Appendix 3
Natural Resources
Harbor and Marina

1. **Implementation Plan from 1995 Local Comprehensive Plan**

2. **Excerpts from 2006 Harbor Management Plan**
   - **Overview Summary**
   - **Recommendations and Summary**

3. **Shellfish Management Plan, 2007**
   - **Goals and Recommendations**

4. **Framework for Waste Water Planning**

5. **Hybrid Uses for Water Resource Planning**

6. **Biodiversity Map and Living Waters**

2.2.4 IMPLEMENTATION PROGRAM

A. Working Waterfront Areas

CR-1 Create a "Historic Harbor District", encompassing the areas along Duck Creek and the Marina from Route 6 to Mayo Beach and Baker Field (see Land Use Element).

Responsibility: Planning Board / Natural Resources Advisory Board

CR-2 Establish a design review process for the Historic Harbor District to encourage development/redevelopment that is sensitive to the Town's traditional maritime character.

Responsibility: Planning Board

CR-3 Provide tax or other incentives to facilitate the redevelopment of sites with non-water dependent uses for new water dependent uses.

Responsibility: Board of Selectmen / Natural Resources Advisory Board

B. Public Rights-Of-Way To The Shore

CR-4 Continue efforts to identify and re-establish traditional rights of way.

Responsibility: Natural Resources Advisory Board

C. Protecting Sensitive Coastal Areas

CR-5 Define and create buffer areas and/or overlay district around harbor.

Responsibility: Natural Resources Advisory Board / Conservation Commission

CR-6 Establish a 100-foot buffer zone around Wellfleet Harbor where natural vegetation should be allowed to grow to prevent surface runoff.

Responsibility: Conservation Commission / Natural Resources Advisory Board

CR-7 Encourage increasing the buffer zone to 150'-200' from edge of sensitive coastal resources

Responsibility: Conservation Commission / Natural Resources Advisory Board

CR-8 Encourage private landowners in the buffer zone to have vegetation rather than impermeable surfaces near the shore.

Responsibility: Conservation Commission / Natural Resources Advisory Board

CR-9 Extend flood plain by-law to require that new development be set back a minimum of 30 times the annual erosion rate.

Responsibility: Planning Board / Conservation Commission / Natural Resources Advisory Board

CR-10 Apply for designation of the Wellfleet Harbor ACEC as a District of Critical Planning Concern (DCPC) and/or establish an overlay district with a protection plan for endangered species.

Responsibility: Conservation Commission / Planning Board / Board of Health

CR-11 Investigate specialized zoning as a means of conserving open space around harbor.

Responsibility: Planning Board

CR-12 Prepare by-law for no building on barrier beaches and regulations for repairing existing structures.

Responsibility: Conservation Commission / Natural Resources Advisory Board

CR-13 Prepare by-law for new public development in flood zone so as not to promote growth and development in the area.

Responsibility: Board of Selectmen / Conservation Commission / Natural Resources Advisory Board

CR-14 Plan future parking needs considering environmental impact.

Responsibility: Natural Resources Advisory Board / Department of Public Works / Beach Study Committee / Marina Advisory Committee

CR-15 Request an environmental impact report (EIR) for any Development of Significant Impact (as defined in the Zoning By-Law) near the Harbor.

Responsibility: Planning Board / Conservation Commission / Natural Resources Advisory Board

CR-16 Identify and seek acquisitions of key open space parcels bordering harbor.

Responsibility: Open SpaceCommittee / Conservation Trust

CR-17 Continue to encourage and promote land donations and conservation restrictions for areas around the harbor.

Responsibility: Open Space Committee / Conservation Trust

CR-18 Work with Eastham on the Hatches Creek watershed to improve water quality.

Responsibility: Natural Resources Advisory Board / Conservation Commission / Board of Selectmen

CR-19 Enforce dog bylaw strictly.

Responsibility: Shellfish Warden / Dog Officer / Police Chief / Conservation Agent

D. Harbor Management Planning

CR-20 Continue harbor management planning and produce dredging plans and schedules.

Responsibility: Natural Resources Advisory Board / Harbormaster

CR-21 Consider watersheet zoning to protect coastal resources and prevent use conflicts on the water.

Responsibility:Natural Resources Advisory Board / Harbormaster

E. No-Discharge Zones

CR-22 Pursue federal designation of Wellfleet Harbor as a No Discharge zone and develop enforcement mechanism.

Responsibility: Natural Resources Advisory Board / Harbormaster

F. Marine Head Waste Disposal

CR-23 Review the effectiveness of the pump-out facility after its first year in operation and consider a by law that requires sealed heads for all boats.

Responsibility: Natural Resources Advisory Board / Harbormaster

G. Marine Waste Oil Disposal

CR-24 Install a larger waste oil tank at the marina to replace the existing 33-gallon tank.

Responsibility: Harbormaster / Department of Public Works

CR-25 Educate boaters about the waste oil collection program.

Responsibility: Natural Resources Advisory Board / Harbormaster

H. Regulating Building Along The Coast

CR-26 Prepare Resource Management Plan for all docks and piers to prevent interference with shellfish, navigation and public recreation.

Responsibility: Natural Resources Advisory Board / Planning Board / Conservation Commission / Marina Advisory Committee

CR-27 Investigate flexible zoning (including cluster zoning), site plan review, and transfer of development rights as means of conserving open space around harbor.

Responsibility: Planning Board / Natural Resources Advisory Board

I. Coastal Access In Private Projects

CR-28 Find means to prevent development or new development from interfering with public access.

Responsibility: Planning Board / Natural Resources Advisory Board

CR-29 Encourage new development to incorporate shoreline walkways.

Responsibility: Planning Board / Board of Appeals

CR-30 Identify projects that provide or enhance coastal access and use of their shoreline to be used in conditioning local Chapter 91 licenses.

Responsibility: Natural Resources Advisory Board

J. Stormwater Management

CR-31 Continue present storm water runoff program.

Responsibility: Department of Public Works

CR-32 Review the process by which runoff areas are prioritized and remediated, and upgrade the program as necessary.

Responsibility: Department of Public Works / Natural Resources Advisory Board

CR-33 Develop a plan to upgrade the level of treatment of existing public and private stormwater discharges.

Responsibility: Department of Public Works

CR-34 Modify local regulations to require upgrading of stormwater systems in connection with any redevelopment or expansion of existing uses.

Responsibility: Board of Selectmen

CR-35 Examine the need for stormwater management improvements at the parking areas along the Bay.

Responsibility: Harbormaster / Department of Public Works / Natural Resources Advisory Board

K. Septic System Management

CR-36 Review the new Title 5 septic regulations and consider more stringent local regulations within 250 feet of a wetland.

Responsibility: Board of Health, Conservation Commission

CR-37 Periodically inspect septic systems in the watershed of Wellfleet Harbor to insure that they comply with local, state and federal regulations.

Responsibility: Board of Health

CR-38 Modify local regulations to require upgrading of septic systems in connection with any redevelopment or expansion of existing uses.

Responsibility: Board of Health

CR-39 Encourage de-nitrifying septic system to replace Title V in coastal areas.

Responsibility: Board Of Health/ Conservation Commission/Planning Board

CR-40 Prepare by-law for mounded septic systems, particularly in FEMA V zones.

Responsibility: Board of Health

L. Water Quality Monitoring

CR-41 Establish an ad hoc committee with representatives from the responsible boards and departments to create a long term water quality monitoring program for Wellfleet.

Responsibility: Health Agent / Minibays Grant Coordinators / Conservation Commission / Natural Resources Advisory Board / Shellfish Constable

CR-42 Review and augment bacterial data from Shellfish Sanitary Survey and Minibays study to determine whether septic systems are contributing to elevated bacterial contamination, particularly in Duck Creek .

Responsibility: Board of Health, Natural Resources Advisory Board

CR-43 Continue to support the conditional shellfishing status of the Herring River as designated by the State program in cooperation with local and county authorities.

Responsibility: Board of Selectmen / Natural Resources Advisory Board

M. Hazardous Waste

CR-44 Explore cooperative efforts between towns to minimize the cost and enable the Town to collect hazardous waste at least three times a year.

Responsibility: Board of Selectmen

CR-45 Consider joining the Hazardous Materials Users Grant sponsored by the Barnstable County Health and Environmental Department to register hazardous materials used by businesses and educate users how to handle and dispose of them properly.

Responsibility: Board of Selectmen

N. Expanding Information About Natural Processes

CR-46 Assess erosion problems.

Responsibility: Natural Resources Advisory Board/Conservation Commission

CR-47 Assess problems of rising sea level, especially need to allow salt marsh migration inland. Locate and map areas vulnerable to future sea level rise and develop site-specific action plans.

Responsibility: Natural Resources Advisory Board/Conservation Commission

CR-48 Assess problems of migrating beaches.

Responsibility: Natural Resources Advisory Board/Conservation Commission

CR-49 Better define part played by open space in protecting harbor's ecological balance.

Responsibility: Natural Resources Advisory Board

O. Public Education

CR-50 Produce a video concerning Harbor Management all around Cape Cod, and periodically air programs concerning water quality and marine ecosystems locally and on public television.

Responsibility: Cape Cod Commission / Coastal Zone Management

CR-51 Inform local media from a compiled list of media contacts whenever the Town initiates a new effort to protect harbor resources.

Responsibility: Natural Resources Officer

CR-52 Produce a short promotional video for the library and local public television about Wellfleet Harbor resources and what the Town is doing to protect them.

Responsibility: Natural Resources Advisory Board / Conservation Commission

CR-53 Compile a series of brochures on specific resource quality issues and distribute them at conspicuous public locations like the marina, post offices, and Town Hall.

Responsibility: Natural Resources Advisory Board / Conservation Commission

CR-54 Maintain a display and pamphlet box at each large beach parking area including the marina, Indian Neck, Mayo Beach and outside of Town Hall.

Responsibility: Natural Resources Advisory Board / Department of Public Works

CR-55 Distribute specific brochures by mailing to residents in designated areas; distributing with dump permit, slip or mooring applications; or including them in the Chamber of Commerce booklet.

Responsibility: Natural Resources Advisory Board

CR-56 Encourage County Extension specialists to present their techniques for low impact gardening each year. These techniques encourage landscaping with indigenous plant species that thrive in local conditions with a minimum of fertilizers and pesticides.

Responsibility: Natural Resources Advisory Board / Conservation Commission

CR-57 Document role of open space in protecting the harbor's ecological balance, the relationship of land use to water quality.

Responsibility: Natural Resources Advisory Board / Open Space Committee / Conservation Commission / Marina Advisory Board / Shellfish Advisory Board

NATURAL RESOURCES ADVISORY BOARD

TOWN OF WELLFLEET

WELLFLEET HARBOR MANAGEMENT PLAN

2006

January 2006

OVERVIEW SUMMARY

Wellfleet Harbor was designated an Area of Critical Environmental Concern (ACEC) in 1989. The state of Wellfleet Harbor has been generally sound now as it was then. There exists a balance amongst the many users of the harbor – the species who live there, boaters, shell and fin-fishers, lovers of nature, and those who enjoy simply the beauty of the harbor.

The sound state of the harbor is the result of many factors, both human and natural. There are many groups throughout the Town who consider themselves as custodians of the harbor and seek to protect it. Many useful actions have been taken since the last Harbor Management Plan (HMP) was issued in 1995:

Regulatory steps have been taken to protect the ACEC designation of the harbor, such as wetlands restrictions and reduction of coliform contamination (septic upgrades, a marina pump out program, installation of catchment basins near the harbor, control of animals on beaches). These must continue.

The Town of Wellfleet, through the Coastal and Pond Access Committee, is taking active steps to protect citizen access to the water, both ways to the water and beach facilities. We support this initiative.

There have been significant conservation purchases adjacent to the harbor, by the Town through the Open Space Committee, the Wellfleet Conservation Trust, and Wellfleet Bay Wildlife Sanctuary, Mass Audubon Society.

The harbor is also favored by its natural features: an open harbor with a ten-foot flushing tide.

However, there are many signals of concern, which require action:

- The last twenty-five years has seen explosive growth in the Town population, summer visitors, boaters, shellfish grants, etc. All of these lead to a more intensive use of the harbor. Closures of shellfish areas downstream of the Herring River dike are on-going.
- High levels of nutrient nitrogen have been found, especially in Duck Creek, the Marina area and Blackfish Creek. These have lead to high levels of Chlorophyll (an indicator of biological activity) and low level of dissolved oxygen. There is evidence for consequent losses in biological diversity. Shellfishermen have reported an increase in seaweeds and algal blooms.
- Eelgrass once existed in Wellfleet Harbor; it is not now present.
- Duck Creek, and the Marina, show a build-up of bottom sediments.
- Revetments and the armoring of the shoreline have gone from practically none to nearly 100% along Mayo Beach, Nauhaught Heights, south Indian Neck and west Lt Island.
- The growth in shoreline development has made harborside access more difficult for Town residents.

BASIC PRINCIPLES

During the course of our harbor management review, we decided that there were several large themes we could all agree to:

- Water quality- maintaining good water quality is critical to all uses of the harbor.
- Ensuring multiple, traditional uses of the harbor, with opportunities for local employment.
- Maintaining the biological diversity of the harbor, with its many habitats and species.
- >Longer term perspective. Policies and actions should withstand the test of time. Therefore, we have favored wherever possible, the use of natural processes to keep a productive, healthy harbor.

KEY ACTION RECOMMENDATIONS

Salt marshes are the critical biological drivers for harbor productivity. Tidal restrictions, especially at the Herring River, should be removed as part of a total plan to protect our salt marshes. Salt Marsh Protection Areas - Chipman's, Fox Island, east Blackfish Creek, Loagy Bay and the Run should be formally recognized and protected. Fortunately, conservation organizations have already taken the lead in these areas.

A plan is needed for remediating the inner harbor watersheds - Duck Creek and Chipmans Cove – by opening Mayo Creek and the old railroad dike, by use of shellfish and, possibly, by land based nitrogen removal technologies. A similar plan may also be needed for Blackfish Creek and Drummer’s Cove.

We are woefully lacking of data to support management steps - water quality, finfish populations, salt marsh health, bottom types are examples. When the harbor was uncrowded, these details were not needed - they are now.

The Marina is a key center of Town life and an economic driver for the Town. A long-range plan is needed to guide development of the Marina without affecting the balance of uses in the harbor.

Shoreline development has limited ways to the water and beach uses guaranteed since colonial times. Traditional neighborhood access is fast disappearing. We must act to rebuild those rights.

Armoring of the harbor shorefront has had the consequence of causing major beach erosion. Each beach is different and needs its own recovery plan. Education about the consequences of armoring and alternate solutions is a good starting point.

Systems to insure that pollution does not enter Harbor (buffer zones, catchments, open space, septic design, and education programs).

We must act to ensure productive and sustainable use of all shellfish areas. The Shellfish Constable office should be strengthened with additional regulatory authority in emergencies.

Salt Marsh protection areas should be formally recognized and protected. Fortunately, conservation organizations have already taken the leading actions.

RECOMMENDATIONS SUMMARY

Chapter 2 – WATER QUALITY

Recommendation. Investigate the regulatory consequences, including by-law and local health regulation changes, in support of the mini-watershed concept. (NRAB, Board of Health (BoH), Conservation Officer)

Recommendations:

- adequately fund and staff the Town Departments of Health and Public Works (DPW) (Board of Selectmen, Town Administrator);
- continue and enforce regulations for dog-walking and provision of "pooper bags" at all Town beaches (Beach Administrator, DPW);
- complete the plan for storm water remediation along Commercial Street as soon as possible, including any special situations noted by the Division of Marine fisheries (DMF) that will require co-operation from abutters; Wellfleet's DPW should continue regular maintenance and clean-out of existing catchments (DPW);
- continued education for boaters to use the harbor pump-out facility is important; a by-law to prohibit boat toilet flushing in Wellfleet Harbor is needed (Harbormaster)

Recommendation:

- establish a Town by-law to require pick-up of dog wastes at any harbor beach (private or public) during the swimming and shellfish growing seasons (NRAB, Beach Administrator);
- ensure that any construction or other project should result in no increase in run-off (Conservation Commission)
- provide toilet facilities at all town beaches. This is especially important at heavily used Mayo Beach: the only toilet is way down at the Harbormaster's or at Baker Field (Beach Administrator, DPW)
- especially along Duck Creek, the Town should work with abutters to provide the maximum vegetated (upland or marsh) buffer between the roads and the estuary (NRAB, Conservation Officer, Open Space Committee)
- remediate the high coliform bacteria counts in the Herring River system by restoring tidal flushing above the current dike (Board of Selectmen);
- upgrade to at least Title V standard any septic or other system within a set-back distance (about 100 yards) of any water body, including the harbor, (Board of Health)
- refer any subdivision proposals with drainage in resource setback areas to the Conservation Commission for review of catch basin design, installation and maintenance plans (Planning Board)
- work with the state to ensure effective run-off control from Rt 6 (DPW)
- assign responsibility to the DPW for cleaning and inspection of all catch basins in

Town (Town Manager)
- establish a regular monitoring system in the mini-estuaries to track improvements in coliform levels resulting from investments in reduced run-off (NRAB, Conservation Officer)

Recommendations:
- Create an education program for citizens, board members and Town officials to increase knowledge about nitrogen overloads, the MEP process and likely outcomes. (Natural Resources Advisory Board, Conservation Officer, Board of Health, Wellfleet Forum)
- Create an education program to encourage a minimum use of fertilizers in Wellfleet (Natural Resources Advisory Board, Conservation Officer)
- Sponsor a broad public education program on modern denitrifying technology options and costs. Experiences with currently installed systems will be valuable references. (NRAB, Board of Health).

Recommendation: Coastal Zone Management (CZM) has published (April 2001) a Marina Best Practices Guide for environmental protection. The Harbormaster has implemented many of the provisions: full compliance is supported by NRAB. The same provisions should apply to any private business located on the harbor shoreline. For example, provision must be made to collect and safely dispose of any oils or other hydrocarbons. No activity which might chemically contaminate the harbor – such as power washing of boats – should be allowed along the harbor shoreline. (Harbormaster)

Recommendation: Many households accumulate wastes – pesticides, solvents, etc – which must not be disposed of into groundwater via septics. Currently, these materials can be taken to the Transfer Station twice a year. A more convenient system would help ensure proper disposal. We recommend that the Transfer Station devise a system so that wastes could be brought for proper disposal at any time that the Transfer Station is open. (DPW)

Recommendation: If a cyst field is confirmed in Cape Cod Bay, test Wellfleet Harbor sediments for "red tide" cysts. If found, then appropriate regulations on shellfish dragging and dredging should be enacted to reduce the risk of disturbing the cysts. (Shellfish Constable, Harbormaster)

Recommendations: A remediation plan is required for **Duck Creek**. There will be many components to a plan, as there is more than a single issue to consider. Some are listed here. We urge that a planning group be appointed to create a detailed program.

- investigate the effects of tidal restrictions (the railroad dike, the Mayo Creek Dike, the Marina pier) on sediment deposition in and tidal flushing in Duck and Mayo Creeks. (The original work by Geise, et al, was focused only on the Marina, not the tidal creeks.) In addition, a complete opening of the inlet to Mayo Creek was not modeled: the only change contemplated was to remove the flapper gate through the existing culvert. The effect of a combination of removals of more

than one tidal restriction at a time was not considered.

- the nature of the sediments in Duck Creek north of the marina needs study, to determine if these are a source of nutrients, of bacteria and of other pollutants (Duck Creek was the commercial center of the harbor for over two hundred years).
- opening Mayo Creek could reduce sedimentation in the north channel, provide additional flushing of water to the inner harbor and restore the degraded marsh. It is recognized that there may be some affected properties in the Mayo Creek flood plain. A mandatory first step would be to survey the topography of Mayo Creek to determine the volume of possible tidal inflows and the effect on flood plain properties. Simple protective diking may be required. It may also be the case that an above ground septic systems may be required: this should be seen as an opportunity to reduce nitrate flows into drinking water and the harbor. Many of the benefits of Mayo Creek restoration could still be achieved by using a self regulating tidal gate that would limit effects on the flood plain properties.
- complete the plan to establish catch basins along Duck Creek and at the Marina. Also, there is storm water discharge into upper Duck Creek directly from Rt 6: this is a state responsibility.
- natural processes are to be encouraged. Naturally vegetated borders can remove both nutrients and bacteria. There is not much room along the west side of Duck Creek. However, a plan to work with owners on a border (which could be salt marsh) should be considered. It is well known that shellfish remove nitrogen as they grow. Shellfish reefs can be established in Duck Creek. (Initially, these shellfish might have to be relayed out elsewhere in the harbor before harvesting and consumption.

The goal of these actions is to limit damage to Duck Creek and begin a process of full restoration. This is consistent with our philosophy of being proactive to limit and correct damage to our harbor environment before they become severe and costly. (NRAB, Board of Health, Conservation Officer)

Chipman's Cove. Chipman's Cove forms its own mini-watershed, which runs from the north section of Indian Neck east to Rt. 6. The waters of the Cove are immediately adjacent to the highly impacted area of the Marina and Duck Creek. The Cove is a critical shellfishing area in Town. Excessive seaweed growth and algal blooms have been seen in the Cove. We strongly urge the need for a special program of testing and prevention in the Cove's watershed. As no further natural flushing of Chipman's cove is possible, the requirement of denitrifying septic systems there should be given serious study. Land for siting of such systems needs to be identified. (Conservation Officer, Board of Health, Open Space Committee (OSC))

Mayo Beach. High levels of nutrient nitrogen are measured off Mayo Beach. Also, this is part of Town with elevated levels of nitrate in drinking water. There is no possibility of further natural flushing in this part of the harbor. Denitrifying systems may be required. (Board of Health, OSC)

Blackfish Creek. Blackfish Creek shows also high levels of nitrogen nutrient and signs of biological degradation. There are two tidal restrictions at the east end of Blackfish Creek (at Rt 6 and the bike path). Removal of these would create additional flushing of the creek and would also create additional 100 acres of salt marsh. Road-run off from Rt 6 must be eliminated. It has to be considered, though, that Blackfish Creek, like Chipman's Cove, may eventually be a candidate for a local de-nitrifying septic upgrade program. This may be especially true in Drummer's Cove. Identification of sites along Blackfish Creek for de-nitrifying systems should be undertaken. (Conservation Officer, DPW,OSC)

Recommendation. The Town of Wellfleet should urge support for and implementation of the recommendations of the Massachusetts Ocean Management Task Force. (Board of Selectmen, NRAB)

Recommendation. Initiate co-operative programs with other Cape Cod Bay towns to address common issues affecting the health of Cape Cod Bay. (This could make use of the Cape Cod Commission as a start.) Important initial projects would be monitoring of Cape Cod Bay for nutrients and "red tide" cysts. (Board of Selectmen, NRAB)

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Chapter 3 – NATURAL RESOURCES

Recommendation: Expand the role of the Herring Warden, within the proposed Town Harbor Oversight Office (see Ch 8), to that of advocating for and managing healthy, sustainable stocks of finfish in Wellfleet Harbor. (Town Administrator, Herring Warden)

Recommendation: Undertake regular inventory of baitfish, squid and jellyfish in the harbor, as well as a survey of Alewives and Eels that run between the harbor and the ponds. The emphasis on baitfish is predicated on the idea that if baitfish are present, the larger sport fish will come. It may also be useful to monitor for specific larger finfish, such as Flounder, which may have a specific loss of bottom habitat.
(Herring Warden)

Recommendation: Map the habitats required by finfish – such as salt marsh, eelgrass, and seabed bottom types – in Wellfleet Harbor. Where needed, habitat restoration projects (eg: salt marsh restoration, eelgrass planting) should be undertaken.
(Herring Warden)

Recommendation: Undertake population studies on horseshoe crabs in Wellfleet Harbor in order to understand the risk to the population. (Shellfish Warden)

Recommendation: Prepare an informational campaign for shellfishermen and boaters to create an early warning system for invasives. As part of its Best Management Practices program, the Harbormaster should work with boaters to reduce the risk of invasive

species coming into Wellfleet Harbor on boat hulls, in bilge water or by any other mechanism. (Shellfish Constable, Harbormaster, NRAB)

Recommendation: NRAB is concerned about the long-term impacts of coastal armoring in Wellfleet and believes that there should be no new coastal armoring. At the same time, we recognize that finding the right strategy that preserves beaches while accounting for property owner concerns is difficult. We recommend that a "summit" of local boards and expertise to devise creative solutions to coastal erosion and sand transport in Wellfleet Harbor. Wellfleet should be a leader, rather than a passive observer, in seeking legal and environmental solutions to human efforts to control nature. (NRAB, ConsCom)

Recommendation*:* The beaches of Wellfleet must be restored. Strategies are needed that are appropriate to the risk and extent of armoring on each beach section of the harbor. In some cases, direct sand replenishment will be appropriate. Construction of "soft" revetments - either by new techniques or by retrofit to old structures – can also be used. These "soft" revetments mimic the action of natural dunes by periodically adding sand and plantings to the revetments so that they act as a dune. Any order of conditions for revetment, groin or seawall construction or replacement should include sufficient steps to avoid unnatural beach or dune loss. In some cases, however, the best strategy will be to remove groins and armoring, in whole or in part. (NRAB, Conservation Commission)

Recommendation: Support Open Space Committee proposal that the town begin a special program to restrict development on the (51) town-owned properties within the ACEC on or abutting coastal marshes, and prohibit he sale of these. (See Appx to Chapter 3). (NRAB, Open Space Committee)

Recommendation: Propose a town by-law that prohibits any revetments, seawalls or other new structures within 100 feet of any coastal salt marsh. (OSC)

Recommendation: Develop a detailed inventory atlas of Wellfleet's salt marshes. This should include historical data, from aerial surveys (which go back to 1938) and/or older maps. (Conservation Officer)

Recommendation: Prepare a proposal for the restoration of Herring River, Mayo Creek, Blackfish Creek and Fresh Brook (Thimas Bog) tidal marshes and flats. The NRAB takes the position that restoration of these marshes is one of the most valuable steps that could be taken to maintain and enhance the quality of the natural resources in Wellfleet harbor. (NRAB, Conservation Officer)

Recommendation: As the tidal creeks are a key nursery habitat for the harbor, the biological health of these should be monitored. We propose an on-going sampling program to track the abundance of finfish and nursery species. (Herring Warden, DMF)

Recommendation: Some areas of the harbor are recognized as critical wildlife habitats (even above the ACEC designation of the whole harbor) … for ducks, shorebirds, terrapins and shellfish. They deserve special protection. We propose that eight areas be

designated as "Salt Marsh Protection Areas". Much of the shore of these areas is already conservation land. The inland borders of the proposed areas follows the ACEC border, except where bordered by the Cape Cod National Seashore.

- East of a line running from the SW corner of Lt Island to South Sunken Meadow beach at the Eastham line;
- The north-west corner of Lt Island, from the revetments east to near the boathouse;
- Loagy Bay, including the marshes south and east of Old Wharf;
- Blackfish Creek, east of a line from Pleasant Point landing to the Old Wharf Point;
- North and east of Field Point, towards Fox island;
- Chipman's Cove, the ACEC part south and east of the mooring basin;
- The Herring River estuary, west of a line from the NE corner of Great Island to the salt marshes west of the Chequesett Country Club;
- An eelgrass restoration area, to be determined, on the west side near Smalley Bar (see below).

The following regulation should be established for these protection areas:

- Current moorings, wild shellfishing, aquaculture, fishing and hunting are allowed;
- No new moorings or new aquaculture grants in these areas;
- Shellfish dragging is not allowed;
- Boating in these areas to be on a no wake basis;
- No shoreline structures or armoring are allowed.

Recommendation: The intertidal flats in Wellfleet harbor have been little studied in the past. The research begun by the town,Wellfleet Bay Wildlife Sanctuary and the Massachusetts Estuaries Project should be continued and supported to ensure that biodiversity is maintained. (Shellfish Constable)

Recommendation: Loose aquacultural netting is a threat to wildlife (such as terrapins, birds and fish). All netting should be removed at harvest time. (This is part of a "Best Practices" for aquaculture.) Efforts should continue to clean up the shoreline each year, as is now done by the Shellfish community (Shellfishermen)

Recommendation: Map the subtidal bottoms in Wellfleet and inventory the basic fauna. Following this study, a program is needed to follow the health of this environment, including the effects of dragging. (Harbor Office)

Recommendation: A project should be undertaken to attempt eelgrass restoration in Wellfleet harbor. A firm sandy bottom is needed, which should not present a conflict with draggers. The restoration beds should also be marked as off limits to boaters and draggers. The area of Smalley Bar is a good candidate location, as is the sanctuary area south and south-west of Lt. Island. Success would give assurance of the health of the harbor system and would also encourage a bay scallop industry. Failure would require a

careful evaluation of the reasons for failure and possible consequences for the rest of the harbor. (Shellfish Constable)

Recommendation: Lands adjacent to the harbor, ideally back to 100', should be naturally vegetated to provide a buffer for the harbor. This is especially important behind salt marshes. Beach and dune systems should be protected by modified conditions on construction and maintenance of hardened structures. (NRAB, OSC)

Recommendation: Develop and implement strategy to protect - via purchase, by-law or other means - critical harborside conservation parcels. These include lands along Duck & Mayo Creeks, wetlands subject to tidal restoration and uplands fringing salt marshes. (OSC, Wellfleet Conservation Trust, NRAB)

Recommendation: Design and distribute NRAB produced "Natural Resources Protection" pamphlet through the Beach Sticker program, the Harbormasters' and Recreation departments and other Town venues in order to educate and inform the visiting public. (NRAB)

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Chapter 3A – SHELLFISHING

Recommendation: Every three years, sample and report the size of the wild oyster population in Wellfleet Harbor (Division of Marine Fisheries (DMF), Shellfish Constable)

Recommendation: Support establishment of oyster bars in appropriate (non-productive, non-aquaculture) habitats of the harbor. (Shellfish Constable)

Recommendation. Continue and expand, as needed, clutching operations in Wellfleet Harbor. (Shellfish Constable)

Recommendation. Many visitors and summer residents in Wellfleet do not fully understand our shellfish industry and its importance. An on-going educational program (for example, informative plaques are already located at Mayo Beach and the Town Pier) should be expanded. As part of this a shellfish aquarium should be located in the Shellfish building. (NRAB, Shellfish Constable, Harbormaster)

Recommendation. A plan is needed to educate and devise remedies for invasive species in Wellfeet Harbor (Conservation Officer, Shellfish Constable, Harbormaster)

Recommendation. Research is needed to understand the effects of dragging on the sub-tidal environment. Dragging must be restricted from environmentally sensitive areas. (Shellfish Constable)

Recommendation: The Shellfish Constable, using the best available science, and with

the support of the shellfish community and the Board of Selectmen, should continue to take all necessary steps to control threats (such as QPX and other diseases) to both the wild and aquaculture populations of all shellfish. This may require controls on seed imports or on growing conditions. Support to continued development of resistant genetic strains of shellfish. (Shellfish Constable)

Recommendations:

- to prevent coliform contamination in the harbor, there must be useful provision of sanitary facilities for beachers and boaters; there must also be effective control of animal wastes on all beaches;
- road and marina storm water run-off must be controlled by completing a system of catchments and funding regular maintenance of these;
- steps must be taken to remediate nutrient (nitrate) overloads, especially in Duck Creek, the Cove, along Mayo Beach and in Blackfish creek;
- the Marina must have effective programs to avoid fuel and boat waste spills and also to avoid introduction of invasive species. (Beach Officer, Harbormaster, DPW, Conservation officer, By-law Committee

Recommendation. Review and upgrade regulations for efficient lay-out and use of aquaculture areas. A process needs to be established for reclamation and re-assignment of license areas that are not being productively used. This process should include a set of priorities for assignment of licenses to new applicants. (Shellfish Advisory Committee)

Recommendation: Estimate and report costs to clarify titles of inter-tidal lands of Wellfleet. (Town assessor)

Recommendation. Support regulations and best management practices to manage aquaculture sites for healthy production, by controlling seed stock quality, by ensuring a genetically diverse population and by following best practices for site cultivation. The guide to best management practices for aquaculture, published by SEMAC (SouthEastern Massachusetts Aquaculture Center) is highly recommended. (Shellfish Constable)

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Chapter 4 – SHORELINE LAND USE

Recommendation: Separately differentiate the ACEC area with its own permitting criteria, distinct from other districts: coordinate with regulatory boards to develop objectives, such as maintaining a naturally vegetated buffer between natural resource features and permitted structures and uses. Provide forum for regulatory boards to work out criteria to consider when permitting coastal development projects. (NRAB)

Recommendations. Because of the importance of Duck Creek, centrally located in the Town, several recommendations for its preservation are summarized here:

- Restore the Mayo Creek marshes
- Open the RR dike
- Plan for de-nitrifying septic systems in the Duck Creek mini-watershed
- Provide naturally vegetated buffers alongside Duck Creek
- Complete the process of preventing storm-water run-off along Commercial Street and its feeders; ensure that the catchment basins are regularly maintained
- Prevent storm-water run-off at the Marina

Recommendation: A 100-foot naturally vegetated buffer zone should be created for all municipally owned parcels along the shore. (There are benefits for any buffer zone, no matter how small.) Private landowners should be encouraged to follow suit through educational brochures. Americorps members should be enlisted to survey all parcels along the harbor shore to identify run-off problems. (NRAB)

Recommendation: NRAB is concerned about the long-term impacts of coastal armoring in Wellfleet and believes that there should be no new coastal armoring. At the same time, we recognize that finding the right strategy that preserves beaches while accounting for property owner concerns is difficult. We recommend that a “summit” of local boards and expertise to devise creative solutions to coastal erosion and sand transport in Wellfleet Harbor. Wellfleet should be a leader, rather than a passive observer, in seeking legal and environmental solutions to human efforts to control nature. (NRAB, Conservation Commission)

Recommendation: The beaches of Wellfleet must be restored. Strategies are needed that are appropriate to the risk and extent of armoring on each beach section of the harbor. In some cases, direct sand replenishment will be appropriate. Construction of "soft" revetments - either by new techniques or by retrofit to old structures – can also be used. These "soft" revetments mimic the action of natural dunes by periodically adding sand and plantings to the revetments so that they act as a dune. Any order of conditions for revetment, groin or seawall construction or replacement should include sufficient steps to avoid unnatural beach or dune loss. In some cases, however, the best strategy will be to remove groins and armoring, in whole or in part. (NRAB, Conservation Commission)

Recommendation: Wildlife Protection. Identify and protectwildlife corridors as part of the town’s various land preservation efforts. To minimize adverse human/animal interactions, ways to water and traditional crossings should be protected (OSC).

Recommendation: Propose a by-law to minimize exterior illumination within 100 feet of the shore through use of baffles and down lighting solutions. An education program should be developed to protect the night sky and traditional coastal wildlife activities (spawning, feeding, etc.). (NRAB)

Recommendation: Support Open Space Committee proposal that the town begin a special program to restrict development on the (51) town-owned properties within the

ACEC on or abutting coastal marshes, and prohibit he sale of these. (See Appx to Chapter 3). (NRAB, OSC)

Recommendation: Support the initiatives of the Coastal and Pond Access (C&PA) Committee to ensure broad public access in an environmentally sensitive manner (Board of Selectmen, NRAB)

Recommendation: Public Access. Access to the water is becoming increasingly difficult as more shorefront is privatized and traditional, neighborhood access points are closed by new development. Advocate for the Town acquisition of the Appendix 1 unbuildable or undeveloped coastal parcels, to augment the acreage of open space for recreation, create neighborhood "pocket parks" or boat launches, and contribute toward the goal that a Town Landing or "Way to the Water" is within ten minutes walk for nearly every citizen of Wellfleet. Such access points need not entail automobile parking, nor necessarily boat launches. Additional access points need not be municipally purchased, but could be obtained through creative use of easements, conservation restrictions, or other options. (C&PA)

Recommendation*:* Once access to the water is secured, the town should work towards obtaining public lateral transit of shorefront. Again, through creative usage of public funds, easements, tax policies, working with trusts and non-profit groups, lateral passage for historic and traditional uses should be assured for all residents. (C&PA, NRAB)

Recommendation: Scenic overviews should be identified and pocket parks designed for passive use. Families and elderly should be able to sit at a park bench or picnic table to observe and enjoy the beauty of Wellfleet Harbor. (DPW, Recreation Department)

Recommendation: Walking trails around Wellfleet Harbor should be designed and parcels of public access property stitched together. (Beach Administrator)

Recommendation: Hamblin Park, at the end of Uncle Tim's bridge, should be upgraded with benches, paths and erosion controls. (Conservation Officer, underway in 2005)

Recommendation: Old Fire Station: Purchase the east half of the current lot. Establish a kayak launch site and address erosion problems. (Conservation Officer)

Recommendation: Support Planning Board efforts to redefine the Central District to more accurately depict existing development patterns. This densely developed area contributes nutrient loading to Duck Creek, has a certain historic and cultural value, and is poised to become served by the expanded Coles Neck Municipal Water supply. These factors in aggregate call for such measures as would reduce the potential redevelopment intensity of use. (NRAB)

Recommendation: Protect traditional maritime, water-dependent activities such as the fisheries, commercial and recreational boating and related service industries with

necessary Marina infrastructure repairs and improvements, such as stormwater runoff remediation, and interpretive, educational displays in town facilities. (Harbormaster)

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Chapter 5 – HERRING RIVER

General recommendations. The NRAB supports the re-opening and establishment of increased tidal flow in all diked marshes in Wellfleet.

Recommendation: An advisory committee should be appointed for each watershed project consisting of: representatives of town officers, agencies and boards involved; federal and state agency representatives; and members of the public representing resource users, property owners, and other significant interests. The committee should provide technical advice based only on the best science and engineering. The committee should also create a basic restoration plan. Public hearings should be held at all major steps in the process (Board of Selectmen)

Note: As of September 2005, the Board of Selectmen of Wellfleet and the Cape Cod National Seashore, acting jointly, had appointed advisory committees for the Herring River marsh restoration. A Memorandum of Understanding jointly agreed to by the Board and the Cape Cod National Seashore defined the committee structure and charge.

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Chapter 6 – MARINA and BOATING

Recommendation. The NRAB recommends that the town sponsor several visioning/strategic-planning sessions to determine what the town wants in the marina area and what development, if any, is appropriate for that vision. A venue for this process would be creation of, and approval by the Town, of a Marina Long range Plan by the Marina Advisory Committee (MAC). This plan should contain estimates of growth in Marina use and revenues. (MAC, Harbormaster)

Capital Planning Process: Recommendation: The NRAB recommends a local Environmental Impact Statement for marina projects greater than a certain impact (dollars or square feet), with distribution of the proposal to other town agencies and boards similar to the town owned land disposition process recently implemented by the board of selectmen. The NRAB believes that there should be greater public involvement in the review of capital expenditures of the marina. (Harbormaster, MAC)

Recommendation. Limit berthing in the dredged basin area of the harbor to a line north of the ACEC boundary of Chipman's Cove. (Harbormaster)

Facilities for Commercial Boaters: Recommendation: Commercial fishermen should be given higher priorities on any waiting lists. We believe that every effort should be made to preserve the town's fishing heritage by providing, if necessary, storage, dry-dock, repairs, ice, water unloading, and provision needs. (Harbormaster)

Waiting lists: Recommendation: The NRAB is concerned about the increasingly limited access to moorings and slips at the marina. Waiting lists for moorings and slips and the process should be open and understandable. To the extent lawfully allowed, residents should be granted preference versus non-residents. Currently, turnover is very low (5%); a greater percentage of space should annually turn over. A lottery might be established for a certain number of spaces. Transfer provisions should also be reviewed (family, death etc.). The Inspector General's recommendations relative to Harwich last year should be consulted. (Harbormaster)

Recommendation. Education of all boaters in the harbor is the key to safety. All boaters – power boats, sailors, kayakers – need to be aware of traffic and areas of risk. The goal should be that any boater on the harbor should recognize safety as a priority. (Harbormaster)

Boat Launching: Recommendation: Establish management guidelines for the use of town landings, including, where appropriate, automobile and trailer parking, launching, and dingy storage. All boat launching via trailer should be done at the marina facilities or at launching points designated by the Harbormaster. (Harbormaster, C&PA)

Recommendation: Designating appropriate activity areas (as was done with windsurfing) for kayak launching, water skiing / tube pulling, extreme sports, etc and publish 'right of way' protocols for distribution through beach sticker program and Harbormasters Department. (Harbormaster, Beach Administrator)

Recommendation. We recommend that power boats and deep keel sailing boats be excluded from aquaculture grant areas, to avoid risk of damage to equipment (see Ch 3A) (Harbormaster)

Recommendation. Divers. All divers must display a diving flag and stay within 100 feet of it. Boaters should observe the divers' flag and stay more than 100' from it. Divers must stay 100 feet clear of any aquaculture lease sites, exempting the lease holder. There shall be no diving for shellfish from October 1 to April 1 south of a line from the breakwater to the eastern tip of Great Island. Diving in the channel is prohibited.

It is imperative that all boaters also understand the significance of a diver's flag and the need to stay clear. (Harbormaster)

Recommendation. Prohibit the use of PWC at high speed everywhere except in the open waters of the south harbor. Elsewhere, 'No Wake' rules must apply. A launching area at Burton Baker Beach would permit PWC to be closer to the south harbor and not have to make a long reach at slow speed to attain a permitted zone. Any PWC in Wellfleet harbor should be registered with the Harbormaster. (Harbormaster)

No Wake Zones: Recommendation: After appropriate notice and hearing, the Harbormaster should be authorized to establish appropriate operational restrictions to preserve important natural resource areas of the town (no wake zone in important marsh areas; no landing areas where necessary to protect shorebirds, etc.). (See Chapter 3.) (Harbormaster)

Kayak/Small Craft: Recommendation: While the town should encourage the development of the Cape Cod Water Trail for small craft, there is the problem that kayaks contain no sanitation devices, can access special areas of marsh and beach frequented by shorebirds and endangered species which have previously been inaccessible. The marina should ensure that appropriate launch areas are available separate from traditional boat ramps and traffic (need for appropriate signage). Restrooms may need to be expanded for the expected growth in personal watercraft. (Harbormaster)

Small Boat sailing. Recommendation. The Chequessett Yacht and Country Club (CYCC) offers lesson and opportunities for small boat sailing in the harbor. Small boat sailing is especially suited to a shallow, relatively sheltered harbor such as ours. These offer great opportunities for recreation and learning, especially for youth. The Town Recreation Department should work with CYCC to expand small sailboating opportunities in the harbor. (Recreation Director)

Pump-out Facilities: Recommendation: We recommend that the Town fully support the updated sanitary pump-out facility program that the Harbor Master has proposed. We recommend that a sealed head program and an alternate program for transients be established and enhanced. . Above all, an on-going education program for boaters is key to success of this protection effort. Without their active support, the program cannot succeed. (Harbormaster, NRAB)

Road Runoff/Marina: Recommendation: To minimize the impact of road runoff from the marina parking lot, we recommend that the Town install catch basins, regrade the surface so that water is directed into the catch basins and regrade and resurface the entire parking lot. Vegetative borders should be established. (Harbormaster, DPW)

Water Quality: Recommendations: As indicated in the Water Quality chapter, water quality is a major concern to the many users of Wellfleet Harbor. The marina should implement a standard water quality-testing regimen. Pump outs and fuel faculties should be constantly monitored. Run-off from the pier should be minimized. Oil booms should be easily deployed. The Town should make resources available (for training, personnel and gear) to expand the current oil containment program that the Harbor Master has established. Boat maintenance should be monitored and education efforts directed to minimize use of harmful chemicals. More eco-friendly engines should be encouraged. Protocols should be established for oil spills, chemical spills, biohazards and marine stranding (stranded mammals, when euthanized, may have to be treated as hazardous waste and may be harmful to natural resources). (Harbormaster)

Alternative Energy: Recommendation: To the extent possible, the marina should implement "green" technologies such as wind and solar energy, greywater systems, recycling and composting operations. (Harbormaster)

Public Education: Recommendation: We recommend that the Chamber of Commerce booklet contain several pages detailing harbor ecology and marina/harbor/shellfish regulations and facilities. (Chamber of Commerce)

Special Events: Recommendation: In order to celebrate the town's maritime heritage, efforts should be made to attract visits from tall ships, training vessels or historic vessels. (Harbormaster)

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Chapter 6A – DREDGING

Dredge Spoil: Recommendation: Dredge spoils can be used to renourish Wellfleet's beaches. Priority should be given to beaches on the north and east sides of the harbor. An appropriate technical study should be completed before any beach is renourished, especially to avoid that the sand is quickly swept off a beach and onto the inter-tidal flats. The Conservation Commission must, of course, approve any renourishment. Costs can be borne by shorefront owners with armored properties under orders of conditions to renourish their beaches. (Harbormaster, Conservation Officer)

Recommendation. A working group of conservation scientists and the harbormaster's office should convene to identify alternate ways of disposal of "black mayonnaise" spoils. (Harbormaster)

Recommendation: A dredging plan should be prepared by the Harbormaster for review by the Marina Advisory Committee, Conservation Committee and Natural Resources Advisory Board. The plan should include:

- description of the dredging process;
- plan for spoils removal;
- pre-testing of sediments, for pollutants (such as heavy metals) and other risk elements;
- proposal for scientific monitoring to determine any effects on adjacent ACEC designated areas and to determine rates of infill following completion of dredging. (Harbormaster)

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Chapter 7 – COASTAL ECONOMICS

Marina Recommendations (Harbormaster):

- Ensure that all fees assessed for services at the marina cover all direct and indirect costs of marina operations.
- Support the marina in developing a long-range business plan. Seek assistance of a marina operations consultant with expertise to establish and test financial projections. Seek state, county or federal grants to finance study
- Ensure that marina enterprise fund has sufficient funds to do regular maintenance, long-term improvements and periodic necessary dredging.
- Establish public "viewing" area with seating, protection from sun and moving vehicles for citizens to watch harbor activities (many citizens travel to Chatham to watch day boats unload).
- Investigate opportunity and viability of high-speed ferry service.

Harbor Resource Recommendations (NRAB):

- Encourage adoption of sustainable practices so that natural resources of the harbor (shellfish, finfish, etc.) are not exploited beyond their capacity.
- Work with Division of Marine Fisheries and Cape Cod National Seashore to open up tidal flow to restricted marshes for the purpose of assisting passage of herring and other baitfish. Reestablishment of traditional fishery runs would be expected to improve finfish in harbor for commercial and recreational fishery.

Economic Development Recommendations (for Long Range Plan):

- Encourage establishment and expansion of water dependent and water related uses along the waterfront, consistent with regulations that protect the ACEC. One approach is to favor the harbor shoreline for coastal dependent activities (those that must be performed in the coastal zone – marina services, water transport, etc.). Coast linked activities (such as marine science research) and coastal activities serving residents (real estate services, restaurants, retail stores) would have lesser priority. Promote public access to the waterfront where such access will not conflict with water dependent uses.
- Seek grants and partners for construction of marine science laboratory, aquaculture, shellfish hatchery, maritime history and coastal education center near the harbor. Seek a partner (Cape Cod Community College, Suffolk University, U Mass. Dartmouth, Mass. Maritime, or other academic institution).
- Create a Town of Wellfleet economic development committee to assist in partnering with private and public agencies to assist development of marine technologies employment.
- Work with Lower Cape Cod Development Corporation to develop seafood coops, joint marketing plans, and small business assistance programs for Wellfleet businesses. Support firms entering or expanding international markets.
- Support a town-wide marketing program to "eat local" (fish, shellfish, produce, etc.)

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Chapter 8 - OVERSIGHT

Recommendation: Create an office or a process, linked to NRAB, that oversees overall harbor oversight issues. (Town Administrator, Board of Selectmen)

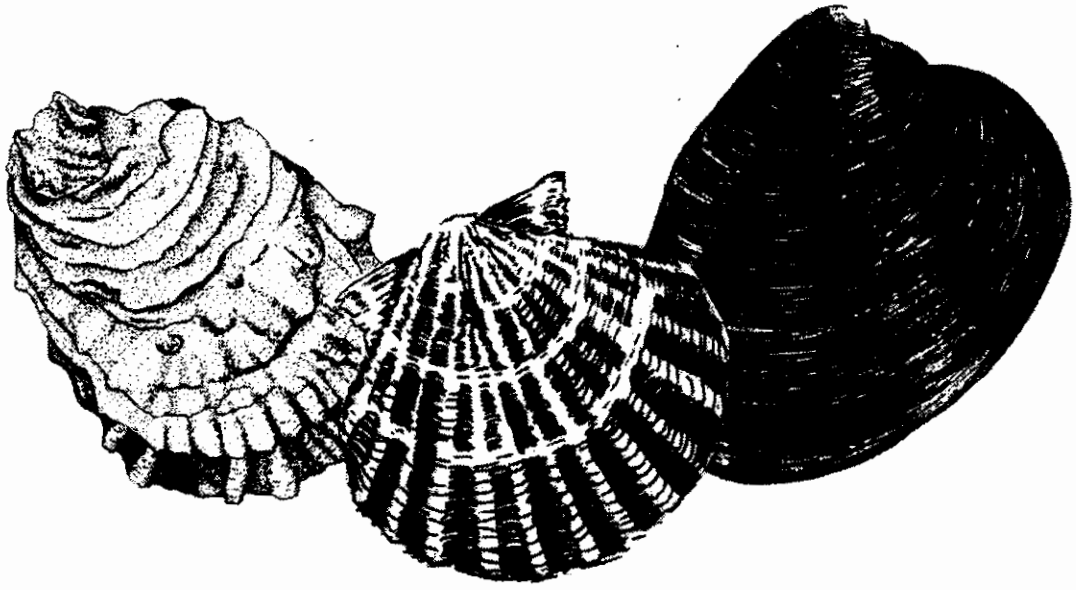
Recommendation: Independent watershed groups ("Friends of…") should be formed by local citizens to monitor developments and help keep local residents informed. (Interested Citizens of Wellfleet)

SHELLFISH ADVISORY BOARD

TOWN OF WELLFLEET

SHELLFISH MANAGEMENT PLAN

2007



Goals and Recommendations

Goal 1. Protection of Water Quality

First and foremost, in order for shellfishing to be a viable commercial and recreational endeavor, water quality must be ensured. Many of the recommendations for shellfish management overlap with recommendations of the Natural Resources Advisory Board as outlined in the 2006 Wellfleet Harbor Management Plan.

Recommendations:

A. Herring River restoration and monitoring; It is important to monitor the effects of the proposed Herring River Restoration, in particular, the effect of this large project on shellfish beds in the Herring River and on licensed shellfish areas in nearby Harbor locations.

B. As stated in the Wellfleet Harbor Management Plan, 2006 : "Steps must be taken to remediate nutrient overloads, especially in Duck Creek, the Cove, Mayo Beach and in Blackfish Creek."

C. Marina issues: The Marina must have effective programs to educate boat owners about avoiding fuel and boat waste spills as well as introduction of invasive species. The Marina must also have a plan to cope with these issues.

D. Storm water runoff: According to Wellfleet General Bylaws, Section 30, no road should be resurfaced, graded, constructed or maintained that diverts or directs road runoff into any wetland. The Wellfleet Harbor Management Plan, 2006, offers further improvements to the run off problem and states that "road and marina storm water runoff must be controlled by completing a system of catchments and funding regular maintenance of these "(Wellfleet Harbor Management Plan, 2006).

E. To prevent contamination by fecal coliforms and enteric viruses:

1. Improved sanitary facilities must be available. We recommend that the Marina Advisory Committee, the Harbormaster, the Beach Administrator, the Shellfish Advisory Board, and the Health and Conservation agent combine efforts to address the issue of water pollution by humans and look for alternative solutions.
2. Animal control and beach regulations and penalties must be strictly enforced. Pet owners must be required to pick up after their pets. Signage,

plastic bags and trash barrels must be provided at all town landings throughout the year. (also stated in the Wellfleet Harbor Management Plan, 2006)

Goal 2. Maintenance and enhancement of wild populations of oysters, quahogs, bay scallops, soft-shell clams.

Traditionally, humans have demonstrated the ability to over harvest fishery resources. Eminent scientists have predicted a dramatic decline in commercial fishery species within the 21st century. Although the shellfish industry is currently prosperous in Wellfleet, it is possible that this may be part of a long term boom/bust cycle. Proactive steps must be initiated to restore and protect Wellfleet's shellfish resources for current as well as future generations. To accomplish these goals, it is important to rebuild substrate in the Harbor in areas that historically have caught a good set of oysters and allow the oysters to mature. The Harbor must be managed to maintain a breeding population of oysters.

To maintain or increase oyster harvest in the Harbor, it may also be necessary to rebuild historic oyster bars, populated with Wellfleet oysters. It remains a challenge to design programs to sustain genetically diverse native quahog and scallop beds.

Recommendations:

A. Cultch Operations

The Shellfish Department has explored areas of the Harbor which are suitable for cultching.

Duck Creek: The Department should continue to deploy cultch to create a sustainable oyster bar.

Chipman's Cove: Although Chipman's Cove is very productive, oysters are not uniformally distributed. The Shellfish Department should continue to cultch this area and explore methods to distribute oysters from densely set areas to less densely set areas.

Mayo Beach: Mayo Beach is restricted to recreational use and is utilized by swimmers, sailors, vacationers and the Wellfleet Recreation Department for summer activities. The beach area should not be cultched. The Department has spread juvenile oysters, grown from seed, at Keller's Corner since 2004 and should monitor the success of this seeding effort.

Herring River: Due to the proposed plans to restore tidal flow to the Herring River Estuary, this area should not be cultched. Various baseline studies of the existing conditions have been in progress for some time. When the restoration commences, this area should continue to be carefully monitored for water quality, shellfish distribution and shellfish health.

West Side: This area is worked year-round by draggers. It is a large area that should continue to be cultched every year in efforts to sustain the harvest.

Indian Neck: This recovering area could benefit from continued cultching efforts. The Shellfish Department must continue to monitor the area.

Blackfish Creek: There is a productive area near Pleasant Point and other candidate areas that have been identified for cultching by the Shellfish Department such as Old Wharf Point and an area east of Fox Island.

In general, cultching should be continued in areas in which it has made a significant difference. Because of limited cultching material available each year an area should be clutched heavily until it produces a sustainable oyster bar. If an area is shown to be sustainable under harvest pressure, then new areas can be considered for cultching. Cultched areas will not be equally successful in catching a set of oysters. There is annual variability in the success of the cultching efforts at various locations. It is important to cultch at least 5-6 areas to ensure a good set in some areas. By monitoring areas on a regular basis the stocks can be assessed to determine whether the plan is working. If the cultching program is not working, it should be reevaluated.

B. Town propagation program:

To provide for the non-commercial shellfish program and limited commercial harvest, it will be necessary for the Shellfish Department to continue propagation efforts. Hatchery seed is currently cost effective and suitable for growing littlenecks for the "put and take" practice for non-commercial shellfish harvest on Indian Neck between the jetty and Burton Baker Beach and in also in Town Cove for commercial and non-commercial harvest when the area is open.

C. Oyster reefs and sanctuaries:

Although the town has an oyster propagation program, the use of hatchery-reared oysters to seed the Harbor may not be the best long-term conservation strategy. While hatchery-reared oysters may be suitable for aquaculture purposes, their limited genetic variation may make them very susceptible to new diseases or to changes in Harbor conditions. In order to maintain the genetic diversity of Wellfleet oysters and ensure stocks of wild breeding oysters, the town must plan for the establishment of oyster sanctuaries and/or rotate harvestable areas on an annual basis. To sustain the wild oyster population while still allowing harvest, some areas should be designated "no take" zones. Currently, the restricted areas such as the Herring River estuary, Duck Creek and temporary, seasonal closures, such as Chipman's Cove, are serving the purpose of an oyster sanctuary and source of broodstock. If the proposed restoration of the Herring River results in lifting of harvest restrictions, or if broodstock are depleted from Chipman's Cove and other areas seasonally closed to harvest, this protected reservoir of broodstock would be lost.

Efforts to create or maintain shellfish sanctuaries must be supported. Further study of the issue, in consultation with scientists and fisheries management experts will be needed to determine the best sites for such areas, the best methods and technology, and the appropriate regulations and protocols (no take sanctuary vs. limited harvest licensed area).

Goal 3. Maintenance of biological and habitat diversity

To maintain the ecological balance in Wellfleet Harbor that has been conducive to the recruitment and growth of shellfish, to protect and encourage species that were historically abundant , including eels, river herring, razor clams, horseshoe crabs, sea worms, softshell clams, tautogs and diamondback terrapins and to maintain the environmental quality of the Harbor, proactive measures are needed.

Recommendations:

A. Encourage research to understand habitat use by all species.

B. Promote shellfishing methods that have minimal negative impact on the environment.

C. Continue to organize annual Harbor cleanups to remove trash from salt marshes and bay beaches and upland areas throughout the Harbor.

D. Eelgrass Restoration: The Natural Resources Advisory Board has proposed an eel grass restoration project that may increase the bay scallop population in the Harbor and thus boost the scallop industry. A firm sandy bottom is needed. The restoration beds should be marked as off limits to boaters and draggers. The possibility of eelgrass restoration should be further explored and efforts to study and experiment with this project should be supported.

Goal 4: Maintenance and improvement of shellfish industry

The shellfish industry in Wellfleet is guided by the *Shellfishing Policy and Regulations* (Appendix 3), Massachusetts General Law and the Massachusetts Department of Marine Fisheries. As the industry evolves, the regulations should be reviewed to reflect changing conditions. In addition, the industry should follow the recommendations developed by the Massachusetts Shellfish Growers in collaboration with the Southeastern Massachusetts Aquaculture Center (SEMAC) and published in *Best Management Practices for the Shellfish Culture Industry in Southeastern Massachusetts, Version 09-04a*

Recommendations:

A. Ongoing review and update of rules and regulations by the Shellfish Advisory Board working with the Board of Selectmen and the Wellfleet Shellfish Department. .

B. Assessment of the feasibility of seasonal closure of the Harbor for dragging.

C. Permit Fees: Review of fee structure and propose changes as necessary that improve the industry and/or protect shellfish resources

D. Encourage legislators and the Department of Marine Fisheries to expand resources in order to speed testing and monitoring for HABs (Harmful Algal Blooms) and shellfish diseases as well as adequate budget for the Department of Marine Fisheries and the Environmental Police so that those involved in the shellfish industry have the most up-to-date information about issues that may impact their operations.

E. Disseminate information about identification and control of predators and pests.

F. Legal gear, gauges and containers: All individuals who have permits and licenses to harvest shellfish must have suitable equipment to measure the size of each individual and the amount of harvest. Appropriate gauges and containers must be used.

Goal 5: Promotion of a thriving shellfish aquaculture industry consisting of small scale, private, commercial, licensed areas.

The Wellfleet shellfishing community and other residents of the town wish to preserve the town's character while supporting shellfish aquaculture. Small-scale farms provide environmental and economic balance while affording the best approach to minimizing user conflicts, sharing of shellfish resources, and maintaining a historic industry that characterizes the town.

Recommendations

A. Develop local protocols for communication about shellfish diseases and rapid response programs to address disease outbreaks.

B. Encourage the Board of Selectmen and Conservation Commission to understand the underlying issues and repercussions of policies regarding expansion of licensed areas vs. granting new licenses

C. Enforce regulations regarding harvest and use of licensed areas

Goal 6: Identify and minimize conflicts between shellfish aquaculture and other human activities within the Harbor

As a result of the 1994 "Pazolt" decision of the Massachusetts Supreme Judicial Court, most shellfish aquaculture practices have been classified as "farming" and aquaculturists do not have the same protections as those who fish in the wild. " Because of the practices and the equipment used, aquacuture may cause conflicts with upland shoreline owners. Many of the titles to intertidal lands are uncertain, depending on whether or not the ownership was separated from the upland ownership. Long range management of the harbor may require better knowledge of title issues." (Wellfleet Harbor Management Plan, 2006).

Recommendations

A. Encourage license holders to resolve conflicts with upland owners whenever possible.
B. Work with Coastal Access Committee, Conservation Commission and Board of Selectmen to preserve and protect town landings and promote public access.
C. Recognize rights and needs of multiple users.

Goal 7. Encourage shellfish research and education

Recommendations:

A. Incorporate an educational component into the planning and design of a proposed new Shellfish Department facility on the town pier.
B. Work with SPAT/ Oysterfest to identify initiatives that are important to the character of Wellfleet in relation to the shellfish industry
C. Solicit community involvement by starting a shellfish preservation volunteer program. (example: predator control task force)
D. Work with the Wellfleet elementary schools to propose and design a shellfish education component for the life and physical science curriculum

Wastewater addendum 11/11/07

The development of an enhanced water system is admirable, but only deals with one facet of the water resource issue. Increasingly Townspeople have come to recognize that issues of wastewater management are of vital importance. Within a fragile closed ecosystem such as exists in our Town, what goes into the groundwater from our homes, our lawns and our businesses inevitably comes out -whether in our drinking water, our estuaries or dependent life forms. If we solve our water supply system and continue on our present course of water disposal, we will perpetuate the present cycle of water pollution and contamination.

While the scope of the problem is not yet determined, we know there are nitrates, sodium and voluble organic compounds which are contaminating our ground water and potentially threatening the health of our ponds and harbor. We also know that Title V septic systems do nothing to alleviate the nitrification of the ground water.

Discussions of what to do have traditionally foundered on the magnitude of cost and infrastructure which a town-wide sewer system would require –and individual advanced nitrate treatment systems which have been developed have seemed out of reach for most Townspeople.

Wellfleet's Water Commissioners, working with concerned citizens, have brought these issues to the Selectmen and have proposed formation of a Citizens Advisory Committee, specifically to look at wastewater concerns. We commend this imitative and suggest herein some of the issues which we understand need investigation.

We encourage the nascent Citizens Advisory Committee to begin by acknowledging that the prior compartmentalization of drinking water from waste water is an artificial construct which may hinder clear thinking and planning. And we encourage all citizens to view water as a resource within our town and sustaining of water as core town value.

In this context it is crucial to think creatively. Wellfleet may need to consider inclusion of hybrid uses in future planning of water resources. Hybrid uses include the reuse of water pumped from the ground (or collected as rain water) multiple times within a household before its "disposal" into a septic system. Systems exist for filtration of water from sink and shower to toilet, for example and from shower, laundry and sink to lawn irrigation. The diminution of the amount of water use by such practices leads directly to diminution of water "contaminated" and thus to diminution of harmful chemicals leaching into our ground water. Solar home distilling systems will be in existence within the next decade and may also be of use.

In addition to the advanced denitrification systems which have been developed, there are other non-plumbing systems for waste disposal, such as composting toilets.

Different parts of Wellfleet will probably seek different solutions. Areas such as Lieutenant's Island, which borders directly on the harbor but has relatively sparse and largely seasonal usage, requires different approaches from the Central District. A first task of this Citizens Advisory

Committee is to conduct a needs survey and come up with site-specific recommendations for each district in town. Part of the "solution" may well be educational in offering to Townspeople information as to water treatment devices as they become available. This need not be expensive beyond collecting the data and distributing information. In this regard, the Board of Health needs to be a partner in whatever recommendations are forthcoming, especially as these may relate to proposed zoning changes or incentives for residents installing devices which preserve/sustain our water resources.

The context of this needs study should be to develop a Waste Care management plan which does not rely on massive public expenditures or harsh regulations. A Plan which relies primarily on lecturing or telling people they must use less is doomed to failure. A Plan which offers constructive suggestions and incentives for people to install devices which will sustain our water resources may have a high prospect of success.

Many of the ideas suggested here come from proposals generated form Safe Harbor, and Gordon Peabody working in conjunction with Emily Beebe, former Wellfleet Health Agent, now private consultant. A copy of the chart depicting Proposed Hybrid Uses and the proposed Scope of Wastewater Management Plan for Wellfleet are included as appendices.

Goal: Appoint and fund as necessary Citizens Advisory Committee to conduct a wastewater management survey and create a Wastewater Management Plan for the town of Wellfleet.

Responsibility: *Board of Selectmen*

Goal: Establish the sustainability of a health water resources as a core town value.

Responsibility: *Board of Water Commissioners, Citizens Advisory Committee, Board of Selectmen*

Goal: Educate and publicize devices and improvements which will enhance Wellfleet's water resource

Responsibility: *Citizens Advisory Committee, Board of Health, Board of Selectmen*

Considerations for inclusion of hybrid uses in future planning of Wellfleet's water resources

Rain water	Irrigation, vehicle washing, toilet flushing,
Potable water uses (town or well)	Drinking, showers, dishwashing, cooking & food preparation, laundry
Well water uses (non-potable)	Irrigation, toilet flushing,
Second source water uses (re-use & distillation)	In house solar distilled drinking water. Sink and shower to toilet. Laundry, shower, sink to lawn irrigation.

Wellfleet Long Range Comprehensive Plan, water resources.
Gordon Peabody, October 15, 2007

BioMap and Living Waters

Guiding Land Conservation for Biodiversity in Massachusetts

Core Habitats of Wellfleet

This report and associated map provide information about important sites for biodiversity conservation in your area.

This information is intended for conservation planning, and is <u>not</u> intended for use in state regulations.

Produced by:

Natural Heritage & Endangered Species Program
Massachusetts Division of Fisheries and Wildlife
Executive Office of Environmental Affairs
Commonwealth of Massachusetts

Produced in 2004

BioMap and Living Waters:
Guiding Land Conservation for Biodiversity in Massachusetts

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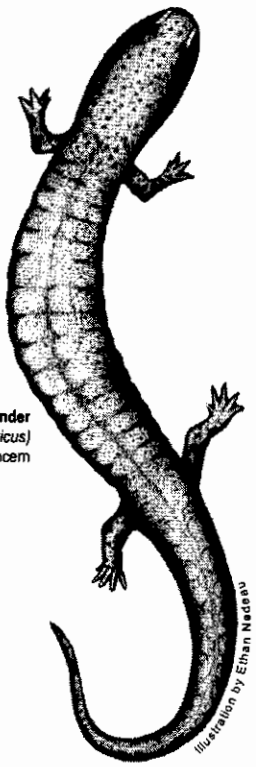
* Depending on the location of Core Habitats, your city or town may not have all of these sections.



Spring Salamander
(Gyrinophilus porphyriticus)
Species of Special Concern

Funding for this project was made available by the Executive Office of Environmental Affairs, contributions to the Natural Heritage & Endangered Species Fund, and through the State Wildlife Grants Program of the US Fish & Wildlife Service.

Natural Heritage & Endangered Species Program

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http://www.nhesp.org

For more information on rare species and natural communities, please see our fact sheets online at ***www.nhesp.org***

BioMap and Living Waters:
Guiding Land Conservation for Biodiversity in Massachusetts

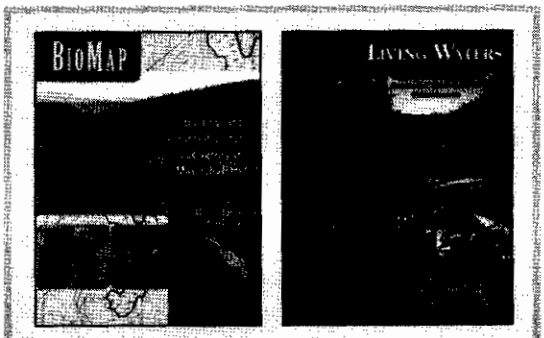
Introduction

In this report, the Natural Heritage & Endangered Species Program provides you with site-specific biodiversity information for your area. Protecting our biodiversity today will help ensure the full variety of species and natural communities that comprise our native flora and fauna will persist for generatons to come.

The information in this report is the result of two statewide biodiversity conservation planning projects, ***BioMap*** and ***Living Waters***. The goal of the BioMap project, completed in 2001, was to identify and delineate the most important areas for the long-term viability of terrestrial, wetland, and estuarine elements of biodiversity in Massachusetts. The goal of the Living Waters project, completed in 2003, was to identify and delineate the rivers, streams, lakes, and ponds that are important for freshwater biodiversity in the Commonwealth. These two conservation plans are based on documented observations of rare species, natural communities, and exemplary habitats.

What is a Core Habitat?

Both BioMap and Living Waters delineate ***Core Habitats*** that identify the most critical sites for biodiversity conservation across the state. Core Habitats represent habitat for the state's most viable rare plant and animal populations and include exemplary natural communities and aquatic habitats. Core Habitats represent a wide diversity of rare species and natural communities (see Table 1), and these areas are also thought to contain virtually all of the other described species in Massachusetts. Statewide, BioMap Core Habitats encompass 1,380,000 acres of uplands and wetlands, and Living Waters identifies 429 Core Habitats in rivers, streams, lakes, and ponds.



Get your copy of the ***BioMap*** and ***Living Waters*** reports! Contact Natural Heritage at 508-792-7270, Ext. 200 or email natural.heritage@state.ma.us. Posters and detailed technical reports are also available.

Core Habitats and Land Conservation

One of the most effective ways to protect biodiversity for future generations is to protect Core Habitats from adverse human impacts through land conservation. For Living Waters Core Habitats, protection efforts should focus on the ***riparian areas***, the areas of land adjacent to water bodies. A naturally vegetated buffer that extends 330 feet (100 meters) from the water's edge helps to maintain cooler water temperature and to maintain the nutrients, energy, and natural flow of water needed by freshwater species.

In Support of Core Habitats

To further ensure the protection of Core Habitats and Massachusetts' biodiversity in the long-term, the BioMap and Living Waters projects identify two additional areas that help support Core Habitats.

In BioMap, areas shown as ***Supporting Natural Landscape*** provide buffers around the Core Habitats, connectivity between Core Habitats, sufficient space for ecosystems to function, and contiguous undeveloped habitat for common species. Supporting Natural Landscape was

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generated using a Geographic Information Systems (GIS) model, and its exact boundaries are less important than the general areas that it identifies. Supporting Natural Landscape represents potential land protection priorities once Core Habitat protection has been addressed.

In Living Waters, ***Critical Supporting Watersheds*** highlight the immediate portion of the watershed that sustains, or possibly degrades, each freshwater Core Habitat. These areas were also identified using a GIS model. Critical Supporting Watersheds represent developed and undeveloped lands, and can be quite large. Critical Supporting Watersheds can be helpful in land-use planning, and while they are not shown on these maps, they can be viewed in the Living Waters report or downloaded from www.mass.gov/mgis.

Understanding Core Habitat Species, Community, and Habitat Lists

What's in the List?

Included in this report is a list of the species, natural communities, and/or aquatic habitats for each Core Habitat in your city or town. The lists are organized by Core Habitat number.

For the larger Core Habitats that span more than one town, the species and community lists refer to the entire Core Habitat, not just the portion that falls within your city or town. For a list of all the state-listed rare species within your city or town's boundary, whether or not they are in Core Habitat, please see the town rare species lists available at www.nhesp.org.

The list of species and communities within a Core Habitat contains only the species and natural communities that were explicitly included in a given BioMap or Living Waters Core Habitat. Other rare species or examples of other natural communities may fall within the Core Habitat, but for various reasons are not included in the list. For instance, there are a few rare species that are omitted from the list or summary because of their particular sensitivity to the threat of collection. Likewise, the content of many very small Core Habitats are not described in this report or list, often because they contain a single location of a rare plant

Table 1. The number of rare species and types of natural communities explicitly included in the BioMap and Living Waters conservation plans, relative to the total number of native species statewide.

BioMap

	Species and Verified Natural Community Types	
Biodiversity Group	**Included in BioMap**	**Total Statewide**
Vascular Plants	246	1,538
Birds	21	221 breeding species
Reptiles	11	25
Amphibians	6	21
Mammals	4	85
Moths and Butterflies	52	An estimated 2,500 to 3,000
Damselflies and Dragonflies	25	An estimated 165
Beetles	10	An estimated 2,500 to 4,000
Natural Communities	92	> 105 community types

Living Waters

	Species	
Biodiversity Group	**Included in Living Waters**	**Total Statewide**
Aquatic Vascular Plants	23	114
Fishes	11	57
Mussels	7	12
Aquatic Invertebrates	23	An estimated > 2500

species. Some Core Habitats were created for suites of common species, such as forest birds, which are particularly threatened by habitat fragmentation. In these cases, the individual common species are not listed.

What does 'Status' mean?

The Division of Fisheries and Wildlife determines a status category for each rare species listed under the Massachusetts Endangered Species Act, M.G.L. c.131A, and its implementing regulations, 321 CMR 10.00. Rare species are categorized as Endangered, Threatened, or of Special Concern according to the following:

- ***Endangered*** species are in danger of extinction throughout all or a significant portion of their range or are in danger of extirpation from Massachusetts.
- ***Threatened*** species are likely to become Endangered in Massachusetts in the foreseeable future throughout all or a significant portion of their range.
- ***Special Concern*** species have suffered a decline that could threaten the species if allowed to continue unchecked or occur in such small numbers or with such restricted distribution or specialized habitat requirements that they could easily become Threatened in Massachusetts.

In addition, the Natural Heritage & Endangered Species Program maintains an unofficial ***watch list*** of plants that are tracked due to potential conservation interest or concern, but are <u>not</u> regulated under the Massachusetts Endangered Species Act or other laws or regulations. Likewise, described natural communities are <u>not</u> regulated any laws or regulations, but they can help to identify ecologically important areas that are worthy of protection. The status of natural communities reflects the documented number and acreages of each community type in the state:

- ***Critically Imperiled*** communities typically have 5 or fewer documented sites or have very few remaining acres in the state.
- ***Imperiled*** communities typically have 6-20 sites or few remaining acres in the state.
- ***Vulnerable*** communities typically have 21-100 sites or limited acreage across the state.
- ***Secure*** communities typically have over 100 sites or abundant acreage across the state; however excellent examples are identified as Core Habitat to ensure continued protection.

Legal Protection of Biodiversity

BioMap and Living Waters present a powerful vision of what Massachusetts would look like with full protection of the land that supports most of our biodiversity. To create this vision, some populations of state-listed rare species were deemed more likely to survive over the long-term than others.

Regardless of their potential viability, all sites of state-listed species have full legal protection under the Massachusetts Endangered Species Act (M.G.L. c.131A) and its implementing regulations (321 CMR 10.00). Habitat of state-listed wildlife is also protected under the Wetlands Protection Act Regulations (310 CMR 10.37 and 10.59). The ***Massachusetts Natural Heritage Atlas*** shows **Priority Habitats**, which are used for regulation under the Massachusetts Endangered Species Act and Massachusetts Environmental Policy Act (M.G.L. c.30) and **Estimated Habitats**, which are used for regulation of rare wildlife habitat under the Wetlands Protection Act. For more information on rare species regulations, see the *Massachusetts Natural Heritage Atlas*, available from the Natural Heritage & Endangered Species Program in book and CD formats.

BioMap and Living Waters are conservation planning tools and do not, in any way, supplant the Estimated and Priority Habitat Maps which have regulatory significance. Unless and until the combined BioMap and Living Waters vision is fully realized, we must continue to protect all populations of our state-listed species and their habitats through environmental regulation.

Natural Heritage & Endangered Species Program

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Understanding Core Habitat Summaries

Following the BioMap and Living Waters Core Habitat species and community lists, there is a descriptive summary of each Core Habitat that occurs in your city or town. This summary highlights some of the outstanding characteristics of each Core Habitat, and will help you learn more about your city or town's biodiversity. You can find out more information about many of these species and natural communities by looking at specific ***fact sheets*** at www.nhesp.org.

Next Steps

BioMap and Living Waters were created in part to help cities and towns prioritize their land protection efforts. While there are many reasons to conserve land – drinking water protection, recreation, agriculture, aesthetics, and others – BioMap and Living Waters Core Habitats are especially helpful to municipalities seeking to protect the rare species, natural communities, and overall biodiversity within their boundaries. Please use this report and map along with the rare species and community fact sheets to appreciate and understand the biological treasures in your city or town.

Protecting Larger Core Habitats

Core Habitats vary considerably in size. For example, the average BioMap Core Habitat is 800 acres, but Core Habitats can range from less than 10 acres to greater than 100,000 acres. These larger areas reflect the amount of land needed by some animal species for breeding, feeding, nesting, overwintering, and long-term survival. Protecting areas of this size can be very challenging, and requires developing partnerships with neighboring towns.

Prioritizing the protection of certain areas within larger Core Habitats can be accomplished through further consultation with Natural Heritage Program biologists, and through additional field research to identify the most important areas of the Core Habitat.

Additional Information

If you have any questions about this report, or if you need help protecting land for biodiversity in your community, the Natural Heritage & Endangered Species Program staff looks forward to working with you.

Contact the Natural Heritage & Endangered Species Program:

by Phone 508-792-7270, Ext. 200

by Fax: 508-792-7821

by Email: natural.heritage@state.ma.us.

by Mail: North Drive
Westborough, MA 01581

The GIS datalayers of BioMap and Living Waters Core Habitats are available for download from MassGIS: www.mass.gov/mgis

Check out www.nhesp.org for information on:

- Rare species in your town
- Rare species fact sheets
- BioMap and Living Waters projects
- Natural Heritage publications, including:
  - Field guides
  - Natural Heritage Atlas, and more!

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BioMap: Species and Natural Communities

Wellfleet

Core Habitat BM1109

Natural Communities

Common Name	Scientific Name	Status
Atlantic White Cedar Bog		Imperiled
Coastal Atlantic White Cedar Swamp		Imperiled
Coastal Plain Pondshore		Imperiled
Estuarine Intertidal: Saline/Brackish Flats		Vulnerable
Level Bog		Vulnerable
Maritime Dune Community		Imperiled
Sandplain Heathland		Critically Imperiled

Plants

Common Name	Scientific Name	Status
Broom Crowberry	*Corema conradii*	Special Concern
Bushy Rockrose	*Helianthemum dumosum*	Special Concern
Commons's Panic-Grass	*Dichanthelium ovale ssp. pseudopubescens*	Special Concern
Few-Fruited Sedge	*Carex oligosperma*	Endangered
Ovate Spike-Sedge	*Eleocharis ovata*	Endangered
Oysterleaf	*Mertensia maritima*	Endangered
Purple Needlegrass	*Aristida purpurascens*	Threatened
Salt Reedgrass	*Spartina cynosuroides*	Threatened
Swamp Oats	*Sphenopholis pensylvanica*	Threatened
Walter's Sedge	*Carex striata*	Endangered
Weak Rush	*Juncus debilis*	Endangered

Invertebrates

Common Name	Scientific Name	Status
Barrens Buckmoth	*Hemileuca maia*	Special Concern
Blueberry Sallow	*Apharetra dentata*	----------

Chain Dot Geometer	*Cingilia catenaria*	Special Concern
Chain Fern Borer Moth	*Papaipema stenocelis*	Threatened
Coastal Heathland Cutworm	*Abagrotis nefascia benjamini*	Special Concern
Coastal Swamp Metarranthis Moth	*Metarranthis pilosaria*	Special Concern
Comet Darner	*Anax longipes*	Special Concern
Drunk Apamea Moth	*Apamea inebriata*	Special Concern
Dune Noctuid Moth	*Oncocnemis riparia*	Special Concern
Gerhard's Underwing Moth	*Catocala herodias gerhardi*	Special Concern
Melsheimer's Sack Bearer	*Cicinnus melsheimeri*	Threatened
New England Bluet	*Enallagma laterale*	Special Concern
Northern Brocade Moth	*Neoligia semicana*	Special Concern
Oak Hairstreak	*Satyrium favonius*	Special Concern
Pale Green Pinion Moth	*Lithophane viridipallens*	Special Concern
Pine Barrens Bluet	*Enallagma recurvatum*	Threatened
Pine Barrens Zale	*Zale sp. 1 near lunifera*	Special Concern
Pink Sallow	*Psectraglaea carnosa*	Special Concern
Spatterdock Darner	*Aeshna mutata*	Special Concern
Water-Willow Stem Borer	*Papaipema sulphurata*	Threatened
Waxed Sallow Moth	*Chaetaglaea cerata*	Special Concern

Vertebrates

Common Name	Scientific Name	Status
Arctic Tern	*Sterna paradisaea*	Special Concern
Common Tern	*Sterna hirundo*	Special Concern
Diamondback Terrapin	*Malaclemys terrapin*	Threatened
Eastern Box Turtle	*Terrapene carolina*	Special Concern
Eastern Spadefoot	*Scaphiopus holbrookii*	Threatened
Four-toed Salamander	*Hemidactylium scutatum*	Special Concern
Least Tern	*Sterna antillarum*	Special Concern

Northern Harrier	*Circus cyaneus*	Threatened
Piping Plover	*Charadrius melodus*	Threatened
Spotted Turtle	*Clemmys guttata*	Special Concern
Vesper Sparrow	*Pooecetes gramineus*	Threatened

Core Habitat BM1189

Plants

Common Name	Scientific Name	Status
Small Site for Rare Plant		

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http://www.nhesp.org

BioMap: Core Habitat Summaries

Wellfleet

Core Habitat BM1109

This large Core Habitat along outer Cape Cod contains a wealth of high-quality and uncommon natural communities that together support incredible species diversity. Several highlights include the many rare species of Coastal Plain dragonflies, damselflies, and moths, as well as the diversity of rare plants. The area's beaches provide some of the most important breeding habitat for Piping Plovers along the Atlantic Coast, and the area contains other important nesting and breeding habitats for rare birds such as Least Terns. In addition, the Core Habitat supports the largest and most extensive populations of Eastern Spadefoot Toads in New England, the largest Diamondback Terrapin population in Massachusetts, and healthy populations of other rare turtles. Much of this large Core Habitat is on protected land, most of which is within the Cape Cod National Seashore, but some of which is in smaller protected areas such as the Wellfleet Bay Massachusetts Audubon Sanctuary.

Natural Communities

This Core Habitat contains over 3000 acres with the largest dune system in the state and in the northeast. It includes excellent examples of a Maritime Dune natural community, the best and largest example of classic bog vegetation on Cape Cod, Atlantic White Cedar Bogs and swamps, the state's best mainland Sandplain Heathlands, and extensive Estuarine Saline/Brackish Flats. The Core Habitat includes very diverse, interdigitated, and often uncommon natural communities.

Plants

A diversity of rare plant species, including several Endangered species, is found within this important area along outer Cape Cod. Among them are most of the state's populations of the Endangered Few-Fruited Sedge. Some of the state's best populations of Broom Crowberry, a low, bushy, heath-like plant with black fruit, are also found here.

Invertebrates

This Core Habitat includes numerous Coastal Plain ponds that are home to rare species of dragonflies and damselflies, including the spectacular red and green Comet Darner and the tiny blue Pine Barrens Bluet. Acidic shrub swamps and bogs associated with the ponds are habitat for rare species of moths such as the Pale Green Pinion moth. Open-canopy pitch pine - scrub oak barrens within this Core Habitat provide habitat for rare moths such as Melsheimer's Sack Bearer and the Barrens Buckmoth. And still other rare moths live in the coastal shrublands and dunes within this Core Habitat, including the Chain Dot Geometer, the Coastal Heathland Cutworm, and the Dune Noctuid moth.

BioMap: Core Habitat Summaries

Wellfleet

Vertebrates

This Core Habitat contains a number of coastal beaches on both the eastern and western shores of outer Cape Cod that collectively comprise some of the most important breeding habitat for Piping Plovers along the Atlantic Coast. Significant areas of nesting habitat for Least Terns are also present. New Island in Nauset Marsh has traditionally supported one of the largest breeding colonies of Common Terns and Laughing Gulls in Massachusetts; however, birds from this colony are shifting to new locations as natural processes of coastline change weld the island to Nauset Spit and allow easier access by mammalian predators.

In this Core Habitat, the sandy upland habitats dominated by pine-oak forests and barrens support the largest and most extensive populations of Eastern Spadefoot Toads in New England. There are also significant and widespread populations of Eastern Box Turtles as well as Spotted Turtles. These woodlands and shrublands also provide some of the most important habitat in New England for landbirds characteristic of pitch pine - scrub oak barrens, including the Eastern Towhee and the Prairie Warbler. This Core Habitat also encompasses breeding habitat for Vesper Sparrows, including open, sparsely vegetated areas of pitch pine barrens in the Marconi area of Wellfleet, and the sandy habitats of the Provincelands, especially adjacent to the Provincetown airport. Northern Harriers have been observed within this Core Habitat, especially near Pilgrim Lake and Hatches Harbor.

The estuarine, salt marsh, tidal creek, beach, and sandy upland habitats in this Core Habitat support Diamondback Terrapins. Wellfleet Harbor contains perhaps the largest Diamondback Terrapin population in Massachusetts. Over 110 documented observations of nesting are known from this Core Habitat. Within the harbor, Blackfish Creek probably supports the most individuals. Wellfleet Harbor is also the northernmost site at which the species occurs in the U.S. Here the Core Habitat is surrounded and interspersed with development, increasing the likelihood of disturbance, collisions with vehicles, and degradation of foraging and nesting habitat. Entrapment by marine debris is a potential source of mortality for this species.

Much of this Core Habitat is protected as part of the Cape Cod National Seashore, but further protection of other suitable habitat is needed.

Living Waters: Species and Habitats

Wellfleet

Core Habitat LW051

Exemplary Habitats

Common Name	Scientific Name	Status
Lake/Pond Habitat		----------

Core Habitat LW052

Exemplary Habitats

Common Name	Scientific Name	Status
Lake/Pond Habitat		----------

Core Habitat LW333

Exemplary Habitats

Common Name	Scientific Name	Status
Fish Habitat		----------
Lake/Pond Habitat		----------

Core Habitat LW342

Exemplary Habitats

Common Name	Scientific Name	Status
Lake/Pond Habitat		----------

Core Habitat LW343

Exemplary Habitats

Common Name	Scientific Name	Status
Lake/Pond Habitat		----------

Living Waters: Core Habitat Summaries

Wellfleet

Core Habitat LW051

Ponds on the Atlantic Coastal Plain experience natural water level fluctuations and provide uncommon freshwater habitats for aquatic plants and insects with their acidic waters and sandy, cobble, or mucky pond bottoms. Williams Pond is one of the few such ponds that has little surrounding development and is removed from cranberry agriculture. Located within the Cape Cod National Seashore, Williams Pond is nutrient-rich, and supports spawning habitats for sea-running fishes.

Core Habitat LW052

Ponds on the Atlantic Coastal Plain experience natural water level fluctuations and provide uncommon freshwater habitats for aquatic plants and insects with their acidic waters and sandy, cobble, or mucky pond bottoms. Dyer Pond is one of the few such ponds that has little surrounding development and is removed from cranberry agriculture. Located within the Cape Cod National Seashore, Dyer Pond is low in nutrients, reflecting the low amount of development in the area.

Core Habitat LW333

Ponds on the Atlantic Coastal Plain experience natural water level fluctuations and provide uncommon freshwater habitats for aquatic plants and insects with their acidic waters and sandy, cobble, or mucky pond bottoms. Herring Pond is one of the few such ponds that has little surrounding development and is removed from cranberry agriculture. Located within the Cape Cod National Seashore, Herring Pond is sandy-bottomed, nutrient-rich, and surrounded by emergent vegetation. The pond contains spawning habitat for Alewife, an anadromous fish that migrates from coastal waters into fresh waters to spawn. This and other migrating fish species are important components of Massachusetts' aquatic biodiversity.

Core Habitat LW342

Ponds on the Atlantic Coastal Plain experience natural water level fluctuations and provide uncommon freshwater habitats for aquatic plants and insects with their acidic waters and sandy, cobble, or mucky pond bottoms. Great Pond in Wellfleet is one of the few such ponds that has little surrounding development and is removed from cranberry agriculture. Located within the Cape Cod National Seashore, Great Pond is large, deep, and low in nutrients reflecting the low amount of surrounding development. The adjacent ponds, including Turtle, Northeast, and Southeast Ponds, provide habitats for rare damselflies.

Core Habitat LW343

Ponds on the Atlantic Coastal Plain experience natural water level fluctuations and provide uncommon freshwater habitats for aquatic plants and insects with their acidic waters and sandy, cobble, or mucky pond bottoms. Duck Pond is one of the few such ponds that has little surrounding development and is removed from cranberry agriculture. Located within the Cape Cod National Seashore, Duck Pond is deep and has a low to moderate nutrient level, reflecting the low amount of surrounding development.