are from the southwest during Summer boating months and are from the northwest during the winter. During the Spring and Fall, wind direction is transitional.

Since the harbor is well-protected from winds during the boating season, even from strong gale-force winds, there is little wave activity in the harbor area. The same is true for much of the river until the open water of the bay is reached. In fact, the harbor area has been argued to be too wind-free, eroding

incentives to relax on-board a boat during the warm, humid months of Summer.

### Shoreline Conditions

The shoreline in the harbor area has been stabilized and protected on the Town side for many years due to the succession of water-related land uses located there. Virtually the entire western and northern side of the harbor and turning basin area is protected by "riprapping" and stone reinforced walls. Since the harbor and river generally "ices over" each Winter, stabilizing of shoreline banks has been necessary. Only in the vicinity of the Town landing do the ice and tidal effects appear to have created a need for additional stabilization, and that need is not acute.

Elsewhere in the harbor and the river where banks are not protected by stone walls or riprapping, the natural protection by steep banks, granite outcrops and vegetation has resulted in little erosion. To be sure, in some locations a combination of ice, tidal action, and boat wakes has resulted in evidence of erosion, but the condition is not seriously threatening property owners, and beyond enforcement of "headway" speeds for boats in the river, these conditions are susceptible to private, rather than public action.

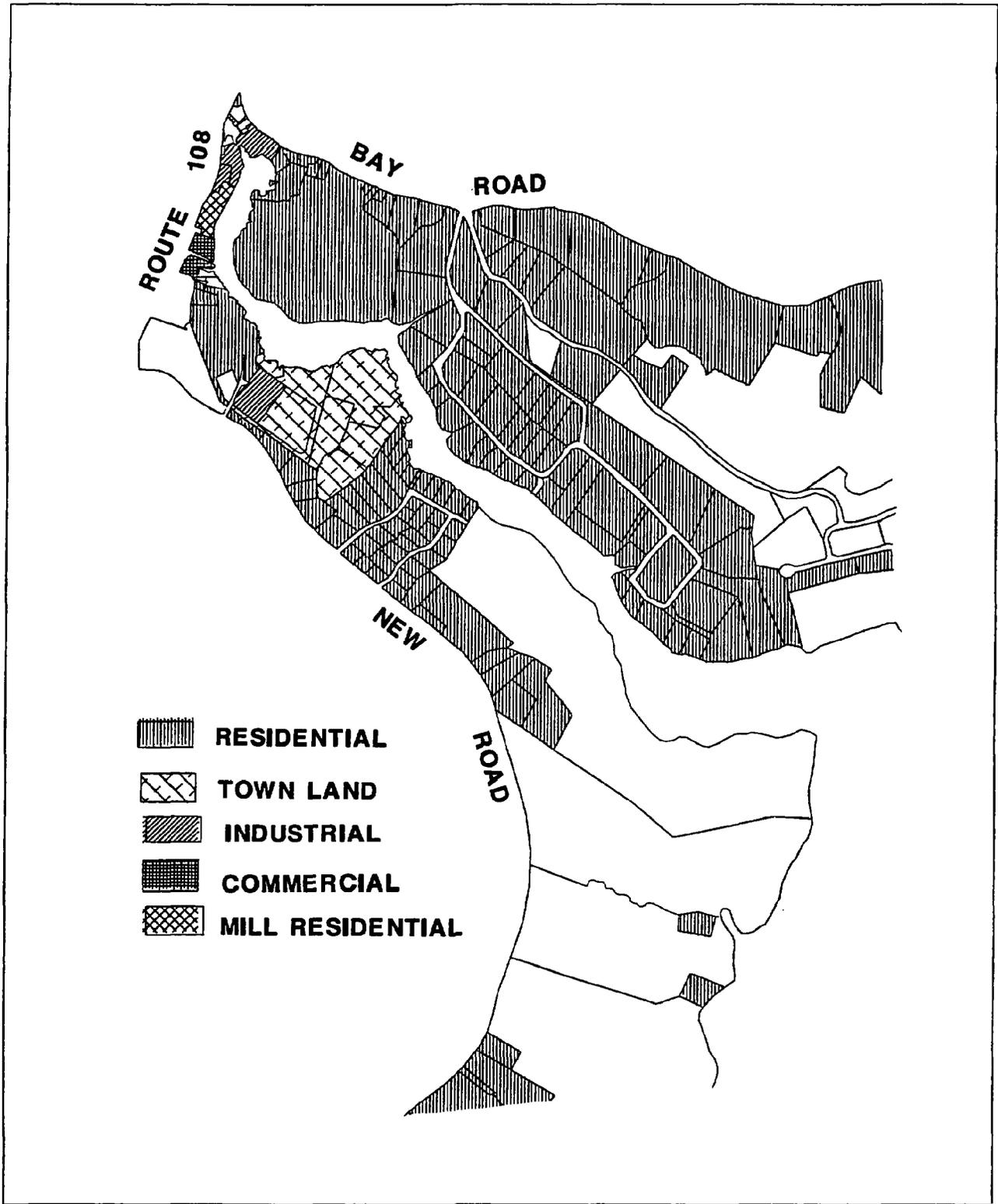
### E. Shorefront Characteristics

The Newmarket harbor area has had a rich history of activities reflecting the major economic trends in the region since pre-revolutionary time. While at one time the harbor and river were buzzing with various commercially-oriented activities, today recreationally-oriented interests predominate. The only "commercial" activity is the entirely water-based operation of a fish weir for capture of alewife and other river herring. However, concerns for Lamprey River history are as strong a motivator as are any commercial interests in the use and maintenance of the weir.

### Land Use Trends

In the harbor area, land use trends appear to favor shorefront activities devoted to residential, mixed-use (residential and commercial) and possibly limited marine-oriented activities. Residential development of a former commercial-industrial activity in a mill building reflects perceptions about markets for that kind of space. Commercial reuse tends to be of a service-oriented white collar activity, rather than industrial. The remaining mill space (300,000 square feet) is either vacant or occupied by an industry seeking to sell and relocate. Across the harbor the currently vacant property has been approved for construction of residences. Both property owners seek to enhance

**FIGURE 4:**



**LAMPREY RIVER: SHOREFRONT LAND USE**

the attractiveness of their developments by offering boat slips to prospective purchasers.

As mentioned, the entire Lamprey River is in the Town of Newmarket. Down river from the harbor, land uses are residential with the exception of Town property on which the Wastewater Treatment Facility is located and the New Hampshire Department of Fish and Game property immediately down river which is vacant.

Below the lower narrows, most of the shorefront is developed. The most obvious examples to the contrary are at the river's entrance to Great Bay. On Moody's Point, a residential development has been approved with some prospect for ancillary boat slip development although water depths do not offer ideal conditions for boat storage. Land at Shackford Point and up river is undeveloped at present, and while some of the shoreline there is unsuitable for development (wetlands), there is much suitable upland which could be built upon. The river here as well is characterized by inter-tidal mud flats, not well-suited for boat storage or launching.

#### Public Access

Long an issue in the harbor and around Great Bay, the opportunities for public access are limited and sometimes inadequate in construction, maintenance, or in parking.

The Lamprey River has one public boat launching ramp, a parking/trailer storage area, and Town dock for boat tie-up. No other public access exists on the tidal Lamprey River.

The condition of the boat launching ramp is generally good with some evidence of scouring under the asphalt resulting in the need for minor repairs. The Ramp width is ample, allowing two boats to be launched during busy weekends or when fishermen are anxious to get into the river. However, the ramp is not useable at low tide except for smaller boats and then with some difficulty.

Parking of vehicles and boat trailers seems to be generally sufficient for all but the busiest of holiday weekends or heavy fishermen usage during anadromous fish runs. The same may be said of the Town's boat dock, except when boats are left there tied up for longer periods of time virtually preventing dock use by other boaters.

The creation of a small park next to the boat launch ramp with an information "kiosk" and strolling/sitting areas provides a form of public access to the waterfront evidently much in demand. Pedestrian and visual access to the water, combined with park aesthetics brings a variety of "users" into contact with the Lamprey. It is worth noting that this form of public access has frequently been cited to us by Newmarket residents as the most

important form of access. Clearly, this little park is a valued public resource.

#### F. Resource Usage

There should be little argument that the Lamprey River is a resource of regional importance. How this resource is used and managed says a great deal about what is being done to assure the resource's long-term viability. Remember that the river resource is owned by the people of the State, and that its management is done in their interest. That means, among other things, that management of the Lamprey River has a present and a future. We are concerned here with the present, and in the sections which follow "Existing Conditions" with its future management.

#### Boating

No commercial boating usage of the Lamprey River takes place. All boating traffic is recreational. What then have been the trends in Lamprey River recreational boating activity?

As general background to Lamprey River information, we can point out that one source\* believes that boating traffic in the Great Bay increased by 35% in 1987 and similar growth was anticipated for 1988.

\* Please see next page.

Until 1989, boat registrations in marine (non-inland) waters were managed by the U.S. Coast Guard. Beginning this year, the NH Department of Safety, Division of Motor Vehicles, Boat Desk Bureau, is handling marine boat registrations. Coast Guard data available through the Boat Desk (registration files were turned over to New Hampshire) does not permit easy confirmation of the above 35% growth figure. However, the Coast Guard has published a report entitled Boating Statistics nearly every year. Data from these reports (1980-1987), which in New Hampshire largely reflects marine conditions, summarizes boat registrations, accident data, and Coast Guard Auxiliary Programs.

Data from those reports indicate the following:

<u>Year</u>	<u>Total Boats</u>	<u>Scope</u>
1979	15,334	Motorboats
1980	16,503	Motorboats
1981	4,432	Motorboats*
1982	6,801	Motorboats*
1983	6,579	Motorboats*
1984	9,242	Motorboats*
1985	9,339	Motorboats*
1986	9,597	Motorboats*
1987	15,214	Motorboats*

\* Portsmouth Harbor Marine Firefighting Contingency Plan; Needs Assessment and Recommendations Report, Maritech, June, 1988, p. 16

Based on Coast Guard statistics, 1987 New Hampshire Federal Waters\* boating traffic increased by nearly 60%! Figures are not available for 1988, but if this information is accurate, it shows a surprisingly large jump in previous (+/- 23%) annual boat registration increases. In any event, the operationally important information is that New Hampshire boat registrations have been growing and showing real strength in that growth.

More specific indicators of boating growth trends in the Lamprey River are quite recent. They are not as helpful because of changes in the way information has been assembled. Mooring and boat slip trends are useful indicators of growth in boating within the Lamprey although not fully indicative of general boating trends there (no information is available on numbers of transient boaters).

Mooring information for the Lamprey River was part of overall Great Bay statistics before 1988. The same is true of waiting list information. In addition, waiting list numbers have recently dropped significantly due to the imposition of a \$5.00 charge for each list (harbor/area) on which an applicant wishes his/her name.

**\* All motorboats used on Federal waters; includes some inland, as well as marine waters.**

At the present time, there are 608 names on the waiting list for moorings in New Hampshire coastal waters. There are 8 names on the Lamprey River list.

There are currently 21 moorings in the Lamprey River and during 1988 there were 22 moorings. Of that number, approximately 14 are in the harbor/turning basin area, and the remainder are down river.

With respect to boat slips, the trend is a little clearer, but numbers are not yet fully resolved. Individual property owners along the lower river have docks permitting maintenance of one or two small boats. There are perhaps as many as 10 such docks, some of which appear to predate existing Wetlands Board regulations. In the harbor area itself, nearly all of the approved boat slips were granted in 1988. There are approximately 65 slips with the potential for more when the Essex Group or the group to whom they eventually sell the mill buildings apply.

<u>Property Owner/Applicant</u>	<u>Approved Boat Slips</u>
Walter Cheney (Cheney/Wajda)	36
Rivermoor Landing	18*
Robert Albee (Bob's Marine Service)	12

\* Final number not fully clear (June, 1989)

Suffice it to say, that since the R. Albee slips are the only in service at this time, the harbor impacts from boat slip approvals to date will not be felt during this boating season.

#### Fishing/ShellFishing

For some time, the New Hampshire Department of Fish and Game has been managing a number of fisheries in the Lamprey River. As will be recalled, the Lamprey River has a history as an extraordinary resource for a variety of anadromous (fresh and saltwater) species, river herring, and smelt.

It is not currently possible to provide strong long-term statistical evidence of trends in the various fisheries which are significant in the Lamprey River: the winter ice fishery, river herring, and salmon. However, we do know that sport fisheries are important in the State, and that the State is spending large sums for stocking programs in the Lamprey River.

In 1985, approximately 17% of the State's population, or about 174,000 residents fished. However, New Hampshire residents are not the only fishermen. Approximately 54% of all fishermen in the State were residents, but a significant 46% were from out of State. If national trends pertain to New Hampshire's 1985 fishing population (322,000), approximately 11% or 35,000

fishermen made New Hampshire's tidal rivers and streams their choice\*. The income associated with sport fisheries, in addition to recreational objectives, are the reasons why the Lamprey River figures so importantly in the State's fish stocking programs.

Since 1971, the Macallen Dam has had a fish ladder. Constructed by the Public Service Company (the dam has hydroelectric generation potential), the ladder is jointly maintained by the Essex Group and the New Hampshire Department of Fish and Game.

The Fish and Game Department reports that the smelt fishery, which spawns about two weeks after ice out in the tidal river; the alewives which spawn above the dam in late April or early May and the blueback which spawn below the dam about two weeks later, are approaching the river's carrying capacity. Those fisheries are improving.

The Fish and Game Department is also actively managing other anadromous species besides the alewife. Three species of salmon (the native Atlantic and pacific coho and chinook) are stocked in the river.

\*1985 National Survey of Fishing, Hunting, and Wildlife Associated Recreation, U.S. Department of the Interior Fish and Wildlife Service, 1988.

<u>Salmon</u>	<u>Numbers</u>	<u>Stage</u>	<u>Timing</u>
Coho	200,000	Smolts	April
Chinook	400,000	Smolts	October
Atlantic	220,000	Fry	April

The coho has not been as productive (returning numbers) nor has it had the longevity of the chinook in other programs, so the Fish and Game Department will supplant coho stocking with an intensive chinook stocking program beginning this year and continuing for the next four years. The Atlantic salmon program in the Lamprey River is in its first year after achieving some success in the Merrimack River. Cost of the above programs will run to approximately \$100,000 during 1989. Other species are also managed in the Lamprey, but are not managed as actively.

The Lamprey River in the past has provided recreational shellfishing opportunities. More significant opportunities for harvesting mussels, oysters, and clams, exists in Great Bay proper. However, water quality standards for intestinal bacteria have not been met for several years, and the river, as well as a good portion of the bay, has been prohibited to shellfishing by the State.

The Lamprey River, as well as the Great Bay, has been designated

by the State of New Hampshire as a Class B water body. Class B is a water quality standard permitting use of that water body for fishing and swimming. The bacterial standard for Class B waters is 240 "most probable number" of total coliform bacteria per 100 milliliters of water. Total coliform bacteria are an indicator intestinal bacteria whose presence may signify the presence of human fecal pollution. However, they may also indicate pollution from animal sources. The 100 milliliters of water represents a dilution standard when used with the total coliform count.

Shellfish which are called bi-valves (clams, oysters, mussels) can store these bacteria in their stomachs which when ingested can cause sickness. A more rigorous total coliform standard exists for Class B "shellfish waters" which is 70 total coliform bacteria per 100 milliliters of water. The Lamprey River, because of its use for shellfish harvesting, and because it discharges into Great Bay, is referred to as having a water quality standard of "Shellfish B" or "SB". This standard is reflected in State Law at RSA 149:3-IV-b.

Testing in the Great Bay and Lamprey River is conducted by two State agencies as indicated:

1. Department of Environmental Services  
Water Supply and Pollution Control Division  
Water Quality and Permit Compliance Bureau  
Water Quality Section

2. Department of Health and Human Services  
 Division of Public Health Services  
 Bureau of Environmental Health  
 Environmental Sanitation Program

Financial and personnel shortages have made for some difficulties in testing consistency, but results from 1986 to the present have shown consistency.

<u>Station</u>	<u>Date</u>	<u>Total Coliform*</u>	<u>Fecal Coliform*</u>
GB 15 (mouth of Lamprey River)	5/27/86	460	460
	6/16/86	> 2,400	210
	7/15/86	2,400	460
	8/11/86	2,400	2,400
	9/8/86	110,000	46,000
	10/6/86	1,100	240
	11/10/86	24,000	460
	1/13/87	460	43
	4/13/87	1,100	23
	5/18/87	11,000	11,000
	6/15/87	> 240,000	11,000
	7/13/87	1,100	460
	8/3/87	> 240,000	> 240,000
9/28/87	1,500	1,500	

\* Per 100 ML Most Probable Number.

<u>Station</u>	<u>Date</u>	<u>Total Coliform*</u>	<u>Fecal Coliform*</u>
GB 15	10/12/87	390	240
	11/9/87	150	15
	12/21/87	11,000	2,400
	4/11/88	93	93
	5/9/88	2,400	210
	6/6/88	430	93
	7/18/88	4,300	4,300
	8/15/88	46,000	4,300
	9/19/88	240	240
	10/17/88	430	240
	11/15/88	2,400	240

Lamprey River	4/11/88	23	4
(at dam)	5/9/88	390	9
	6/6/88	150	93
Lamprey River	4/11/88	930	430
(at boat dock)			
Lamprey River	4/11/88	2,400	430
(at Moonlight Brk)	5/9/88	3,900	2,400
	6/6/88	4,300	930
Lamprey River	4/11/88	430	150
(at Upper Narrows)	5/9/88	240	23
	6/6/88	4,300	2,400
Lamprey River	4/11/88	43	15
(at treatment	5/9/88	150	< 3
plant)	6/6/88	4	> 3
	7/18/88	43	3

<u>Station</u>	<u>Date</u>	<u>Total Coliform*</u>	<u>Fecal Coliform*</u>
Lamprey River	4/11/88	75	75
(at Lower Narrows)	5/9/88	460	93
	6/6/88	930	430
	7/18/88	2,400	2,400
Lamprey River	4/11/88	150	75
(below Narrows)	6/6/88	430	430
GB 15 (mouth of Lamprey River)		No Sampling thus far this year.	

The fecal coliform test is a more accurate indicator of human fecal microorganisms than total coliform. The "SB" standard is 14 fecal coliform per 100 milliliters of water. One can see by reviewing the above data that rarely has the Lamprey River met its legislatively assigned water quality standard over the last 3 years. It is for that reason that the river has been closed to shellfishing by the State's Division of Public Health Services.

### Other Uses

The Lamprey River is used as the receiving water for the Newmarket Sewage Treatment Plant discharge. That discharge, after biological treatment and effluent chlorination, takes place between the Upper and Lower Narrows.

The river may again be used to produce electricity at the dam. Two applications were filed with the Federal Energy Regulatory Commission. One was dropped last year, but the proposal from Hydroelectric Development Inc. is still active as of this moment (6/89).

More important perhaps are the numerous "passive" uses which the Lamprey River serves. The presence of the river is an important factor in the lives of many Newmarket residents. Being able to walk along the river, to observe its wildlife and see the changing tides are important, although non-measurable attributes of the river. These kinds of "passive uses" probably involve more people than the active uses mentioned.

### G. Resource Management

The previous section described how the river is used. This section will describe how it is currently being managed. The

problem of unmanaged uses is the potential for abuse. Without use standards, the competing "use groups" would very likely not manage the river resource in such a way so as to assure its long-term viability. Long-term viability is the object of resource management. That is the meaning of the RSA 149:3-IV-b water quality standards. It is also one of the reasons behind harbor management plans.

### Boating

Boat use on a river like the Lamprey requires navigational aids. Federal Law (CFR; title 33, Chapter 1, Part 66) requires that the U.S. Coast Guard District Commander approve any navigational plan in tidal waters. In addition, approval is required from the U.S. Army Corps of Engineers. Without such an approved navigational plan (buoy location and type), any aid-to-navigation system is illegal and heavy fines can result.

No navigation aid system currently exists in the Lamprey. The "informal" system used during previous boating seasons has been discontinued due to legal and liability concerns.

Boat use also requires provision for berthing of vessels and provision for accessing those berths. As mentioned, mooring permits are managed by the State Port Authority while slips (docks) are managed by the State Wetlands Board. These State

agencies do not consult on a regular and formal basis with one another respecting applications for moorings and slips, although clearly one affects the other. Moorings and slips both result in boats, and marinas and harbors have physical limits to the number of boats which can be stored.

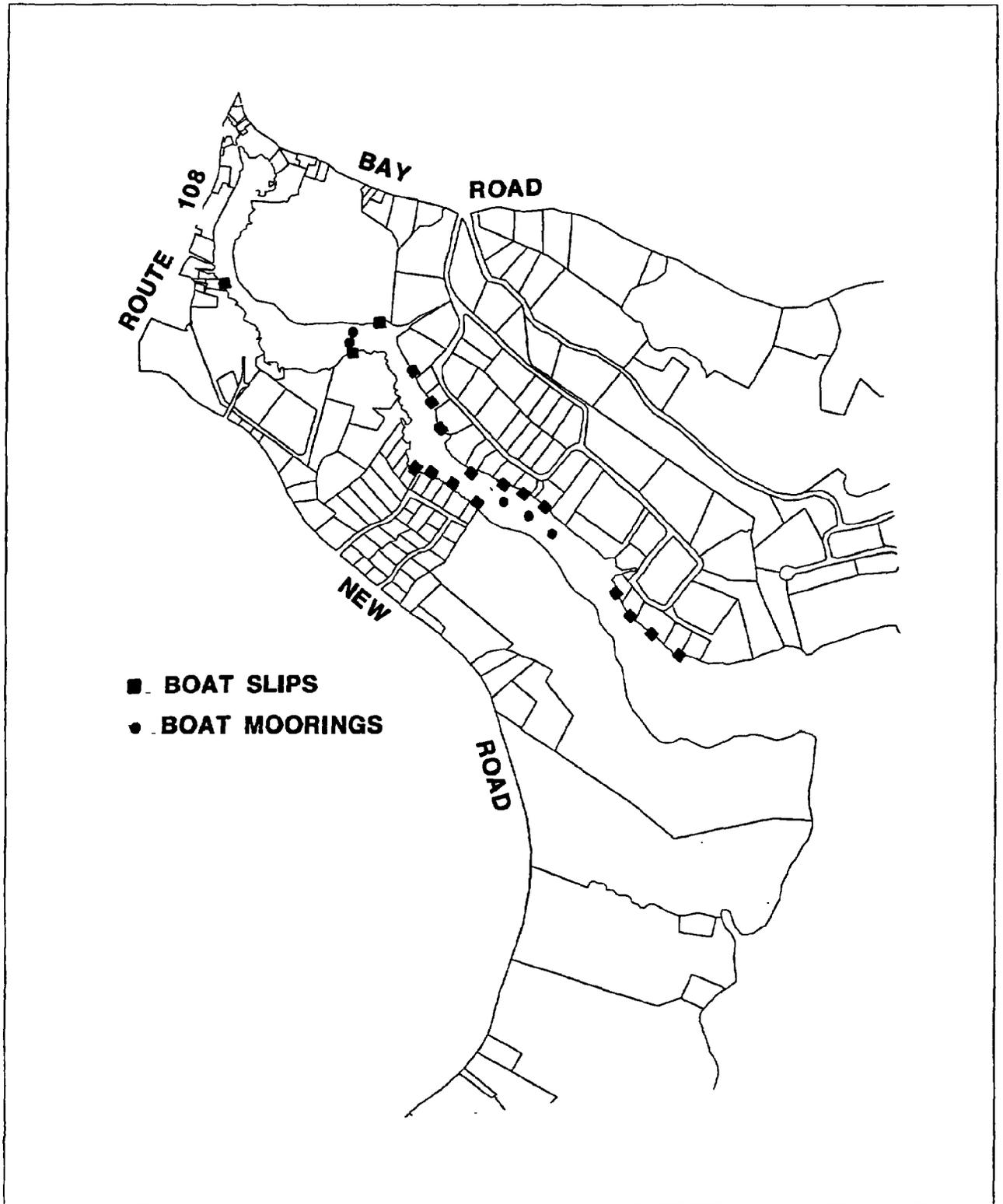
The New Hampshire State Port Authority approves mooring applications on the basis of boating safety considerations.

Demand for moorings is high, as has been mentioned, but demand shrunk considerably with the imposition of a \$5.00 waiting list fee.

The New Hampshire Department of Environmental Services, Wetlands Board approves boat slips on the basis of criteria contained in the New Hampshire Code of Administrative Rules at Chapter Wt 400 "Shoreline Structures".

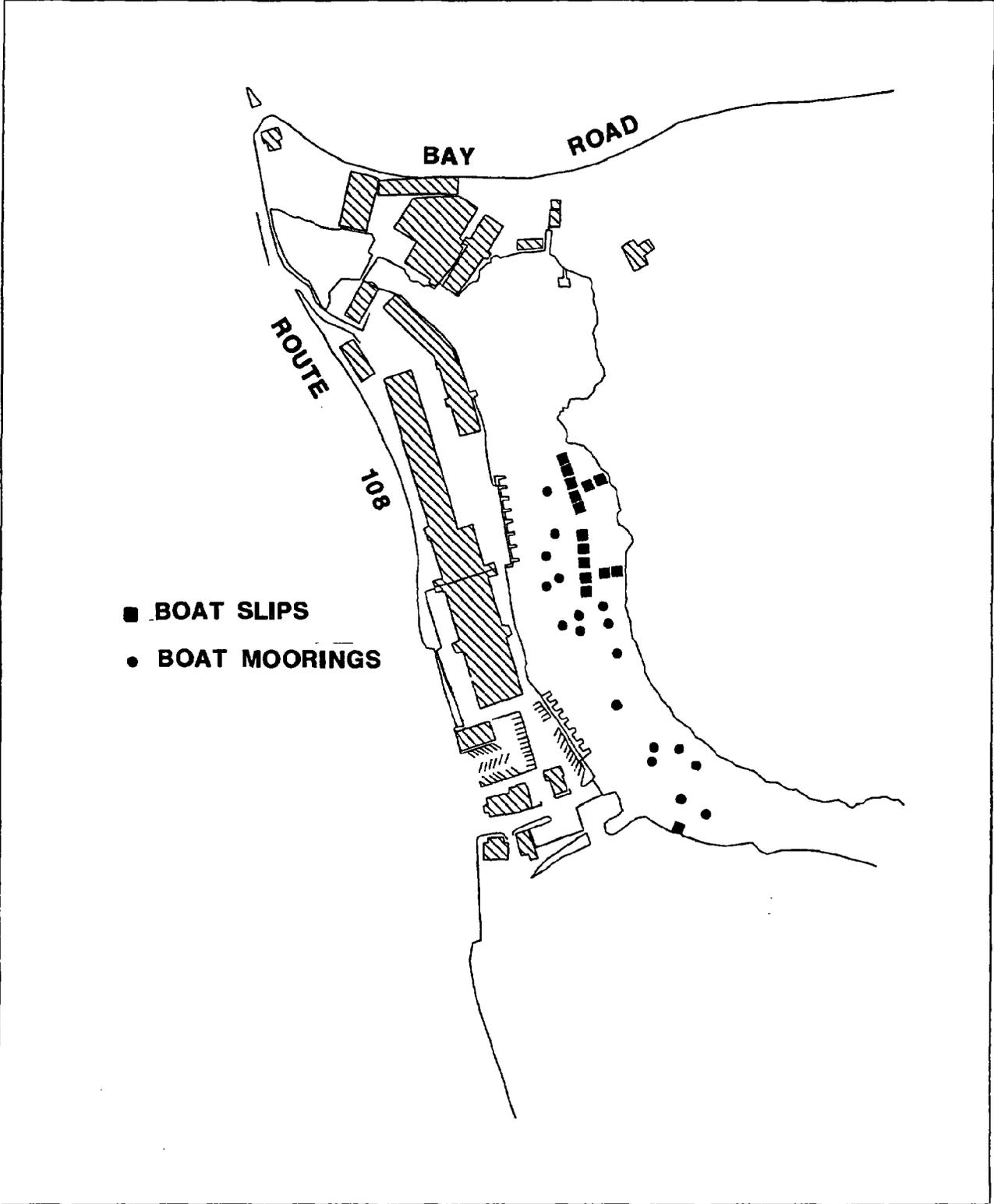
1. to insure safe navigation;
2. to minimize alterations in prevailing currents;
3. to minimize reduction of water area available for public use;
4. to avoid changes in subsurface conditions that would be deleterious to fish and wildlife habitat; and,

**FIGURE 5:**



**LAMPREY RIVER: BOAT MOORINGS AND SLIPS**

FIGURE 5



LAMPREY RIVER HARBOR: BOAT MOORINGS AND SLIPS

5. to avoid changes in water movements that might cause erosion to abutting properties (Wt 401.02).

Slip numbers are approved on the basis of frontage along the water body. For non-commercial slips, 75 feet of frontage is required for the first 2 boat slips and 75 feet of additional frontage for each additional slip (Wt. 402.14). Marinas require 25 feet of shoreline frontage for each slip (Wt. 402.17 (b)). The New Hampshire Wetlands Board approved slips in the Lamprey Harbor area on the basis of the above criteria. Therefore, while both State agencies appear to use roughly the same criteria for decision making, they do not collaborate respecting decisions, nor do they appear to have similar perspectives on what constitutes safe boating. It is worth observing that neither agency specifically and explicitly elaborates what is meant by "safe boating" or "safe navigation". This language appears to make reference to judgments shared by decision-makers on the basis of evidence presented in a particular set of circumstances.

Boat access for those with moorings in the harbor area is provided at the Town launching ramp and dock. The Town Administrative Assistant reports that only rarely does Newmarket have administrative problems with boaters launching or tied up to the dock. There are no Town regulations respecting use of the launching ramp, dock, or parking lot.

Water Quality Act amendments mentioned earlier in this report, which require discharge of marine sanitation devices outside the three mile coastal waters limit, are not observed. Very little Coast Guard enforcement takes place due to manpower/cost constraints, and boaters know this. Promiscuous dumping of boat sanitary wastes in the bay, the rivers, and harbors, is, while not possible to establish empirically, commonplace and accepted among boaters. To our knowledge, only one boat sanitary pump-out exists in coastal New Hampshire, and no enforcement program has been established there (Wentworth Marina) to require its use. Collectively, we appear to accept the implication that our tidal waters are, in fact, raw sewage receiving waters for members of the boating public.

While we have no survey of boats currently moored or berthed in the Lamprey River, it is our judgement that at least 30% of those vessels have some form of marine sanitation device.

Marine boat registration is now being managed by the New Hampshire Department of Safety. For years, New Hampshire has registered boats in its inland waters, but the Coast Guard, until 1989, registered boats in marine waters. For inland waters, the State has a staggered fee structure based on boat length, motor power, etc., but marine registrations now are a flat fee for three years (reflecting former Coast Guard fees). The State Department of Safety appears to perceive boat registrations as a

revenue mechanism largely, and seems to feel that those revenues should go directly to the General Fund. No known service is provided by the Department of Safety for marine registration fees.

### Fishing/Shellfishing

The State Department of Fish and Game manages the several fisheries in the Lamprey River. The principal purpose of that management is to generate income from recreational fishermen and enhance the managed fishery.

Strong emphasis has been placed on reestablishing anadromous fisheries, principally the salmon, and marine fisheries, principally the smelt, in the Lamprey River. Management consists of monitoring species, stocking and analyzing elements of the habitat which can influence the fishery.

The State Department of Fish and Game does not control all elements of habitat influence which can strengthen or weaken a particular fishery. Especially in the case of salmon which, after stocking, leave the estuary for several years of feeding and growing in the open ocean, many things can happen.

Commercial harvesting, predation, disease, or man-induced disaster can all adversely impact a fishery. In addition, management of size and numbers of fish stocked is only gained

with considerable experience.

The Department of Fish and Game believes reductions in returning salmon numbers over the last several years may reflect a combination of the above factors. The numbers of chinook to be stocked over the next 5 years underscores a State commitment to a strong salmon fishery in the Lamprey River.

Shellfish management largely consists of monitoring bacterial water quality, and regulating harvesting on the basis of those results. The test, total coliform bacteria per 100 milliliters of water, determines the likelihood there may be pathogenic (disease causing) bacteria in the water, which if present, would tend to be concentrated in shellfish whose stomachs are consumed, (bivalves) such as clams, oysters, and mussels.

Water quality information earlier presented has resulted in closing shellfish beds in the Lamprey and elsewhere in the Great Bay. The Division of Public Health Services regulates shellfish harvesting in New Hampshire and works cooperatively with the Water Supply and Pollution Control Division. Both agencies have had funding/staffing shortages affecting their abilities to collect and process water quality samples.

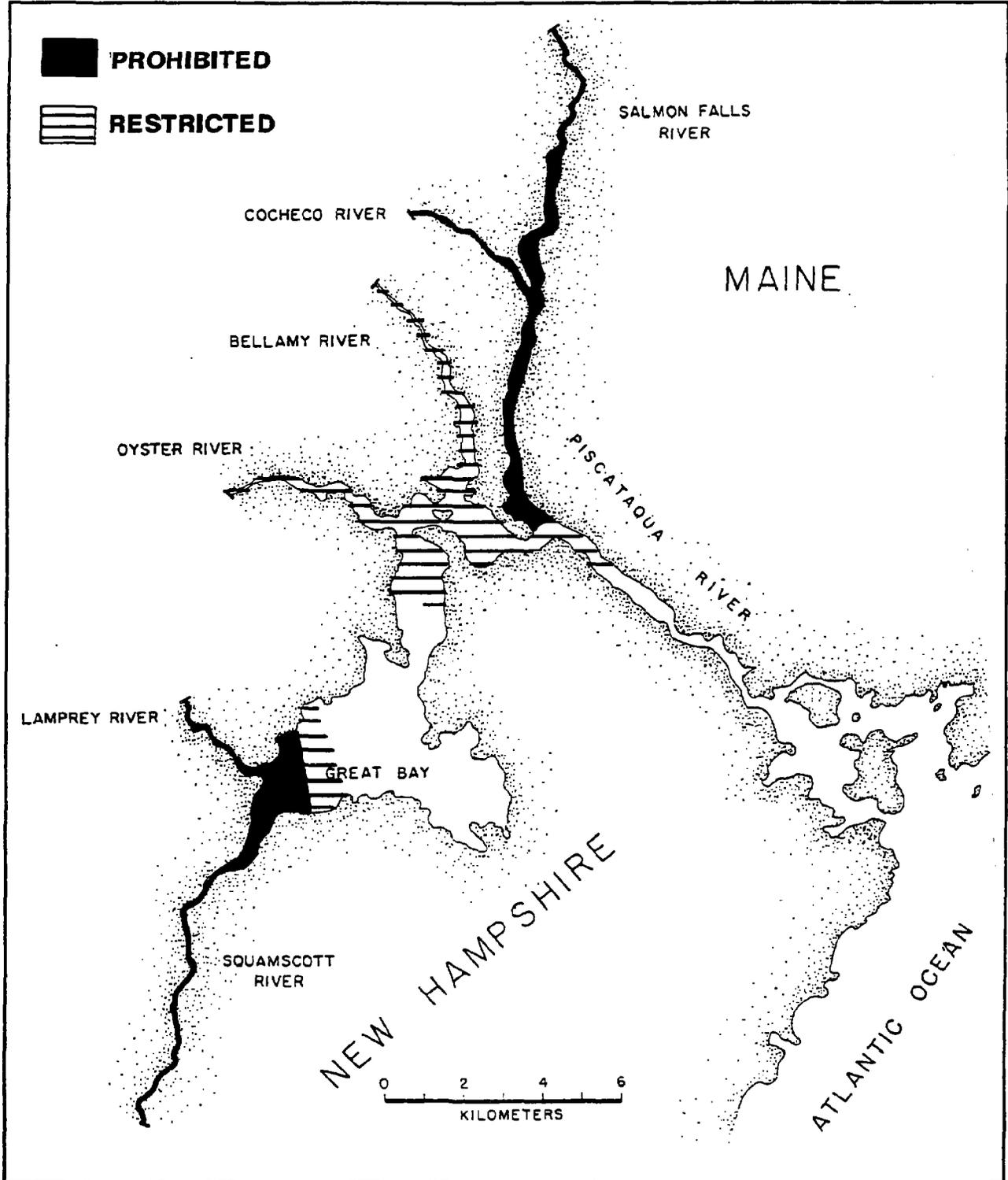
The categories for classification of shellfish growing areas in New Hampshire are derived from the National Shellfish Sanitation Program:

1. Approved: Total Coliform (Most Probable Number) less than 70 per 100 milliliters of water.
2. Restricted: Total Coliform less than 700/100 ML.
3. Prohibited: Areas exceeding above limits.

The difference between restricted and prohibited is only applicable to commercial harvesting (aquaculture) operations. Shellfish from restricted waters may be sold after undergoing controlled purification which consists of residence time in clean waters to enable "flushing" of potentially harmful bacteria.

We understand that shoreline water quality surveys scheduled for this summer (1989) will not sample in areas now prohibited to shellfishing. Time and funds are limited so that a decision has been made to only sample in approved and restricted areas. The thinking is that public health protection is better served by examining quality in waters now open to shellfishing. Waters prohibited from shellfishing do not represent a public health liability. Implicitly perhaps, the Lamprey River's recent water

FIGURE 6:



GREAT BAY SHELLFISH BED STATUS

quality history does not instill confidence that significant improvements have been made during 1989.

The significance of bacterial testing is in determining the sanitary quality of the water body and, by reference, the likelihood of encountering pathogenic bacteria. It is possible for these tests to show "good" results when, in fact, fecal bacteria in cyst form (undetected) may be present. The tests are not conclusive. Moreover, bacterial testing does not generate information about the potential presence of viruses (Hepatitis A, Norwalk, Polio, etc.). Shellfish can concentrate viruses irrespective of the bacterial condition of local waters.

#### Other Uses

Management of the Newmarket Sewage Treatment Plant is a Town responsibility which is reviewed by the State Department of Environmental Services, Water Supply and Pollution Control Division, Water Quality and Permit Compliance Bureau, Permits and Compliance Section.

The management difficulty is to adequately and accurately dose biologically treated wastewater effluents with chlorine so as to kill bacteria without leaving a chlorine residual in discharge waters sufficient to also kill fish life or food sources in the river. Since wastewater volumes and concentrations vary,

chlorine dosage can be a fairly delicate process. One suspects that plant design and management are not always up to those exacting standards.

With respect to municipal management of harborfront land, there are several points to keep in mind:

1. boat numbers will prospectively increase in the Lamprey River over the next several years;
2. the Town has a decision to make on the reuse of the old Town Hall site;
3. the Town is in a strong position to negotiate with the Mill owners as they seek to sell and relocate;
4. the relocation of the Mill owners leaves about 300,000 square feet of floor space on Newmarket's Lamprey River waterfront;
5. the harbor area has limited current fire suppression ability;
6. the harbor area has limited current visual and pedestrian access from Main Street;

7. the harbor area has limited retail, especially of marine-related goods; and,
8. the harbor area has no Town developed vision of what is should be once reuse decisions have been made.

While the Town of Newmarket has been actively discussing, in the context of its building moratorium, impacts on the school and water systems of various regulatory alternatives, it is usefully discussing harborfront development options also. Ideally, a vision for the harborfront will emerge which Newmarket will have drawn, but which allows for flexibility of content and approach by property owners. The Town should circumscribe development parameters, without designing projects or seriously handicapping land development financial opportunities. The vision must be both politically and economically practical.

### III. HARBOR MANAGEMENT ISSUE IDENTIFICATION

Issues reflect dispute or disagreement. In the context of harbor management, those disagreements which seem most pronounced reflect differences in basic perspectives about resource usage or differences in basic perspectives about the role or ability of government. Usually, the process of data gathering and analysis will sufficiently inform and educate so that disagreement is lessened. However, where disagreement is founded on economics rather than access to information, information may simply make disagreement more rigid. Thus far, there have been two Public Hearings for interested residents (on April 27 and June 1, 1989), an attitude survey (33 responses), numerous discussions with public and private institutions (see listing which follows) and several newspaper stories about the harbor management planning process.

The attitude survey solicited responses to the following statements by asking respondents to indicate whether they:

- a) Strongly Agree (+2)
- b) Agree (+1)
- c) Not Sure (0)
- d) Disagree (-1)
- e) Strongly Disagree (-2)

The statements are as follows:

1. Pleasure boat traffic on the Lamprey River is often too heavy.
2. The Newmarket Town Landing provides adequate public access to the Lamprey.
3. There should be additional mooring opportunities on the Lamprey.
4. Most boaters do not exceed "headway" speed on the Lamprey River.
5. The Lamprey River channel should be annually marked by the appropriate authority; and those costs should be borne by boaters.
6. The Lamprey River water quality is improving noticeably.
7. There should be a publicly approved sewage pump out facility for Lamprey boaters, financed by boaters.
8. Lamprey River fishing has noticeably improved.

9. There is the need for a part-time Lamprey River Harbormaster during the summer to improve boating safety education and enforcement.
10. Public access to the Lamprey River is inadequate, and additional access should be financed by boaters.
11. The Town of Newmarket should work with developers of Lamprey shorefront to preserve visual access of the river.
12. Developers of Lamprey shorefront have the right to exploit their property consistent with existing State and local law.
13. The Town of Newmarket should adopt more stringent regulations as needed for shorefront property development.
14. The Lamprey River Harbor Management Plan should establish financing and regulatory mechanisms, as needed to implement management recommendations.

Individual responses were weighted, as indicated, and a "score" assigned on the basis of all responses received. Therefore,

respondent's answers can cancel one another. Total scores reflect degree of consensus, whether in support of or opposition to the statement.

"Scores for the statements are as follows:

1.	-14	8.	-8
2.	+6	9.	+17
3.	-14	10.	-29
4.	-6	11.	+42
5.	+3	12.	+12
6.	-10	13.	+22
7.	-12	14.	+28

Therefore, with a potential total score of from -66 to +66, respondents have indicated the greatest degree of consensus for statements 11, 10, 14, 13, etc. Negative indicates disagreement and positive, agreement with the statement. Looked at another way, the lowest total scores (negative or positive) indicate the greatest disagreement among respondents! Therefore, the most substantial issues are represented by statements 5, 4, 2, 8, etc.

The meaning, to the extent this small survey is an accurate reflection of larger community attitudes, is that:

A. Consensus.

1. Visual access to the river is most important.
2. Public river access is adequate.
3. The harbor management plan should be implemented.
4. Shorefront development regulations should be stronger.

B. Disagreement.

1. Whether the river should be marked and costs of marking paid for by boaters.
2. Whether boaters do or do not exceed headway speed.
3. Whether the Town landing provides adequate access.
4. Whether fishing has improved on the river.

Of course, there is some degree of "issue" associated with any of the above statements. In tabular summary fashion, Lamprey River issues are:

A. Water Side

1. The amount (numbers of boats).
2. The numbers of moorings available.
3. The numbers of boat slips available.
4. Availability of moorings/slips for transient boaters.
5. Speed of boaters on the river.
6. The extent to which boaters should assist in financing boating improvements.
7. The size and power of boats.
8. The need for a sewage pump-out facility for boats.
9. The need for a part-time Harbormaster.
10. A harbor management plan with "teeth".
11. Adequacy of river water quality.
12. Reopening shellfish beds.
13. Maintenance dredging to improve depths at and around the Town Landing.
14. Recent trends in popular Lamprey River fisheries.
15. The desirability of retaining the fish weir.
16. Use of the Town dock (need for rules).
17. Need for boating safety education.
18. Need for a harbor/river decision-making management structure.

B. Land Side

1. Adequacy of public access in the harbor/river.
2. Provision of utilities and emergency services.
3. Adequacy of shorefront development controls.

4. Developer's right to exploit property.
5. The need for waterfront beautification.
6. The need to develop financing mechanisms for harbor/river improvements.
7. A marine refueling station.
8. The need to encourage marine uses along the waterfront.

Public agency and private citizen contacts, aside from contacts at Public Hearings and survey respondents, have been the following:

1. NH State Port Authority
  - a) Ernie Connors, Executive Director
  - b) Beverly Dorr
  - c) Richard Benn
2. Strafford Regional Planning Commission
  - a) Paul Smith, Executive Director
  - b) Rob Houseman
3. Town of Newmarket
  - a) Edward Wojnowski, Administrative Assistant
  - b) David Andrade, Health Officer
  - c) Luke Weigle, Conservation Commission
  - d) Charles Clark, Fire Chief
4. NH Coastal Zone Program
  - a) David Hartman
  - b) David Murphy
  - c) Stephanie D'Agostino
5. NH Department of Fish and Game
  - a) John Nelson
  - b) Robert Fawcett
  - c) Doug Grout
  - d) Ted Spurr
  - e) Rich Tishko

6. NH Wetlands Board
  - a) Kenneth Kettenring
  - b) Gino Infrachelli
  - c) Frank Richardson
  - d) Janet Hilson
7. NH Department of Health and Human Services
  - a) Paul Raiche
8. NH Department of Environmental Services
  - a) George Berlandi
  - b) Richard Flanders
  - c) Donald Chesebrough
  - d) Laurie Cullerot
9. NH Water Resources Board
  - a) Richard DeBold
  - b) Gary Kerr
10. NH Department of Safety
  - a) Marshall Newland
  - b) Beth Clarke
  - c) Kevin McKenna
11. U.S. Coast Guard
  - a) William Smith (Boston)
  - b) Luke Brown (Boston)
  - c) Robert Arnett (Chicago)
12. U.S. Federal Energy Regulatory Commission
  - a) James Wing (Washington)
  - b) Anable Lang (Washington)
13. U.S. Army Corps of Engineers
  - a) Nancy Derry-Wilson (Waltham)
  - b) Frank Mroczek (Waltham)
14. U.S. Geological Survey
  - a) Rick Fontaine (Augusta)

15. U.S. Environmental Protection Agency
  - a) John Kaledin (Boston)
16. University of New Hampshire
  - a) Clayton Penniman, Jackson Lab
  - b) Brian Doyle, Sea Grant Program
  - c) Dr. Maureen Donnelly
  - d) Dr. Aaron Margolin
17. Other Contacts
  - a) Joseph LaSala, Essex Group
  - b) Robert Albee, Bob's Marine Service
  - c) Walter Cheney, The Cheney Companies
  - d) James Belli, Rivermoor Landing
  - e) Robert Snover, Appledore Engineering
  - f) Edward McDevitt, Massachusetts Harbormaster's Association
  - g) John Clarke, Massachusetts C.Z.M. Program
  - h) Joseph Migliore, Rhode Island Department of Environmental Management

#### IV. HARBOR MANAGEMENT GOALS

The following summary of harbor management goals reflects the input of the many sources mentioned in the previous section of this plan. These goals also reflect elements of the Public Trust Doctrine and State Water Quality Law described earlier. Most importantly, these goals reflect what we perceive is an emerging community consensus on harbor/river growth and protection.

The goals and objectives are organized under water and land side headings:

##### A. Water Side Goals and Objectives

1. to establish a clear, approved navigational aid system for the Lamprey River;
  - 1.1 to work with the U.S. Coast Guard in design of a navigational aid system and application;
  - 1.2 to develop accurate base maps of the Lamprey River channel, mooring areas, docks, etc.;
  - 1.3 to solicit Corps of Engineers approval of the system;

- 1.4 to finance, install, and maintain buoys annually for the approved navigational system;
  - 1.5 to enforce boat speed regulations in the river;
  - 1.6 to relocate moorings from the approved channel;  
and
  - 1.7 to periodically and minimally dredge the harbor channel when siltation begins to restrict channel use.
2. to establish a clear and supportable limit on total boat berthing opportunities in the Lamprey River.
    - 2.1 to the extent possible, base boat number limits on existing State, legal and regulatory precedent;
    - 2.2 to secure institutional support and cooperation from appropriate State and municipal agencies;  
and,
    - 2.3 to periodically review and/or reassign available boat berthing opportunities as appropriate.

3. to improve and maintain acceptable standards for Lamprey River natural resource protection:
  - 3.1 to identify existing sources of Lamprey River bacterial water pollution;
  - 3.2 to develop methods by which existing sources of bacterial pollution will be adequately abated;
  - 3.3 to prevent future pollution sources from compromising river water quality standards;
  - 3.4 to determine an appropriate zone for "prohibited" shellfishing below the sewer treatment plant outfall;
  - 3.5 to re-open the Lamprey River to shellfishing;
  - 3.6 to protect tidal wetlands; and,
  - 3.7 to provide for the conservation of the Lamprey River's fish and wildlife habitat.
4. to develop a systematic harbor management plan decision-making process;

- 4.1 to amend the plan periodically and provide direction on important public policy questions;
- 4.2 to resolve conflicts between resource user groups;
- 4.3 to effectuate needed cooperation between the State, municipalities, and private groups;
- 4.4 to adopt and amend, as necessary, a set of harbor management regulations for harbormaster enforcement;
- 4.5 to develop procedural standards for fire suppression, hazardous spills, and medical emergencies on the water; and,
- 4.6 to establish and administer a harbor management fund which will finance the harbormaster's budget and needed maintenance of capital facilities on the river.

B. Land Side Goals and Objectives

1. to encourage the municipal development of a clear vision for reuse of waterfront land or structures;

- 1.1 to improve visual, pedestrian waterfront access;
  - 1.2 to improve public infrastructure on the waterfront;
  - 1.3 to preserve significant historical elements of the Town's marine heritage;
  - 1.4 to facilitate the creative, adaptive reuse of historical structures; and,
  - 1.5 to encourage development of limited marine recreational facilities including boat holding tank pump-out facilities and public toilets.
2. to encourage modest augmentation of riverfront/harbor access and enhancement of existing access;
    - 2.1 to periodically and minimally dredge the area around the Town launching ramp to permit low tide usage;
    - 2.2 to develop a limited set of posted use regulations for the Town launching ramp, dock, and parking area;

- 2.3 to encourage active fishing in the river by purchase of fishing easements from private land owners;
  - 2.4 to investigate and interpretively sign historic waterfront locations; and,
  - 2.5 to designate "scenic" view areas along the Lamprey River and negotiate for passive access;
3. to encourage greater public awareness of the harbor and river history, resources, and uses;
    - 3.1 to develop a public "bulletin board" for the posting of Lamprey River information;
    - 3.2 to develop a Lamprey River guide with river map, navigational aid system, harbor regulations, etc. for the general public; and,
    - 3.3 to work with other groups to encourage the safe and harmonious use of river resources.

## V. MANAGEMENT RECOMMENDATIONS

The following recommendations are advanced with the conviction that they:

1. strike a balance between river use and protection;
2. are necessary and fair; and,
3. are practical and implementable.

The Lamprey River has a finite capacity to support boating use and assimilate water pollution just as it has a finite capacity to support smelt or shellfish. While different people will no doubt perceive those "limits" or that "carrying capacity" differently, it is nevertheless a concept which has broad subscription. Furthermore, it is a concept of fundamental importance in the management of the tidal Lamprey River. Most of us want to do what we want to do when we want to do it!

However, most of us can also appreciate the need to know when such "demand driven" attitudes are in real danger of threatening a natural resource or degrading a quality of life.

Most seasoned boaters will have a perception, based on their experience, about how many boats should use the Lamprey River and

Harbor before boating safety becomes an issue. Likewise, most sanitary engineers have similar perceptions about the inter-relationships between sewer treatment plant design capacity and receiving water assimilative capacity. The difference between the above two examples is that the latter has a scientific derivation while the former represents non-scientific judgement. The latter has standards which are repeatable, the former has standards which are personal. The fact is that the latter (scientific) example is perceived to be more legitimate, more acceptable to us, without however, being necessarily any more valid. Judgments can be subjectively personal or they can be persuasive thereby serving as the basis for consensus.

The Lamprey River has a sewer treatment plant which represents an improvement over former Newmarket management of sanitary wastes. Treatment (physical settling, biological digestion, chlorination) is preferable to direct discharge of human wastes into the river. Notwithstanding treatment, however, bacterial counts in the Lamprey River exceed what they should be. We don't know from where the problem(s) originate, but we do know:

1. we need to locate and abate the problem(s); and,
2. we need to prevent other like problems from arising if the Lamprey River is going to achieve and maintain its designated water quality standards.

To repeat, the water quality bacterial standard for the Lamprey River is carried in New Hampshire law. This management plan seeks to achieve that standard, and has no reason to believe other governmental agencies and Newmarket citizens do not likewise seek to achieve designated water quality standards for the Lamprey River.

Boating access to the Lamprey or any other State waters sometimes seems more managed by boater demands and budget, then by public judgments based on clear standards. This plan recommends that water quality is a standard which is a necessary element in the public management decision. Water quality and boating safety should serve as the bases for determining river/harbor boat "carrying capacity". All agencies of government with a role in boat berthing decisions are, to some degree, now guided by water quality standards. However, the acknowledgement of water quality objectives should be a more explicit factor in decisions relating to boat berthing.

Knowledge of a harbor's water quality or safety limit for boats allows management decisions to focus on apportionment of boat numbers in the interest of fairness and balance. Without an accepted and acceptable numerical boat limit, demand pressures force management to establish a largely "first come - first serve" decision-making structure, modified only by institutional and sometimes by personal practice.

The essential basis for recommending the limitation of boat numbers in the Lamprey River is the river's bacterial water quality standard, the numbers of boaters with marine sanitation devices, and what is known about use of these sanitary devices. Given known practice, it would be foolish to assume boat owners are not discharging sanitary wastes into the Lamprey River or harbor.

A number of years ago, the Food and Drug Administration, the Environmental Protection Agency and the Interstate Shellfish Sanitation Conference, developed and modified a table (see below) for determining how many boats a marina or harbor could support based on shellfish bacterial standards (fecal coliform). Most recently modified by the Marine Advisory Service in 1988, it is actively used by the Rhode Island Department of Environmental Management, Water Resources Division, to regulate boat numbers there.

Like determining the inter-relationship between sewer treatment plant design capacity and receiving water assimilative capacity, this determination of boat limits is scientifically based on the volume of water, water quality standards, and assumptions about sewage discharges:

<u>Area In Square Miles</u>	<u>Depth in Feet At M.L.W.</u>	<u>Number of Boats</u>
0.1 (64 Acres)	5	14
	10	28
	15	41
	20	55
	25	69
	30	83
	40	110

<u>Area In Square Miles</u>	<u>Depth in Feet At M.L.W.</u>	<u>Number of Boats</u>
0.25 (160 acres)	5	35
	10	69
	15	104
	20	138
	25	173
	30	207
	40	276

The formula is  $14 \text{ Fc}/100 \text{ ML} = \text{GPE}/\text{V}$  where:

14 FC/100 ml is the water quality standard.

G = number of boats.

P =  $2 \times 10^9$  Fc/person

E = population equivalent of 2 people/boat during the boating season.

V = volume of dilution water.

For example, let's assume the tidal Lamprey River is roughly 0.1 square miles (64 acres) which equals  $2.79 \times 10^6$  square feet. If the mean low water depth averages 5 feet, the volume (V) equals  $2.79 \times 10^6 \times 5$ . Since there are 283 (100 ml) units per cubic foot of water, therefore:

$14 \text{ Fc}/100 \text{ ml} = G \times 2 \times 2 \times 10^9 / 3.95 \times 10^9 \text{ (100 ml units)}$   
 $G = 13.8 \text{ boats with marine sanitation devices.}$

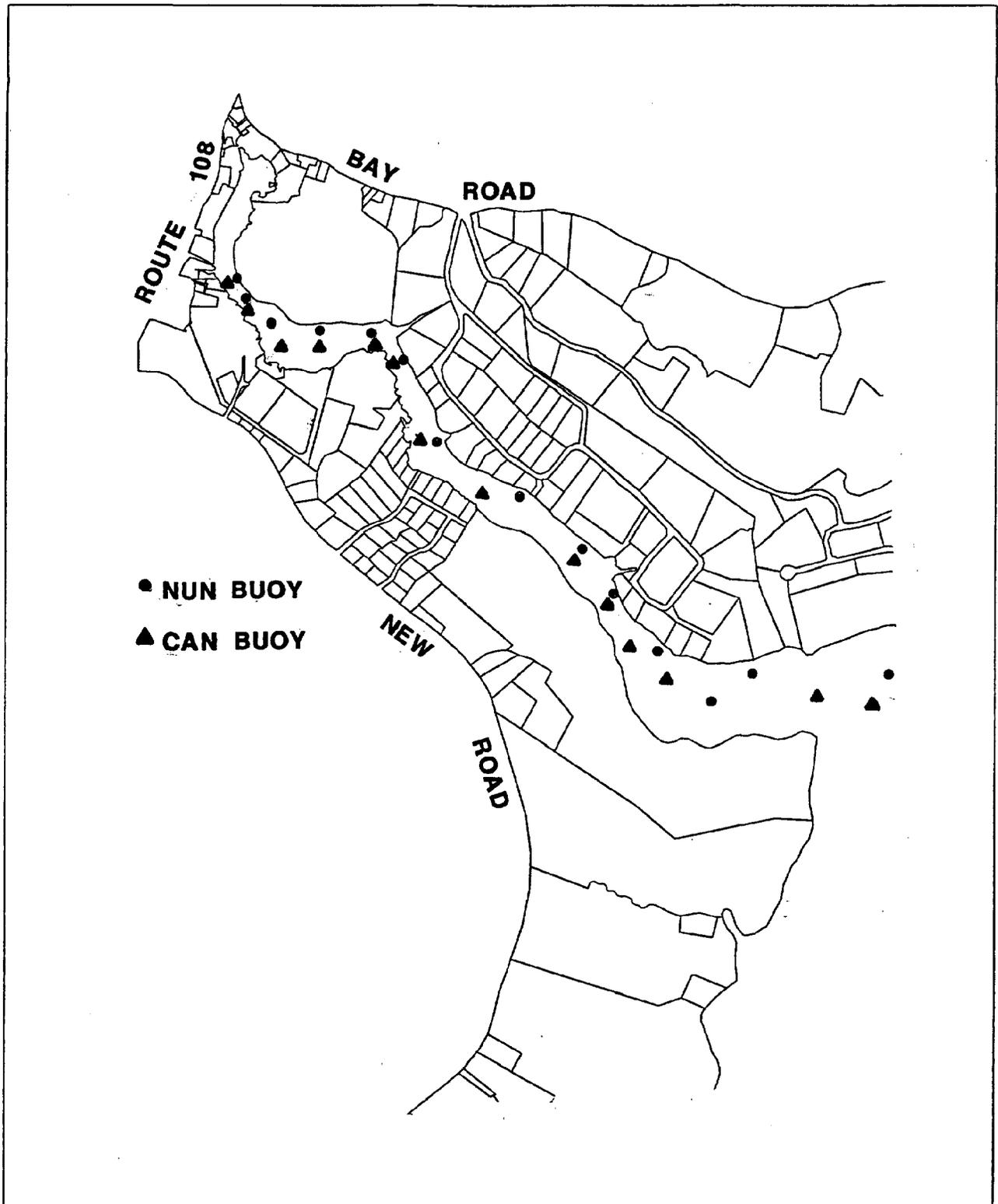
If one assumes that 30% of the boats in the Lamprey River have toilets, and that there are now in excess of 80 boats approved (but not yet located) in the river, the above standard is already exceeded.

It is for that reason that we recommend a moratorium on further permits for boat moorings or boat slips. Further recommendations include:

A. Water Side Recommendations

1. The NH State Port Authority should prepare an application to the U.S. Coast Guard and Corps of Engineers for approval of an aid-to-navigation system in the Lamprey River and, as needed, in the Great Bay to connect with the existing, approved buoy makers.
2. Upon approval by the U.S. Coast Guard and Corps of Engineers, the NH Port Authority should purchase and install buoy markers and ground tackle in approved locations which will then be initially displayed in the first Coast Guard District publication "Local Notice to Mariners" and

**FIGURE 7:**



**LAMPREY RIVER: PROPOSED AIDS-TO-NAVIGATION**

subsequently by the (NOAA) National Ocean Service in its chart updates.

3. Capital costs associated with the purchase of needed buoy markers, ground tackle, and transportation should be financed by the State of New Hampshire Legislature. Operating costs for personnel and maintenance should be assumed by the State Port Authority and State of New Hampshire.
4. A full-time Harbormaster should be assigned part-time responsibility for boating safety enforcement and education in the Lamprey River by the State Port Authority.
5. The Harbormaster assigned to the Lamprey River should develop, in conjunction with the Town of Newmarket, a harbor/river ordinance and guide respecting use and location of the channel, channel setbacks for moorings, docks and other structures; use of the Town landing, dock and parking lot; control of boat traffic; use of moorings, slips, and other boat facilities; unsafe behavior or unseaworthy vessels; and boating sanitary standards. Appropriate penalties should be assessed violations of these standards and served to boating violators.
6. The Harbormaster, Port Authority Director, and Town Chief

Executive should serve as the Lamprey River Harbor Committee for the purpose of resolving disputes which may arise in connection with the harbor ordinance and decisions of the harbormaster; the need to periodically amend the harbor management plan; and the need to periodically review, approve, or amend the harbormaster's budget.

7. The Lamprey River Harbor Committee should assume joint responsibility for all financial, legal, or policy decisions felt to be necessary to the adequate management of the Lamprey Harbor and River. A memorandum of understanding to that effect should be drawn and signed by the Newmarket Board of Selectmen and Port Authority Board.
8. The Consultant to the Port Authority should establish survey control for Lamprey River aeriels and maintain information on buoy locations, mooring areas, and the like for subsequent Port Authority use.
9. No sailboards, jet skis, or waterskis should be permitted to be used in the Lamprey Harbor or river. No swimming should be permitted in the Lamprey River above the Lower Narrows.
10. The Lamprey River Harbor Committee should negotiate with the State Wetlands Board to amend its regulations to eliminate references to shore frontage requirements in marine waters

for commercial and non-commercial boat slip applications. Further, the Harbor Committee should seek from the State Wetlands board a moratorium on any further boat slip approvals in the Lamprey River until such time as it can be established that neither boating safety nor water quality standards will be compromised. Finally, we recommend that the NH State Port Authority solicit a legal opinion from the Attorney General respecting whether State agencies are obligated to reflect State water quality standards in their day-to-day administrative decisions, and whether the Public Trust Doctrine offers potential injunctive relief in the event it can be reasonably established a State agency may have acted in such a fashion so as to potentially abrogate those water quality standards.

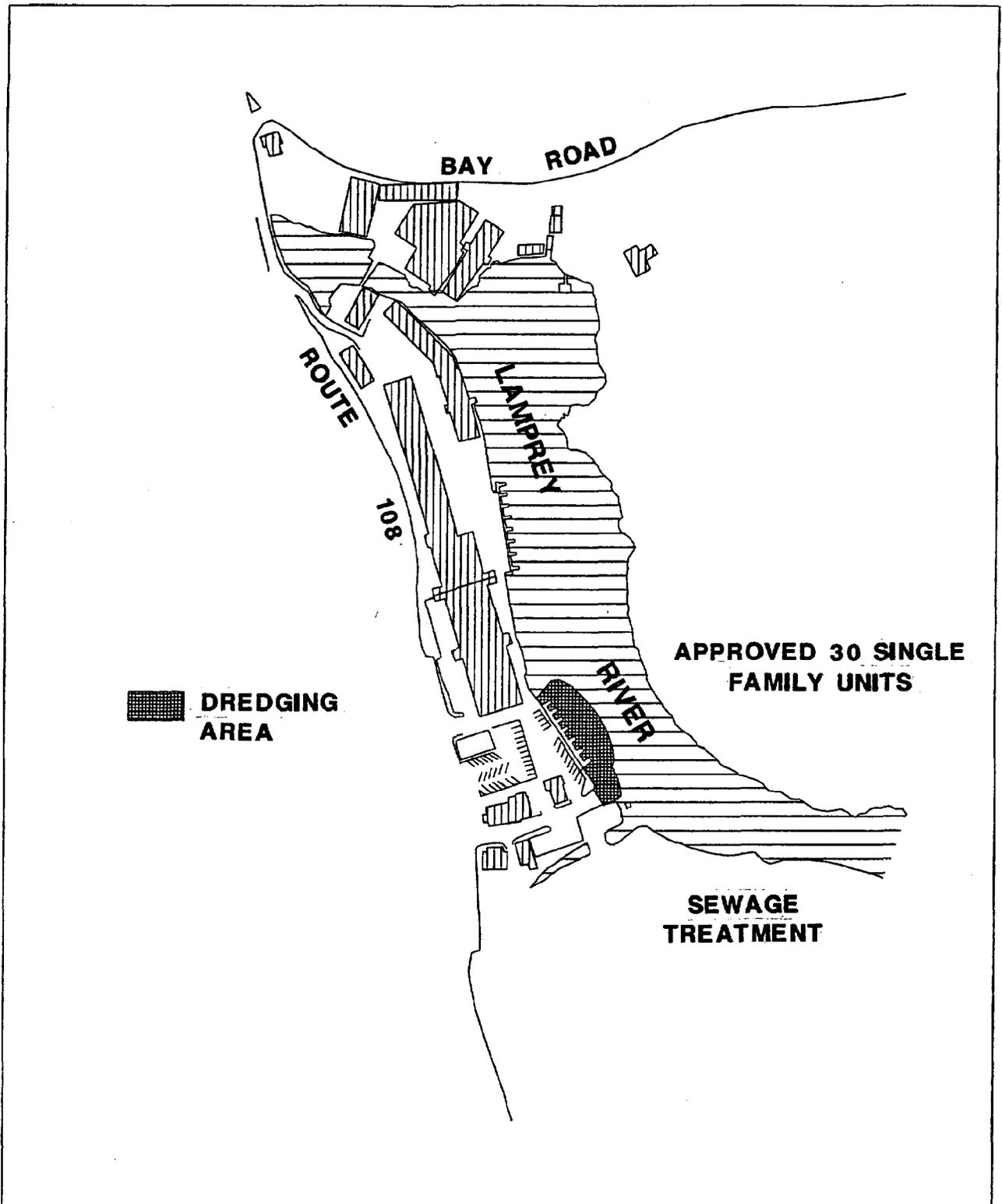
11. The Lamprey River Harbor Committee should petition the Water Supply and Pollution Control Division, the Division of Public Health Services, and the Town of Newmarket to conduct a sanitary survey of the tidal Lamprey River in order to locate and abate sources of long-standing bacterial pollution there.
  
12. The Lamprey River Harbor Committee should petition the Water Supply and Pollution Control Division and the Town of Newmarket to revise the Newmarket sewer treatment plant National Pollution Discharge Elimination System (NPDES)

permit to reflect the river's 70 total coliform/100 ml water quality standard, and to make needed changes to plant facilities in order to achieve that standard in discharge waters without detrimental chlorine residuals.

13. The Lamprey River Harbor Committee should establish composition of bottom sediments in areas proposed for limited dredging; should determine the most appropriate scheduling of any dredging activity and should explore alternative locations for potential disposal of dredged sediments.
  
14. Beyond this, the Lamprey River Harbor Committee should seriously consider State legislation to create a boating no discharge zone for the Lamprey River\*. Such legislation (passed in Illinois, Michigan, Indiana, and other mid-western states) would require installation of a boat sewer pump-out facility and strong enforcement by appropriate authorities, but may ultimately prove to be necessary throughout the Great Bay estuary to effectively manage boat sanitary waste discharges.

\* See Public Law 95-576, Section 312 [1977]).

**FIGURE 8:**

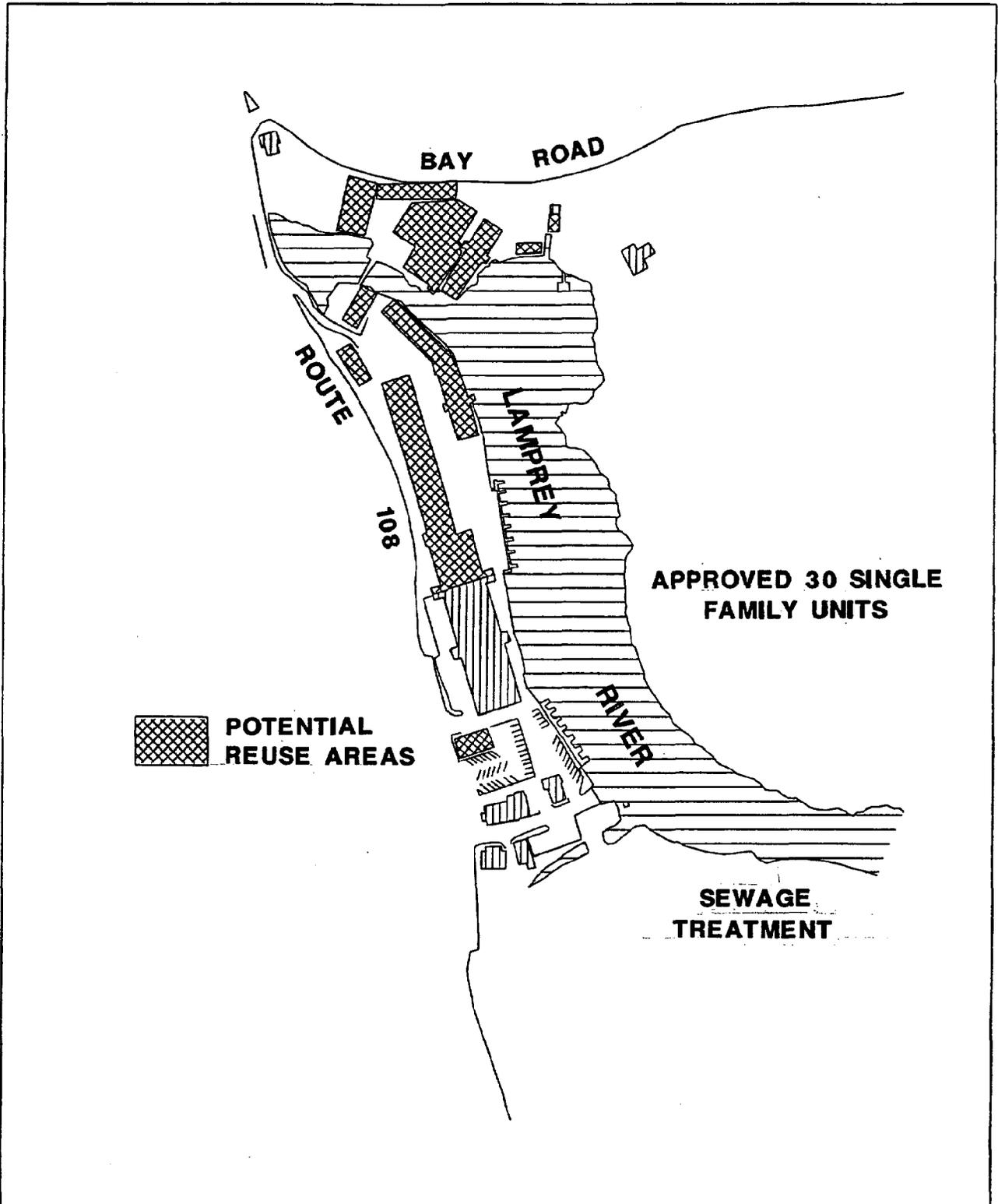


**LAMPREY RIVER HARBOR: PROPOSED DREDGING**

B. Land Side Recommendations

1. The NH State Port Authority and Newmarket Fire Department should establish the needed emergency procedures and facilities which are required to adequately protect the Lamprey Harbor area and Newmarket waterfront.
2. The NH State Port Authority should establish a revolving fund account for Lamprey River Harbor management expenses, including normal personnel and maintenance costs.
3. The Lamprey River Harbor Committee should encourage Newmarket to develop a clear set of shorefront goals and objectives as it seeks to amend the Town plan and Town development controls. Efforts should be made to coordinate harbor management goals and objectives with those of Town planners. Subsequent proposals for revision to the municipal plan or regulations in connection with the river, should emanate from the Lamprey River Harbor Committee.
4. The Town should seek to secure needed improvements in shorefront utilities during private property owner redevelopment proposals and the regulatory approval process.

FIGURE 9:



LAMPREY RIVER HARBOR: POTENTIAL REUSE AREAS

5. The Lamprey River Harbor Committee should work with the State of New Hampshire and the Town of Newmarket to establish a location for a boat sanitary waste pump-out facility and public toilets which should utilize the public sewerage system.
6. The Lamprey River Harbor Committee should solicit State Department of Fish and Game and municipal Conservation Commission participation in locating potential fishing access points along the river, and should negotiate fishing easements from appropriate property owners.
7. The Lamprey River Harbor Committee should seek to establish the feasibility of securing public access to the Lamprey River for passive pedestrian "scenic" opportunities.
8. The Lamprey River Harbor Committee should work with appropriate municipal authorities to develop a location and design for a Lamprey River Bulletin Board. Use of the board would be controlled by the Committee and would be limited to appropriate events/announcements on the harbor/river or bay.

The above recommendations do not reflect any adjustment to existing inter-relationships between boaters who may be transient and boaters who are property owners. The Lamprey Harbor currently has only 2-7 berthing opportunities (moorings and

slips) for transient boaters. Additionally, we do not propose at this time a transient anchorage for boaters since shoreside facilities are not adequate and since approved boat numbers are now a management problem.

Further, we recommend that the Port Authority establish a total of 2-3 additional transient moorings, marked and enforced as such, when existing harbor area permittees relinquish moorings due to relocation or other cause. Fees associated with their use should be collected by the Harbormaster. Monies should be returned to the harbor management fund.

The harbor management fund has already been proposed by the State Port Authority to assist in underwriting harbor management costs. Proposals to raise revenues, such as leasing land below the mean high tide or securing monies from marine boat registrations, go beyond the scope of this plan for the Lamprey River. However, additional revenue sources such as violation fines, clearly directed at financing harbor management costs, are much needed.

The alternative to a harbor management fund will certainly be reflected in the Port Authority budget, or will be reflected in some considerably less ambitious management perspective than is embodied herein.

## VI. HARBOR MANAGEMENT IMPLEMENTATION

Political support for recommendations advanced herein will not be easy to secure, particularly since they will often require the expenditure of funds which are always limited and for which competition is always keen.

However, the Lamprey River's recent water quality and navigational safety history confront those of us who seek to solve our public problems with difficult choices. Public law requires approved aids-to-navigation, which are always more costly than non-approved alternatives. Public law requires a water quality standard for the Lamprey River which has not been met for several years at least. There is no inexpensive alternative if that problem is to be abated. Laws can always be ignored and occasionally overturned, but this plan cannot responsibly propose such alternatives.

Management recommendations advanced in the previous section simply seek to build an organizational and financial capacity which would make Lamprey River Harbor Management a self-sufficient, or largely self-sufficient, process. Problems are not solved unless they stay solved, and that doesn't happen unless someone is managing the problem monitoring and abatement process.

Water Use Plan

1. Navigation Aid System: There are three principal alternatives, only one of which is responsible (do nothing, develop an informal, non-authorized system, or apply for and seek approval of a Coast Guard approved navigation system). Cost items are:

- (a) application process (base maps, engineering);
- (b) buoys and ground tackle - \$300 - \$500/each;
- (c) emplacement - \$25 - \$100/each;
- (d) annual maintenance - \$1,000 - \$3,000.

Capital expenditures could range from \$14,000 - \$24,000 depending on buoy numbers and cost. It may be possible to coordinate purchase with the U.S. Coast Guard or some other buyer to achieve cost economies.

Costs for needed buoys and ground tackle can theoretically be paid for by either municipal, State, or Federal government sources. The likelihood of securing Federal funds for a river not involved in commerce of any kind is

remote. The Town of Newmarket divested itself of river navigational responsibility some time ago so the municipality will be difficult to involve in funding. These are "state waters" by dint of the Public Trust Doctrine. Furthermore, the State directly benefits from boat registration revenues. Costs for Lamprey River navigational marking should be either a line item in the Port Authority budget or authorized by a special piece of legislation.

2. Operating and maintenance costs associated with buoy emplacement and removal can be either financed by annual appropriations and/or incrementally financed by a harbor management fund established for the purpose which is largely "user fee"-oriented. The latter offers the potential to be largely self-sustaining. Fees for leasing moorings are well-established. Fees for boat slip leaseholds and other similar uses of "State waters" would be analagous. Inland boat registrations, in part, provide revenues for Department of Safety personnel. Marine boat registrations can be similarly structured for operating expenses associated with harbor management in the coastal environment. It is prudent, to the extent possible, to recapture marine administrative costs from users of marine safety and enforcement services, and from those who would use "state waters" (at no cost) for their own profit. The State of New Hampshire can certainly use additional revenues, and the

lease of submerged tidal land is practiced elsewhere.

3. An experienced marine harbormaster, with knowledge of boaters (as well as boats), is needed to:
  - 3.1 develop a harbor ordinance, guide, and necessary memoranda of understanding;
  - 3.2 develop working relationships with the Town of Newmarket, Wetlands Board, Department of Safety, and Fish and Game Department, etc.;
  - 3.3 monitor compliance and enforce the ordinance;
  - 3.4 "fine tune" and assist in amending the harbor management plan; and,
  - 3.5 maintain the navigational aid and mooring system and collect all fees and fines.

Such an individual should be retained by the State Port Authority. Alternative employment by the Town, common in other states, does not offer the same potential for rigorous enforcement (when necessary) nor for close coordination with other harbormasters or other State agencies.

4. The Lamprey River Harbormaster should bear major responsibility for establishing the needed elements of a harbor/river ordinance. Some of the particulars are now well-known, but preparation and adoption of such an ordinance should not precede acceptance of the harbor management plan by the Port Authority and Town of Newmarket. Once this plan has been accepted by the Port Authority Board and Newmarket Planning Board, there is clear direction for a harbor ordinance which should be accepted by the Lamprey River Harbor Committee upon completion. Subsequent revisions to the Lamprey River Harbor Ordinance should be accepted by the committee and posted on the bulletin board and local newspaper before being enforced.
5. Upon emplacement of the navigational aid system, the Harbormaster, through the Lamprey River Harbor Committee, should prepare a river/harbor guide, the purpose of which would be to inform mariners about buoy location, harbor safety rules, marine services, local restaurants, and the like. Costs associated with publication and distribution could be assumed by advertisers.
6. The Lamprey River Harbor Committee should investigate purchase and location of a boat sewer pump-out facility (such as Keco), and also establish educational and enforcement programs with its use. The objective should be

zero discharge of marine sanitation devices in the river/harbor, and penalties for discharge should effectively encourage use of the facility. If enforcement services are partially provided by the Harbormaster, some monies from use of the facility should be returned to the harbor management fund.

7. A moratorium on boat slip and mooring approvals is a prospectively limited-in-time management strategy which should be pursued:

- 7.1 because it is initially cost effective and provides for needed coordination between the Port Authority and Wetlands Board; and,

- 7.2 because it allows time for the Lamprey River Harbor Committee to create the opportunity for effective no boat sanitary discharge in the river.

8. The goals, objectives, and specific management recommendations contained herein should be the subject of a memorandum of understanding jointly signed by the Port Authority Board and the Newmarket Board of Selectmen.

9. The management objectives for State interagency cooperation are:

- 9.1 recognition between the Port Authority and Wetlands Board that they share responsibility for boat berthing numbers in marine rivers and harbors;
- 9.2 recognition between the Port Authority and Wetlands Board that New Hampshire has no effective control on boating sanitary discharges in marine waters at this time;
- 9.3 recognition between the Port Authority and Wetlands board that in marine waters which do not meet legislated water quality standards there is no "by right" property-owner entitlement to a boat slip(s) or mooring(s); and,
- 9.4 a joint resolution of both the Port Authority and the Wetlands Board to coordinate decision-making in marine waters and to issue no further approvals in the Lamprey River until the impacts of existing approvals can be assessed, a sanitary survey of the river is conducted, and the wisdom of approving additional boat berthing opportunities can be reassessed.

10. Background bacterial water quality problems in the Lamprey River are not primarily caused now by boat marine sanitation devices! Sources of existing problems must be uncovered and abated. However, once existing problems are abated is not the time to begin to address boat sanitary discharges. There is a good case to be made for limiting boat numbers, but an even better case can be made for effectively controlling boat sanitary discharges. The former is a water quality surrogate for the latter, in the absence of existing political and financial commitments to prevent and penalize boat discharge. We see no alternative to this approach given the non-collaborative nature of the state/municipal dialogue and funding constraints associated with water quality protection.
11. The State of New Hampshire and Town of Newmarket should jointly conduct and finance a sanitary survey of the tidal Lamprey River. Until such a survey is completed, it will be impossible to determine from what sources bacterial pollution is entering the river.
12. This plan concurs with many of the recommendations contained in the Interagency Report on the Shellfish Waters of New Hampshire (1989) and most especially with the letter from Raymond Grizzle, a research scientist at the Jackson

Estuarine Laboratory in Durham:

12.1 the goal is to reopen shellfish beds;

12.2 performance of the Newmarket Sewage Treatment Plant  
needs to be improved;

12.3 sources of river pollution need to be ascertained;

12.4 a "prohibited" zone around the treatment plant outfall  
needs to be established; and ,

12.5 "water quality problems should be the ... concern of  
the State" (Grizzle).

13. Utilizing existing bathymetric information, the Lamprey River Harbor Committee should explore with the NH Department of Fish and Game and the Corps of Engineers procedures and potential difficulties in undertaking limited maintenance dredging of the Lamprey Harbor. The size, location, characteristics, and schedule for any dredging should be known in addition to proposed area for disposal of materials.

Land Use Plan

1. The Port Authority can materially assist the Town of Newmarket Volunteer Fire Department prepare for potential waterfront fires on the basis of its existing experience in this area. Discussions between appropriate personnel should strive to establish needed emergency procedures and needed capital facilities. Emergency procedures can, through the Lamprey River Harbor Committee, be made part of the ordinance and guide. Capital facility needs can be made part of the Town's capital budget, to be potentially underwritten as an "off-site" expense by private property owners interested in waterfront reuse or expansion.
  
2. A Lamprey River Harbor Management fund under the control of the Lamprey River Harbor Committee should be established. The use of monies should be generally circumscribed in the Lamprey River Harbor Ordinance. Sources of funds can include Town appropriations, mooring permit and harbor waiting list fees, fees from mooring or boat slip leasing and fees for other services specifically provided in the Lamprey River by the Harbormaster or the Town.
  
3. The consultant regional planning agency should seek to assist the Town of Newmarket draft a "Mill Reuse Zone" as

part of its land development controls. Such a zone could either be an "overlay" option through special exemption provisions of the Board of Adjustment, or a zone offering "by right" and "bonus" provisions in exchange for public policy objectives like improved visual, pedestrian access, improved infrastructure facilities, marine-related services, parking and the like. Design details could then be negotiated with prospective developers on a more flexible basis.

4. The Lamprey River Harbor Committee, through the consultant regional planning agency, should solicit Newmarket Conservation Commission, NH Department of Fish and Game, and Trust for NH Lands involvement in prioritizing, negotiating for, and securing fishing rights and scenic easements along the Lamprey River. The monies available to Fish and Game and the Trust are competitive, but assuming Town, Port Authority, and property owner support, chances for funding assistance could be good.
  
5. Prospective locations for a "harbor bulletin board" could be in the Town park, in the vicinity of Joyce's Kitchen or alternatively near the Town dock. The concept need not be grand or expensive, but if well-located could provide a useful means of communicating information on boating, the river, and similar subjects.

Implementation of the above, which has no substantial cost associated with it, can be accomplished by means of organizational push. The emphasis on a small committee of committed players is reflective of a belief that a track record of accomplishing a few, less expensive items will potentially draw resources for implementation of some of the larger items. Many potential supporters of this plan will wait to see what happens, but will "jump aboard" if the ride looks to be going somewhere.

## VII. SUMMARY AND CONCLUSIONS

Conditions in the Lamprey River warrant concern. The same can be said of other tidal rivers, the bays, and the Piscataqua River as well. Institutions of government, whose role it is to protect the public health, safety, and welfare of residents using these waters need both encouragement in that effort, and support in abating problems herein described. Encouragement and support must, by need, be long-term.

In the Lamprey River, much can be accomplished by cooperation between levels and agencies of government. There are good, very dedicated people in government who want to solve problems, but there are also those who haven't the personal or political will to tackle tough problems. It is not difficult to learn which governmental employees are among the former, and which are not.

So too there are citizens who can appreciate the competition of uses to which the Lamprey River is put, and can see their interest in perspective with others. Likewise, there are those whose only interest is their use of the river.

It is clear that the Lamprey River can and must be more actively, more aggressively managed if its problems are to be solved and solved consistently. That means clear, coordinated, equitable

management and supportive, understanding, vigilant participation in the management process. That means, very simply, putting the river's long-term needs as the primary objective of river/harbor management.

