



# HARBOR MANAGEMENT PLAN FOR THE TOWN OF WARREN



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Prepared by:

The Warren Harbor Management Commission &  
Warren Harbormaster's Office

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## **CHAPTER 1. OVERVIEW**

### **1.1 Forward to the 2004 Revision**

The Warren Harbor Management Plan was initially prepared in 1989 through an extensive consultative process and with the assistance of it was approved by the Town Council and the Coastal Resources Management Council (CRMC), but no longer holds an approved CRMC status. It is also out of date in some key areas, primarily as a result of increased recreational use of Warren's extensive water resources and an increased awareness of the value of its maritime tradition and its water resources. Although a relatively small waterfront town, Warren enjoys over 16 miles of historically important, economically significant, visually attractive and natural resource rich shoreline, including one of the State's most historic waterfronts and one of its most beautiful marine estuaries. The purpose of this revision to Warren's plan to manage its water and water related resources is to recognize these changes and ensure that these economically, socially and historically important resources are preserved and protected so that they may continue to benefit all Warren's citizens both today and for generations to come.

### **1.2 Introduction**

Geographically Warren is situated on a peninsula surrounded by rivers that run into the Narragansett and Mt. Hope Bays. Historically, the Warren community has been an area rich in coastal resources that have developed several water dependent industries that utilize the waterfront as well as the shellfish resources in the area. More recently, the increased interest in pleasure boating has created additional demand on Warren's waters.

Increased popularity of the water and adjacent lands has made a management plan necessary to accommodate all the uses while maintaining and where feasible enhancing the river environment, its water quality, safety and navigation, and aesthetics.

Several federal, state and local government agencies work together to manage and protect Warren's rivers. The role of the Town of Warren as specified in the RI General Laws. (RIGL 46:4) is to manage four areas of activities within the Town's waterways. 1) Vessel operation within the river and water areas, 2) anchorage and moorings, 3) activities such as water-skiing, skin diving, regattas and marine parades, and 4) shore side resources potentially impacting the river and water areas.

This Harbor Management Plan will examine the current condition of the rivers and project the needs for various user groups on the waters. The Rhode Island Coastal Resources Management Council's (CRMC) harbor management planning guidelines offer a framework from which communities may develop a comprehensive harbor management plan. Planning tools such as the Rhode Island Department of Environmental Management (DEM) standards for water quality, categories of CRMC water types, Federal Emergency Management Association (FEMA) and local building regulations, and mooring configurations are available to implement community goals and objectives.

### **1.3 Definition and Purpose**

A Harbor Management Plan (HMP) is a comprehensive document which: 1) identifies the issues associated with the harbor area and waterways; 2) suggests goals, objectives and policies for guiding public and private use of land and water in the defined harbor area; 3) provides an accurate inventory of both coastal and water resources of the Town; and 4) sets forth an implementation program which specifies the strategies for achieving the desired patterns of use on and adjacent to the harbor. Within a harbor management plan, all major issues pertaining to landside and waterside use, and the relationship among them, are addressed. Relevant technical information pertaining to water quality, navigational hazards, mooring inventory, Rhode Island Coastal Resources Management Program (CRMP) water use designations, current use inventory and natural resource areas is collected and analyzed in developing goal and policy objectives. In addition, all harbor user groups, as well as the public, are actively involved throughout the planning process.

Title 46, section 4 of the General Laws of RI grants municipalities the authority to establish Harbormaster ordinances and rules and regulations pertaining to the administration of their harbors. The objectives of a harbor management plan for the Town of Warren are to provide a comprehensive, long-term evaluation of the activities on or adjacent to the tidal waters of Warren, to provide for a comprehensive evaluation of current and/or proposed municipal harbor management programs; to establish ordinances or regulations consistent with applicable regulatory and management program requirements of the State of Rhode Island; and to promote the delegation of primary authority for implementation of the Harbor Plan to the town.

By adopting a comprehensive harbor management plan, the Town of Warren can create a vision for the harbor areas and waterways and establish mechanisms for achieving that vision. The harbor management plan will place the Town's harbor policies at the forefront of decisions regarding harbor development and protection and avoid the need to react haphazardly to each problem and project as it arises.

The Warren Harbor Management Plan will provide guidance to the Town government, Boards and Commissions throughout the decision-making process for projects along the Warren waterfront. The HMP will also provide a reference for State decision-making bodies reflecting the desires of the Town regarding coastal development and other integrated with the Town's Comprehensive Community Plan.

### **1.4 Methodology**

This document is the product of an extensive participatory public planning process. Rather than establish a new harbor planning board, the Town Council of the Town of Warren elected to appoint a committee to oversee the development of the Harbor Management Plan.

The Warren Harbor Commission held the first Public Workshop on February 22<sup>nd</sup>, 1989, to identify issues and goals affecting the Warren Palmer and Kickemuit Rivers. Public notice of all meetings was an extensive and included news article in various local papers. Well over 100 people attended the first public workshop.

Issues in all three rivers were identified at this first public workshop. The issues were consolidated into five categories: boating safety/enforcement, commercial fishing, moorings, public access and water quality. Working groups were formed and met on March 7, 1989 to further discuss the issues and to provide more specific information pertaining to each issue and its relation to the Warren, Palmer and Kickemuit Rivers.

Five working groups were established to review the available information and to evaluate issues for each area of concern. The working groups met several times and produced reports for the Harbor Commission. The URI Coastal Resources Center, CRMC and DEM staff members completed an inventory of all coastal resources, defined the harbor boundaries and collected all relevant technical information pertaining to all of the rivers. Based on the resources inventory prepared by the CRC and CRMC staffs, the Harbor Commission developed policies and recommended actions.

Drafts were developed by the CRC in consultation with the Harbor Commission based on the assessment of the technical information and the issues, goals and policies. Additional feedback was solicited from the community through the public workshops. Revisions were made based on public review and a final harbor management plan was presented to the Town for adoption. The plan was then sent to the CRMC for its approval.

### **1.5 Goals and Objectives**

The Town of Warren is committed to the preservation and upgrading of all its waterways.

#### **It shall therefore be the goals of the Warren Harbor Management Plan to:**

1. Plan, regulate and provide for the use of the harbor and rivers to resolve the conflicts between harbor uses.
2. Provide for the clean, safe, orderly, and efficient use of the water and waterfront, consistent with the goals, policies and standards of the Rhode Island Coastal Resources Management Program.

#### **The objectives to reach these goals are to:**

1. Respond to the increasing demand for coastal recreational opportunities by:
  - a) Giving the highest priority and preference to water dependent uses in Warren harbor waterfront locations in accordance with local zoning ordinances, comprehensive plans and other community policies;
  - b) Pursuing opportunities for improving existing and providing new areas for public access and conservation

2. Work to improve water quality in the harbors and rivers;
3. Provide for the efficient and equitable distribution of commercial and private moorings consistent with the State's water quality goals and the policies of this harbor management plan;
4. Provide for the public utilization and enjoyment of the urban waterfront by preserving the maritime character of the municipal harbor and by encouraging marine uses which create additional public access opportunities;
5. Recognize the importance, both historically and economically, of the state's shellfish and fishing industries and resources and take appropriate measures to ensure their protection, revitalization and continued viability;
6. Provide safe, unobstructed access to federal navigation channels, anchorage and harbor facilities;
7. Utilize harbor management funds supported by revenues from harbor use fees and other monies in the maintenance, administration and operation of municipal waters;
8. Integrate the comprehensive plan and zoning ordinances of the Town of Warren with goals, objectives, policies and recommendations of the Harbor Management Plan.
9. Encourage community cooperation among the three Towns of Barrington, Bristol and Warren;
10. Preserve and protect the Kickemuit River as an SA waterbody suitable for shellfishing and water contact sports.
11. Improve the Warren River water quality to protect the town beach for water contact sports and increase areas southerly for shell fishing.

## **Chapter 2. Harbor Description**

### **2.1 Geography**

Warren, Rhode Island is often referred to as the smallest town in the smallest county of the smallest state. With only 6.2 square miles of land area, it has 16.5 miles of coastline bordering the Warren, Palmer and Kickemuit Rivers and Mount Hope Bay.

The Warren River is easily accessible from the East Passage of Narragansett Bay. The river cuts northeast into the Barrington River and the Palmer River. A junction marker marks the entrance to the Palmer River northward under the Route 103 Bridge for two miles along marshland into Massachusetts.

The Kickemuit River, which opens two miles north of Mount Hope Point on Mount Hope Bay, is bordered by 5.75 miles of Warren shoreline. The entrance to the river is known as Bristol Narrows and is marked by buoys. Of the land surrounding the Kickemuit, 85% is in Warren, with the remaining area belonging to Bristol. To the east of Bristol Narrows, one mile of waterfront property looks south onto Mount Hope Bay. Only 1.5 miles of Warren waterfront has been developed for commercial use; the remaining 15 miles of shore is residential or remains as marshland and farmland.

### **2.2 History**

Warren, or “Sowams”, as named by Massasoit and his tribe, was initially inhabited by the Wampanoag Indians and was the location of early contacts between the Indians and the Englishmen of Plymouth, Massachusetts. In the early 1600s the Dutch traded along the Warren River, and as early as 1632 the English established a trading post on the western bank of the Kickemuit. This land was then bought from the Wampanoag Indians in 1653. However, not until after King Philip’s War of 1675 was the land effectively platted and settled in large numbers by the English. The Town of Warren was incorporated in 1746 and named for Sir Peter Warren, an admiral of the British Navy.

Warren’s development has been determined largely by the town’s strategic and accessible location halfway between Providence and Newport and adjacent to the deep river channel of the Warren River. Warren’s deep river waterfront attracted shipwrights, carpenters, coopers, and merchants. By mid 1700 the waterfront accommodated activities such as Caleb Carr’s ferry to Barrington, Cole’s Hotel and Carr’s Tavern, an establishment providing “entertainment for man and beast.” Many vessels that sailed around the world were built along the Warren waterfront at Sylvester Child’s shipyard, Cromwell and Caleb Child’s shipyard or up the Palmer River at Barneysville or Bungtown. Warren could not only build her own ships but also fully rig them as well. The growing prosperity and skill of the settlers was reflected in fine homes built in the 1760’s and early 1770’s.

By the time of the Revolutionary War, Warren had become a center for shipbuilding, contributing many vessels to the cause of the battle. The war interrupted Warren's rapid mercantile growth when events such as the British raid of 1778 damaged shipyards, businesses and seventy flat boats including the row galley "Washington" stationed to guard the entrance to the Kickemuit River. Nevertheless, the recovery was rapid. Shipbuilding regained leadership among the town's industries while merchant service, West India trade, and coastal trade all flourished after the war. From 1790 to 1810 Warren was second only to Providence as a shipbuilding center. Whaling, initiated before the Revolution, was revived in 1821, and by the peak year of 1844, Warren was the homeport of twenty-six whalers.

Prior to the Civil War, Warren saw a decline in whaling and shipping activities, but the oyster industry prospered. Around 1880 Boston merchants brought southern oysters up the Warren River to small shucking houses on the waterfront. When the seeding of oyster beds, pioneered by Joseph Stubbs, became economically feasible, Warren men began to grow and market these mollusks themselves. By late 1890, Warren was a strong manufacturing community though not distinguished by exceptional wealth or prosperous merchant families. The twentieth century brought economic depression and depreciation of the waterfront district, with commercial industry prevalent over much of Main Street. Additionally, many of the historic houses of the era of sea-related wealth were neglected.

Throughout the first half of the twentieth century, the railroad right-of-way provided a structure for the town's growth. To the east of the tracks was predominantly industrial and commercial use; while to the west was a densely built residential, commercial and industrial waterfront oriented historic community (Rhode Island Historic Preservation Commission). A suburban trolley went down Main Street. As travel became easier, summer home sprouted along the Kickemuit River. In 1887, "Camp Cady", a summer residence, was the only house on the western slope of the Kickemuit River. Around it grew the homes of Laurel Park. On the eastern shore of the Kickemuit River, Touisset Point began development in 1901. Building of the Touisset Tennis Club in 1919 sparked construction of this summer community

Demand for industrial land along the Warren River has remained a constant pressure. Shipbuilding continues to be a major industry, with yards such as Blount Marine manufacturing ferries and cruise ships. The sewage treatment plant was constructed on the shore in the 1970s. The Warren Waterfront Historic District, consisting of the town of Warren and a few scattered outlying farms, was named to the National Register of Historic Places in 1973. The area is recognized as having a unique social and historic record worthy of commendation and preservation, which in many cases is illustrated, through the architecture of the buildings of the district. The commercial fishing industry continues to have its impact on the waterfront. A food processing plant utilizes offshore shellfishing resources. The increased needs of the commercial fishing industry for safe docking facilities and access to the water has encouraged the town to acquire monies for construction of a new commercial pier and docking facility.

### **2.3 Projections of Future Growth**

During the past ten years the number of commercial and recreational slips and moorings in the waters of Rhode Island has increased by over 75 percent (Rhode Island Coastal Resources Management Council). A study initiated over the July 4, 1978 holiday weekend by Clarkson Collins showed that the total number of slips and moorings in Rhode Island was 8,965 (CRC, 6

1979). A 1987 International Marina Institute study and a Coastal Resources Management Council update of this study in 1988 show that the total number of slips and moorings has risen to 15,785, an increase of 6,820 over this ten-year period. This increase in the number of moorings for recreational boaters has created a growing concern in many communities over the current management of their water.

One obvious concern is the fact that multiple uses are made of the water. Traditional activities; shorefront harvesting, quahogging, fishing, swimming, canoeing, small boat sailing, etc., now compete with powerboats and sailboats on moorings and in slips, and personal watercraft.

The waters within the Town of Warren are highly desirable for their accessibility from Narragansett Bay, scenic value as destination ports, and sheltered areas. Congestion frequently occurs in the Kickemuit River during the boating season, the Kickemuit being a popular and scenic waterway for weekend boaters. If not managed properly, the finite coastal resources of the Town could become endangered. Additionally, severe congestion problems such as lack of parking spaces and excessive boating densities would result. Most importantly, uncontrolled growth could result in serious boating safety and navigation problems. An analysis of this growth pattern is one aspect in the formulation of a municipal harbor management plan.

## **2.4 Physical Setting**

### **2.4.1 Harbor Boundaries**

For the purposes of the Harbor Management Plan, the boundaries of the harbor will include all of the waters within the jurisdiction of the Town of Warren for the Warren River, Mount Hope Bay, Palmer River/Belcher Cove and the Kickemuit River. (See Map #1)

### **2.4.2 CRMC Water Type Designations**

The following boundary lines describe those points along the coastline where one water use type changes to another. These designations are depicted on Map #2 in Appendix G. Each mapped boundary is coded by number on the map corresponding to the verbal description listed below. Except where otherwise noted, the water use classifications along any shoreline and between any two boundary line designations run parallel to the shore and extend 500 feet seaward from the mean high water mark.

Type 1 waters and conservation areas. Included in this category are (1) water areas that are within the boundaries of designated wildlife refuge areas, (2) water areas that have retained undisturbed natural habitat or maintain scenic values of unique or unusual significance, and (3) water areas that are particularly unsuitable for structures due to their exposure to severe wave action, flooding and erosion. (RICRMP, Sec. 200.1) The boundaries for Type 1 have been designated within the Palmer River from the Massachusetts line extending south to a point due east from the north side of the end of Stanley Avenue in Barrington. The Council's goal is to preserve and protect Type 1 waters from activities and uses that have the potential to degrade scenic, wildlife, and plant habitat values, or which may adversely impact water quality or natural shoreline types.

Type 2 waters are categorized as waters in areas with high scenic value that support low intensity recreational and residential uses. These waters include seasonal mooring areas where good water quality and fish and wildlife habitat are maintained. Type 2 waters are designated in the Palmer River seaward of Type 1 waters and south of the easterly line drawn from the north side of the end of Stanley Avenue in Barrington. Type 2 waters are also located in Belcher Cove south of the pipeline. Type 2 waters are located in the Kickemuit River to the tip of the peninsula near the end of Brownell Street, Warren. Type 2 waters are also located in Mount Hope Bay along the Warren shoreline extending 500 feet seaward. The Council's goal is to maintain and, where possible, restore the high scenic value, water quality, and natural habitat values of these areas, while providing for low-intensity uses that will not detract from these values.

Type 3 waters include intensely utilized water areas where recreational boating activities dominate and where the adjacent shorelines are developed as marinas, boatyards, and associated water-enhanced and water-dependent businesses. The highest priority uses of Type 3 waters and adjoining land areas within the Council jurisdiction are (a) marinas, mooring areas, public launching ramps, and other facilities that support recreational boating and enhance public access to tidal waters; and (b) boatyards and other businesses that service recreational boaters.

Type 4 waters includes (1) large expanses of open water in Narragansett Bay and the Sounds which support a variety of commercial and recreational activities while maintaining good value as a fish and wildlife habitat; and (2) open waters adjacent to shorelines that could support water dependent commercial, industrial, and/or high-intensity recreational activities. Type 4 waters have been designated within Mount Hope bay seaward of Type 2 waters in Warren's jurisdiction. The Council's goal is to maintain a balance among the diverse activities that must coexist in Type 4 waters. The changing characteristics of traditional activities and the development of new water-dependent uses shall, where possible, be accommodated in keeping with the principle that the Council shall work to preserve and restore ecological systems.

Type 5 waters support a vibrant mix of commercial and recreational waterfront activities. All have important historic value that must be preserved. Competition for space is intense in all Type 5 waters, commercial fishing vessels, recreational boats, and ferries compete for limited water space, while waterfront businesses of many varieties vie for a position on the waterfront. The visual quality of these areas is highly important, since all are centers for tourism. The highest priority uses of Type 5 waters and adjoining land areas within Council jurisdiction are (a) berthing, mooring, and servicing of recreational craft, commercial fishing vessels, and ferries; (b) water-dependent and water-enhanced commerce, including businesses catering to tourists; (c) maintenance of navigational channels and berths, and removal of obstructions to navigation; and (d) activities that maintain or enhance water quality and scenic qualities, including the preservation of historic features. The Council shall suitably modify or prohibit activities that significantly detract from or interfere with these priority uses.

Type 6 waters These water areas are extensively altered in order to accommodate commercial and industrial water-dependent and water-enhanced activities. Highest priority uses of Type 6 waters and adjacent lands under Council jurisdiction are: (a) berthing, loading and unloading, and servicing of commercial vessels; (b) construction and maintenance of port facilities, navigation channels, and berths; and (c) construction and maintenance of facilities required for the support of commercial shipping and fishing activities.

### **2.4.3 Water Depth and Federally Maintained Navigation Channels**

The water depths of Warren's coastal waters are depicted on NOAA chart #13221 (map #3). The depths within the Warren River generally range between 7 and 14 feet below mean low water (MLW), with the designated channel averaging 10 feet below MLW.

The Kickemuit River is relatively shallow in the upper reaches and along the shoreline with depths typically less than 5 feet. The lower portion of the River carries depths up to 16 feet in the interior sections.

The Palmer River has not been charted; however, it has been observed that the waters are shallow and typically less than 5 feet.

### **2.4.4 DEM Water Quality Classifications**

In 1975 the Rhode Island Department of Environmental Management established a set of water quality standards for the waters of Warren. A water quality standard defines the water quality goals of a water body by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. Therefore, the designated water quality standards may not reflect current conditions. Water quality standards are intended to protect public health and welfare, enhance the quality of water and serve the purposes of the Federal Clean Water Act, and the General Laws of Rhode Island (Chapter 46-12).

The objective of the Clean Water Act is that, whenever attainable, water quality standards shall provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water; take into consideration their use and value as public water supplies; and take into consideration their use for aquaculture, industrial, and other purposes including navigation.

**TABLE 1**  
***Tidal Water Classifications***

(a). Class SA<sup>\*@</sup> - These waters are designated for shellfish harvesting for direct human consumption, primary and secondary contact recreational activities, and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation and industrial cooling. These waters shall have good aesthetic value.

(b). Class SB<sup>\*</sup> - These waters are designated for primary and secondary contact recreational activities; shellfish harvesting for controlled relay and depuration; and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value.

(c). Class SB1<sup>\*</sup> - These waters are designated for primary and secondary contact recreational activities and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value. Primary contact recreational activities may be impacted due to pathogens from approved wastewater discharges. However all Class SB criteria must be met.

(d). Class SC - These waters are designated for secondary contact recreational activities, and fish and wildlife habitat. They shall be suitable for aquacultural uses, navigation, and industrial cooling. These waters shall have good aesthetic value.

\* Certain Class SA, SB and SB1 water body segments may have partial use designations assigned to them as noted in rules 8.B(3) below.

@ Some Class SA waters contain Closed Safety Zones which are waters in the vicinity of an approved sanitary discharge which may be impacted in the event of complete failure of treatment and are therefore, currently prohibited to shellfishing. Although shellfishing use is restricted, all SA criteria must be met.

(3). Partial Uses - In accordance with rule 19 of these regulations, the Department may designate a partial use for the above listed water use classifications. Partial use denotes specific restrictions of use assigned to a water body or water body segment that may affect the application of criteria. For example, a partial use designation may be appropriate where waters are impacted by activities such as combined sewer overflows and concentrations of vessels. Additional partial uses may be so designated by the Director if provided in accordance with rule 19.

(a). CSO - These waters will likely be impacted by combined sewer overflows in accordance with approved CSO Facilities Plans and in compliance with rule 19.E.1 of these regulations and the Rhode Island CSO Policy. Therefore, primary contact recreational activities; shellfishing uses; and fish and wildlife habitat will likely be restricted.

(b). Concentration of Vessels - These waters are in the vicinity of marinas and/or mooring fields and therefore seasonal shellfishing closures will likely be required as listed in the most recent (revised annually) RIDEM document entitled Shellfish Closure Areas-, however, all Class SA criteria must be attained.

Please note that partial use designations are represented by the lower case letters, "a" or "b", which appear in brackets { } next to the classification.

*Source:* STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS, DEPARTMENT OF ENVIRONMENTAL MANAGEMENT Water Resources WATER QUALITY REGULATIONS  
July 2006

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DEM water quality classification standards for the Town of Warren (Map #4) are listed below:

SA- Palmer River from the Massachusetts line to the Railroad Bridge at Route 103; Kickemuit River

SB- Warren River south of the jetty to Jacob's Point

SB1 Warren River from the Railroad Bridge south to the jetty at the town beach

All other tidal water areas are “SA”.

#### **2.4.5 Flood Zones**

Most of the tidal water areas in Warren’s jurisdiction are subject to extreme fetch conditions (Vzones) where coastal flooding and storm surge associated with hurricanes raise the water level 18-22 feet above present high water heights. Additional precautions need to be considered when establishing mooring fields. (Map #5)

### **2.5 Coastal Resources**

#### **2.5.1 Wildlife and/or Conservation Areas**

Several areas along Warren’s shoreline have been designated conservation areas or open space by either the town or the state (See Map #6). Green Acres, a parcel containing 60-70 acres, is located above the saltwater/freshwater interface of the Kickemuit, adjacent to School House Road; additionally a small plot of Green Acres is located adjacent to Belcher Cove. This town conservation area contains a considerable expanse of freshwater wetlands abutting the river.

The state designated bikeway runs through Warren along the old railroad route. The scenic rights to Jacobs Point abutting the Warren River are owned by the state, a measure that is meant to conserve the natural habitat of the wetlands environment.

The town has zoned the south and west edges of Belcher Cove as recreational/conservation land. Jamiel Park is located just south of the cove; however, much of the shoreline along this reach is undeveloped. Despite all of these natural resources there are currently no sites where scientific research projects are managed by the State or universities.

#### **2.5.2 Fish and Shellfish Resources**

***Shellfish Resources:*** Much of the Warren area is closed to shellfishing due to adverse water quality, either on a permanent basis (Warren River and Belchers Cove), seasonally, or conditionally as health risks are determined within Narragansett Bay (see Map #7). Regardless, in terms of the ecosystem’s biological productivity, the Warren River’s central location between Hundred Acre Cove and harvesting grounds provides a valuable environment for the population of brood stock for the adjacent areas rich in shellfish resources, such as Ohio Ledge and Barrington Beach. (Ganz, 1989)

***Fisheries:*** The Warren and Kickemuit Rivers provide an important environment for migrating and spawning and a protected nursery for a variety of fish crucial to Rhode Island’s recreational and commercial fishing interests.

The waters of Warren are popular to schooling menhaden in populations viable for industrial fisheries. The State has regulated the fishery and closes areas such as the Warren and Kickemuit Rivers to large purse seiners once one million tons have been harvested in Narragansett Bay.

Anadromous fish such as blueback, alwives and American shad utilize Warren’s riverine and estuarine systems for spawning and nursery grounds. Barrington’s Runnins River, the only existing natural shad run in Rhode Island, along with the headwaters of the Palmer River in Massachusetts, provide the populations for a substantial recreational fishery of native shad in the Warren and Palmer Rivers (Gibson, 1989). The Kickemuit hosts juvenile species in the past; however, the construction of the Route 103 dam has impeded their run to the headwaters. It has been

observed that local fishermen have maintained the run by dip netting the fish over the dam so that passage to the spawning grounds is feasible.

The Town of Warren presently has been awarded a grant to construct a fish ladder, scheduled for construction at a date to be determined.

The Kickemuit and Warren Rivers offer an excellent refuge to small fry. Atlantic Menhaden and Silversides are summer residents in both rivers offering forage to the larger migratory species. Some species, such as Winter Flounder, set up home year round while others leave in the winter for deeper waters only to return in the spring.

The Warren and Kickemuit Rivers have seen considerable development along their banks in the last decade, which could have a profound effect on fisheries if unchecked in the future. Excess runoff from streets causes silting of the water in both rivers. Runoff containing fertilizers from surrounding farms and plush landscape can cause algae blooms, which in turn rob oxygen from surface waters. Atlantic Menhaden need a constant supply of oxygen flowing through their gill plates for survival. Without this food supply the larger predatory fish are also forced to leave, usually to colder northern waters. (See Appendix F for list of fish species)

### **2.5.3 Biological Habitats**

The Warren area has retained much of its natural salt marsh environment. Present along the shoreline are relatively large patches of undisturbed areas, providing a necessary natural habitat for plants, waterfowl, and birds.

This valuable saltmarsh attracts several unique species. The expanse abutting the Palmer River, for example, contains unique plants scattered within the marsh such as bulrush and seaside gerardia, not typically common to the Bay area (Enser, 1989).

The Northern Diamond Back turtle, a truly unique resource to the area, is frequently sited in the Palmer River. This species nests in Hundred Acre Cove upstream of the Barrington River, and is noted as the only Rhode Island location for the species (Enser, 1989). It is highly likely that the other river systems within Warren/Barrington are also utilized by the turtle.

The salt marsh and tidal flats attract a variety of waterfowl providing an aesthetic resource to the area. Surveys in 1982 showed high usage by black ducks, mallards, Canadian geese and scaup or breeding and nesting grounds (Allen, 1989). The nesting area is also popular to the mute swan, though the abundant population is presently under a DEM program for species control. Additionally, substantial populations of diving ducks such as bufflehead, ganzers, canvasback, and goldeneye inhabit the area during migration.

The waterways host various types of long legged wading birds including several varieties of egrets and shorebirds, while the marshes provide a feeding ground for others such as black crown night heron and glossy ibis. There have been recent efforts by Save the Bay and the Town Conservation Commission. However, the current water quality is not high enough to support a self sustaining population.

## **2.6 Current Uses**

### **2.6.1 Commercial Fishing**

From the early eighteenth century until the 1950's Warren's economy was predominantly based on maritime activity. The whaling industry started in the late eighteenth century and peaked between 1830 and 1850. The late 19th century saw the beginning of the oyster industry, which flourished through the first third of the 20th century. The historical flow of Warren's fishing history is illustrated by the whaling facility started by the Gardener Brown Company in 1840. When whaling declined the facility was taken over by the Narragansett Oyster Company, and now, is a clam processing facility owned by the Blount Seaford Company.

Warren's present fishing industry is small, primarily shell fishing, but based on quahogs; both near shore and offshore varieties and shell clams.

The near shore fishery, both quahogs and little necks (juvenile quahogs) are harvested by hand rakers. Present facilities for quahoggers include the two town docks that host some 40-45 quahogging boats, typically 17-23 foot outboard slips. Private docks host a number of other skiffs and many quahog boats are trailered, although the only town boat ramp is in poor condition. There are presently several dealers for Bay quahogs, one of which has a waterfront facility on Water Street for landing and retail sale.

The Ocean fishery is Ocean quahogs (also known as Black Quahogs) and surf clams. Harvesters include the 90-foot dredger "Wando River" based at a private pier owned by Blount Seafood that buys and processes ocean quahogs for firms such as Campbell Soup. It also sells its own soups on a wholesale and retail basis.

Several local vessels in the 36 to 50 foot range, based at private piers, engaged in near shore lobster fishery. One of the Town Commercial docks has limited unloading facilities. Two trawlers in the 40-50 foot range are currently docked at the Town Wharf on a temporary basis.

Another class of vessels (and fishery) consists of combination vessels ranging in size from skiffs to forty foot boats engaged in pot fishing for conches and combined fishing such as hand-raking / lobstering / conch pots. These vessels are berthed at private piers or are trailered and work in near-shore fisheries. Blount Seafood is a buyer of conch and a dealer for conch bait.

### **2.6.2 Other Commercial Uses**

Blount Industries is a significant waterfront shipbuilding firm that focuses on construction of ferries and cruise ships in the 300+ foot range. It also runs American-Canadian Cruise Line and a Bay based tour ship from the same location using its own vessels.

Commercial use is rounded out by a number of construction tugs, barges, and marina maintenance vessels.

### **2.6.3 Recreational and Commercial Moorings**

Warren manages all seven active mooring fields each of which are effectively filled. There are waiting lists for moorings in both the Warren and Kickemuit rivers. There are some locations available at the Southern end of the Warren River due to access problems. The one launch service only serves the Northern part of the harbor. There are a number of commercial moorings in the Warren River, most of which are rented to recreational boaters.

After a period of some laxness in the past, the Warren Harbormasters office is effectively managing all mooring fields. Mooring ordinances were revised to address problems and are now being implemented both effectively and fairly. A number of computer based management systems have been developed to assist in management. A mooring inspection system has been established and the use of moorings is being monitored to ensure proper utilization and reduce the waiting list.

Both ordinance enforcement and safety are being addressed through the purchase of a new Harbormaster boat, an increase in staff for the Harbormasters office and through coordination with the Bristol Harbormasters office for more efficient coverage of the Kickemuit, both with regards to patrolling and pump out services. Regular pump out service is provided to all moorings.

**2.6.4 Marinas and boatyards:** The town of Warren includes three municipal marinas as well as the following private marinas;

The Warren Town Landing

The Warren Commercial Dock

Ginalski Boatyard with marina services

Old Warren Marina

O'Connell's Marina

Speed's Marine

Blount Shipyard

Striper Marina is located in the town of Barrington however manages 34 moorings in the Warren river that are regulated by the Town of Warren.

## **2.7 Recreational Areas and Shoreline Access**

### **2.7.1 Recreational Areas**

Warren has a fine Town Beach on the Warren River, which is enhanced by trees, grass and adequate parking. It has been impacted by pollution problems in recent years, but the causes have been identified and remedial action is underway (2003). The Warren River is also used for dinghy sailing.

The Kickemuit River has long been one of the finest recreational areas in the State. Use includes activities such as kayaking and, bird watching, swimming, quahogging, water-skiing and sailing, however there are no sites regularly used by windsurfers. Increasing pollution led to the establishment of the Kickemuit River Council, which has effectively led an extremely successful clean-up effort. The Council now has serious concerns about the environmental impact of potential commercial development.

### **2.7.2 Shoreline Access**

The Town of Warren has a number of shoreline access areas as listed below and depicted on Map #6. In addition to the CRMC designated public rights-of-ways, the Public Access Subcommittee has identified several areas for potential development of water access. These are listed in Appendix E.

#### **Public Rights-of-Way (ROW) and other boat access**

The commercial fishermen's Town Dock facility includes a dock and ramp with an adjacent parking lot, located at existing ramp site, adjacent to sewer treatment plant on Warren River. Maple Street (R-1) An asphalt ramp that extends west from the west end of Maple Street to a cobble beach bordering the Warren River. At pole #8. (Beach Terrace) L: 143'/W"40'. Patterson Ave. (R-3) A parcel of land covered with brush and marsh grass that extends east from the east end of Patterson Ave. to a wetland area bordering the Kickemuit River. At pole #10. Just north of Laurel Park. L:158' / W:40'. An additional smaller boat ramp exists in Touisset.

Shore Drive 3 (R-6) an area of broken pavement and brush that extends west from the intersection of Shore Drive and Chase Avenue to a cobble beach bordering the Kickemuit River. At pole #12 (Touisset) L:170' / W:10'.

### **2.8 Waterfront Areas/Shoreline Zoning Districts**

The majority of land along the waterways surrounding the Town of Warren is zoned for residential use. The only true commercially zoned area along the warren waterfront is located along the Warren River and stretches from the Barrington town line, along Water Street, and ends at the Warren Town Beach. This stretch of land adjacent to the waterfront is zoned Waterfront District, with the exception of the Narragansett and "American Tourister" property, which are zoned Special District.. The land along Belcher's Cove and areas north along the Palmer River are Conservation District lands.

The residential areas along the waterfront range in land use density from R-10 to R-40, where densities of 10,000 (R-10) square feet to 40,000 (R-40) square feet are the minimum lot sizes required for development.

The Waterfront District and Special District allow a variety of commercial, industrial and residential uses, many of which require special use permits after review by the Planning Board and Zoning Board of Review. The Town took steps in 2003 to further protect this area by enacting Waterfront Design Review. This process allows the Town to monitor site planes and aesthetics of the historic working waterfront area.

As a result of private/public partnerships between the Town of warren and The Trust for Public Land, key waterfront parcels have been preserved through deed restrictions and open space easements. These properties will in perpetuity be restricted to water-related and water-dependant uses, including boat building, marinas, docks, marine repair, etc. the historic natures of these properties are further protected through historic easements requiring all architectural work to be first approved by the Warren Voluntary Historic District Committee. This partnership reflects the fact that local resources are responsible for public recreation in the town as there are no state managed parks or boat launching facilities in the town.

## **CHAPTER 3. Issues, Policies and Recommended Actions**

The issues identified at the public meetings helped to establish the Warren Harbor Management Plan remain, and as use of the waters and interest in conservation of both natural and historic resources have increased, some of these have increased in priority and new issues have emerged. Listed below, the issue categories appear in the following format: issues statement, issues discussion, and recommended policy and action.

### **A. BOATING SAFETY/NAVIGATION**

#### **Issue:**

Boating safety and navigation in the waters of the Town of Warren have been significantly improved in recent years. Increased patrols and added office hours at the Harbormaster's Office have addressed the lack of mooring management, increasing numbers of boats, unskilled boat handlers in close proximity to other water uses, and lack of adequate enforcement in past years. Although there are no official federal navigation projects in the Town the USCG does manage buoys to identify the existing channel.

#### **Discussion:**

The tidal changes that occur in Narragansett Bay cause swift currents. The Warren River, being a narrow and naturally deep river, creates severe currents at tidal changes that make Navigation an extremely difficult task. This problem also occurs at the Narrows of the Kickemuit.

Anyone purchasing a boat may operate it the same day, without the aid of a license. The result is an ignorance of boating safety rules, which further poses a safety risk on the water and causes numerous accidents. Boating safety regulations should be a necessary requirement when operating a vessel. Yet, this is not the case as many training classes are held in the Warren River where interference with vessels in the channel is common and it is perceived that the training vessels have the right of way. They do not.

These conditions create a demand for the presence of the harbormaster and evidence the need for additional patrols on the town's waters. Patrolling the Warren and Palmer Rivers is a full-time task, given the existing conditions. The Kickemuit River is also an area that needs constant patrolling, but can only be accessed by the harbormaster by travelling around Bristol, a time-consuming task. There is a boat-launching ramp in the Kickemuit, but it is unusable.

The Kickemuit is also a "destination port" for many vessels that use it as a weekend retreat. On any given weekend, vessels will anchor, moor, or raft to other vessels in the River. This not only causes congestion but also hinders navigation. In addition, if a boating accident did occur in the Kickemuit River, the fact that the harbormaster would have to travel around Bristol to reach the River or that a rescue vessel would have to use a launch that was in poor condition furthers the premise that the Kickemuit River needs constant patrolling.

Warren is in need of additional patrolling resources in particular areas of its waters for boating safety problems. These areas include the Kickemuit River "Narrows" area and the Warren River, specifically at "Buoy 18". The Buoy 18 location is plagued with boating safety problems because of the high volume of boating traffic traveling in and out of the channel. Another trouble spot

experiencing the problems of boating congestion and boats operating at unsafe speeds is the “Narrows” on the Kickemuit River. This area is popular with recreational boaters and is congested, which results in potentially dangerous boating incidents. The combination of commercial shipping, moorings, recreational boating, commercial fishing vessels, experienced and particularly inexperienced sailboats, and any boats traveling at unsafe speeds through this portion of the Warren River is extremely dangerous.

These problems could be ameliorated if there were sufficient harbor patrols available. Unfortunately, one harbormaster cannot be at two or more problem areas at the same time. More harbor patrols are needed to mitigate these and other boating safety problems.

**Recommended Policy:**

It is the policy of the Town of Warren that utilization of the Town’s water resources by both commercial and recreational users will be done in a safe and prudent manner in accordance with Town Ordinances and State law and with due respect for the safety of all vessels and persons working on and enjoying the waters of the Town.

**Recommended Actions:**

- Action A-1.* Increase the hours of the harbormaster and/or seek hire additional full or part-time help as assistant harbormasters and adopt the (forthcoming) Harbor Ordinance.
- Action A-2.* Establish the conditions required to permit the Deputy Harbormaster and designated Assistant Harbor Master to be assigned authority to enforce Chapter 10 of the Town Ordinances: “Harbors and Vessels”.
- Action A-3.* Require that the harbormaster and any assistants trained in CPR, basic first aid and all Division of Boating Safety courses required for harbormaster training.
- Action A-4.* Develop a cooperative agreement with the towns of Barrington and Bristol to assist in the patrolling of the Rivers. This agreement should specifically involve the town of Bristol for patrols of the Kickemuit River.
- Action A-5.* Require the harbormaster and Harbor Commission to organize and conduct, with the assistance of the state’s Division of Boating Safety, safe boating courses for the public-at-large.
- Action A-6.* Expand and establish “no wake zones” for specific areas of the town.
- Action A-7.* Develop a memorandum of agreement with the towns of Barrington and Bristol for cooperative patrols of the Rivers and seek to allow each town’s harbormasters to enforce boating safety and navigation rules within the Warren Ordinance.
- Action A-8.* Contact the State Division of Boating Safety, the U.S. Coast Guard Auxiliary, Power Squadron and interested local certified residents at least yearly to help assist with public workshops/courses for boating safety.

**Action A-9.** Petition the state Division of Boating Safety to expand and/or establish “no wake zones” in specific areas of the Warren, Palmer, and Kickemuit Rivers.

**Action A-10.** No wake zones have to be established, and where appropriate, expanded in the Warren and Kickemuit Rivers.

## **B. COMMERCIAL FISHING**

### **Issue:**

Dockage for small scale fishing vessels is limited and may decrease in the face of potentially increasing demand.

### **Discussion:**

Support of small-scale commercial fishing by the Town was limited until a town fishing dock was built with grant funds. A second dock is in need of significant repair. The only launching ramp located in the town was poorly designed and has no supporting facility or parking availability.

Except for two temporary docks at the Town Wharf, trawlers are located at rented private facilities, which may or may not be available over the long term. At the same time, strict conservation measures on fishery stocks are expected to increase harvestable stocks significantly in the near future, which will create increased commercial fishing opportunities, leading to an economic opportunity for Warren to serve as a base for Trawlers and similar vessels.

### **Recommended Policy:**

The Town of Warren will integrate support for commercial fishing in the development of the Warren Waterfront.

### **Recommended Action:**

The Town should take advantage of waterfront owned or controlled by the Town (e.g. the waterfront in front of the waste treatment plant) to expand physical facilities for fishing vessels up to fifty feet as part of the development of the Warren Waterfront as set forth in Section I (Town Docks) below.

## **C. RECREATIONAL AND COMMERCIAL MOORINGS**

### **Issue:**

The dramatic increase in demand for moorings has necessitated changes in mooring regulations to ensure proper management of moorings and equitable access to mooring opportunities. Additionally, increases in the number of moorings have an effect on other uses of the river as well as an impact on the environment: particularly in the Kickemuit. While the Harbor Commission began addressing these issues more concretely a few years ago, its efforts were constrained until an experienced Harbormaster was recruited in 2002. Rapid progress was made during that year, and is continuing. None of these moorings are in federal navigation channels.

## **Discussion:**

Significant action to address these issues began in 2002 when the Warren Harbor Management Commission, in consultation with the new Harbormaster, developed proposed changes in the mooring section of the Town Ordinances as required to reflect the above policy statement and as needed to enable the Harbor Master to implement that policy. The Town Council adopted the proposed changes in December of 2002.

Additional hours were allocated in the Town Budget to allow the Harbor Master and his assistants to take the necessary action to implement and regulate mooring fields in accordance with policy.

Also in 2002, the Harbormaster began implementing the current ordinances and prepared for implementation of changes to the ordinances adopted in 2002. A new Harbormaster boat that was put into service in 2002 will aid the achievement of this purpose. These actions have, to date, included the following:

- All existing moorings were mapped by GPS coordinates. Illegal and abandoned moorings were identified, a process assisted by the adoption of brighter mooring stickers with better adhesives.
- Initial action was begun on eliminating or regularizing illegal moorings and removing abandoned moorings.
- Based on above actions, a number of individuals on the waiting list were allocated moorings.
- Mooring application and renewal application forms were redesigned to allow better tracking of boats and individuals requesting moorings for them. This will allow quicker location of individuals in cases of emergency, increase the ease with which illegal moorings can be identified and improve the management of the waiting list.
- Other required forms, such as violation notices, were brought up to date.
- In late 2002, the 7 active mooring fields were mapped by GPS coordinates that were converted to the State mapping system. The maps of the mooring fields are attached in Mooring Field Appendix
- The proportion of residential and non-residential moorings is established at a no greater than 3-1 ratio in accordance with CRMC Policy.
- In the case of federal anchorages the Town would follow the USACE “open to all” on an equal basis policy.
- The new ordinances require that registered mooring inspectors on installation and every two years inspect moorings. A number of qualified individuals have registered with the Town as Mooring Inspectors.

Plans to move forward on other actions are currently underway. These actions include:

- With the renewal of exiting mooring permits and issuance of new permits, permit holders will be advised of the new ordinances, made aware of relevant ordinances, and advised that, unlike the past, ordinances will be fully enforced. During this process the identification of currently illegal moorings will be completed and appropriate action taken. Abandoned moorings will be removed.
- Mooring fields shall be appropriately marked and fairways within the field shall be marked after they are modified as required.

The Harbormaster's duties have increased as a result of the additional responsibility for management of the Town Wharf, including rental slips, and management plans and budgets are being worked on.

**Recommended Policy:**

Designated mooring locations in established mooring fields in the waters of the Town of Warren shall be allocated to residential and non-residential recreational and commercial users on an equitable basis in accordance with Town mooring ordinances, State and National policies and regulations, the interests and safety of other recreational users of the Town's water resources and the overall interests of the residents of Warren.

**Recommended Actions:**

**Action C-1.** The planned areas of expansion of existing mooring fields should be activated. In conjunction with the adoption of this plan, the Town will amend the ordinance requiring that all new and significantly expanded mooring areas be sited to avoid adverse effects on water quality.

**Action C-2.** Commercial activities supporting moorings, such as launch services, mooring placement, inspection and winterizing should be encouraged. If commercial operators are not interested in providing launch services to mooring fields that are difficult to access, the Town should consider the implementation of a launch service based at the Town Marina.

**Action C-3.** During the course of policy implementation, the Harbor Commission and the Harbor Master should regularly assess the need for changes in the ordinances and draft, for submission to the Town Council, any recommended changes in the regulations that appear necessary.

**Recommended Actions - Ordinance Changes**

**Action C-4.** Commercial moorings in the Warren River will be limited to 10% of moorings in each field. Field number 1 in which commercial moorings exceed 10% will be reduced to a 10% level over time as commercial mooring permits are retired.

**Action C-5.** No commercial moorings will be allowed in the Kickemuit River due to

restrictions relating to its water quality status.

**Action C-6.** To ensure that recreational boaters have access to moorings at a reasonable cost, new commercial mooring permits will be issued for any valid commercial purpose as determined by the Harbormaster except that no new commercial mooring permits will be issued for the purpose of seasonal rental to individuals. Existing permits for commercial moorings rented out by registered businesses will be reviewed. Permits for commercial moorings rented by individual persons will not be renewed.

#### **D. RECREATION**

##### **Issue:**

Along with increased boating activities requiring moorings, all other recreational use of Warren's water resources have increased as well, generating some competition for the use of the water. At issue is the need to ensure a balance between all demands on water resources, including all forms of recreational use.

##### **Discussion:**

Recreational competition has emerged only on the Warren and Kickemuit Rivers.

As the Warren River has long been commercialized and the water quality less than optimal, recreational use is largely limited to boating. The main requirement has been to ensure that recreational moorings and boating activities do not conflict with commercial uses. One area of the river has been traditionally used for dinghy sailing, primarily by a local Yacht Club. One of the mooring fields to be activated as part of this Harbor Management Plan revision will intrude on this sailing area (also used as a short cut for vessels leaving and returning to Warren and Barrington Harbors). In discussions between Warren and Barrington Town Officials (where the Yacht Club is located), it has been agreed that the Warren Harbormaster will locate moorings in this field in such a manner as to minimize any impact on dinghy sailing programs.

The situation on the Kickemuit River is more complex as this is a beautiful site with excellent water that has long been used for a range of recreational activities including swimming, fishing, shell-fishing, canoeing, kayaking, sailing, bird watching, waterskiing, and mooring of recreational vessels. Expansion of mooring fields has impacted on swimming activities. General growth in boating activities has required introduction of marked no-wake zones and other restrictions. To protect both people and the environment. The introduction of personal watercraft with their unusual characteristics has introduced a range of concerns, particularly safety and noise pollution.

##### **Recommended Policy:**

Management of the Warren River shall take into consideration the needs of all recreational and commercial users in a manner that maximizes the net social and economic benefit of the river for all its citizens. Management of the Kickemuit River will take into consideration the needs and concerns of the disparate groups of users to establish management policies and procedures that are fair in balancing competing demands, protective of the environment and equitable in implementation.

## **Recommended Actions:**

**Action D-1.** Warren River - As there are limited locations where recreational moorings are feasible and as there are other locations where dinghy sailing is possible, mooring requirements should take precedence over sailing, provided that every effort is made to minimize the impact of moorings on sailing.

**Action D-2.** Kickemuit River - The Narrows, the upper end of the navigable area, conservation areas and all Mooring Fields should be conspicuously marked with no-wake buoys to allow strict enforcement of no-wake regulations.

Mooring fields should be laid out to allow a buffer zone between mooring fields and the shore to permit swimming activities.

Appropriate pump-out restrictions should be ordinances and strictly enforced to protect water quality.

Sufficient resources should be made available to the Harbormaster to properly enforce ordinances applying to the Kickemuit. Discussions should be held with the Town of Bristol toward the objective of cooperative enforcement activities to reduce costs. Cooperative arrangements with the Warren Fire Department should be explored.

The town should study the impact of personal watercraft use on other uses of the river and the environment to determine how any identified negative impact can be ameliorated. Experiences of other towns in dealing with the impact of this new type of watercraft should be reviewed as part of the process.

## **E. PUBLIC ACCESS**

### **Issue:**

Existing public access areas have not been enforced, and as a result, many rights-of-way have succumbed to privatization by neighboring private landowners. Additionally, many public access areas are not marked nor do they provide adequate public parking, trash barrels or maintenance.

### **Discussion:**

The Town of Warren is committed to preserving, protecting, and where possible, establishing public access to the water. However, as the Town of Warren grows and coastal development increases, public access opportunities will become increasingly more difficult to find.

There are several different types of public access to the shore. Pedestrian access typically includes those areas, which merely offer a footpath, and no vehicular parking, to the shore. The neighboring community most commonly uses this type of access. Visual access simply means that a water view is

possible (such as at various locations along the East Bay Bicycle Path) but direct access to the shore is not possible. Another category of public access includes boating and/or fishing access. This type would most likely include a boat ramp and possibly parking for cars and trailers. An excellent example of this type is the Community Dock Facility. The best type of access for use by the general public is those, which provide plenty of parking and possibly trash and sanitation facilities. These are typically found at federal, state and municipal parks.

Continued growth of the town may result in more people seeking to use the rivers of the town. Without establishing additional ROWs, existing ROWs will become quite crowded. The lack of parking at all of the ROWs in town can only serve as another source of conflict between those using the ROW and the neighborhoods in which they are found.

The condition of many of the ROWs could be improved. Many are overgrown with weeds, brush, and in some cases, trees. A few have been altered or disguised by abutting property owners in such a way as to make them either difficult or impossible to find or use. Many are unmarked, poorly marked or posted with “NO TRESPASSING” signs. These abuses must be addressed whether by simple maintenance, by removal of illegal signs or by offending property owners being forced to return the use of the ROW to the people of the Town and State.

In some areas where traditional but unrecognized ROWs currently exist, these ROWs should be legally declared so that they will not be lost to the future residents of the Town. The north end of Kelley Street on Belcher Cove on the Palmer River is an example. All of the streets on the Town maps that are shown as dead ends at the water are to be included in this category.

The construction of the East Bay Bicycle Path and the rebuilding of the railroad trestle are both a blessing and a curse. The obvious blessing is the use of the path as it is now impassable in some places and strewn with trash in others. The problem is that in those places where the path is in close proximity to the river it is used for parking. This parking will be lost without the Town’s intervention. The parking on Locust Terrace as an entry point for those seeking to reach Hanley’s Point is an example.

The Town of Warren has entered into an agreement with the RIDEM to participate in the statewide shoreline Access Program. Identification signs will be placed at the Town Dock, Maple Street, Patterson Avenue, and Shore Drive/Chace Avenue ROW’s. In addition, grants have been received by the Town to upgrade the Shore Drive/Chace Avenue site. In the future, if monies become available, these sites will receive priority attention.

The goals of the Town are to 1) protect and maintain existing public ROWs, 2) upgrade public ROWs around the Kickemuit to allow for emergency rescue access, 3) improve public parking conditions where possible, 4) identify and develop new rights of way when ever possible.

## **E.1 Rights of Way**

### **E.1.1 Discovery and Designation**

#### **E.1.1.1 Policies:**

a) It shall be the policy of the Town of Warren to undertake the discovery and designation of traditional and existing public Rights of Way to the shore through any legal methods and approaches available to it.

b) It shall also be the policy of the Warren Town Council to require that all new waterfront development projects provide public access and adequate public parking.

c) It shall include the policy of the Town of Warren to provide an updated and maintained “ROW” location map of the designated right of ways to the general public.

**E 1.1.2 Recommended Actions:**

a) A designated committee be formed between the Harbor and the Conservation commissions and this “Right of Way Committee”, to investigate and report to the Town Council on the process for dedication of lands used as traditional access ways to the shore as “Highways by User” under Chapter 24-2-1 GL RI, and the application of this to creating public access to the shore;

b) That appropriate street ends, which end at or near the shore, be investigated by the Town to establish their legal status as public ROWs, and further, that they be made accessible and usable to the public;

c) That appropriate street ends or public highways are nominated to the CRMC for recognition and designation as CRMC public ROWs (see Appendix E).

**E 1.2 Enforcement**

**E 1.2.1 Policies:**

a) It shall be the policy of the Town of Warren that all designated public Rights of Way to the shore must be kept open and clear for the use of the public.

b) It shall be the policy of the Town of Warren to pursue all avenues available to prevent or remedy the unlawful posting or blocking of any public Right of Way.

c) It shall be the policy of the Town to further enlists the aid of the State in pursuing these policies.

**E 1.2.2 Recommended Actions:**

a)

1. A plan be incorporated, possibly the formation of a Right of Way Committee, that will develop and maintain all public rights of way to the shore in Warren and that includes a procedure for securing funding from the state Department of Environmental Management’s Shoreline Access Improvement Program strictly for the improvement and development of public rights of way;

2. The Warren Department of Public Works be directed to implement this plan;

3. Contact be made with the Coastal Resources Management Council to request signage to mark CRMC right of ways;

4. Funding for the continued maintenance of these public rights of way is incorporated.

b) The following public access areas need enforcement action:

**Maple Street (R-1) Between Plat 15C Lot 1 and Plat 7 Lot 1 both being residential**

dwellings. A small asphalt/gravel ramp that extends west from the west end of Maple Street to a cobble beach bordering the Warren River best accessed at high tide. With a worn sign designating as a public right of way. At pole #8. (Beach Terrace) N41.43.031/W71.17.073.

**Parker Avenue (R-2)** Between Plat 13E Lots 130 and 27 clearly shown as a dead end street extending to the Kickemuit River. Parcels of land overgrown with brush with a walking path. Large storm drain (pipe) and a stony stream (drain bed). A guardrail separates the street from the lot. N41.43.305/W71.15.764.

**Patterson Ave. (R-3)** Between Plat 13D Lots 31 and 32 clearly shows as a dead end street extending to the Kickemuit River. A parcel of land covered with brush and marsh grass that extends east from the east end of Patterson Avenue to a wetland area. At pole #10. Just north of Laurel Park. N41.43.244/W71.15.742.

**Harris Avenue (R-4)** Plat 13E between Lots 118 and 119, both residential. A dead end street, paved with a low sea wall and a closure line relative to shell fishing, which coincides with the north side of the street. N41.42.920/W71.15.558

**Shore Drive 3 (R-6)** Plat 17, between Lots 118 and 119. An area of broken pavement and brush that extends west from the intersection of Shore Drive and Chase Avenue to a cobble beach bordering the Kickemuit River. At pole #12 (Touissett). N41.42.648/W71.14.525

**Shore Drive 5 (R-7)** Plat 17, between Lots 128 and 129. Limited parking and difficult to distinguish. N41.42.589/W71.14.496

**Shore Drive 6 (R-8)** Plat 17, between Lots 134 and 135. Limited parking and difficult to distinguish. N41.42.535/W71.14.487

**Shore Drive 7 (R-9)** Plat 17, between Lots 140 and 141. Limited parking and difficult to distinguish. N41.42.453/W71.14.463

**The Town Landing (R-10) (Touissett Road)** Plat 16, between Lots 259 and 27. No trespassing sign, very limited parking. N41.42.054/W71.14.530

### **E.1.3 Development and Maintenance**

**E.1.3.1 Policy:** It shall be the policy of the Town of Warren that all established public rights-of-way to the shore, designated by CRMC and accepted by the Town, be developed and maintained as unobstructed access points that further ensure and enhance the viability of shore side access to the waters of the Town of Warren.

#### **E.1.3.2. Recommended Actions:**

1. A plan will be incorporated that will develop and maintain all public rights of way to the shore in Warren and that includes a procedure for securing grant funding from the state Department of Environmental Management as available strictly for the improvement and development of public rights of way (see agreement in Appendix C);

2. The Warren Department of Public Works be directed to implement this plan;
3. Contact be made to the state Department of Environmental Management's Shoreline Access Program to mark these designated access sites;
4. Funding for the continued maintenance of these public rights of way is incorporated.

#### **E.1.4. Access Development**

##### **E.1.4.1 Existing Sites**

**Policy:** It shall be the policy of the Town of Warren to preserve appropriate existing shoreline access sites and provide for their upkeep and maintenance.

**Recommended Actions:**

- a) The Warren Harbor Management Commission recommends that the Town Council and the state Department of Environmental Management take all necessary steps to ensure the preservation of all existing shoreline access points as outlined above.

##### **E.1.4.2 Future Development**

**Policy:** It shall be the policy of the Town of Warren to undertake the identification of potential shoreline access sites and to provide for the preservation and maintenance of each as such.

**Recommended Actions:**

- a) The Warren Harbor Commission recommends that the Town Council assist the Coastal Resources Management Council in the identification of potential shoreline access sites and also petition the DEM for funds for the improvement and/or purchase of these sites once designated. Municipal paper streets, and dedicated easements such as drainage outfalls and buried cables shall be investigated as potential rights of way.

- b) Specific sites which should be considered for future development and/or purchase include:

- 1 **Company Street** – Visual, dead ends to Warren River, parking on both sides of street and on Westminster Street. Recent upgrade and new low wall, a bench and a small grassy area. Old sign designates this as a Public Right of Way. Plat 2 on the north side is, Lot 125, a residential home and on the south side is, Lot 30, a commercial structure and boatyard (Ginalski Marine).
2. **Crescent Street** –Visual, limited parking. Plat 1, at the intersection with Mill Street, between Lots 5 and 43. An area near the East Bay Bicycle Path, this would allow fishermen to access the East Bay Bicycle Bridge and Warren River without inconvenience to adjacent neighbors.

3. **Locust Terrace** – Visual, limited parking/should be improved, near town property, a prime location for visitors to Hanley’s Point. Plat 15C, between Lots 28 and 15.
4. **Barker Avenue** – (Broken Bridge) Plat 13B, between lots 82 and 96. Visual, Limited parking, CRMC recognized, Historical Massasoit Spring, Kidde Lot (playground). Shows River Street traveling 279 ft. to the waterfront.
5. **Maple Road** – Plat 16, between Lots 344 and 345. Limited parking, beach, dirt road dead-ends at waterfront (Mt. Hope Bay / Coles River).
6. **Sunset Court** – (Asylum Road) Plat 16, between Lots 307 and 67. Visual, abuts marsh, nearby limited parking.
7. **Libby Lane** – Plat Visual, abuts marsh, nearby limited parking.
8. **Blackthorne Lane** – Plat 16, between Lots 329 and 330. Visual, abuts marsh, limited parking.
9. **Brownell Street** – (Cedar Street extension) Plat 16, between lots 180 and 181, 176 ft. leading to waterfront. CRMC recognized, limited parking, marked private.
10. **Shore Drive** – (exts: Prospect, Highland, and Pleasant View) Plat17, no parking and not easily distinguishable. The Chase Avenue location the launch ramp is in poor condition and needs repair.
11. **Laurel Lane** – Plat 13d, between lots 338 and 342, clearing shown to the Kickemuit River, limited parking, marked private, Laurel Lane Association controls access.
12. **Clark Road** – Plat 13E, between Lots 314 and 310. No parking dead-ends at waterfront.
13. **Beach Street** – Plat 7, between Lots 119 and 41. Street dead-ends at waterfront, beach, limited parking and a low seawall at the end of the street.
14. **The Town Commercial Docking Facility** – (Extension of Wheaton Street) Plat 5, Lot 74. Includes a concrete launch ramp, two timber-framed docks (one with finger piers) with a total capacity of twenty-five boats for commercial fisherman and an adjacent parking lot capable of holding twenty-five vehicles. Off Water Street behind the sewer treatment plant and next to the main pump out facility.
15. **Washington Street** – Clearly shows on Town Plat Maps as extending to the Warren River. This extension also provides access and serves as a driveway for the adjacent business (Warren Boat Works). On the north side is a residential home (Plat4, Lots112 & 113) and on the south side is a commercial structure (Plat 5, Lot 1).

**16. Wharf Tavern –**

Plat 4 Lot 1. Visual, Limited Street parking on Miller Street and Water Street, the Wharf Tavern parking lot is private. Public walkway on boardwalk from the end of Miller Street around outer perimeter of restaurant (river side). This is not listed on CRMC listing/progress report as amended June 2001 this location should be added and designated. The sign, which is posted reads: “This Public Access is Being Provided by the Coastal Resources Management Council in Cooperation with the Owners. Public Access is permitted from 7 am to 10 pm Subject to Local Ordinances and Laws. For Further Information Call CRMC at 266-2476.”

**17. Miller Street**

(Extension) – Visual, Street dead-ends to Warren River. Between Plat 4, Lot1 and Plat 2 Lot 41. Limited street parking including angle parking for five vehicles. Limited view of Warren River due to the adjacent commercial buildings, Wharf Tavern, Lot 1, to the south and Dyer Boats, Lot 41, to the north side.

**18. Riverview St. and Barker Ave. –**

Limited parking, leading to the Kickemuit River. Recent development of the Riverview Plat resulted in the town gaining additional deeded land at this location, Plat 13B Lots 86 and 87, but also impaired parking and access due to a fence (enclosing drainage retention pond) and pond outlet pipe. Town map clearly shows Riverview Street extending to the river between Lot 85 (town owned) and Lot 86.

**19. The Old Harbor Marine –**

Plat 4, Lot 96. This is a 48,570 square foot area with over 400 foot of waterfront, recently available and purchased by the Town of Warren on March 15, 2003. This is due to a grant made available, by the Rhode Island Department of Transportation, for a Ferry Dock and providing an easement for public access and donations by local citizens, The Warren Waterfront Committee and business professionals. The potential for this location is great as it has several buildings and dockage including three main docks with ten finger piers. The town also has plans for a new Harbor Masters Office and a boardwalk around the parameter that will extend as far as Baker Street.

**20. Baker Street (Extension) –**

Visual, Plat 4, between Lots 139 and 4. Dead ends to Warren River and limited parking. The Town of Warren has received a grant in 2002 and is presently working to improve this area. The Town also plans on a connecting walkway to the new access and ferry point as stated above (Harbor Marine). Recently upgraded at the end by the town with a rebuilt wall and brick area. On the south side is a commercial structure / waterfront business (Boatyard). This area would be suitable for an extensive site with additional parking, a picnic area and a launch.

**F. WATER QUALITY**

**Issue:**

There is concern about the present and future water quality and use of the Palmer, Kickemuit and Warren Rivers. Industrial use, increased development, point discharges such as that from the sewage treatment plant, non-point source pollution and recreational boating all have detrimental effects on the water quality of the rivers.

**Discussion:**

Warren is committed to the preservation and upgrading of her waterways. Water quality is a particularly important issue in Warren because of the number of water dependent activities such as commercial fishing, quahogging, clamming and swimming. The numerous wetlands surrounding the perimeter of much of the Warren, Palmer and Kickemuit Rivers provide a very delicate ecosystem. Wetlands provide spawning habitats for many fish species caught in Narragansett Bay. The water quality of the rivers must be maintained and, when possible, improved for the survival of the species within this system. Town has won a grant for the development of a fish ladder in the Kickemuit River.

The DEM Division of Water Resources into four categories has classified the waters of the Town: SA, SA(b), SB, SB1 (see “Water Quality” section in the Harbor Description section and Map #4). The water quality of the Warren, Palmer and Kickemuit Rivers is affected by a number of factors ranging from indirect sources such as non-point source pollution to direct means from the sewage treatment plant. Mount Hope and Narragansett Bays are affected by and affect the rivers’ water quality, which in turn affects Rhode Island coastal fisheries. Water pollution is the number one reason for poor water quality; Warren must examine the sources of water quality degradation and take active steps towards its mitigation.

Non-point sources of pollution include storm water runoff. Storm drains discharge into all three of the rivers. In the event of a storm, storm water carries everything in its path, such as road salt, used oils and other products from the roads, sidewalks and parking lots to the rivers. Other sources of runoff material include lawn care products such as fertilizers, pesticides, herbicides and fungicides. These materials runoff into the rivers and are toxic to all marine life. Another source of water pollution includes sewage, sewage treatment, and leaching individual sewage disposal systems (ISDS). In the past, the Warren Sewage Treatment facility has received “good” ratings from DEM and Save the Bay (*Save the Bay, “The Good, the Bad and the Ugly”*) Warren’s Town Beach is in such close proximity to the sewage treatment plant that a tertiary plant is recommended to protect this natural resource. Long range planning for the sewage treatment plant should include the consideration of expansion and upgrading to a tertiary plant. In terms of point source inputs to the Warren River, both Blount Seafood and the Sewage Treatment Plant are permitted by the DEM for discharge of water into the river (Manning, pers com). Blount is permitted for 125,000 gallons per day (GPD) for noncontact cooking water and 250,000 GPD of process water. The Sewage Treatment Plant is permitted at 2.48 million gallons per day discharge. Any other point discharges within the jurisdictional boundaries of Warren should be identified monitored and subject to the same conditions as the Warren Sewage Treatment Plant. The land areas around Warren’s water areas, particularly around the “SA” waters, are becoming more populated as coastal development increases. There is concern regarding the fragility of the Palmer and Kickemuit Rivers and the poor effect new development could have on its ecology. CRMC rules and regulations need to be rigorously enforced. Also the type 2 water classification of the Kickemuit River should be continued with the corresponding regulations enforced and upheld and some parts should be considered for change to Type 1 conservation area. As development continues, pollutants will increasingly threaten the water quality of the rivers. The pollutants will include not only bacterial

contaminants, but also other contaminants including plastics, floatable and debris. Other sources include failing ISDS from homes, which already exist along the shores. Coastal wetlands are important for a variety of reasons. They provide food and shelter for large populations of juvenile fish and are nurseries for several species of fish. Coastal wetlands include salt marshes and freshwater or brackish wetlands contiguous to salt marshes. Areas of open water within coastal wetlands are considered a part of the wetland. The mud flats and creeks associated with many coastal wetlands are rich in shellfish, particularly soft-shelled clams. Coastal wetlands are effective in slowing erosion along protected shores.

Land uses and activities abutting coastal wetlands may have a strong impact upon the wetland itself. Nearby drainage patterns that affect sedimentation processes and the salinity of waters may easily be altered, with detrimental effects. Wildlife must be protected from harassment. Bulk heading and filling along the inland perimeter of a marsh prevents inland migration of wetland vegetation as sea level rises. Boating activity may contribute to the degradation of water quality. Individual boaters fail to realize that the cumulative impacts of boating can cause serious problems. Boating problems range from the spilling of gas and oil when fueling to littering garbage, cleaning out bilges, and pumping out heads into the rivers. Indirect sources of pollution come from the TBTs associated with boat bottom anti-fouling paint, the potential leaching of underground fuel tanks at marinas, septic tank cleaners, and creosote from pilings. When combined, the numerous different sources of water pollution, and the intensity with which the boating activity exists during the three month season, can add up to considerable water quality degradation.

The goal of the Warren Harbor Management Plan is to not only identify the numerous issues associated with water quality problems in the water areas of Warren, but to work towards the improvement of water quality conditions by adopting policies and programs to address, within the limitations of municipal jurisdiction, pollution generated by point source and non-point source pollution, boating activities, shore side development and other land use activities.

There are many factors that affect the water quality of these waters. Consideration must be given to all of them when establishing policies and action plans for achieving the stated goal.

### **Recommended Policies:**

***Policy F-1.*** To support all public educational opportunities pertinent to the preservation and protection of the ecology of Warren's rivers.

***Policy F-2.*** To support the inventory, assessment, monitoring, and review of the impacts to water quality caused by existing and proposed storm drains and treatment plant's point discharges.

***Policy F-3.*** To comply with DEM regulations under RIGL 46-12-39 and to limit vessel concentrations to preserve the presently designated DEM water quality standards.

In addition, the town's harbormaster shall enforce these regulations per RIGL 46-12-41.

***Policy F-4.*** To undertake the designation and acquisition of open space and conservation areas bordering the three Warren Rivers and Mount Hope Bay, working in cooperation with the Warren Land Conservation Trust, to aid in the preservation of current water quality

conditions. These areas may also be seen as a first step towards improving water quality conditions in Warren.

**Policy F-5.** To protect the ability of the wetlands to perform their natural function.

**Recommended Actions:**

**Action F-1.** The Town's agencies and authorities shall develop public educational materials and programs to educate waterfront property owners, boaters and summer visitors of the dangers of water pollution by cleaning agents containing phosphates, lawn fertilizers, failing ISDS and other non-point sources of pollution. In addition to property owners or visitors, an educational curriculum should be developed for use in the school systems.

**Action F-2.** Land uses around the rivers shall continue to be inspected for potential sources of pollution. Marinas, recreational areas and waterfront businesses will appropriately dispose of lubricants, paints and litter, boat sewage and other contaminants. The Warren Department of Public Works has provided for disposal of hazardous waste at its facility. The result of a grant, as of 2002, all non-performing ISDS systems within reach of the Warren municipal sewer line have been identified and tied into it. This is a particularly substantial benefit to the Kickemuit River where the entire west bank of the river has access to Warren municipal sewer. Moreover, Rhode Island Division of Water Resources Estuarine Water Quality Monitoring Results indicate significant improvement in water quality in the Kickemuit River over the last twelve years. The Warren Harbor Management Plan urges that monitoring continue in all of its tidal waters.

**Action F-3.** Consistent with RIGL 46-12-39, the Harbor Management Ordinance (Section 10-27) prohibits the discharge of any untreated wastes from vessels within the tidal waters of Warren. The town of Warren maintains a pump-out boat that services Warren, Barrington, and part of Bristol. In addition, the town also operates and maintains two (2) pump-out stations at the town commercial dock behind the water treatment plant and at the Warren Landing at 279 Water Street. Because of the unusual geography of the three towns, we have coordinated with town of Bristol in order to provide this service to all boaters in our tidal waters and harbors. We plan to implement a disposal line from the bulkhead at the sewerage treatment plant to the end of the dock. This would allow deeper draft boats to dispose of sewer waste dockside as well as through the mobile pump out boat. This additional service, while increasing efficiency and convenience, can only encourage compliance.

**Action F-4.** The Town will regulate moorings within Warren's water areas consistent with the water quality policies of this section and regulate the number of permits accordingly. Warren has completed the survey of all moorings, legal and illegal, and has given notice of violation of mooring ordinances where necessary. The harbormaster has also documented all moorings by GPS coordinates, providing satellite photographic records for our database. Included in this documentation is the identification of each boat for each mooring, its size, the size of its tackle and other pertinent data to ensure accurate, safe, and environmentally compatible mooring field management. The current mooring plan complies with all CRMC Harbor Management Guidelines. Now that moorings and mooring fields have been designated, the town, with the counsel of CRMC, will determine appropriate

numbers of moorings for the different areas and continue to regulate them in a manner consistent with this plan, CRMC guidelines, and the regulations set forth by DEM.

**Action F-5.** It is recommended that in conjunction with DEM/NBP standards, policies and recommendations all storm drains be upgraded and storm water management be investigated. A cooperative agreement with the Soil Conservation Service to review standards for storm water and erosion control should be used to develop the standards for a runoff ordinance with standards for storm water. The town of Warren has installed two high-capacity vortex drain catches, one on Bay Road, and the other on Patterson Avenue. They are designed to inhibit the runoff of storm sewerage into the Kickemuit River directly and positively impacting water quality. Warren is continuing to upgrade its main sewer lines preventing the migration of ground water into the sewer line; these improvements cumulatively improve the efficiency of the Warren Sewerage Treatment Facility by restricting the volume of water the plant must treat.

**Action F-6.** When considering new and/or expansion of existing waterfront development the Town will encourage:

1. Prohibit the use of asphalt as pavement for parking lots, sidewalks and waterfront roads, instead requiring the use of crushed shells, gravel or stone;
2. Require a naturally vegetated buffer zone in accordance with the CRMC assent for that site;
3. Require public access to the waterfront; The Warren Harbor Commission has documented all CRMC Rights of Way, and potential future rights of way. They have been listed on our website, and we are implementing a plan to have the rights of way duly marked with appropriate signage.
4. Require new development (commercial and residential) to use water saving plumbing features;
5. Require mandatory tie-in to municipal sewer system wherever possible - this has already been completed wherever town sewer is available.
6. Require the building inspector to follow through on applications with increased ISDS capacity following new ISDS recommendations.
7. The Town should promote the use of environmentally friendly herbicides; pesticides, fungicides and lawn care chemicals within a mile of any of the rivers. Road salt should be used very lightly on waterfront roads, if possible, using new technology, including mixture with calcium carbonate, to decrease the negative impacts of runoff into the rivers. Warren Department of Public Works is pursuing the appropriation of the technology needed to meet this recommendation.
8. The town will actively pursue the acquisition of open space near the waterfront. The Town of Warren will work with bordering towns for joint acquisition of open space when appropriate. A committee should be formed consisting of members from Warren, Bristol, Barrington and Swansea, Massachusetts to examine and pursue the acquisition of open space. The committee should examine and pursue the acquisition of open space.
9. Develop conservation zones that provide for tax advantages near the waterways;

10. Apply for all open space and farmland federal and state grants;
11. Direct the grant writer to work on all grant proposals for open space;
12. Publicly recognize those individuals that have donated or designated their land for preservation, conservation, historical or agricultural use;

**Action F-7.** Identify and prioritize all open space areas by the rivers that the Town of Warren may want to purchase prior to November bond issues.

**Action F-8.** The Town of Warren will enforce all ordinances pertaining to waterfront development.

**Action F-9.** Any new or expanded in ground fuel storage tanks should be prohibited. Existing underground tanks will be identified and monitored in cooperation with DEM for any leaks. Any existing tanks should be checked annually for leaks.

**Action F-10.** The existing Harbor and Vessel Code will be amended to Sec. 10-27 to authorize the harbormaster to enforce and fine violators of state and local regulations of boat discharges.

**Action F-11.** Warren in conjunction with Bristol will acquire enough oil booms to lay two double lines across the Narrows at the mouth of the Kickemuit. For best access and deployment, oil booms should be housed at the Touissett Fire Station.

**Action F-12.** The Town will develop a disposal program to address the issue of inorganic materials including waste oil, plastics, trash, paint and varnish. In addition, a disposal site that is convenient to recreational and commercial boaters will also be explored.

**Action F-13.** The Town shall encourage marinas to participate in the CRMC Clean Marina Program or develop Marina Operations and Maintenance Plans.

**Action F-14.** The Town shall restrict boating in shallow waters where critical natural resources are identified.

## **G. THE WARREN WATERFRONT**

### **Issue:**

Warren has recently adopted an ambitious plan for the development of the waterfront on the Warren River in a way that will preserve one of the State's last working waterfronts. Implementation, supported by grant funding, has begun but full implementation of the plan will take a number of years, a continued implementation planning process and significant amounts of money.

### **Discussion**

In 2002 the Town of Warren adopted the "Warren Waterfront Plan" which addresses the historic waterfront district of the Town and includes the area bounded by the area West of

Water Street, from the Route 114 Bridge in the north end of town to Bridge Street in the South. The plan was prepared by a Waterfront Committee which drew on the findings of the Waterfront Study prepared by the Urban Design Group. The Plan is included in the Warren Harbor Management Plan as an unattached annex.

The overall objective for the planning activity was to determine how best to preserve one of the State's last working waterfronts. In general, the Plan includes a number of goals that call for Warren's waterfront to be "maintained and anchored by water-dependant uses supplemented by related uses"; "reinforcing the waterfront's historic fabric"; "creating a water oriented civic space for the community"; a river walk running the length of the Harbor; and a number of other physical goals. As a result of Plan adoption, the Town, with the assistance of The Trust for Public Land and a significant donation from a local industrialist, has already assured that two significant parcels of waterfront land where a private developer had planned to erect condominiums were secured for water-related and water-dependent businesses. Part of one parcel, including a significant amount of waterfront, has been secured for the town as a base for future development, including the waterfront walkway.

**Recommended Policy:**

The preservation and development of Warren's historic working waterfront in a manner that supports water and water-related business, increases public access to the waterfront, and encourages increased public utilization and appreciation of the waterfront shall continue to be a development priority of the Town of Warren.

**Recommended Actions:**

**Action G-1.** The Town should follow in close regard the recommendations and phased implementation as outlined in the Warren Waterfront Plan.

**Action G-2.** The Harbor Management Commission should work in close concert with the Town Planning Board and other boards and commissions in review of project with impact on waterway, wetland protection, public access, etc.

**H. WARREN TOWN WHARF**

**Issue :**

As part of the acquisition of land under the Warren Waterfront, the Town has received title to a parcel of waterfront land with a deep-water pier and a number of small craft slips. The purpose of acquiring the land was to develop an area of the Warren River waterfront for public access. The challenge now is to develop the site, the "Town Wharf", as part of an integrated plan for development of the entire waterfront, in a manner that allow it to serve as an anchor for the development of public utilization of the waterfront for a range of activities.

**Discussion**

The parcel of land secured by the town to become the Town Wharf, is part of a property known as "Harbor Marine" which was purchased by the Trust for Public land and divided into three parts. The two additional parcels making up the land that was purchased are on either side of the Town land, but are set back from the waterfront itself, making the Town land a rough T shape). In late 2003 these parcels were in the process of being sold by the

Trust for Public Land for water-related businesses that will complement the public use that is planned by the Town.

The Town Wharf site includes a slip used as an old dry-dock, which is envisaged as a ferry dock in the future (the justification for an Inter-modal Transportation Grant). It is currently used for dockage for two private trawlers on annual leases. This is expected to continue until such time as ferry activities are considered feasible. Ferry activities being contemplated are inter-modal transport (including stops for north-south ferries and cross bay ferry service) and tour vessels.

The site also contains a deep-water dock that has the potential for use as a dock for large historic sailing vessels on a short or long term basis. It is currently used to anchor floating docks for recreational vessels. The town has applied for a grant to fund the conversion of some of these docks for transient use, which will require additional services. The installation of slips for seasonal recreational rental in the same area behind the waste treatment plant (see Section I below) would assist in the development of this site, including the possibility of making the deep-water dock accessible by large vessels. The town also plans to locate the Harbormaster's office on the Town Wharf to assist and site management as well get Harbormaster service closer to the water. The Harbormaster boat is also based here. The land portion of the Town Wharf will not only provide adequate parking for planned maritime activity, but also sufficient open space for a range of events linked to water related activities (e.g. an exhibition tied to the presence of a tall ship), or any public event that would benefit by being able to draw on the attractiveness of a waterfront location. The Trust for Public Land has indicated its intent to sell the adjacent sites to businesses whose operations would complement planned public uses of the Town Wharf. The Town Wharf will also serve as one of the initial anchors for the planned Waterfront Walkway and will also be linked to the East Bay Bike Path.

**Recommended Policy:**

The area of waterfront deeded to the Town shall be designated as the Town Wharf and will be utilized for appropriate public purposes such as fairs, festivals and other public activities on the waterfront area; dockage for transient vessels and visiting deep water vessels, a small craft tie up dock for services; a dinghy dock, and recreational boat rental. Existing slips will be used for seasonal rental until demand for transient uses and large vessel transient or permanent dockage is viable.

**Recommended Actions:**

**Action H-1.** Development of a specific plan for the Town Wharf based on the Waterfront Plan that maximizes its benefit for the town.

**Action H-2.** Work with the Trust for Public Land to assure that adjacent parcels are sold to entities planning water dependant commercial activities that are supportive of the plan for the Town Wharf

**Action H-3.** Actively seek opportunities to attract deep-water vessels such as tall ships, small cruise boats and ferries that will increase the attractiveness and utilization of the site and generate increased revenue.

**Action H-4.** Link development of the Town Wharf with development of the Town

Docks (see below) to ensure development of both provides the maximum benefit possible.

**Action H-5.** Work with public agencies to secure funding for the continuing development of the Town Wharf.

## **I. TOWN DOCKS**

### **Issue:**

Dockage for commercial fishermen in Warren does not meet demand. There is a waiting list for slips at the town dock and larger vessels berth where they can find space, sometimes of uncertain continued availability. Demand for recreation slips is also high as reflected by steadily increased seasonal rates. Transient dockage or moorage is nonexistent. Both recreational and commercial demand will continue to grow. The Town is already committed to supporting commercial fishermen, but its ability to do so to date has been limited by the lack of capacity to seek available finance for facilities. It also has town waterfront available that can be used to support commercial fisherman and to create recreational space that can be used to finance waterfront development.

### **Discussion:**

Warren currently has three public docks; two are commercial and one is recreational. One commercial dock, built with grant funds, has been recently restored and is fully utilized. Slips are leased by the Harbormaster from a waiting list. While Warren residents are given first priority, non-residents hold many slips. The second is an old dock currently managed by slip holders under an informal agreement. While the Town pays insurance for the dock, it does not manage or maintain it, and the dock is not in good condition. The Town has no permanent public docking facilities for larger commercial fishing vessels such as Trawlers. The Town Wharf mentioned in the previous section has a number of recreational slips. All are currently leased annually as there are insufficient services to permit transient dockage. Two commercial trawlers temporarily occupy docking space that is designated for a Ferry Slip.

### **Recommended Policy:**

It shall be the policy of the town of Warren to protect, preserve and where possible develop the commercial fishing resources of the town; develop transient slips, particularly at the Town Wharf, as part of its waterfront development program; and increase the availability of seasonally recreational slips, both as a service to boaters and as a source of funding of harbor management and development activities.

### **Recommended Actions:**

**Action I.1** The commercial dock not now managed by the Harbormaster should be placed under the Harbormaster's control and the town should seek funding to require upgrading of the dock to an acceptable level commensurate with its use.

**Action I.2** Development of structures and services at the Town Wharf will continue to permit opening the slips to transient boaters, both large and small.

**Action I.3** Dinghy docks will be installed at the Town Wharf to service transient moorings now being installed.

**Action I.4** Land services for the deep-water slip planned for a ferry landing shall be installed.

**Action I.5** The Town owned land in front of the waste treatment plant where the two commercial docks are located is suitable for further development of docks with some dredging. Plans for such development already exist. Dockage and wharf should be expanded to accommodate various demands including:

- Dockage for Trawlers currently berthed at locations in Warren that is not secure (including the Town Wharf)
- Dockage for additional shell fishing vessels
- Wharfage for commercial fishermen
- Additional seasonal recreational slips, including accommodation for vessels now at the Town Wharf to allow for transient dockage and use of the deep water dock for large vessels.
- The inadequate launching ramp at the location (which is the only public launch slip in Warren) needs to be improved to an acceptable level.
- Additional supportive services and parking need be installed
- The feasibility of including transient docking in this working waterfront area should be studied.

## **J. CONSERVATION AND PUBLIC UTILIZATION OF COASTAL RESOURCES**

### **Issue:**

Numerous agencies, public and private, local, state and federal, have focused increased attention on protection and development of Warren's water and water-related resources. This has created the opportunity for synergistic cooperation amongst these organizations to both increase the effectiveness of these initiatives as well as increasing the public's utilization of our natural resources.

### **Discussion:**

A few illustrative examples demonstrate this opportunity:

- A significant amount of the Town's coastal resources have been protected through private and public purchase. Access to these resources by land is of necessity limited. Access by water is a possibility that has not been explored to date. An initiative to provide and publicize access by low-impact watercraft such as kayaks and canoes would increase appreciation of these resources without endangering them and thereby increase support for future protection activities.
- Warren is only one of a number of Narragansett Bay towns that have secured waterfront facilities that permit access to the town by ferryboat. Warren's facility was purchased through an inter-modal transportation grant designed to enable the establishment of such facilities. What is needed now is coordinated action to development water linkages between these towns.
- The Coastal Resources Management Council is concerned about maritime resources below the high tide mark in Warren as it is in all towns. Given Warren's extensive coastline, a number of local organizations have taken action based on similar concerns. Lack of full

awareness of the goals and objectives of the different organizations has led to misunderstandings and unnecessary friction between groups with shared objectives.

**Recommended Policy:**

Warren will encourage increased communication and cooperation between public and private groups working to preserve water-related natural resources in Warren to increase the overall impact of such efforts and increase the responsible utilization of maritime resources for the benefit of the people of Warren and Rhode Island.

**Recommended Actions:**

Direct the Harbor Management Commission to serve as a focal point for communication and commence the process of identifying the organizations active in the conservation and development of Warren's water-related resources, and encourage the development of activities that will take advantage of increased cooperation and mutual support.

**K. FINANCE**

**Issue:**

The cost of financing harbor management and development has increased markedly in the past two years, and will continue to increase. While funding for many of the actions proposed in this plan will be available on a (usually) competitive grant basis, funding requirements of the Town will increase for recurrent cost associated with development and for matching grant funding of capital grants.

**Discussion**

Financing of recurrent and minor capital costs for the management development of Warren's Harbor has traditionally come from the Town's general fund. Until 2003, fees for recreational and commercial mooring permits did not fully offset them. Capital costs, such as the construction of the commercial fishing pier and its recent major repair have been funded from State and Federal Grants. Commencing in 2003, a program of increased fees was established to bring receipts in line with expenditure. With the implementation of the Waterfront Development Plan and the acquisition of the Town Wharf, this situation changed. In the short term, the ability to rent out existing but not fully developed slips at the Town Wharf has resulted in a positive cash flow from waterfront activities, but future development will add additional costs, both capital and recurrent. Increased management is already overtaxing current staff and will increase. Although expected and planned capital costs can largely be offset by grants, most will require some local contribution. Some of the significant required and potential capital expenditures are summarized below:

***Town Wharf***

- "Brownfield" alleviation due to its prior use as a coal depot.
- Overall site development, including relocation and reinforcement of dockage, and development of supportive facilities for seasonal and transient recreational boats and to permit use of the existing deep water dock now partially blocked by floating slips; facilities required for use of the ferry landing site, and creation of parking and

landscaping to complete renovation of the site for public use.

- Establishment of a Harbormaster office.
- Construction of the portion of the Waterfront Walkway the site at the site.
- Commercial/Recreational Dock Site
- Rehabilitation and upgrading of boat ramp
- Rehabilitation of existing shell fishermen dock
- Construction of Wharf for Trawlers and Lobster Boats, etc.
- Construction of slips for small commercial fishing and recreational boats.
- Overall development of site and services.

### ***Other Areas in the Waterfront area***

Additional parcels of waterfront land on the currently underutilized Narragansett Electric access to and parking for the waterfront walkway, which would begin at that site. Such it become available to the town, at least some development capital funding would be required.

### ***Waterfront Walkway***

Long term plans call for a walkway along the entire waterfront from the Route 114 Bridge to the Town Beach, which ends at Bridge Street. Construction at could begin at any time, subject to funding availability, at three sites; Town land where the commercial docks are located, the Town Wharf, and what is called the “Eastern Yachts” site where property was sold by the Trust for Public land with an easement for a walkway and access road.

### ***Other Water Resources***

Some capital may also be required for the acquisition and development of access sites and other water resource development or conservation.

### **Recommended Policies:**

***Policy K-1.*** It is recommended that the Town, through the office of the Town Planner, with the support of the Harbor Commission and the Harbormaster, aggressively seek Federal, State and Private funding available for the development of waterfronts, multi-modal transport, water use and historic districts to continue the development of the sites mentioned above and other areas of Warren’s Waterfront.

***Policy K-2.*** It is recommended that funds generated by permit allocation, rental of slips, transient moorings and other fees be set aside to provide both recurrent and capital funding (primarily for matching grant funds) to ensure that adequate funding is available for development at a rate that will not put an inappropriate burden on Warren’s taxpayers.

### **Recommended Action:**

**An Illustrative Budget is attached:** *To be submitted in September*

## **APPENDICES**

### **APPENDIX A**

### **ACRONYMS**

**Army Corps of Engineers (ACE)** – has permitting authority over all dredging and dock constructions.

**Coastal Resources Center (CRC)** – affiliated with the University of Rhode Island, School of Oceanography, and CRC provides technical assistance to municipalities developing their Harbor Management Plan.

**Coastal Resources Management Council (CRMC)** – is the state’s primary agency for planning and management of coastal resources and the uses made of tidal waters.

**Coastal Resources Management Plan (CRMP)** – is the management plan for the state including such coastal resources as the tidal waters, shoreline, and fish and shellfish resources.

**Department of Environmental Management (DEM)** – has primary responsibility within the state for implementing the requirements of the Federal Clean Water Act, for managing the living resources of the state’s waters, for overseeing federal and state land acquisition and open space programs, and making sure that pump-out facility(ies) are maintained and up to the standards required for “No Discharge” designation.

**Environmental Protection Agency (EPA)** – is a federal agency responsible for setting water quality criteria and approving all discharges within all states’ waters.

**Food and Drug Administration (FDA)** – has the responsibilities of water quality and (fish) food quality nationwide. FDA establishes the water quality classification criteria followed by DEM Water Resources in deciding safe shellfishery water quality standards.

**Federal Emergency Management Agency (FEMA)** – has the responsibility of establishing coastal areas subject to flooding, and extreme wave and fetch velocities during hazardous storms.

**Harbor Management Plan (HMP)** – is a municipal management program that guides the implementation of policies and programs outlining goals for the development of the tidal waters adjacent to a municipality.

**Narragansett Bay Project (NBP)** – the Narragansett Bay Project (NBP) was created to administer a comprehensive study of Narragansett Bay. The NBP is a five-year project jointly sponsored by the EPA, and the Rhode Island Department of Environmental Management. Through a team effort involving state and federal agencies, the academic community and local special interest groups, NBP is developing a master plan that will ensure an acceptable and sustainable level of environmental quality for Narragansett Bay.

## **APPENDIX B**

### **DEFINITIONS**

**ABODE** – shall mean the principal, non-water dependent use of a structure or vessel as a dwelling or home.

**ANCHORING** – shall mean to secure a vessel temporarily to the bottom of a waterbody by dropping an anchor or anchors or other ground tackle from a vessel.

**CHANNEL** – shall mean any water areas reserved for unobstructed movement of vessels.

**COMMERCIAL MOORING** – shall mean the rental or lease of a mooring or the use of a mooring to conduct business.

**FAIRWAY** – shall mean any locally designated and/or maintained water areas reserved for unobstructed movement of vessels

**HARBORMASTER** – shall refer to that person appointed by the Town Council.

**LAUNCHING RAMP** – shall mean any manmade or natural facility used for the launching and retrieval of boats. (§ 300.4 RI Coastal Resources Management Program)

**MARINA** – includes any dock, pier, wharf, float, floating businesses, or combination of such facilities that service five or more recreational boats as commercial enterprise or in association with a club. (§300.4 RI Coastal Resources Management Program)

**MEAN HIGH WATER (MHW)** – the average height of the high waters over a 19-year period.

**MOOR** – shall mean to permanently secure a vessel to the bottom of a water body by the use of mooring tackle.

**MOORING** – shall refer to that location duly permitted by the Town of Warren and registered to the applicant.

**MOORING TACKLE** – shall mean the hardware used to secure a vessel at a mooring and which is kept in place seasonally.

**NON-RESIDENT** – shall mean any individual, business, or corporation that does not meet the definition of “resident”.

**NONWATER DEPENDENT USE** – refers to those activities, which are not dependent upon the waterfront for continued use. (E.g. restaurants, residential development)

**NONWATER RELATED USE** – refers to those activities that are in no way dependent upon or related to the waterfront for its use.

**PERSON** – shall include individuals, corporations, societies, associations, and partnerships.

**QUALIFIED INSPECTOR** – shall mean any person or business approved as an inspector of tackle by the mooring assignment committee.

**RECREATIONAL BOATING FACILITY** – includes marinas, launching ramps, residential boating facilities, recreational wharves, piers and slips, floats or floating docks, and recreational mooring areas. (§ 300.4 RI Coastal Resources Management Program)

**RESIDENT** – shall refer to any full-time inhabitant, taxpayer or non-profit organization of the Town of Warren.

**RIGHT OF WAY** – shall mean an unobstructed path or corridor from a public thoroughfare or facility leading to or along the waters of the Town of Warren shoreline areas below the mean high water mark.

**VESSEL** – shall mean every description of watercraft, other than a seaplane on water, used or capable of being used as a means of transportation on water. Specifically excluded by this definition are floating homes.

**WATER DEPENDENT USE** – refers to those waterfront activities solely dependent upon the water for their use. (E.g. commercial fishing, marinas, boats building).

## **APPENDIX C**

### **MANAGEMENT RESPONSIBILITIES WITHIN THE TIDAL AREAS OF THE STATE**

#### **1. The Federal Role**

a) U.S. Army Corps of Engineers The federal government, through the Army Corps of Engineers (ACE), exercises authority over the placement of structures and obstructions in the navigable waters of the nation. ACE regulatory programs also consider the environmental impacts of proposals and their consequences to elements of the “public interest.” Through its permitting program, the ACE reviews certain projects located in navigable waters, involving dredging, filling, and placing structures such as moorings. Under the Corps program, moorings and their availability for use are considered integral parts of the ability to navigate. As such, moorings are subject to the ACE’s responsibility to ensure equal opportunity in navigation and commerce within the waters of the country. The public interest review often requires that the availability of moorings be non-exclusionary and that transient vessels be considered. Non-residents must be allowed opportunity to obtain a mooring space, and a certain percentage or proportion of available mooring space within a harbor must be made available to transients.

#### **b) US Environmental Protection Agency:**

This federal agency is responsible for setting water quality criteria and approving all discharges for all states’ waters.

#### **c) US Food and Drug Administration**

The Food and Drug Administration (FDA) has the responsibility of water quality and (fish) food quality nationwide. FDA establishes the water quality classification criteria followed by DEM Water Resources in deciding safe shellfishery water quality standards.

## **2. The State Role**

The submerged lands, coastal resources and tidal waters of the State are all subject to the State of Rhode Island's jurisdiction. These areas are owned by the State and held in trust for the public. The State carries out several different management and regulatory programs to protect the rights and interests of the public in these areas, primarily through the CRMC and the Department of Environmental Management (DEM).

### **a) CRMC**

The CRMC carries out its responsibilities in three ways: planning and management, coordinating functions and regulatory programs. Adopted in 1978 (revised in 1983), the Coastal Resources Management Program (CRMP) is the planning and management tool for the State. The CRMP identifies and designates six different water "types" in various locations throughout the state. The goals, policies and regulatory standards established for each of these areas, and activities taking place within them, are based upon an assessment of the characteristics of each individual water area and shoreline, the activity it supports, its potential capabilities for use in keeping with measures necessary to protect its resources, and the areas' role in a balanced statewide plan. The Water Type Category and other regulations set forth what uses may be made of an area and how these uses may be carried out. In order to promote the objectives of the state coastal program, CRMC functions as a binding arbitrator in disputes involving coastal resources and the interests of two or more municipalities and state agencies. Additionally, the Council carries out consulting and coordinating actions with local, state, regional and federal agencies and private interests. CRMC sponsors and conducts coastal research and advises the Governor, General Assembly and the public on coastal matters.

### **b) DEM**

The Department of Environmental Management (DEM) has primary responsibility within the state for implementing the requirements of the Federal Clean Water Act, for managing the living resources of the state's waters, and for overseeing federal and state land acquisition and open space programs. The DEM through its Division of Water Resources has promulgated specific regulations and water quality standards to implement its authority under the Clean Water Act. The water quality standards are different for the six water-type categories issued by the CRMC. The Water Quality Classifications and Standards are designed to protect and improve the quality of the State's waters where they may be threatened or impaired by discharges of pollutants. The regulations are more restrictive in purer water areas such as Types 1 and 2 (see water quality map). The regulations also contain an anti-degradation clause, which establishes that there can be no degradation of classified high-quality waters from their assigned classification due to a proposed activity. The regulations specifically identify concentrations of vessels, as in a marina or mooring area, as a potential source of pollution. The DEM currently utilizes a methodology developed by the National Shellfish Sanitation Program and the US

environmental Protection Agency to determine the potential impacts to water quality from marinas and mooring areas. The DEM ensures compliance of an activity by certification through the issuance of a Water Quality Certification, a prerequisite for CRMC approval of many activities. The DEM Division of Fish and Wildlife, in conjunction with the Marine Fisheries Council, manages the fish and shellfish fisheries within the state. Current programs include the regulation of commercial fisheries, shellfish propagation and transplanting, and establishment and protection of shellfish management areas. The Division provides comments on any proposal before CRMC, which might impact the resources within their jurisdiction.

### **3. The Local Role**

Chapter 4 of Title 46 of the General Laws of Rhode Island (Waters and Navigation) confers upon the coastal communities of the state certain powers concerning the regulation of public waters within their boundaries. These powers can be categorized into four different types:

- 1) management of vessel operation within the harbors;
- 2) management of anchorages and moorings;
- 3) regulation of such activities as water-skiing, skin-diving, regattas and marine parades;
- 4) management of shoreside resources potentially impacting the water.

The enabling legislation clearly grants the towns these powers to ensure the orderly development of the harbor areas within their jurisdictions. Specifically, the municipalities are granted authority and power to enact, through ordinance and an appointed harbormaster, rules and regulations and to regulate recreational boating activities such as water-skiing and boat speed.

They may assign, remove, provide minimum standards for and set and collect a fee for the use of moorings. The cities and towns may also provide for the removal of wrecks, derelict or abandoned boats, docks or moorings. Finally, they may impose penalties for violations of such ordinances. The powers and duties granted through the enabling legislation may not be construed to abrogate the powers and duties of the CRMC. While the enabling legislation grants considerable authority to the municipalities in managing certain uses of the harbor area, they are not specifically empowered to consider environmental impacts of activities, prevention of conflicts with other water dependent uses, or to decide resource allocation questions.

## **APPENDIX D**

### **DESCRIPTION OF COMMERCIAL FISHING INFRASTRUCTURE**

To be provided

## **APPENDIX E**

### **E. PUBLIC ACCESS INVENTORY**

#### **Appendix E-1**

**LIST OF RIGHT-OF-WAYS  
WARREN COMPREHENSIVE PLAN  
EVERETT ASSOCIATES, INC. 1991  
(CONFIRMED AND UNCONFIRMED)**

1. NUNES FARM
2. CHASE LAND
3. PALMER AVENUE
4. CONNELLY AVENUE
5. JAMIEL'S PARK
6. BROWN STREET
7. KELLY STREET
8. COMPANY STREET
9. MILLER STREET
10. BAKER STREET
11. WASHINGTON STREET
12. SCHOOL STREET
13. TOWN DOCK
14. TOWN BEACH
15. BRIDGE STREET
16. BEACH STREET
17. MAPLE STREET
18. HANLEY'S POINT
19. HARRIS AVENUE
20. LAUREL LANE
21. PATTERSON AVENUE
22. LIBBY LANE
23. BARKER AVENUE
24. MANCHESTER LAND
25. CHACE AVENUE
26. SHORE DRIVE (1-7)
27. AUDUBON LAND
28. TOUISSET ROAD
29. BROWNELL STREET
30. MAPLE ROAD
31. SERPENTINE ROAD
32. GROVE AVENUE

**APPENDIX E-2**  
**LIST OF Right OF WAYS**  
**CRMC DESIGNATED SITES**

**Public Rights-of-Way (ROW)**

Maple Street (R-1) Between Plat 15C Lot 1 and Plat 7 Lot 1 both being residential dwellings. A small asphalt/gravel ramp that extends west from the west end of Maple Street to a cobble beach bordering the Warren River best accessed at high tide. With a worn sign designating as a public right of way. At pole #8. (Beach Terrace) N41.43.031/W71.17.073.

Parker Avenue (R-2) Between Plat 13E Lots 130 and 27 clearly shown as a dead end street extending to the Kickemuit River. Parcels of land overgrown with brush with a walking path. Large storm drain (pipe) and a stony stream (drain bed). A guardrail separates the street from the lot. N41.43.305/W71.15.764.

Patterson Ave. (R-3) Between Plat 13D Lots 31 and 32 clearly shows as a dead end street extending to the Kickemuit River. A parcel of land covered with brush and marsh grass that extends east from the east end of Patterson Avenue to a wetland area. At pole #10. Just north of Laurel Park. N41.43.244/W71.15.742.

Harris Avenue (R-4) Plat 13E between Lots 118 and 119, both residential. A dead endstreet, paved with a low sea wall and a closure line relative to shell fishing, which coincides with the north side of the street. N41.42.920/W71.15.558

Shore Drive 3 (R-6) Plat 17, between Lots 118 and 119. An area of broken pavement and brush that extends west from the intersection of Shore Drive and Chase Avenue to a cobble beach bordering the Kickemuit River. At pole #12 (Touissett). N41.42.648/W71.14.525

Shore Drive 5 (R-7) Plat 17, between Lots 128 and 129. Limited parking and difficult to distinguish. N41.42.589/W71.14.496

Shore Drive 6 (R-8) Plat 17, between Lots 134 and 135. Limited parking and difficult to distinguish. N41.42.535/W71.14.487

Shore Drive 7 (R-9) Plat 17, between Lots 140 and 141. Limited parking and difficult to distinguish. N41.42.453/W71.14.463

The Town Landing (R-10) (Touissett Road) Plat 16, between Lots 259 and 27. No trespassing sign, very limited parking. N41.42.054/W71.14.530

## APPENDIX E-3

### LIST OF RIGHT-OF-WAYS CRMC/RI/PROGRESS REPORT (AS AMENDED JUNE 2001, PG.17) Street Designation ROW Designation No.

Maple Street R-1  
Barker Avenue Not Public  
River View Street Not Resolved  
Parker Avenue R-2  
Patterson Avenue R-3  
Read Road Not Resolved  
Harris Avenue R-4  
Shore Drive (1) Not Public  
Shore Drive (2) Not Public  
Shore Drive (3) R-6  
Shore Drive (4) Not Public  
Shore Drive (5) R-7  
Shore Drive (6) R-8  
Shore Drive (7) R-9  
Road to Town Landing R-10  
Emery Road (1) Not Public  
Emery Road (2) Not Resolved  
Brownell Street Not Public  
Cedar Street Not Public  
Bay View Street Not Public

#### Summary

Public 9  
Not public 8  
Not Resolved 3

**Total 20**

## APPENDIX E-4

### LIST OF RIGHT OF WAYS POTENTIAL SITES

1. **Company Street** – Visual, dead ends to Warren River, parking on both sides of street and on Westminster Street. Recent upgrade and new low wall, a bench and a small grassy area. Old sign designates this as a Public Right of Way. Plat 2 on the north side is, Lot 125, a residential home and on the south side is, Lot 30, a commercial structure and boatyard (Ginalski Marine).
2. **Crescent Street** – Visual, limited parking. Plat 1, at the intersection with Mill Street, between Lots 5 and 43. An area near the East Bay Bicycle Path, this would allow fishermen to access the East Bay Bicycle Bridge and Warren River without inconvenience to adjacent neighbors
3. **Locust Terrace** – Visual, limited parking/should be improved, near town property, a prime location for visitors to Hanley’s Point. Plat 15C, between Lots 28 and 15.
4. **Barker Avenue** – (Broken Bridge) Plat 13B, between lots 82 and 96. Visual, Limited parking, CRMC recognized, Historical Massasoit Spring, Kidde Lot (playground). Shows River Street traveling 279 ft. to the waterfront.
5. **Maple Road** – Plat 16, between Lots 344 and 345. Limited parking, each, dirt road dead-ends at waterfront (Mt. Hope Bay / Cole’s River).
6. **Sunset Court** – (Asylum Road) Plat 16, between Lots 307 and 67. Visual, abuts marsh, nearby limited parking.
7. **Libby Lane** – Plat Visual, abuts marsh, nearby limited parking.
8. **Blackthorne Lane** – Plat 16, between Lots 329 and 330. Visual, abuts marsh, limited parking.
9. **Brownell Street** – (Cedar Street extension) Plat 16, between lots 180 and 181, 176 ft. leading to waterfront. CRMC recognized, limited parking, marked private.
10. **Shore Drive** – (exts: Prospect, Highland, and Pleasant View) Plat 17, no parking and not easily distinguishable. The Chase Avenue location the launch ramp is in poor condition and needs repair.
11. **Laurel Lane** – Plat 13d, between lots 338 and 342, clearing shown to the Kickemuit River, limited parking, marked private, Laurel Lane Association controls access.
12. **Clark Road** – Plat 13E, between Lots 314 and 310. No parking dead-ends at waterfront.
13. **Beach Street** – Plat 7, between Lots 119 and 41. Street dead-ends at waterfront, beach, limited parking and a low seawall at the end of the street.
14. **The Town Commercial Docking Facility** – (Extension of Wheaton Street) Plat 5, Lot 74. Includes a concrete launch ramp, two timber-framed docks (one with finger piers) with a total capacity of twenty-five boats for commercial fisherman and an adjacent parking lot capable of holding twenty-five vehicles. Off Water Street behind the sewer treatment plant and next to the main pump out facility.
15. **Washington Street** – Clearly shows on Town Plat Maps as extending to the Warren River. This extension also provides access and serves as a driveway for the adjacent business

(Warren Boat Works). On the north side is a residential home (Plat4, Lots112 & 113) and on the south side is a commercial structure (Plat 5, Lot1).

16. **Wharf Tavern** – Plat 4 Lot 1. Visual, Limited Street parking on Miller Street and Water Street, the Wharf Tavern parking lot is private. Public walkway on boardwalk from the end of Miller Street around outer perimeter of restaurant (river side). This is not listed on CRMC listing/progress report as amended June 2001 this location should be added and designated. The sign, which is posted reads: “This Public Access is Being Provided by the Coastal Resources Management Council in Cooperation with the Owners. Public Access is permitted from 7 am to 10 pm Subject to Local Ordinances and Laws. For Further Information Call CRMC at 266-2476.”

17. **Miller Street** (Extension) – Visual, Street dead-ends to Warren River. Between Plat 4, Lot1 and Plat 2 Lot 41. Limited street parking including angle parking for five vehicles. Limited view of Warren River due to the adjacent commercial buildings, Wharf Tavern, Lot 1, to the south and Dyer Boats, Lot 41, to the north side.

18. **Riverview St. and Barker Ave.** – Limited parking, leading to the Kickemuit River. Recent development of the Riverview Plat resulted in the town gaining additional deeded land at this location, Plat 13B Lots 86 and 87, but also impaired parking and access due to a fence (enclosing drainage retention pond) and pond outlet pipe. Town map clearly shows Riverview Street extending to the river between Lot 85 (town owned) and Lot 86.

19. **The Old Harbor Marine** – Plat 4, Lot 96. This is a 48,570 square foot area with over 400 foot of waterfront, recently available and purchased by the Town of Warren on March 15, 2003. This is due to a grant made available, by the Rhode Island Department of Transportation, for a Ferry Dock and providing an easement for public access as well as donations by local citizens, The Warren Waterfront 56 Committee, and business professionals. The potential for this location is great as it has several buildings and dockage including three main docks with ten finger piers. The town also has plans for a new Harbor Masters Office and a boardwalk around the parameter that will extend as far as Baker Street.

20. **Baker Street** (Extension) – Visual, Plat 4, between Lots 139 and 4. Dead ends to Warren River and limited parking. The Town of Warren has received a grant in 2002 and is presently working to improve this area. The Town also plans on a connecting walkway to the new access and ferry point as stated above (Harbor Marine). Recently upgraded at the end by the town with a rebuilt wall and brick area. On the south side is a commercial structure / waterfront business (Boatyard). This area would be suitable for an extensive site with additional parking, a picnic area and a launch.

## APPENDIX F

### **FISH AND WILDLIFE SPECIES WARREN, PALMER AND KICKEMUIT RIVERS**

#### **Fish Species**

American Eel Oyster Toadfish  
Atlantic Tomcod Striped Killifish  
Sheepshead Minnow Atlantic Silverside  
Stickleback Bluefish  
Blackfish Shorthorn Sculpin  
Winter Flounder Summer Flounder  
White Mullet Atlantic Herring  
Pogie or Menhaden Northern Puffer  
Spiny Dogfish Sand Lance  
Searobin Black Seabass  
Striped Bass Scup or Porgy  
Wealfish or Weakfish Yellowtail Flounder

#### **Amphibians**

Spotted Salamander Red-Spotted Newt  
Northern Dusky Salamander Redback Salamander  
Northern Two-Lined Salamander American Toad  
Spring Peeper Gray Treefrog  
Bullfrog Green Frog  
Wood Frog Northern Leopard  
Frog  
Pickerel Frog

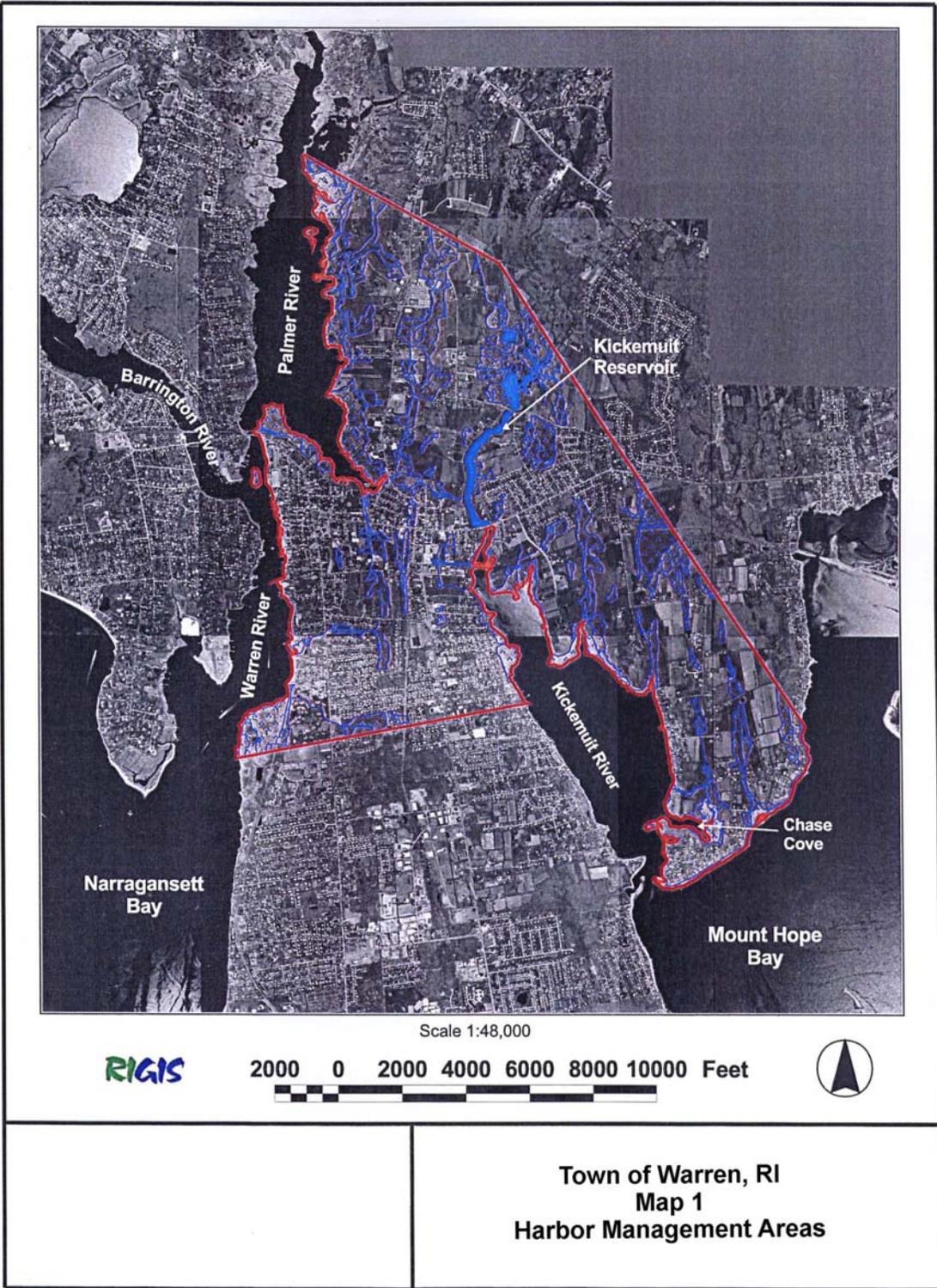
#### **Invertebrate**

Blue Shell Crab Horse Shoe Crab  
Little Neck Clam Quahog  
Salt Marsh Snail Ribbed Mussel  
Bent Mussel Common Oyster  
Scallop Lobster  
Crayfish Green Crab

## **APPENDIX G**

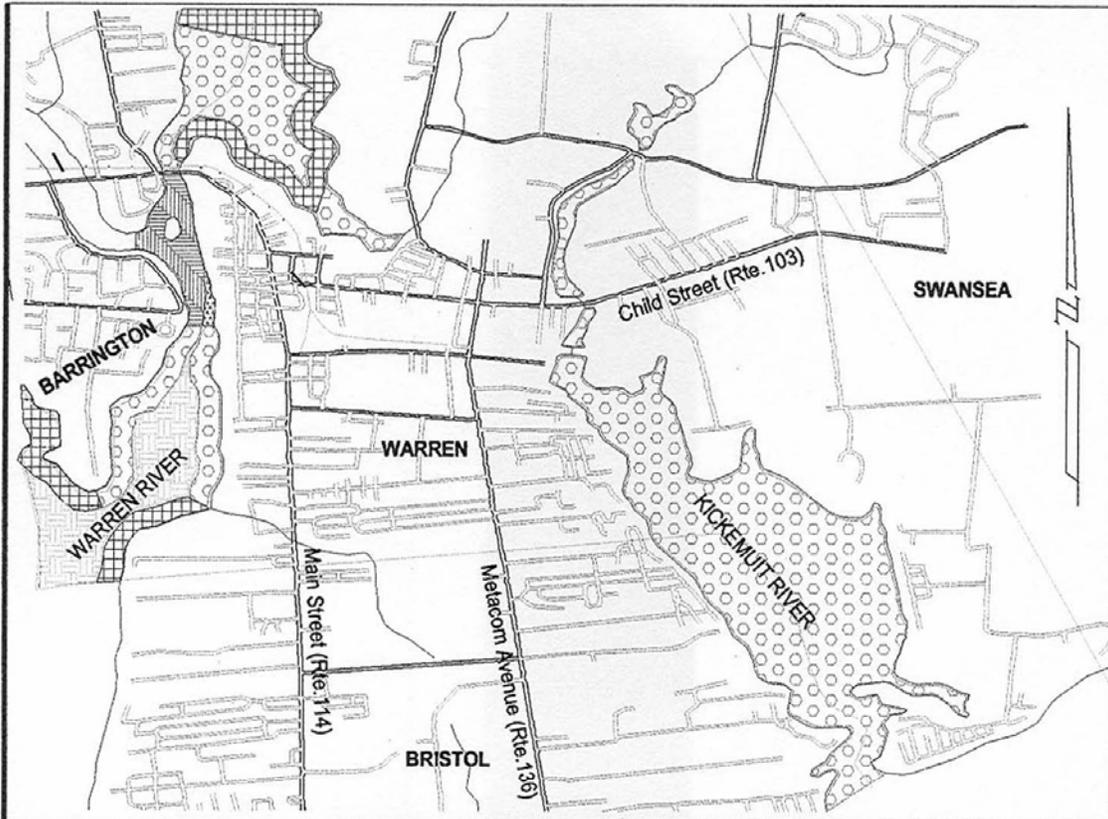
### **MAPS**

- 1. Harbor Management Area**
- 2. CRMC Water Type Classification**
- 3. Refer to U.S Navigation Chart 13221 –**  
*Available at Town Hall & Harbormaster's Office*
- 4. DEM Water Use Classification**
- 5. Refer to FEMA Flood Maps –**  
*Available at Town Hall & Harbormaster's Office*
- 6. Right of Way Locations**
- 7. Existing Conditions/Resources**
  - 7A – Forest and Wetlands**
  - 7B – Groundwater Resources**
  - 7C – Watershed Sub-basin & Surface Water**
  - 7D – Biodiversity Resources**
  - 7E – Coastal Wetlands**
- 8. Existing Moorings and Marinas**
  - 8A – Mooring Field 1**
  - 8B – Mooring Field 2**
  - 8C – Mooring Field 3**
  - 8D – Mooring Field 4**
  - 8E – Mooring Field 5**
  - 8F – Mooring Field 6**
  - 8F – Mooring Field 7**



# TOWN OF WARREN, RI

## MAP NUMBER 2

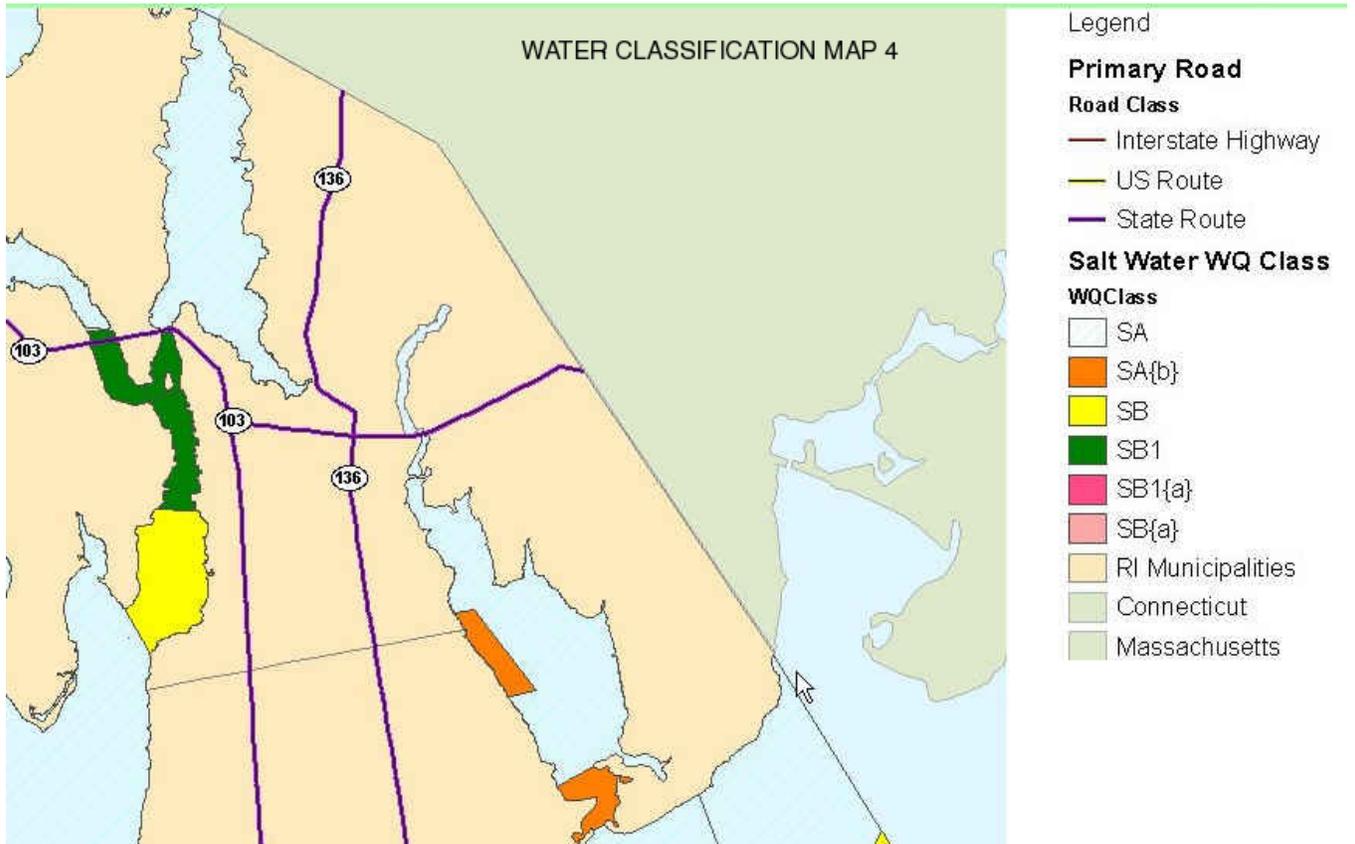


### C.R.M.C. WATER TYPE CLASSIFICATION

TYPE	USE	LEGEND
TYPE 1	CONSERVATION AREAS	
TYPE 2	LOW-INTENSITY USE	
TYPE 3	HIGH-INTENSITY USE	
TYPE 4	MULTIPURPOSE WATERS	
TYPE 5	COMMERCIAL AND RECREATIONAL	
TYPE 6	INDUSTRIAL WATERFRONTS/ COMMERCIAL NAVIGATIONAL CHANNELS	

# WATER CLASSIFICATION MAP 4

## Rhode Island Department of Environmental Management

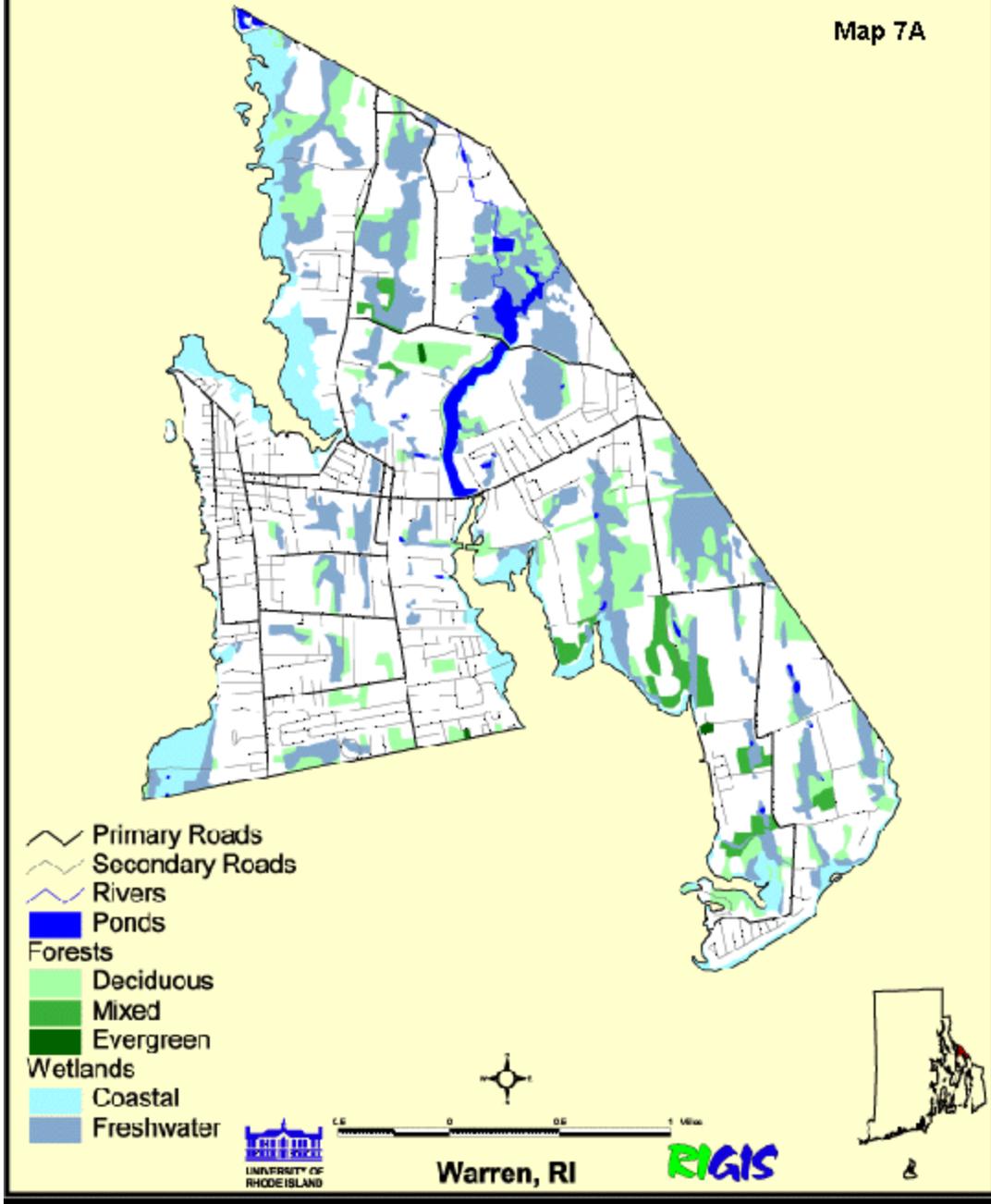




**Appendix G**  
**Map Series 7 - Attached**

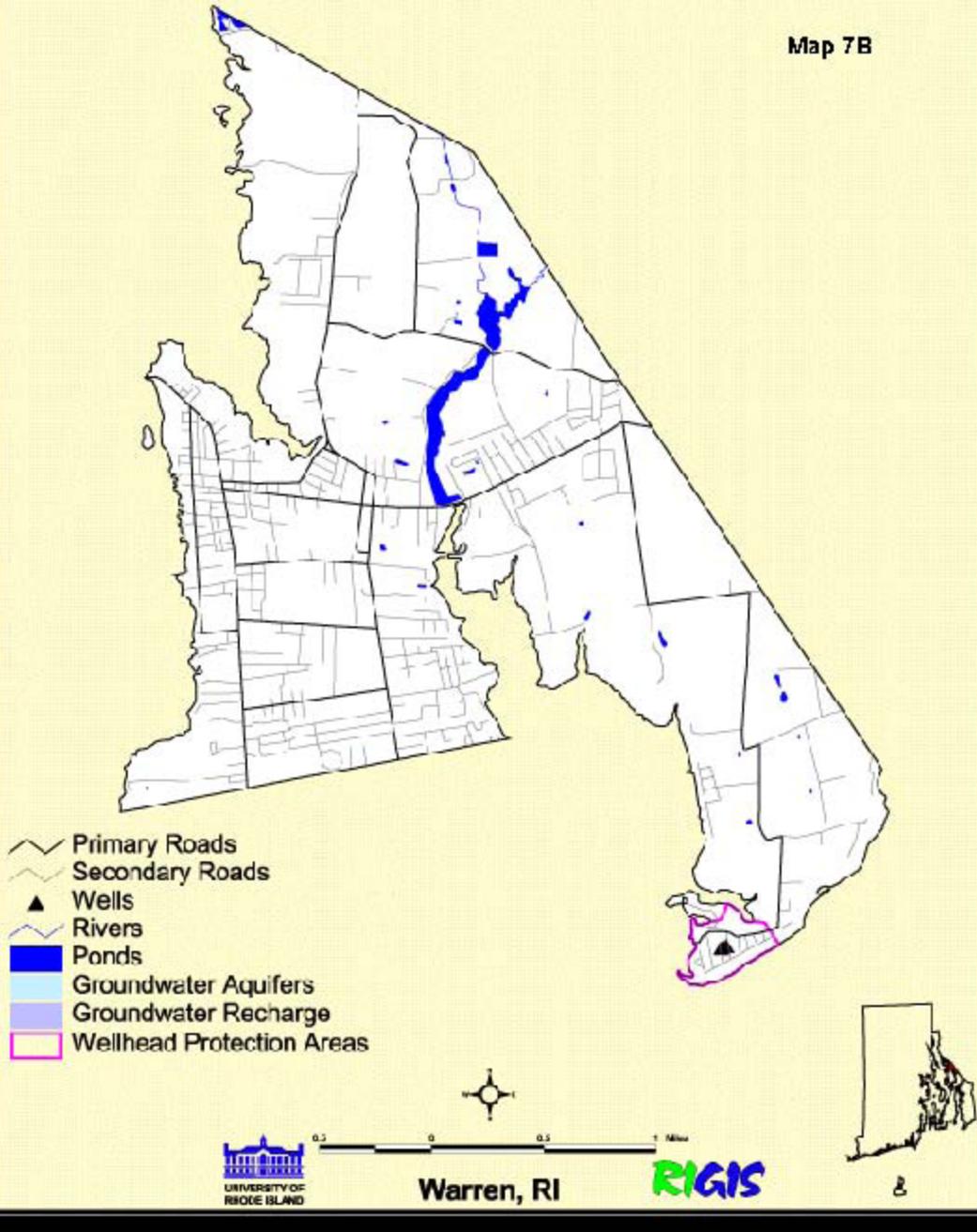
# Forest & Wetland Resources

Map 7A



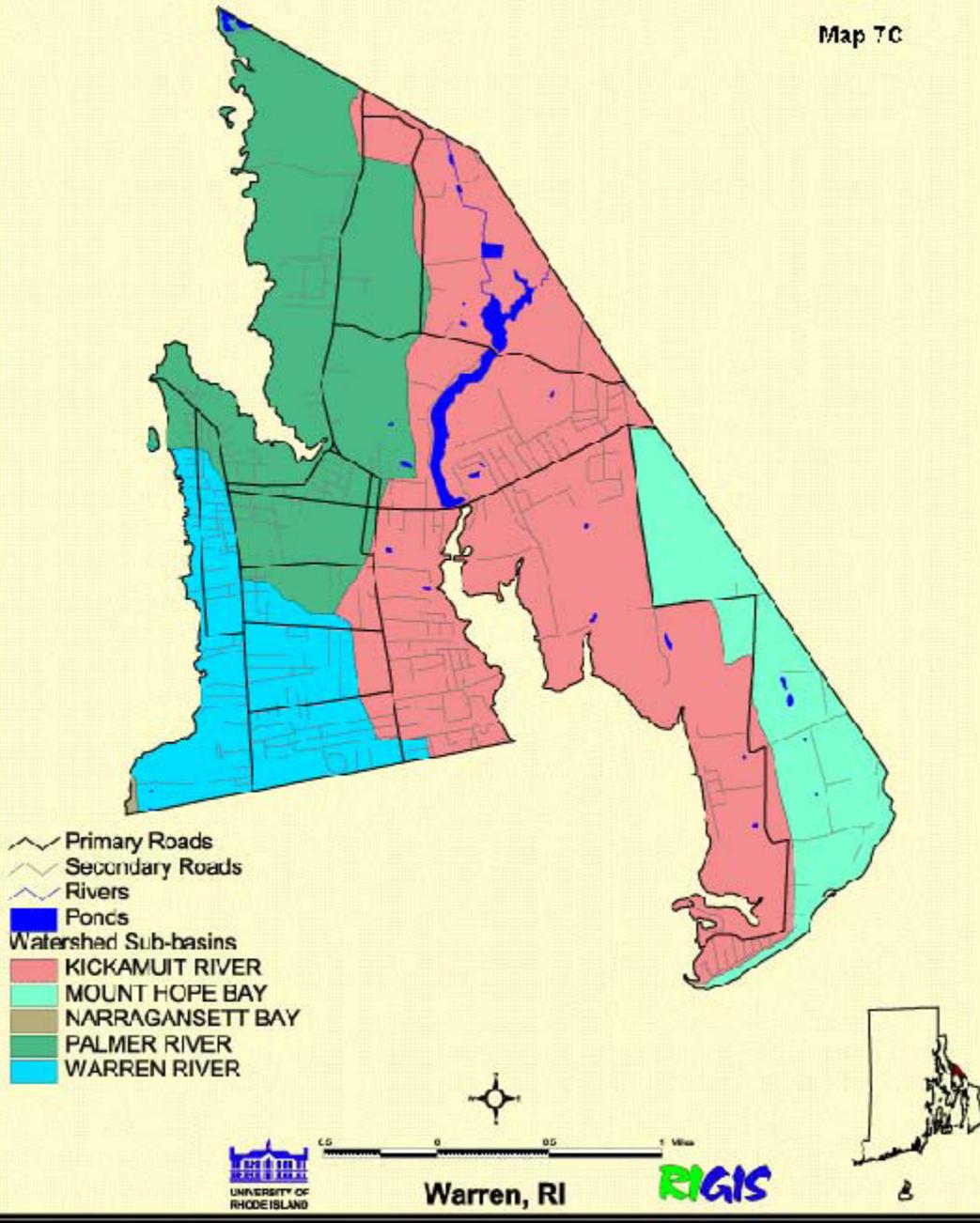
# Groundwater Resources

Map 7B



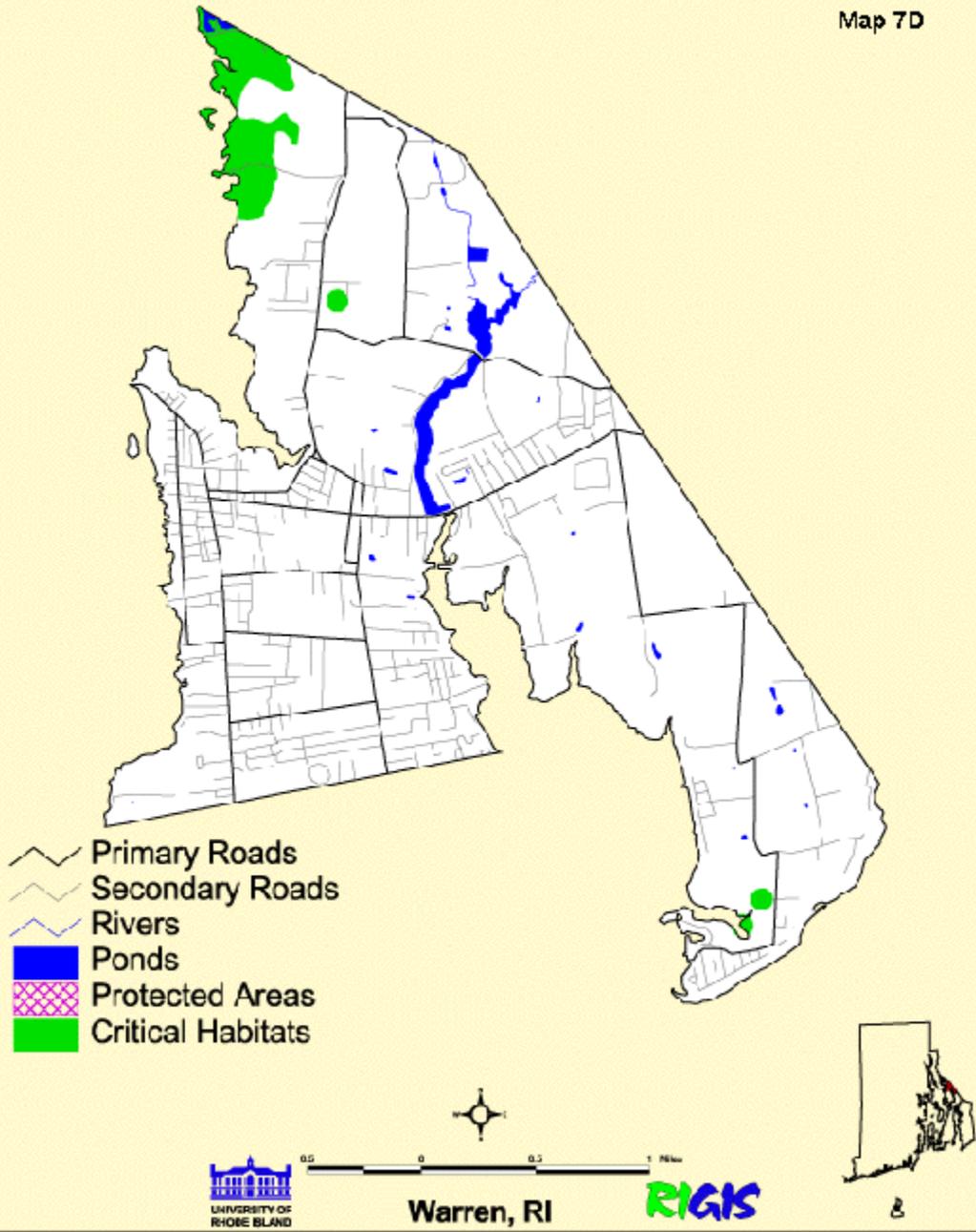
# Watershed Sub-basins & Surface Water

Map 7C



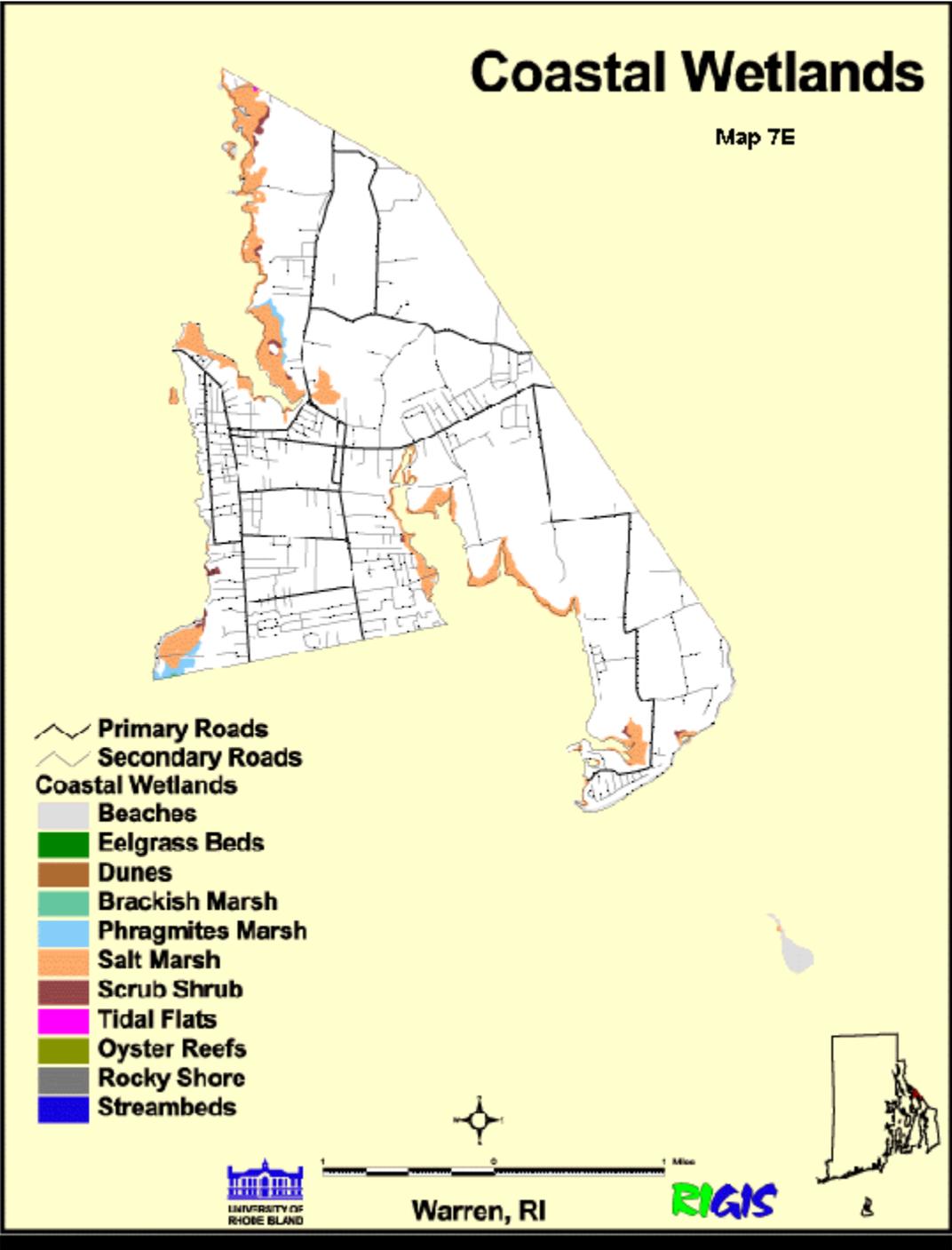
# Biodiversity Resources

Map 7D



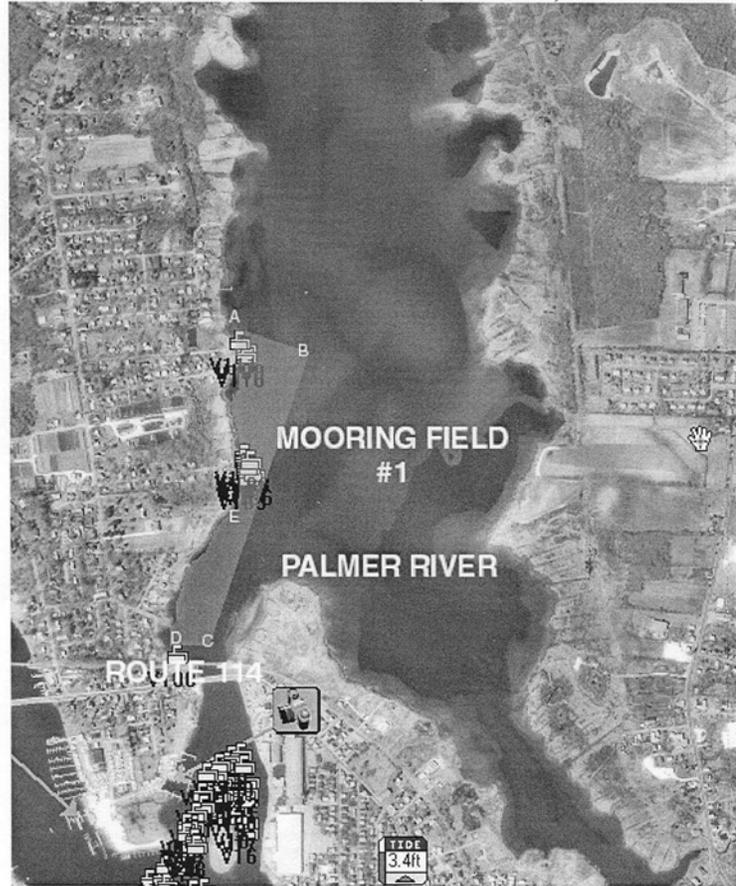
# Coastal Wetlands

Map 7E



**Appendix G**  
**Map Series 8 - Attached**

**MOORING FIELD 1 (Palmer River)**



**Total Moorings: 13**

**Water Depth:** Average depth approximately 5 ft.

**Priority Use:** Minimal Boating

**Number of Docks and Structures:** To be determined in the 2004 Boating Season

**Swimming Areas:** none

**Moorings Field Status:** Open (moorings available)

**Vessels over 25 feet in length:** 0

**Moorings Boundaries:**

Mark A: 41.44.574N – 71.17.321W

Mark B: 41.44.560N – 71.17.260W

Mark C: 41.44.277N – 71.17.411W

Mark D: 41.44.297N – 71.17.445W

Mark E: 41.44.518N – 71.17.312W

**State Plane Coordinates:**

A. 12151315 158784181

B. 12312311 135151511

C. 12312311 841681113

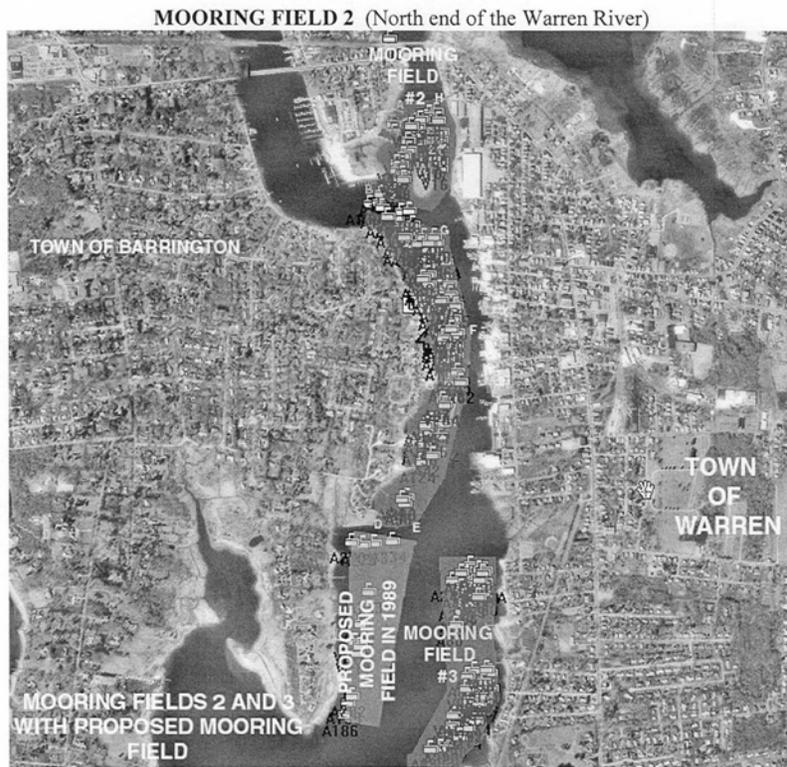
D. 44811144 841681113

E. 12123818 181813777

**Total Area in Acres:** 4.8 Acres

**Moorings Field Boundaries Description:** Mooring Field 1 is located in the Palmer River. The mooring field boundaries run north along the Barrington shoreline from

the 114 Bridge to Baron Ave, Barrington.



**Total Moorings:** 93

**Water Depth:** Average depth approximately 16 ft.

**Priority Use:** Commercial and Recreational Boating

**Number of Docks and Structures:** To be determined in the 2004 Boating Season

**Swimming Areas:** Warren Town Beach

**Mooring Field Status:** Mooring Field is at capacity. Waiting list is in place.

**Vessels over 25 feet:** Approximately 61 moorings

**Mooring Boundaries:**

Mark A: 41.44.150N – 71.17.355W

Mark B: 41.43.957N – 71.17.483W

Mark C: 41.43.679N – 71.17.276W

Mark D: 41.43.446N – 71.17.334W

Mark E: 41.43.447N – 71.17.279W

Mark F: 41.43.680N – 71.17.217W

Mark G: 41.43.904N – 71.17.294W

Mark H: 41.44.153N – 71.17.302W:

**State Plane Coordinates:**

A. 45721233 23483183

B. 53818131 51861883

C. 43181/87 486486486

D. 43510531 123123181

E. 56456456 334564564

F. 45646464 784564565

G. 23231113 388754521

H. 23120014 174123121

**Total Area in Acres:** 11.4 Acres

**Mooring Field Boundaries Description:**

Mooring Field 2's northern boundary line starts at the Route 114 / Main Street bridge and runs south to the Southern property line of Blount Shipyard.

**MOORING FIELD 3 (Lower Warren River)**



**Total Moorings:** 52 Total

**Water Depth:** Average depth approximately 11 ft.

**Priority Use:** Commercial and Recreational Boating

**Number of Docks and Structures:** To be determined in the 2004 Boating Season

**Swimming Areas:** Warren Town Beach

**Mooring Field Status:** Mooring Field almost at capacity. Waiting list is in place.

**Vessels over 25 feet:** Approximately 26 boats

**Mooring Boundaries:**

Mark A: 41.43.272N – 71.17.251W

Mark B: 41.43.027N – 71.17.221W

Mark C: 41.42.900N – 71.17.318W

Mark D: 41.43.047N – 71.17.121W

**State Plane Coordinates:**

A. 4848611 3118144

B. 1518148 1518448

C. 1218781 1518788

D. 1531/871 1581878

**Total Area in Acres:** 4.8 Acres

**Mooring Field Boundaries Description:**

Mooring Field 2's northern boundary line starts at the south property line of the Warren Town Beach and runs south to the pollution / no-shell fishing signs line running east to west. ( Jacob's Point to Adams Point, Barrington near the mouth of the Warren River.)

#### MOORING FIELD 4

(Kickemuit River: Harris Ave to the Warren / Bristol Town line.)



**Total Moorings:** 64

**Water Depth:** Average depth approximately 6-8 ft.

**Priority Use:** Recreational Boating

**Number of Docks:** To be determined in the 2004 Boating Season

**Swimming Areas:** Laurel Park Beach

**Mooring Field Status:** Mooring Field is close to capacity. Waiting list already in place

**Vessels over 25 feet:** 18

**Mooring Boundaries:**

Mark A: 41.43.061N – 71.15.545W

Mark B: 41.43.103N – 71.15.444W

Mark C: 41.42.928N – 71.15.353W

Mark D: 41.42.862N – 71.15.467W

**State Plane Coordinates:**

A. 445681 541884

B. 085411 654782

C. 185184 181844

D. 1581/87 331114

**Total Area in Acres:** 4.1 Acres

**Mooring Field Boundaries Description**

Mooring Field 4 is located in the northern section of the Kickemuit River. The southern boundary line is the Warren / Bristol Town line and runs to just north of the private boat ramp at Laurel Park .



**MOORING FIELD 6**  
(Entrance to the Kickemuit River)



**Total Moorings: 26**

**Water Depth:** Average depth approximately 10 ft.

**Priority Use:** Recreational Boating

**Number of Docks and Structures:** To be determined in the 2004 Boating Season

**Swimming Areas:** Chase Point Beach

**Mooring Field Status:** Mooring Field is at capacity. Waiting list is in place.

**Vessels over 25 Ft: 16**

**Mooring Boundaries:**

Mark A: 41.42.177N – 71.14.610W

Mark B: 41.42.161N – 71.14.697W

Mark C: 41.42.055N – 71.14.627W

Mark D: 41.41.967N – 71.14.624W

Mark E: 41.41.960N – 71.14.570W

Mark F: 41.42.044N – 71.14.549W

Mark G: 41.42.132N – 71.14.558W

- A. 481681 415152
- B. 153150 113181
- C. 513052 131218
- D. 351315 131511
- E. 223158 153530
- F. 231232 231212
- G. 231511 253151

**Total Area in Acres:** 3.9 Acres

**Mooring Field Boundaries Description:** Mooring Field 6 is located on the east side of the mouth of the Kickemuit River. The mooring field is located between two sandbars on the right side of the entrance to the river.

**MOORING FIELD 7**  
(Paralleling Brownell Street / Mt. Hope Bay)



**Total Moorings: 42**

**Water Depth:** Average depth approximately 12ft.

**Priority Use:** Recreational Boating

**Number of Docks and Structures:** To be determined in the 2004 Boating Season

**Swimming Areas:** Beach runs the length of mooring field

**Mooring Field Status:** Mooring Field is not at capacity.

**Vessels over 25 ft:** 12

**Mooring Boundaries:**

Mark A: 41.41.868N – 71.14.463W

Mark B: 41.41.806N – 71.14.419W

Mark C: 41.42.116N – 71.13.774W

Mark D: 41.42.184N – 71.13.880W

Mark E: 41.42.100N – 71.13.591W

**State Plane Coordinates:**

A. 151547 121474

B. 154547 187711

C. 151747 117244

D. 157475 178777

E. 157774 187784

**Total Area in Acres:** 16.2 Acres

**Mooring Field Boundaries Description:**

Mooring Field 7 is located in Mt. Hope Bay. The mooring field boundaries start from just east of the mouth to the Kickemuit River along the Touisset shoreline to the Warren / Swansea town line.

## APPENDIX H

### REFERENCES

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## **APPENDIX I**

**Warren Historic Waterfront Plan**  
*On File at the Town Planner's Office*

**APPENDIX J**

**Town of Warren Harbor and Vessels Ordinance**

**Chapter 10**

**Town of Warren Code of Ordinances**

**Available at Town Clerk's Office and Warren Harbormaster's Office**

Ordinances are also available online at <http://www.municode.com>

**APPENDIX K**

**Storm Preparedness and Hazard Mitigation Plan  
Warren Harbor Master's Office  
Town of Warren  
October 2008**

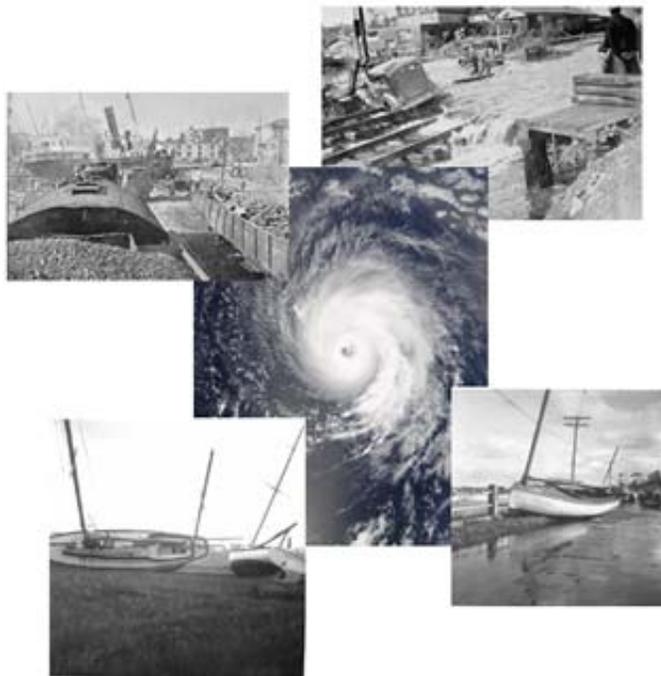
# STORM PREPAREDNESS AND HAZARD MITIGATION



## WARREN HARBORMASTERS OFFICE TOWN OF WARREN

Updated October 7, 2008

### **FEMA Flood Maps attached:**



44001C0007 F, 44001C0008 F, 44001C0009 F, 44001C0010 F, 44001C0011 F and 44001C0012 F. *Maps effective as of March 5, 1996*

Prepared by Matthew J. Calouro, Warren Harbormaster

One of the critical harbor and shoreline users is the individual boater. Because they are often the primary occupants of the harbor area, they should be given special attention. As part of this element of the harbor plan and related ordinance, each boater should complete and submit to the Harbormaster a preparedness plan. There is a growing amount of technical and educational material being developed for individual boat owners about to prepare for storm events.

The following is a summarization of key points contained in the current literature.

Boat owners will be faced with the decision of what to do with their boats in advance of a storm event.

If the storm is less than hurricane strength and the decision is made so that boats can remain tied to the docks, all lines should be doubled and chaffing protection provided where dock lines pass through fairleads and chocks over the vessel's side. Dock lines should be attached to the high end of the pilings, if on a floating dock, rather than to cleats or other fastenings on the dock.

If mooring tackle has been recently inspected and serviced, leaving the boat on the mooring may be the best option. One of the drawbacks to staying on a mooring, as with staying at a dock, is the threat of storm surge. Check with expected storm-surge forecasts to determine if the scope of the mooring will provide sufficient holding power at maximum tidal flow. All individuals using their moorings during a storm must notify the Harbormasters Office that they will be weathering the storm on the mooring. Those same individuals will also be required to notify the Harbormaster again when finally leaving the vessel. The Town of Warren requires mooring inspections to be done every other year. Inspection reports are due on September 1<sup>st</sup>.

Regardless of whether the boat remains at a dock or mooring, there are some basic steps that need to be taken before the storm strikes. The first is to minimize the amount of surface area the wind can work against. The more surface area the wind has to push on, the greater the strain on all components of your boat and securing devices. Remove sails entirely and stow them below deck, especially roller furling jibs. Secure or remove everything in the cabin that is not fastened down, with particular attention to the galley area and chemicals stored in lockers. Secure all ports and hatches, and remove and cap all funnels. Tightly secure the tiller or wheel with strong lines from either side of the cockpit, do not leave coils of line on deck, and take out all slack from running lines on the deck or mast. In order to minimize damage caused by impact of loose boats in a crowded harbor, it is important to place fenders on both sides of the boat. Once all precautions have been taken, the boat owner should leave the boat and seek shelter.

*Can the municipality tow a disabled vessel?*

According to the U.S. Coast Guard, assistance cases fall into two broad categories: distress and non-distress. Distress is defined as imminent danger requiring immediate response and assistance (U.S. Coast Guard COMDTINST 16101.2B, p. 2). If the situation is life threatening, the historic law of the sea obliges the Harbormaster, or any boater, to render assistance.

In cases of distress the Coast Guard should be notified immediately of the situation and of the intent of the Harbormaster. The Harbormaster plays a key role in the hierarchy of emergency response as he/she is often the first to arrive on-scene. If the Coast Guard deems it necessary, it may direct other private/public resources, in addition to its own, to respond. If the Coast Guard arrives and finds a stable situation with the first responders capable of assisting, it may withdraw its response equipment.

However, if the Coast Guard finds the situation unstable, and if the first responders are unable to provide the necessary assistance, it will intervene immediately.

When a Harbormaster responds to a distress situation, and provides some form of emergency aid, he/she is afforded protection from liability through Title 46, Section 2303 of the US Code which states:

Any person...who gratuitously and in good faith renders assistance at the scene of a vessel collision, accident, or other casualty without objection of any person assisted, shall not be held liable for any civil damages as a result of the rendering of assistance for any act or omission in providing or arranging salvage, tonnage, medical treatment, or other assistance where the assisting person acts as an ordinary, reasonable prudent man would have acted under the same or similar circumstances.

The key phrase here is “act as an ordinary, reasonable prudent...” which dictates that the Harbormaster must act in good faith and in a reasonable, seamanlike manner. Any variance from this standard may increase liability.

This potential liability, and the fact that alternatives exist, should dissuade the Harbormaster from towing. Other resources that may be able to offer assistance can be contacted. The Coast Guard will issue a Marine Assistance Request Broadcast (MARB) which solicits voluntary response of anyone who can assist the disabled mariner (including Coast Guard Auxiliary Units and good Samaritans) (U.S. Coast Guard COMDTINST 16101.2B, p. 2). A Harbormaster may also contact a friend or family member of the boater for assistance.

Another viable form of assistance may be sought through professional towing companies that work in the area. The Harbormaster can provide the disabled boater with information on how to contact these companies, and their current rates. In most instances these firms will contact the boater directly in response to the MARB. Once the boater decides upon a service and a verbal agreement is made, the Harbormaster cannot interfere with that contract.

Safe Sea - 401-294-2360

Sea Tow - 800-338-7327

It is clear that "good faith" actions of Harbormasters are protected, to some degree, by the "Federal Boating Safety Act of 1971," but to what extent remains uncertain. Unfortunately, there is no statutory framework from which to formulate guidelines. Issues such as this are decided by customary law, which means each case is reviewed individually by a judge and jury. Because there are so few cases involving Harbormaster liability, judges and jurors lack prior judicial decisions which set precedents. It is therefore difficult to predict the extent to which Harbormasters will be protected by the state. In order to limit the potential of being found liable, Harbormasters must realize the extent of their liability and must make rational, professional decisions which can be supported as reasonable actions before a court of law.

*What is the municipalities mooring liability?*

The major concern focuses on the Harbormaster's involvement with setting mooring

standards, placing ground tackle and conducting inspections. In order for a Harbormaster to

avoid or minimize the amount of liability he/she must exercise reasonable care. This

includes:

- (1) setting mooring standards which are appropriate for the area. The Harbormaster must be able to justify the standards which have been set. The maximum load the mooring gear is expected to withstand must be identified and documented (Taylor, 1992);
- (2) providing mooring occupants with information on the stress points of moorings and offering advice on dealing with extreme weather conditions; and
- (3) ensuring that all mooring gear under town control is routinely inspected, and that proper records of these inspections are kept. The question of liability continually arises if the town conducts the inspections itself. Liability results not because the town inspects the mooring, but because it does so improperly or fails to correct a situation in which the mooring does not meet specifications. Some towns have opted to place the burden of mooring inspection on the boaters. This is generally a financial decision. However, by doing so, the town relinquishes direct control of the inspection process, and may not be as effective in ensuring that all mooring tackle conforms to the regulations. The Harbormaster can choose instead to conduct the inspection and assure that each mooring has in fact been inspected.
- (4) identifying and correcting situations which may cause damage to a moored vessel. If a Harbormaster learns that two boats are hitting one another while on town managed moorings, the situation needs to be rectified quickly. The Harbormaster must first stop the vessels from hitting. This can be achieved by removing one of the vessels from its mooring. The Harbormaster then decides where to move the vessel. Warren mooring tackle specifications are indicated in the Warren Town Code (Chapter 10) Information on mooring specifications and storm preparedness

can be obtained through the Harbormasters Office, Town Clerks Office, through any Mooring Inspector or online in the near future.

If and when the Town of Warren implements a commercial mooring field with town owned moorings, owning and then renting the mooring gear, it will greatly increase the liability of the Town. The town will need to provide security patrols, annual mooring inspections and provide additional monitoring during storms and weather events.

## **Hazard Mitigation Plan**

### **Harbor Summary**

- RIDEM Water Quality Designation: SA and SB
- CRMC Use Type Designation: Type 2 and 4
- FEMA Flood Zone(s): 44001C0007 F, 44001C0008 F, 44001C0009 F, 44001C0010 F, 44001C0011 F and 44001C0012 F.

*Effective dates on all maps was March 5, 1996*

- Land Use: The land use along the shores of the Warren River are a mix of high density residential and water dependent commercial development, such as marinas, boat yards, commercial seafood businesses, boat repair companies, etc. The majority of residential and commercial properties will be significantly affected in severe weather with high tides.
- Moorings: The town regulates 8 mooring fields in both rivers with a total of 311 moorings.

### **100. Authority:**

The primary authority for carrying out the responsibilities detailed in this plan is vested with the Harbormaster, who will work in cooperation with the harbor commission. However to successfully complete the activities outlined in this plan, the Harbormaster is required to work with other town departments including the: planning board, police and fire departments, town planners, building code official, department of public works and the emergency management officer. The Harbormaster shall be a member of the Emergency Management Committee.

### **200. Goals of the Harbor Hazard Mitigation Plan**

To prevent the loss of life and property by:

- properly preparing for storm events
- having a completed and enforceable response and recovery plan
- working in cooperation with harbor and shorelines users to ensure that a coordinated approach is applied to hazard mitigation
- integrating harbor hazard mitigation activities with other, ongoing, local hazard mitigation programs.
- identifying and completing long term actions to redirect, interact with or avoid the hazard.

**300. Risk Assessment**

**310. General Harbor Characteristics:**

The bottom consistency is mixed. The Warren River, from the 144 Bridge to Blount Shipyard, is generally hard due to the constant current with softer bottom south of the town beach. The Kickemuit River is mainly soft sand and mud. The average depth in the Warren River is 16 feet. The average depth in the Kickemuit River is approximately 6 feet and the Palmer River is approximately 4 feet. The town manages a total of 311 moorings.

The surrounding harbor uses can be divided into three general uses:

1. Open space – Approximately 10% of Warren’s waterfront is open space.
2. Residential - this use totals approximately 70% of the land use surrounding the harbor area. Generally, the single family dwellings are built upon lots that range from 10,000 square feet to 1 acre.
3. Commercial - commercial waterfront uses such as marinas, vessel repair businesses and restaurants are located in the northeastern section of the Warren River. There are nine marinas located in the Warren River. Striper Marina is the only marina that offers fuel.

**320. High Hazard Areas:**

According to FEMA flood insurance maps, all of the land surrounding the Warren, Kickemuit and Palmer Rivers are within the 100 year storm flood plain. Historically, the land uses in all three rivers have received significant surge damage during hurricanes and severe weather coupled with high tides.

**330. Risk Assessment Table**

Threat	Marine interest	Effect	Result -1	Result -2
Flood/surge	Boaters on moorings and docks	decreased scope		Dragging
		Lower		threaten shoreline homes
		Middle		threaten shoreline business
		Upper		Severe threat to auto bridge
	Marina facility	flooded facility		floating debris
		spills of hazardous material		threaten surrounding
		Docks topping piles		freed docks and boats
	Private residences			flooded property
		Docks		freed docks

		topping piles	and boats
Wind	Boaters on moorings	windage	Dragging or pennant
	Marina facility	windborne debris	structural damage

**400. Strategies for Preparedness, Response and Recovery**

410. Town of Warren - The Harbormaster will coordinate all harbor activities related to preparation, response and recovery. This will be done in coordination with the emergency management officer and department of transportation.

410.1 Preparedness - The Town of Warren, through its Harbormaster, will activate the following preparedness, response and recovery plan 72 hours prior to a severe storm event or as necessary for unpredictable events.

**THE SAFFIR-SIMPSON HURRICANE SCALE**

The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf in the landfall region. Note that all winds are using the U.S. 1-minute average.

**Category One Hurricane:**

Winds 74-95 mph (64-82 kt or 119-153 km/hr). Storm surge generally 4-5 ft above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage. Hurricanes Allison of 1995 and Danny of 1997 were Category One hurricanes at peak intensity.

**Category Two Hurricane:**

Winds 96-110 mph (83-95 kt or 154-177 km/hr). Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings. Hurricane Bonnie of 1998 was a Category Two hurricane when it hit the North Carolina coast, while Hurricane Georges of 1998 was a Category Two Hurricane when it hit the Florida Keys and the Mississippi Gulf Coast.

**Category Three Hurricane:**

Winds 111-130 mph (96-113 kt or 178-209 km/hr). Storm surge generally 9-12 ft above normal. Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water

3-5 hours before arrival of the center of the hurricane. Flooding near the coast destroys smaller structures with larger structures damaged by battering from floating debris. Terrain continuously lower than 5 ft above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences with several blocks of the shoreline may be required. Hurricanes Roxanne of 1995 and Fran of 1996 were Category Three hurricanes at landfall on the Yucatan Peninsula of Mexico and in North Carolina, respectively.

**Category Four Hurricane:**

Winds 131-155 mph (114-135 kt or 210-249 km/hr). Storm surge generally 13-18 ft above normal. More extensive curtainwall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km). Hurricane Luis of 1995 was a Category Four hurricane while moving over the Leeward Islands. Hurricanes Felix and Opal of 1995 also reached Category Four status at peak intensity.

**Category Five Hurricane:**

Winds greater than 155 mph (135 kt or 249 km/hr). Storm surge generally greater than 18 ft above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 ft above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required. Hurricane Mitch of 1998 was a Category Five hurricane at peak intensity over the western Caribbean. Hurricane Gilbert of 1988 was a Category Five hurricane at peak intensity and is one of the strongest Atlantic tropical cyclones of record.

**LEVEL 3 - 72 HOURS**

1. If hurricane, begin tracking and monitoring hourly weather reports
2. Contact any services under contract for after event to assess their readiness
3. Manage harbor traffic as it increases during marina/boater preparation activities
4. Ensure fuel tanks are full and reserve batteries are charged
5. Inventory and update first aid equipment and other onboard emergency tools
6. Contact local marinas and boat moving companies for statuses to relay to mariners.
7. Maintain radio watch
8. Alert local port community, encouraging boat owners to seek safe refuge, remove boats from water, or take action to minimize damaging effects

9. Alert local marinas, marine interests, holders of mooring permits, and occupants of special anchorage areas to impending emergency.
10. Keep MSO Providence apprised of hazardous conditions in harbor
11. Monitor Kickemuit River with vessels taking refuge.
12. Document waterfront using photographs or video
13. Start tracking time and resource allocations for possible state and federal reimbursement.

*LEVEL 2 - 48 HOURS*

1. Continue to perform activities in level 3
2. Contact mooring permit holders who are not complying with preparedness plan.
3. Assist marinas/waterfront business with special requests
4. Continue to manage harbor traffic as it increases
5. Finalize emergency work schedule with assistant Harbormasters
6. Confirm arrangements to have Harbormaster vessel hauled and stored
7. Preparation of town properties with department of public works, that includes:
  - removing all town equipment from flood plain
  - securing all items such as trash bins, benches, etc..
  - complete necessary precautions for Harbormaster office
8. Establish liaison with police, fire and public works departments
9. Alert maritime community to unsafe conditions in the harbor as needed
10. Curtail regular business activities
11. Begin regular patrols of the harbor to ensure necessary individual precautions are begin taken
12. Advise MSO Providence as to the status of emergency preparedness in progress
13. Alert local harbor community to any impending closure of anchorages or waterways.
14. Encourage local marinas to suspend fueling operations and to secure fueling piers sufficiently to minimize pollution threat.

## **LEVEL 1 - 24 HOURS**

1. Final patrol of the harbor
  - inventory number of vessels and precautions taken by harbor and shoreline users
  - clear public pier of vessels and equipment
2. Log information on transient boats (see section 425.2)
3. Fuel Harbormaster vessel
4. Haul and store Harbor Patrol vessel with assistance of the Department of Public Works
5. Complete shoreline survey and final harbor check from shore
6. Alert harbor community and MSO to any unsafe conditions in harbor
7. Continue to perform pertinent level 2 activities.
8. Raise hurricane signal twelve hours prior to storm's arrival

**410.2 Response** - The Town of Warren's policy is that no emergency watercraft will be dispatched for emergency response during a storm event. All requests for assistance will be forwarded to the nearest Coast Guard Station. This policy will remain in effect

unless revoked by the Fire Chief or Town Council President. The Harbormaster will remain on-call to address any harbor related issues. This will also allow the Harbormaster vessel to begin operation immediately at the conclusion of storm. The Harbormaster shall monitor police, fire and marine frequencies throughout the event.

**410.3 Recovery** - Immediately after the event has terminated, the town has three recovery priorities.

Priority 1:

Reestablish the Harbormaster's Office as an operational unit in order to facilitate the second and third priority

Priority 2:

Take the necessary immediate action to minimize additional risk to life and property.

Priority 3:

Reopen the harbor for recovery activity.

To achieve these priorities, the following sequential actions will be taken:

*IMMEDIATE 24 HOURS*

1. Assess readiness of the Harbormaster's Office, correct deficiencies
  - reestablish radio communications.
2. Complete rapid appraisal of damage
3. Provide damage assessment information to town's public information center and to MSO Providence
4. Initiate pre-established contracts services companies (towing, salvage) if required
5. Institute security watches as necessary
6. Alert maritime community to unsafe conditions in the harbor
7. Provide damage assessment information to town's public information center and MSO Providence
8. Track time and resource allocation of Harbormaster's Office for possible state and federal reimbursement.

*MID-TERM 1 TO 14 DAYS*

1. Complete comprehensive inventory of damage using photographs and video if possible
2. Notify appropriate parties regarding damage (i.e., mooring holders)
3. Provide list of unidentified boats to MSO Providence and DEM Enforcement
4. Contact local harbor and shoreline users to assess their situation
5. Provide MSO Providence with a daily harbor status.
6. Begin to remove large pieces of floating debris from the harbor

7. Assist town and state agencies with damage assessments and emergency permitting process.

### **LONG-TERM 14 TO 90 DAYS**

1. Analyze effects of storm on the harbor. Complete summary report within 30 days of storm event for town manager.
2. Review mitigation list and selection actions that could be implemented during the recovery phase
3. Conduct an evaluation meeting for harbor and shoreline users to identify problems not properly addressed by this plan
4. Complete a survey of boat damage
5. Update hazard mitigation plan and identify new mitigation opportunities
7. Assist emergency situations as appropriate
8. Track time and resource allocations for possible state and federal reimbursement.

### **420. Harbor and Shoreline Users**

421. Marina facilities - As part of the Town of Warren's harbor hazard mitigation plan, all marina facilities as defined by CRMC, will submit a hazard mitigation plan to the Harbormaster within 90 days of this document being approved. The facility's plan will be updated annually and any changes will be reported to the Harbormaster by January 1 of each year.

Facility plans will include:

- Primary contact person primary and secondary phone numbers.
- VHF channel that is monitored
- List of facility staff who are expected to assist in preparation, response and recovery phases.
- List of hazardous material stored on site (i.e. waste oil, fuel tanks, solvents). This information can be extracted from the facilities Environmental Operations and Maintenance Plan.
- Inventory of potential recovery equipment (heavy equipment, generators), including outside contracts for special equipment for recovery phases
- Debris disposal plan
- Special assistance requested from town
- List of preparation, response and recovery activities and timing

422. Boaters - Boats moored on town managed moorings will be required to submit a preparedness plan. This will be accomplished by adding a preparedness plan questionnaire as part of the annual mooring renewal forms. For a mooring permit to

be approved, the questionnaire must be completed and returned with the mooring application. Boaters will be expected to comply, to the best of their ability, with the plan they have prepared. The boat owner should advise the Harbormaster of any significant changes to the plan made during the boating season.

Mooring standards have been developed to maximize safety during normal weather conditions. To safeguard a moored boat during a severe storm event, additional precautions will be necessary. This actions will include:

- Improving the connection between the vessel and the mooring chain by using chafing gear and extra lines.
- Reducing windage
- Whenever possible, increase scope.

Boaters should also consider:

- Bypassing the mooring swivel and attach the chain directly to the pennant.
- Hauling their boat and storing it upland
- Leave anchor lights and autobilge pumps on.

- Ensure that self-bailing cockpit drains are clear of debris
- Add an emergency catenary weight at the vessel end of the chain to absorb shock

Boat owners are encouraged not to stay aboard during major storm events. The town's standard procedure is NOT to respond to on-the-water requests for assistance during a major storm event. Such requests for assistance will be forward to the nearest U.S. Coast Guard Station.

423. Waterfront business (excluding marinas) - All waterfront business are expected to take the necessary precautions to protect their property.

424. Shorefront home owners- All shorefront homeowners are expected to take the necessary precautions to protect their property.

425. Special Hazards

.1 Commercial Dock- all vessels shall be cleared of the town commercial dock 12 hours prior to expected storm event.

.2 Transients- vessels not usually moored in the harbor, but seeking safe refuge will be allowed to moor in the specified anchorage areas. Transit yachts will not be allowed to tie to a mooring if not authorized by both the mooring owner and the Harbormaster. Transient vessels seeking shelter will provide the Harbormaster with:

- name of owner and captain if different.
- home port
- registration/documentation numbers
- length, draft and type (power/sail)
- number of persons aboard
- address and phone were owner can be contacted

.3 Passenger vessels and ferries- As deemed necessary by the Harbormaster, local passenger vessels and ferries will submit individual plans to the Harbormasters. These plans will include information about planned preparedness, response and recovery actions.

## 500. Inventory of longer term mitigation projects

1. Maintaining the existing seawalls. Although it does not provide complete protection, there is a measure of safety gained by having the seawall properly maintained.
2. Methods to increase scope within the harbor without losing surface area maximization should be explored. Actions may include a targeted approach to removing vessels from moorings and increasing the scope with storm pennants for those that remain. In the existing mooring configuration, increasing mooring scope is difficult. Therefore, the town should explore alternative methods for gridding the mooring field that will allow space maximization and increased scope.
3. Implement an annual education and training program conducted by the Harbormaster for the public. This program should focus on storm preparedness for the boater. Other workshops should be conducted with the help of the building inspector and planning board to discuss shoreline construction standards and storm proofing homes and business.
4. The Harbormaster should compile a list educational material that can be shared with harbor and shorefront users.
5. Maintain an accurate lists of principle marine interests including marinas, waterfront business, neighboring Harbormasters, Coast Guard, Towing and Salvage Companies, Environmental Response teams, Key vessel operators (charter boats and ferries) fishing cooperatives, etc.
  
6. Starting at the beginning of each hurricane season (June 1) the Harbormaster shall:
  - review local harbor hazard mitigation plan and update as necessary
  - distribute and post revised plan
  - inspect all storage sheds, outbuildings, and portable office trailers for proper tie-down.
  - inspect all emergency power sources and lighting systems to ensure they are operational
  - prepare and distribute a storm checklist for to boaters
  
7. Conduct a Disaster Mitigation workshop for Business and Industry in cooperation with RI Emergency Management Agency. Propose activities that can be implemented to mitigate damage. Suggested actions for local coastal business may include:
  1. Place more essential equipment and functions on higher levels of the structure, above the anticipated flood level;
  2. Construct berms around the facility;
  3. Install or have dewatering pumps;
  4. Provide emergency generators and potable water storage;
  5. Install blowout plugs in floor slabs whose elevation is below anticipated flood elevation.
  6. Install master shutoff valve controls for sewer, gas, and water above anticipated flood elevation;
  7. Reinforce walls to carry hydrostatic and hydrodynamic loads;
  8. Install floodproof electrical systems and utility cores in areas subject to flooding; and

9. Install safety glass in windows.
8. Assess the feasibility of developing a volunteer corp who can assist the Harbormaster secure vessels during the phase or maintain security patrols after an event.

## **600. Coordination**

Memorandum of Agreement shall be entered into with the Department of Public Works to establish the working relationship between it and the Harbormaster for completing the following activities:

- preparing public waterfront property
- hauling and storing the Harbormaster vessel

The harbor commission shall work with the planning board and planning department to establish redevelopment policies for shoreline areas. These policies will be consistent with CRMC and DEM regulations.

In order to discourage redevelopment of critical shoreline areas and to reduce vulnerability of life and property to coastal hazards the Town of Warren should: (the following has been adapted from Florida Department of Environmental Protection)

1. encourage and participate in the maintenance, restoration and enhancement of beaches and dunes.
2. limit development and redevelopment in hazardous coastal areas to protect lives and property from coastal storms and hazards. Post storm development shall avoid extensive rebuilding and intensification of land uses in critical areas and encourage reductions in the amount and intensity of development in order to reduce exposure of lives and property to coastal hazards.
3. attempt to minimize public expenditures and reduce risk to public infrastructure and facilities through redevelopment
4. encourage relocation of structures landward of critical areas. This can be done by influencing State policies, expenditures, and programs to reduce the amount and intensity of development and redevelopment
5. require shorefront areas replacement of non-conforming uses and eliminate unsafe conditions and inappropriate uses as opportunities arise
6. identify shorefront areas that shall be subject to post-storm regulations and acquisition in order to reduce loss of life and damage to property.

In order to further coordinate local policies contained in the comprehensive land use plan for resource protection, coastal management, the town should consider the following policies.

7. work with appropriate state agencies to ensure that Post-storm shoreline management options for shoreline areas shall be consistent, to the extent possible, with use, density and other land uses policies and standards contained in the comprehensive land use plan.
8. create local priorities for acquiring coastal properties to promote hazard mitigation, public recreation, and resource management objectives contained in the comprehensive plan.
9. post-storm redevelopment options should consider impacts to evacuation routes, as determined by emergency management officials.

10. maintain and or adopt minimum parcel size and configuration requirements on the subdivision of critical shoreline features.
11. discourage platting of shoreline properties and encourage replatting to accommodate post-storm relocation of structures landward.

## **Hurricane Preparedness Links:**

### **RHODE ISLAND EMERGENCY MANAGEMENT:**

<http://www.riema.ri.gov/hazards/hurricane.php>

**National Hurricane Center / NOAA:** <http://www.nhc.noaa.gov>

**Ready America:** <http://www.ready.gov/america/beinformed/hurricanes.html>

**FEMA:** <http://www.fema.gov/hazard/hurricane>

**RED CROSS:** <http://www.redcross.org/news/ds/0305hurricane/>

**The Weather Channel:** <http://www.weather.com>

## **THE GREAT NEW ENGLAND HURRICANE of 1938** (CAT 3 - September 21)

The Great New England Hurricane of 1938 was one of the most destructive and powerful storms ever to strike southern New England. This system developed in the far eastern Atlantic, near the Cape Verde Islands on September 4. It made a twelve day journey across the Atlantic and up the eastern seaboard before crashing ashore on September 21 at Suffolk County, Long Island, then into Milford, Connecticut. The eye of the hurricane was observed in New Haven, Connecticut, 10 miles east of Milford. The center made landfall at the time of astronomical high tide, moving north at 60 mph. Unlike most storms, the hurricane did not weaken on its way toward southern New England, due to its rapid forward speed and its track. This kept the center of the storm over the warm waters of the Gulf Stream.

Sustained hurricane force winds occurred throughout most of southern New England. The strongest winds ever recorded in the region occurred at the Blue Hill Observatory with sustained winds of 121 mph and a peak gust of 186 mph. Sustained winds of 91 mph with a gust to 121 mph was reported on Block Island. Providence, Rhode Island recorded sustained winds of 100 mph with a gust to 125 mph. Extensive damage occurred to roofs, trees and crops. Widespread power outages occurred, which in some areas lasted several weeks. In Connecticut, downed power lines resulted in catastrophic fires to sections of New London and Mystic. The lowest pressure at the time of landfall occurred on the south side of Long Island, at Bellport, where a reading of 27.94 inches was recorded. Other low pressures included 28.00 inches in Middletown, Connecticut and 28.04 inches in Hartford, Connecticut.

The hurricane produced storm tides of 14 to 18 feet across most of the Connecticut coast, with 18 to 25 foot tides from New London east to Cape Cod. The destructive power of the storm surge was felt throughout the coastal community. Narragansett Bay took the worst hit, where a storm surge of 12 to 15 feet destroyed most coastal homes, marinas and yacht clubs. Downtown Providence, Rhode Island was submerged under a storm tide of nearly 20 feet. Sections of Falmouth and New Bedford, Massachusetts were submerged under as much as 8 feet of water. All three locations had very rapid tides increased within 1.5 hours of the highest water mark.

Rainfall from this hurricane resulted in severe river flooding across sections of Massachusetts and Connecticut. Three to six inches fell across much of western Massachusetts and all but extreme eastern Connecticut. Considerably less rain occurred to the east across Rhode Island and the remainder of Massachusetts. The rainfall from the hurricane added to the amounts that had occurred with a frontal system several days before the hurricane struck. The combined effects from the frontal system and the hurricane produced rainfall of 10 to 17 inches across most of the Connecticut River Valley. This resulted in some of the worst flooding ever recorded in this area. Roadways were washed away along with sections of the New York, New Haven, and Hartford Railroad lines. The Connecticut River, in Hartford reached a level of 35.4 feet, which was 19.4 feet above flood stage. Further upstream, in the vicinity of Springfield, Massachusetts, the river rose to 6 to 10 feet above flood stage, causing significant damage. A total of 8900 homes, cottages and buildings were destroyed, and over 15000 were damaged by the hurricane. The marine community was devastated. Over 2,600 boats were destroyed, and over 3,300 damaged. Entire fleets were lost in marines and yacht clubs along Narragansett Bay. The hurricane was responsible for 564 deaths and at least 1700

injuries in southern New England. Damage to the fishing fleets in southern New England was catastrophic. A total of 2,605 vessels were destroyed, with 3,369 damaged.

### **HURRICANE CAROL** (CAT 3 - August 31, 1954)

On the morning of August 31, Hurricane Carol, the most destructive hurricane to strike southern New England since the Great New England Hurricane of 1938, came crashing ashore near Old Saybrook, Connecticut, leaving 65 people dead in her wake. Carol had developed in the Bahamas several days earlier, making only slow progress northward. Carol began her rapid acceleration during the evening of August 30, while passing just east of Cape Hatteras, North Carolina. Carol made landfall on eastern Long Island and southeastern Connecticut about 12 hours later, moving at over 35 mph.

Sustained winds of 80 to 100 mph roared through the eastern half of Connecticut, all of Rhode Island, and most of eastern Massachusetts. Scores of trees and miles of power lines were blown down. Strong winds also devastated crops in the region. Nearly 40 percent of apple, corn, peach, and tomato crops were ruined from eastern Connecticut to Cape Cod. Several homes along the Rhode Island shore had roofs blown completely off due to winds which gusted to over 125 mph. The strongest wind ever recorded on Block Island, Rhode Island occurred during Carol when winds gusted to 135 mph. The National Weather Service in Warwick, Rhode Island recorded sustained winds of 90 mph, with a peak gust of 105 mph. Lowest recorded pressure was at Suffolk County Airport on the south shore of Long Island with a reading of 28.36. Block Island reported 28.51 while Quonset Airport in North Kingstown, Rhode Island reported 28.72.

Hurricane Carol arrived shortly after high tide, causing widespread tidal flooding. Storm surge levels ranged from 5 to 8 feet across the west shore of Connecticut, and from 10 to 15 feet from the New London area eastward. Storm tide profiles show, as in 1938, how dramatically the tides increased just before landfall across Narragansett Bay, the Somerset, Massachusetts area and in New Bedford, Massachusetts harbor. Narragansett Bay and New Bedford harbor received the largest surge values of over 14 feet in the upper reaches of both water ways. On Narragansett Bay, just north of the South Street Station site, the surge was recorded at 14.4 feet, surpassing that of the 1938 hurricane. However, since Hurricane Carol arrived after high tide, the resulting storm tide was lower.

Coastal communities from central Connecticut eastward were devastated. Entire coastal communities were nearly wiped out in New London, Groton, and Mystic, Connecticut, as well as from Westerly to Narragansett, Rhode Island. Once again, as in the 1938 hurricane, downtown Providence, Rhode Island was flooded under 12 feet of water.

Rainfall amounts ranged from 2 to 5 inches across most of the area. The heaviest amounts, up to 6 inches, occurred in the New London, Connecticut area in the vicinity of landfall, and across extreme north central Massachusetts.

Hurricane Carol destroyed nearly 4000 homes, along with 3500 automobiles and over 3000 boats. All of Rhode Island, much of eastern Connecticut and much of eastern Massachusetts lost electrical power. In addition, as much as ninety-five percent of all phone power was interrupted in these locations.

This information was taken from **SOUTHERN NEW ENGLAND TROPICAL STORMS AND HURRICANES, A Ninety-eight Year Summary 1909-1997**, by David R. Vallee and Michael R. Dion, National Weather Service, Taunton, MA.