

Section 2.0 Natural Resources

A full treatment of Natural Resources inventory and analysis can be found in the Appendix as Section 2 Natural Resource Inventory. The following summaries, actions and strategies outline key issue areas and methods to address them.

The Town of Barnstable is centrally located on Cape Cod, a sandy peninsula surrounded by ocean. The land in Barnstable is low lying, with extensive areas of wetlands, ponds and marshes. The boundaries with the sea are flat, there are no rocky cliffs, and the sea and shore form a shifting pattern of sandy beaches, dunes, estuaries and marshes. The highest elevation is less than 250 feet. From lookout points along Route 6, both the south shore and the north shore of the town can be seen. The sea is never far from the land.

Water resources are a natural system of groundwater, ponds, salt water estuaries and embayments. Groundwater is the only source of drinking water on Cape Cod, a sole source aquifer. All natural resources have scenic and recreational value for boating, fishing, swimming, walking, or viewing. Traditional natural resource dependent industries such as cranberry culture, finfishing and shellfishing are closely identified with Barnstable. The town's scenic and recreational resources support tourism and retirement economic sectors.

The natural environments are distinctive and varied. Together with the built environment, they form the essential character and identity of the area. To maintain Barnstable's character the natural resources must be protected.



Town of Barnstable Comprehensive Plan 2010

This section is divided into nine subsections and the Open Space and Recreation section that addresses principal natural resources and their protections. Each subsection has goals, actions and strategies:

Section 2.A

Natural Resources

- 2.1 Drinking Water Resources
- 2.2 Coastal Resources
- 2.3 Freshwater Resources
- 2.4 Wetland Resources
- 2.5 Wildlife and Plant Habitat Resources

Natural Resource Protection

- 2.6 Wastewater Management
- 2.7 Stormwater Management
- 2.8 Hazardous Materials and Waste Management
- 2.9 Public Education

Section 2.B

Open Space and Recreation

Section 2.A

NATURAL RESOURCES

2.1 Drinking Water Resources

Groundwater is the only source of drinking water. Groundwater flows through layers of saturated sands and gravels to form an extensive "unconfined aquifer" throughout the Cape. Public wells draw water from wide areas known as Zones of Contribution, which occupy approximately thirty percent of the area of the town. Drinking water supplies are vulnerable to contamination because these contributing areas are extensive, because the coarse-grained soils drain rapidly, and because of the low-lying nature of the land, providing little depth to groundwater. The quality and quantity of groundwater is a significant factor in the protection and healthy function of other natural resources, such as ponds, wetlands, marshes, and salt water embayments.

2.2 Coastal Resources

Shoreline systems consist of embayments, beaches, dunes and salt marshes. Salt water embayments and salt marshes are spawning grounds

and nurseries for a great variety and quantity of coastal and oceanic species. Traditional aquaculture and fishing industries utilize these resources. Coastal environments are also very significant recreational, scenic and community character resources.



Shellfish are abundant in the shallow, sheltered coastal embayments in Barnstable. Clams, both soft-shelled and hard-shelled, scallops and oysters can be found in the saltwater embayments and along the shore. Cotuit oysters, cultivated since the mid-19th century, are internationally renowned delicacies. There are approximately 6,178 acres of shellfish beds. Shellfishing is a traditional economic pursuit and recreational pastime. Shellfish resources require pristine water quality to thrive in the quantities necessary to support these activities. In recent years, contamination of coastal waters has caused a decline in harvests.

Coastal systems of dunes, barrier beaches and salt marshes provide storm protection to coastal banks and coastal properties, and provide habitats for wildlife, some of which are listed as endangered species.

Through the Massachusetts Estuaries Program (MEP), the Town, County and Commonwealth are mapping recharge areas for all major estuaries and embayments to identify areas where development and land use have the most impact on coastal water quality. This effort will lead to the establishment of Total Maximum Daily Loads (TMDLs) of nitrogen by the DEP. These TMDLs will become the management tool to restore and protect coastal water quality from the impact of septic systems, fertilizers and runoff. Each embayment has a TMDL. These critical nitrogen-loading rates should not be exceeded. Where they may be exceeded, the town will develop management strategies to reduce the nitrogen load on the embayment.

2.3 Fresh Water Resources

Numerous ponds throughout Barnstable provide natural, recreational and scenic resources. Fifty-five ponds exceed three acres and all are highly valued by the residents. The shorelines of several shallow coastal plain ponds contain several rare and endangered species that thrive in these highly specialized environmental niches that are globally rare. Streams are relatively uncommon but where they do occur they provide freshwater for animal species and anadromous fish runs at the entrance to salt water embayments for species such as the alewife.

2.4 Wetland Resources

Numerous wetlands are found throughout Barnstable. "Wetland" is a collective term that includes marshes, bogs, swamps, wet meadows and similar environs that reside between open water and dry land. Wetlands function to "polish" water quality effectively by retaining nutrients and sediments, by storing and attenuating floodwaters, and by providing fish and wildlife habitat. Many significant open space vistas are provided by wetlands.

The greatest conflict in wetland protection in Barnstable arises from the development pressure on private property. Development of marginal lots challenges regulators to reconcile development with wetland resources protection performance standards such as adequate buffer zones. Regulatory changes that increase protection for wetlands are recommended.

2.5 Wildlife and Plant Habitat

Critical wildlife and plant habitats are numerous in Barnstable. Freshwater fisheries are found in the great ponds and streams. Vernal pools with associated upland areas and margins of shallow ponds are specialized

habitats for rare and endangered species. Upland open space with unfragmented forest supports a wide variety of plant and animal species. Cranberry bogs are specialized agricultural wetlands and are part of the traditional Barnstable landscape. Protecting these resources requires vigilance through careful implementation of and adherence to land use regulations.

NATURAL RESOURCE PROTECTION

The town's natural resources continue to experience pressure from increasing development and intensifying use. Careful, consistent resource management is essential to the continued viability of these life sustaining natural systems.

Undeveloped areas protect groundwater quality through the natural system of infiltration and recharge. Over time, some land uses have contaminated groundwater resources and the ponds, streams and estuaries fed by groundwater. While we now have knowledge to avoid these mistakes in the future, contamination requiring closure or treatment of public and private water supplies has already had financial impact on water supply users. Contamination of ponds and salt water embayments has a serious impact on the ability of these systems to support reproduction of freshwater and saltwater species.

Development has resulted in the loss of natural woodlands and grasslands. These upland areas provide habitats for wildlife and are significant scenic and recreational resources. Where development has isolated open space areas, the town should ensure that wildlife corridors are maintained for linkage.

The Town has exercised stewardship through active participation in the Massachusetts Estuaries Program, Wastewater Facilities planning; open space acquisition and sound land use planning in addition to regulatory and outreach programs.

2.6 Wastewater Management

The town's water supply protection program of land use controls and restrictions on sewage flows is working. No well has exceeded the Federal Maximum Contamination Level (MCL) of 10 ppm nitrate nitrogen and only one well in Hyannisport, BW HY with 5.7 ppm, exceeds the 5 ppm planning advisory limit.

The Water Pollution Control Facility located in Hyannis off Bearses Way has an average daily discharge of 1.4 million gallons per day (mgd) and a design capacity of 4.2 mgd. This treatment plant is essential to protect groundwater quality, public supply wells and public health. The plant serves the most densely populated area of the Cape including regional commercial areas and high density Hyannis neighborhoods.

On-site treatment systems have a major impact on water quality. Septic systems do not remove nitrogen, phosphorous or other contaminants. These compounds are discharged into the aquifer and flow into wells, ponds, estuaries and coastal waters. Only 12% of all development, part of Hyannis and a small portion of Barnstable Village is connected to town sewer. All other land uses are served by individual on-site septic systems.

It is essential to limit nitrogen, the contaminant of concern for coastal waters, and phosphorous, the contaminant of concern for fresh waters. The inventory for Section 2 includes a thorough discussion of the implications of cesspools, Title 5 Systems, innovative/alternative wastewater treatment facilities, and small wastewater treatment facilities that include privately owned or Package Sewage Treatment Facilities (PSTF). An update on the content and progress of the Wastewater Facilities Plan is also included.

Through the Wastewater Facilities Plan, the Town has begun a town wide Nutrient Management Plan. This plan includes an assessment process to establish wastewater alternatives to restore and protect coastal waters.

2.7 Stormwater Management

Stormwater runoff from roads, parking lots and other impervious surfaces contains a variety of contaminants, including: hazardous chemicals derived from oil, gasoline and other automobile fluids; heavy metals; fertilizer, pesticides and herbicides washed off lawn surfaces; and bacteria from animal droppings. Road runoff is the principal cause of closure for shellfish beds and swimming areas. New roads, reconstruction of existing roads, parking lots and drainage systems need to be designed to minimize contamination of groundwater. Many existing stormwater drainage systems that discharge directly to coastal areas have been prioritized for remediation; freshwater areas also need this evaluation and remediation program.

Barnstable is a Phase II Stormwater Community. This program is discussed in detail in Section 4 Capital Facilities and Services. Phase II, mandated by

the Federal Environmental Protection Agency through the Clean Waters Act, was enacted to preserve, protect and improve the nation's water resources from polluted stormwater runoff. This program incorporates best management practices (BMPs) for construction and post construction management of stormwater facilities thereby providing maximum protection to sensitive natural resources.

To help reduce stormwater impacts to sensitive environmental areas, the Town should explore adopting low impact development standards in appropriate regulations.

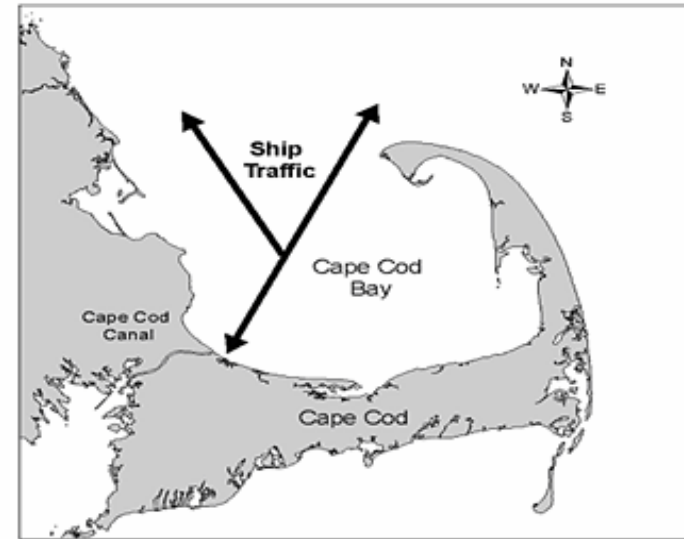
2.8 Hazardous Materials and Waste Management

Spills and leaks of hazardous materials may be the greatest threat to drinking water supplies. Five wells in Barnstable have been closed due to contamination with volatile organic compounds (VOCs) and one, BWC ST, remains closed. Other water resources, ponds, streams and coastal embayments can also be affected by groundwater contamination. Cleanup is slow, difficult and very costly. Every effort should be made to prevent contamination with hazardous chemicals, to protect the environment and drinking water supplies.

Many household cleaning agents, paints and stains contain synthetic organic chemicals that can contaminate groundwater, surface water and drinking water supplies if disposed in septic systems or on the ground. Programs to educate homeowners and the public about the Town's ongoing easy to use collection and disposal program should be continued.

With the extension of sewers to the industrial and commercial zone, pre-treatment programs and enforcement of hazardous waste regulations are essential to protect the wastewater treatment facility processes, and prevent contamination of sludge.

Leakage of heating fuel and gasoline from underground storage tanks to groundwater can also result in contamination of water resources and extraordinary costs to property owners. The Town must ensure proper oversight and removal of these tanks. Over the last 20 years, Board of Health regulations have minimized the potential threat of leaking underground storage tanks by requiring inspection and testing programs and removal of underground storage tanks.



Provincetown Center for Coastal Studies

Barnstable's coastal resources are threatened by off shore activities. Single hulled vessels routinely transport very large quantities of petroleum products via shipping lanes in Nantucket Sound and Cape Cod Bay. Proposed industrial uses in Nantucket Sound may pose additional threats to sensitive habitat and valuable town resources, which are at risk from spills resulting from vessel collisions, strikes on marine structures or vessel failure.

Solid waste is now disposed by SEMASS waste-to-energy incinerator in Rochester. Illegal dumping of solid waste on open lands remains a town wide problem.

2.9 Public Education

Perhaps more than any other issue area, natural resource protection depends largely on public education. Public education increases knowledge of natural resources and encourages residents to engage in activities that protect natural resources. The Town administers several programs that involve and educate the public. These programs reach out to and cooperate with schools and local organizations.

The Town should continue and foster educational outreach programs that promote environmental stewardship and awareness; create opportunities for community involvement; increase community responsibility for actions and their impacts; and build understanding for informed decision making through education and active involvement in stewardship activities.

Consistency

This plan adopts the Regional Policy Plan Goals 2.1.1, 2.1.2, 2.1.3, 2.2.1, 2.2.2, 2.2.3, 2.3.1, 2.4.1 and 2.5.1. In lieu of adopting the RPP Minimum Performance Standards the following sections outline Barnstable’s action plan in support of these goals.

NATURAL RESOURCES

Section 2.1 Drinking Water Resources

Goal: 2.1.1: To maintain and improve quality and quantity of groundwater to ensure a sustainable yield of high quality drinking water with the ultimate goal of achieving an untreated water supply.

Action 2.1.1.1 Maintain and improve groundwater quality to prevent expensive closure and replacement of public supply wells or the need to treat public water supplies. All public policies shall be compatible with protection of public water supply wells to ensure that all existing and future public supply wells provide high quality drinking water.

Action 2.1.1.2 Long range planning for future provision and protection of Barnstable public water supply shall remain the highest priority in the key areas of water supply, land use, and capital facilities planning.

Strategies

- Estimate water supplies needed for buildout population.
- The Town shall share with and acquire from the independent water districts serving town residents mapping information, demographic information and build out projections to ensure that a comprehensive strategy is in place to facilitate acquisition of future wells and associated lands before development of these land areas.
- Working with all appropriate agencies and water companies, determine, map and protect through regulation the Zones of Contribution and Wellhead Protection Zones for future public supply wells.
- Ensure that town-wide future water supply needs assessments include areas dependent on private wells.

Action 2.1.1.3 The town shall protect public drinking water supplies by continuing to regulate land use in existing Zones of Contribution to public supply wells and as they may be redefined to accommodate additional withdrawals or installation of new wells.

Strategies

- Determine and protect through regulation neighboring towns’ Zones of Contribution that extend into Barnstable.
- Determine if protection exists for Barnstable ZoC’s in the neighboring towns of Sandwich, Mashpee and Yarmouth. This report shall also recommend a strategy for obtaining these protections if missing. An informal inter-municipal arrangement to update this information every few years should be explored.
- Using GIS capabilities identify key land areas for public water supply. Protect the land areas determined by this assessment through regulation.
- Collect and map water quality data from all water suppliers. Use map products to monitor, detect and locate water quality trends. Provide this data to independent water districts.

Action 2.1.1.4 No development shall occur within a 400-foot radius of a future public supply well. Lands within 400 feet of wells shall be acquired wherever possible.

Strategy

- Identify and map all public supply well 400’ Zone 1s. For unprotected areas within these radii, determine a land use strategy, including acquisition, to ensure maximum drinking water supply protection.

Action 2.1.1.5 Practice water conservation measures to help ensure adequate water supply.

Strategies

- Encourage water suppliers to identify and reduce system leakage.
- Explore development and redevelopment regulations to require water saving devices for large quantity users.

Action 2.1.1.6 Encourage development and implementation of water resource supply management program for the entire town. Coordinate a Comprehensive Water Supply Assessment.

Strategies

- This assessment, conducted in cooperation with the private water companies, shall include short term and long term water supply needs of the entire town; water supply management needs; land acquisition needs; land protection needs; and a comprehensive strategy for implementing recommendations.
- Work with the water districts to develop a groundwater model to evaluate water protection areas and undertake a water management optimization assessment.
- Ensure adequate water supplies in the event of short and long-term closure of supply wells.
- Support the work of the Town's Water Quality Advisory Committee, which provides a forum for regular meetings between the Town and the independent water districts.
- Work with independent water districts to develop cross connections and agreements for the exchange of water during emergencies or drought.

Action 2.1.1.7 Ensure, in addition to the state's permitting determinations, that all water supply wells, public and private, are located to avoid water withdrawal impacts on ponds, streams, coastal embayments and wetlands.

Strategies

- Prevent groundwater mining or overdraft and ensure that withdrawals do not exceed the safe yield of the aquifer.
- Ensure that public and private supply well pumping does not cause saltwater intrusion.
- Develop regulations to protect adverse impacts to wetlands and water bodies from large quantity private well or public water supply withdrawals to fill swimming pools or other large quantity use.

Action 2.1.1.8 Public water supply infrastructure expansion should be prioritized for areas where private wells are vulnerable to contamination from wastewater effluent, saltwater intrusion or other contaminant.

Strategies

- Map lots served by private wells.
- Designate areas for connection to public water supply where water quality tests reveal contamination trends.

Section 2.2 Coastal Resources

Goal 2.2.1 The major goal for Coastal Resources is to develop a comprehensive Coastal Resources Management Plan (CRMP). The

natural resource, aesthetic, historic, and cultural qualities of Barnstable's coastline should be maintained. The unique maritime character of working harbors, coastal villages and other developed areas should be protected and, if possible, enhanced.

Action 2.2.1.1 Develop a Coastal Resources Management Plan.

Strategies

- The CRMP shall include an inventory of existing coastal resources, all available water quality data, an inventory of existing public and private access for recreational and commercial uses, an overview of existing federal, state and local regulations, an assessment of potential impacts from coastal storms, identification of conflicts, projections for future conditions including a buildout analysis for FEMA A and V zones, barrier beaches and coastal banks, and recommendations for protecting critical habitats and important resources while providing for recreational and commercial uses.
- Include a Resource Management Plan for the Sandy Neck ACEC that meets DEP/MCZM requirements, to aid in the management of this important resource.

Goal 2.2.2 Development in high hazard areas should be limited in order to minimize loss of life and structures, and reduce erosion and other environmental damage resulting from storms, natural disasters and sea level rise.

Action 2.2.2.1 To protect the integrity of coastal features that serve as a natural barrier from storms to the greatest feasible extent and so protect human life and private property new development and redevelopment shall be restricted in velocity zones where there is known to be danger of significant flood damage.

Strategies

- The Town shall adopt a sewer neutral regulation through a General Ordinance. In barrier beach areas and FEMA A and V Zones where there is existing development the Town may install wastewater infrastructure to better protect or improve coastal waters or sensitive habitat areas subject to the sewer neutral regulation.
- To reduce potential for erosion, damage to structures and loss of sensitive habitat the Town shall acquire land in the FEMA A and V zones and barrier beach areas. The Town will prepare a Pre-Disaster Mitigation Plan in accordance with FEMA regulations. When approved

this plan will make the town eligible for land acquisition funds for these areas, particularly properties subject to repetitive damage.

- To avoid “taking” of property by regulatory requirements ensure reasonable use of property through regulations.
- Development in FEMA V Zones, on barrier beaches or on coastal dunes shall be limited. Existing structures may be reconstructed or renovated in conformance with all regulatory requirements provided there is no increase in area or intensity of use. Where applicable non-water dependent development shall be concentrated on that part of the lot outside the A and V Zones.
- Locate new development outside the FEMA A and V Zones through regulations and incentives.
- To prevent earth placement or removal that interferes with the natural flood protective function of barrier beaches and other coastal formations the Town shall develop a regulation that limits earth removal and placement and develop an appropriate building height definition.
- The town shall adopt a regulation that prevents armoring structures and mounded septic systems from interfering with the natural flood protective function of barrier beaches and other coastal formations.
- Explore adoption of the Cape Cod Commission Model Floodplain Bylaw as an ordinance to better protect land subject to coastal storm flowage and its buffer areas.

Action 2.2.2.2 Control erosion in barrier beaches and coastal banks to the greatest extent possible to protect important wildlife habitat, storm surge protection and recreational amenities.

Strategies

- Development and redevelopment shall be controlled to the greatest extent possible on barrier beaches or coastal dunes as identified and defined by the Wetlands Protection Act and local Conservation Commission regulations.
- Development or redevelopment on a coastal bank or dune or within 100 feet landward of these resources shall be designed to have no adverse effect on the height, stability or use of the bank or dune as a natural sediment source. In areas where dunes or banks are eroding, the setback for all new buildings and septic systems from the top of the bank or dune crest shall be at least 50' in conformity with present Conservation Commission policies and Board of Health regulations requiring 100 feet or more septic system setback from the top of coastal banks.

Action 2.2.2.3 Buildings and infrastructure in areas of projected sea level rise should be designed for protection from flooding as well as to minimize risk to human health and safety.

Strategies

- Determine the extent of protection needed from the real threat of sea level rise.
- Design stormwater management systems and new and replacement septic systems within FEMA A and V zones to accommodate a rise sea level.

Goal 2.2.3 Maintain and improve coastal water quality to allow shellfishing and recreation as appropriate, and to protect coastal ecosystems which support shellfish and finfish habitat with the ultimate goal of restoring and maintaining ecological integrity in our coastal waters.

Action 2.2.3.1 Continue, through the Massachusetts Estuaries Program (MEP), Town, County and Commonwealth mapping of recharge areas for all major estuaries and embayments to identify areas where development and land use have the most impact on coastal water quality. This information is available through the Town’s GIS system as it is developed.

Strategies

- Through the MEP, a long-term coastal resource water quality monitoring program is underway in Barnstable. The Town will continue to participate through the completion of the project in Barnstable.
- The Town should determine a course of action to comply with the Total Maximum Daily Loads (TMDLs) established as part of the Massachusetts Estuaries Program (MEP).

Action 2.2.3.2 Protect environmentally fragile areas and reduce nitrate-nitrogen loading in marine recharge areas.

Strategies

- Reduce impacts in FEMA A and V zones by amending the Zoning Ordinance to require floor area ratio requirements and impervious area limitations to allow development and redevelopment that does not create large impervious areas that interfere with the flood mitigating function of natural resources.
- Adopt a town-wide regulation to limit impervious surface area.

Goal 2.2.4 Develop a local Harbors Management Plan (HMP).

Action 2.2.4.1 Coordinate the management of harbors that are under the jurisdiction of multiple Town Departments, Boards and Commissions. The HMP shall commence within one year of the adoption of this Comprehensive Plan.

Strategies

- Inventory public and private uses in harbors to monitor changes in water and marine dependent uses.
- Inventory, assess existing conditions, needs, and methods for maintaining navigation channels in the HMP. Evaluate the impact of piers and docks on navigation channels.
- Inventory and prioritize necessary repairs to harbor facilities.
- Assess harbor improvements that may contribute to increased access and improve harbor functions.
- Assess the need for and feasibility of additional public restrooms at harbor facilities.
- Establish watershed zoning to protect and preserve traditional maritime uses dependent on harbor location and proximity to marine waters.

Action 2.2.4.2 A mooring plan shall be included in the HMP. This plan should be reviewed and revised at least every two years.

Strategies

- Inventory existing moorings. Evaluate capacity for new moorings in existing mooring fields. Determine if new areas should be designated to meet future demand. Inventory rental and transient mooring permits.
- Site, design and manage new mooring fields to minimize damage to benthic habitats, protect boats from storms and maintain navigability.

Action 2.2.4.3 Marine vessel sanitary wastes shall not be discharged to coastal waters. Marine wastes from boats and other sources including oil spills, dredge material, solid waste and all other types of waste should be disposed of using environmentally responsible practices.

Strategies

- Working with existing programs such as Three Bays and Mass Bays the town shall explore instituting a No Discharge zone in a 500 foot strip from Oregon Beach to the Kennedy breakwater.
- In addition to the three shore side facilities at Three Bays, Bismore Park and Barnstable Harbor and the two boats that serve the area from East

Bay to Hyannis, the Town should locate additional pump-out facilities as needed.

- Develop and adopt a regulation to be applicable to new construction and/or change, alteration or expansion of an existing facility requiring private marinas to provide pump out facilities for their clients.

Goal 2.2.5 Habitat for shellfish, finfish, rare and endangered species, other coastal wildlife and native coastal plants shall be protected to ensure their survival and sustain their biological diversity.

Action 2.2.5.1 Wildlife and plant habitat should be protected and managed to ensure long-term viability of a wide variety of coastal species, including fish and shellfish taken for commercial and recreational use. Particular care should be taken to preserve habitats of rare and endangered species.

Strategy

- Plant and wildlife species in the areas depicted on the Sensitive Habitat map should be monitored for changes in population. This map shows Natural Heritage and Endangered Species Program Estimated and Core Habitats. If it is determined that impacts from human activities are detrimental to these species protective measures shall be taken.

Action 2.2.5.2

Continue to identify, rate and map existing high value significant shellfish habitat to expand and protect existing and potential habitat areas.

Strategies

- The Town shall make special efforts to protect the variety of shellfish species as well as the benthic habitat native to the area.
- Shellfish species in Significant High Value Shellfish Areas, as shown on the CP Sensitive Habitat Map and the Town of Barnstable Significant High Value Shellfish Habitat Maps as may be amended from time to time, shall be monitored for changes in population. Protective measures shall be taken if it is determined that impacts from human activities are detrimental to species in these areas.



- The Town shall continue rating and mapping of significant high value shellfish habitat for the north side.
- The Town shall rate and map potential high value shellfish areas.

Action 2.2.5.3 Barnstable should continue to promote marine research in local waters and continue to manage licensed aquaculture areas and support aquaculture where appropriate for coastal resources.

Strategies

- Barnstable shall promote aqua farming, marine research and aquaculture in local waters.
- The Town should explore providing additional shellfish grants to the aquaculture industry.
- The Town should encourage and coordinate with existing aquaculture education and training programs.

Action 2.2.5.4 The town will explore, develop and implement watershed zoning as a mechanism for balancing and regulating competing interests in coastal waters such as protecting shellfish, finfish, avian and plant habitat, protecting overall coastal water quality and providing coastal access for passive and active water dependent recreational activities and to ensure that traditional maritime uses continue.

Strategies

- The creation of a map depicting existing conditions and proposed expansion areas for critical coastal habitat, mooring fields, public and private navigation channels, docks and piers shall be included in this process. Water dependent uses shall be allowed or limited based on these mapped findings.
- The Conservation Commission should continue to require site-based performance requirements in areas where piers are permitted. Until watershed zoning is fully implemented, the existing policy shall remain in effect. The existing policy states that construction or expansion of docks and piers shall not be permitted in significant high value shellfish habitat areas as shown on the Town of Barnstable Significant High Value Shellfish Habitat Maps as may be amended from time to time.
- The Planning Board should assess their process for Chapter 91 application review.

Goal 2.2.6 Protect the public interest in the coast and rights for fishing, fowling and navigation and preserve and, where appropriate, expand public access to the shore.

Action 2.2.6.1 Development or redevelopment of filled tidelands projects should provide or enhance coastal access and use of the shoreline in conjunction with the Chapter 91 licensing program. Continue to re-establish and/or designate through appropriate legal means traditional rights of way to the water to ensure that these are not lost or abandoned,

Strategy

- Inventory and map filled tidelands. Analyze results to ensure access is provided in accordance with Chapter 91 requirements.

Action 2.2.6.2 Continue Ways to Water program building on completed research revealing about 75 ways to water. Develop maintenance, signage and outreach program including GIS mapping for posting to the Town website and internet sites.

Section 2.3 Fresh Water Resources

Goal 2.3.1 The major goal for Fresh Water Resources is the development of a comprehensive Fresh Water Management Plan (FWMP). To the greatest extent possible, the water quality of Barnstable's freshwater water bodies should be maintained to standards that support living organisms appropriate for the pond, and allow recreation for the neighborhood, town residents and other recreational users.

Action 2.3.1.1 Identify Coastal Plain Ponds. The long-term viability of freshwater ponds serving as habitat for rare and endangered species should be ensured in particular Coastal Plain Ponds, a globally rare natural resource.

Strategies

- Include an analysis of the recharge areas and any water supply withdrawal as they relate to Coastal Plain Ponds. This information will be shared with the Health, Conservation and Planning departments and the appropriate Water Companies.
- Wherever possible, land within 100 feet of any freshwater pond should be maintained in its natural, vegetated condition. Where significant populations of rare, endangered or threatened species have been identified, every effort should be made to ensure permanent control over these buffers through acquisition by the town or a conservation organization through acquisition, conservation restriction or deed restriction.

Action 2.3.1.2 Within pond recharge areas development or redevelopment located within 300' of freshwater water bodies shall be required to meet critical nutrient loading standards. Where existing development exceeds identified critical loading standards for a fresh water recharge area, redevelopment should maintain or improve existing levels of nutrient loading.

Strategies

- Support the county testing program through existing and new volunteer programs. Include neighborhood stewardship organizations in this program. The Town should develop and adopt regulations, for development and redevelopment within pond recharge areas that encourage or require septic leaching fields to be located outside of a 300' buffer to ponds.
- Develop management strategies based on scientific studies to ensure diversity of freshwater plant and animal species.
- Determine the capacity of these ponds to attenuate the impacts from onsite septic systems within their recharge areas. Develop incentives through regulations or other approaches including, but not limited to acquisition of undeveloped land or transfer of development rights, to ensure that these capacities are not exceeded or to ensure improvement where necessary.

Action 2.3.1.3 Continue Ways to Water program to ensure public access to fresh water bodies.

Section 2.4 Wetland Resources

Goal 2.4.1 Preserve and restore quality and functions of Barnstable's coastal and inland wetlands. Reclaim filled or non-functioning wetlands where possible.

Action 2.4.1.1 Under existing regulations, only 2500 square feet of a wetland area is allowed to be altered. Inventory altered wetlands and determine whether alteration has impacted their function. Monitoring data collected pursuant to Chapter 237, Section 7E shall be included in this study. Review existing regulations for amendment based on these findings.

Action 2.4.1.2 Where the size of the lot permits, a buffer of at least 100' from the edge of coastal and inland wetlands including isolated wetlands shall be maintained in an undisturbed, natural state to protect the natural functions of these areas, including but not limited to mitigation of stormwater impacts and

wildlife habitat value. Where the lot size does not permit a 100' buffer, the maximum feasible buffer shall be maintained but in no case shall this buffer be less than 50'. The Conservation Commission may require a larger buffer to protect sensitive areas or where the site conditions such as slopes or soils suggest that a larger buffer is necessary to prevent adverse impacts.

Action 2.4.1.3 Continue state and federal grant funded measures through the Conservation Division and Commission to restore impaired ponds, salt marshes and estuaries.

Goal 2.4.2 Preserve, and restore where feasible, quality and function of isolated lands subject to flooding needing additional protection, including vernal pools.

Action 2.4.2.1 Continue to identify, certify and map vernal pools.

Action 2.4.2.2 Determine, through scientific research, if existing buffer regulations for vernal pools adequately protect this resource. Review existing regulations for amendment based on these findings.

Action 2.4.2.3 Vernal pools shall not be used for stormwater management. Identify and map vernal pools that are now stormwater receptors. Ensure that appropriate remediation for vernal pools is included in the Town's Stormwater Management Program. Develop and enact additional regulations as needed to prevent future incidences of this practice.

Action 2.4.2.4 Examine the need to amend Wetland Replication Ordinance to exclude vernal pools.

Action 2.4.2.5 Identify and map other isolated lands subject to flooding. Determine their flood control and flood mitigation value and assess the need for additional regulation to protect this vital function.

Section 2.5 Wildlife and Plant Habitat Resources

Goal 2.5.1 Prevent loss or degradation of critical wildlife and plant habitat, minimize the impact of new development on wildlife and plant habitat, maintain existing populations and species diversity, and maintain areas which will support wildlife's natural breeding, feeding and migration patterns.

Action 2.5.1.1 The Sensitive Habitat Map shall guide development decisions.

Strategy

- In mapped Sensitive Habitat Areas, clearing of vegetation should be limited. In areas that have multiple habitat attributes, no clearing or cutting of vegetation should be permitted. In less sensitive areas, clearing may be permitted, but will be limited to the minimum area needed for building construction, roads, driveways and accessory structures, and as needed for safe sight distances. In any other undeveloped areas, clearing and alteration of topography should be minimized, with appropriate vegetation planted as needed to enhance or restore wildlife habitat.

Action 2.5.1.2 In all other undeveloped areas, minimize the impact of development. Fragmentation of wildlife and plant habitat should be minimized.

Strategies

- Regulations and policies should ensure the establishment of greenways and wildlife corridors of sufficient width to protect edge species and species that inhabit the interior forest through the protection or acquisition of large unfragmented areas and open space or cluster development. Wildlife should be provided with opportunities for passage through developed areas where such opportunities will maintain the integrity of wildlife corridors.
- Clearing of vegetation and alteration of natural topography shall be minimized, with appropriate vegetation planted as needed to enhance or restore wildlife habitat.
- Minimize fragmentation of wildlife and plant habitat and create green infrastructure by identifying and protecting wildlife corridors and existing large and unfragmented tracts, and by encouraging use of open space and cluster subdivisions.

Action 2.5.1.3 The Town shall develop and adopt ordinances limiting land clearing and alteration of natural topography. This is a high priority for implementation.

NATURAL RESOURCE PROTECTION

Section 2.6 Wastewater Management

Goal 2.6.1 Minimize wastewater contamination of water resources from private or public wastewater management systems to improve drinking water quality, with the ultimate goal of achieving an untreated water supply, and to improve the ecological integrity of streams, ponds and coastal embayments using all available data including Massachusetts Estuaries Program (MEP) data.

Action 2.6.1.1 Analyze contaminant capacity to assess impacts to public supply wells, potential public supply wells, private wells, wetlands, ponds, streams, coastal embayments, rare and endangered species habitats and future water resource areas from increased nutrients, pathogens, volatile organic chemicals or metals from wastewater.

Strategies

- To maintain the highest levels of water quality and to minimize contamination with other pollutants, such as pathogens and volatile organic chemicals, limit on-site sewage effluent discharges and density of development in Zones of Contribution to public supply wells.
- Prioritize locations within Zones of Contribution that are calculated to exceed contaminant capacities for remediation with connection to sewer or alternative wastewater treatment, either on-site, community or package sewage treatment plant.
- Implement Wastewater Facilities Plan strategies and actions.

Action 2.6.1.2 Development shall minimize, to the greatest feasible extent, contamination of water resources.

Strategies

- The town shall develop and adopt a sewer neutral policy that will apply to all properties and establish that development in a sewer area shall not modify any existing structure or change its use so as to increase sewage flow based on the sewage flow estimates listed in 15.02(13) 310 CMR 15.00, Title V of the State Environmental Code or Board of Health Regulation.
- Existing Board of Health Regulations adequately protect existing and proposed public water supply under S 232-5 and private water supply under S 360-27.
- To reduce impacts to public water supply, new and expanded developments located in zones of contribution to public water supply

wells that generate more than 2,000 gpd shall connect to sewer where available, or if not available, require innovative or alternative wastewater treatment.

- To reduce impacts to private water supplies, new and expanded developments that generate more than 2,000 gpd shall connect to sewer where available, or if not available, require innovative or alternative wastewater treatment.
- Identify and map land areas outside of Zones of Contribution with no abutting private well users. Develop regulations, similar to existing Board of Health regulations, to protect water supply in these areas.
- In sensitive barrier beach areas any construction of public sewers shall not allow increase in sewage flow from existing development. Such wastewater infrastructure shall be designed and constructed to protect sensitive habitats, maintain natural flood protection systems and withstand coastal inundation and erosion.
- The Hyannis Growth Incentive Zone growth center is served by the Town's Water Pollution Control Facility (WPCF).
- Commercial and multi-family development and redevelopment in areas outside the growth center generating more than 2,000 gpd sewage effluent shall connect to sewer where available or, if not available, require innovative or alternative wastewater technology or a private sewage treatment facility (PSTF).
- Residential development supported by the Town that is not located nor will impact environmentally sensitive areas and that also provide a public benefit through diversification of housing stock, provision of workforce housing or other substantial public benefit may generate more than 2,000 gpd. These developments shall connect to sewer where available or, if not available, shall make every possible effort to employ innovative or alternative wastewater technology or a PSTF.

Action 2.6.1.3 The Town will review Cape Cod Commission impaired groundwater areas designations and develop regulatory strategies as needed.

Strategies

- Continue to collect data from all water suppliers, monitor groundwater quality and analyze sensitivity of down gradient receptors.
- Water quality remediation efforts will be prioritized as determined through water quality data as evaluated and prioritized by the Town.

Action 2.6.1.4 The Board of Health shall continue to monitor and regulate the location of wastewater treatment facilities in environmentally fragile areas.

Goal 2.6.2 Encourage, in coordination with the Wastewater Facilities Plan, the use of public and private wastewater treatment facilities in appropriate areas where they will provide environmental or other public benefits.

2.6.2.1 To maintain water quality, manage wastewater flows in areas dependent on private wells.

Strategy

- Complete mapping of private water supply wells. Prioritize areas dependent on private wells for additional groundwater protection regulations.

Action 2.6.2.2 Locate private WTFs in areas where it is necessary to protect drinking water supply or to remediate impaired water quality.

Strategies

- Private and community wells and septic systems or wastewater treatment facilities (WTF) shall be located to avoid contamination. Development and redevelopment shall identify proposed well locations and any existing wells within 400 feet of the proposed and existing septic system or WTF effluent disposal area.
- The Town prefers that private WTF effluent receive tertiary treatment. In all cases, the nutrient removal rates shall be consistent with TMDLs or other water quality standards.

Action 2.6.2.3 Areas of Concern (AOC), which are priority areas for connection to the Wastewater Treatment Facility, are detailed in the Town's Wastewater Facilities Plan (WFP). To implement this plan the town will:

Strategies

- Seek final approval from DEP and the Cape Cod Commission.
- Conduct an analysis of potential effluent discharge sites. Implement expansion of the WPCF capacity consistent with this analysis.

Action 2.6.2.4 In accordance with the WFP, MEP and other available water quality data, prioritize wastewater remediation for environmentally sensitive areas such as: recharge areas to coastal embayments, fresh water ponds,

flood plains, zones of contribution and WP for public supply wells and private wells dependent areas.

Action 2.6.2.5 Implement WFP recommendations for effluent treatment to protect the sole source aquifer and its interconnected hydrological system of groundwater, fresh water bodies and coastal waters.

Action 2.6.2.6 Continue Health Department supervision of inspection and upgrade requirements for on-site systems in especially vulnerable environmentally sensitive areas such as ZOCs to public supply wells, private wells dependent areas, coastal flood plains, and pond recharge areas. Upgrades should be required according to a prioritization of these areas; also, incorporate recommendations of the MEP and WFP.

Strategies

- Continue Health Department identification and mapping project to identify septic remediation areas based on lot size, age and proper functioning of systems, soil conditions, depth to groundwater and nutrient loading prioritized by sensitive environmental areas.
- Establish discharge standard regulations for effluent disposal in environmentally sensitive areas.

Action 2.6.2.7 Continue to implement the septic betterment program through the County.

Strategies

- Continue to provide funds for low and moderate income property owners for upgrade of failed on site systems. Prioritize these funds for cases that involve a public health threat or threat to environmentally sensitive areas.
- Provide grants and revolving loan funds for low and moderate income property owners to connect to sewer where individual onsite systems have failed. Prioritize these funds for cases that involve a public health threat or threat to environmentally sensitive areas.

Action 2.6.2.8 Develop and adopt regulations to ensure that individual on-site septic systems design, location and maintenance minimizes contamination of drinking water, groundwater, surface waters, wetlands and rare and endangered species habitats and are also designed to easily connect to sewer infrastructure when it becomes available or when it is desirable to make the connection.

Strategy

- Locate future development outside velocity zones, barrier beaches and flood plains wherever possible. Inventory and map vacant land in velocity zones, barrier beaches and flood plains and develop regulations, such as mandatory cluster, sewer neutral requirements and site design standards, to manage development and ensuing wastewater impacts in velocity zones and flood plains.

Action 2.6.2.9 In accordance with the WFP, encourage the use of Private Sewage Treatment Facilities (PSTF), an important tool for wastewater management where sewer infrastructure is not available. The design, location and operation of PSTFs shall protect groundwater and surface water resources and be designed to easily connect to sewer infrastructure when it becomes available or it is desirable to make the connection.

Strategies

- PSTFs may be constructed only if there are no feasible public treatment facility options available or planned.
- The preferred design for new PSTFs shall be tertiary treatment as required to meet TMDLs or other standards. Where a PSTF is installed to remediate existing wastewater discharge, the requirements for tertiary treatment may be somewhat relaxed provided any down gradient water resource or other natural resource is satisfactorily protected.
- Prior to commencement of operation for privately owned PSTFs Town boards and agencies shall ensure that reliable maintenance, repair and eventual replacement is secured by cash surety or a bond deemed reliable by appropriate Town staff.
- In accordance with the WFP, the town shall regulate PSTFs ownership and management.
- The Town should identify acceptable PSTF technologies and explore regulations to require the identified standard.
- Through local regulations, ensure that application for and all approvals of PSTFs include a detailed plan for all residuals.

Goal 2.6.3 Encourage the use of innovative or alternative wastewater treatment technologies to achieve higher quality effluent discharge to better protect natural resources, especially water resources with the ultimate goal of achieving an untreated water supply and ecological integrity of streams, ponds and coastal embayments.

Action 2.6.3.1 Achieve a higher quality of wastewater treatment including reduced nitrogen and/or phosphorous in sensitive environmental areas by encouraging the use of innovative and alternative (I/A) on-site, community wastewater treatment facilities or sewer connections.

Strategy

- At the discretion of the Board of Health, septic system upgrades may be delayed so that alternative wastewater systems yielding higher quality effluent can be developed.
- The use of innovative/alternative wastewater treatment or sewer connection shall not allow increase of wastewater flows over what Title V allows.

Action 2.6.3.2 Explore adoption of a regulation that requires a minimum natural depth to groundwater for effluent discharge to provide maximum protection of sensitive environmental receptors.

Action 2.6.3.3 Methods for wastewater disposal in coastal recharge areas shall maintain or improve existing water quality. Advanced public and private sewage treatment in the form of connection to sewer, use of small treatment plants or I/A systems, is encouraged.

Strategy

- To maintain or improve water quality in coastal recharge areas continue to implement the Board of Health requirement for upgrading septic systems to denitrifying systems or use other nitrate-nitrogen or bacterial reducing methods. These requirements are triggered by the sale of a home or put in place as part of a local remediation program. Evaluate the need for expanding or altering this program based on all available water quality data. In no case shall wastewater flows exceed what Title V allows.

Action 2.6.3.4 Methods of wastewater disposal in freshwater body recharge areas, particularly in the 300' buffer to ponds, shall maintain acceptable water quality standards.

Strategy

- The Board of Health shall require that new septic systems in the recharge area to freshwater ponds shall help maintain an acceptable standard of water quality. Advanced public and private sewage treatment in the form of connection to sewer, use of small treatment plants or nutrient removing systems should be encouraged.

Section 2.7 Stormwater Management

Goal 2.7.1 Prevent contamination of the environment and public water supply through best management practices for stormwater.

Action 2.7.1.1 Continue to provide funding for remediation of town owned stormwater management systems which have been determined to contribute to contamination of fresh and marine water bodies.

Strategy

- Repair, upgrade or replace stormwater infrastructure or properly regrade roadways.
- "No Dumping - Drains To _____" should be marked on storm drains known to connect to outfalls to fresh or marine water bodies.

Action 2.7.1.2 To minimize impacts to sensitive environmental areas and water resources develop and adopt regulations that require road design standards that can properly manage generated stormwater for new roads and for reconstruction of existing roads.

Strategies

- Review Zoning Ordinance, Site Plan Review Ordinance and Subdivision Rules and Regulations (SRR) for necessary amendments to incorporate best practices for stormwater management including, but not limited to, low impact development (LID) standards.
- Maintain existing stormwater management regulations that prohibit direct discharge to surface waters. Ensure adequate flexibility for manmade surface waters or stormwater management systems that may have evolved into wetlands.
- SRR, Zoning and Site Plan Review ordinances should require deep soil borings at specified locations to ensure proper soil conditions for stormwater management systems.
- Develop and adopt Zoning and Site Plan Review ordinance and SRR amendments that minimize pavement by requiring clustered development, allowing greater flexibility for lot frontage requirements, shared lot access provisions changing road design standards to reflect use and location of roadways.
- Develop and adopt Zoning and Site Plan Review ordinance and SRR amendments that allow grassed or pervious paving options for parking areas.
- In sensitive environmental areas, require oil and grease traps with mechanisms to ensure their maintenance.

- Research, develop and adopt road design standards for the SRR and town roadways that significantly reduce storm water impacts such as direct drainage along the length of the roadway and other proven technologies.

Action 2.7.1.3 Direct discharge of stormwater into coastal and fresh waters or wetland resource areas including associated buffers and discharges at, above or below mean high water shall not be permitted. All direct untreated stormwater discharges to surface waters and wetlands should be redirected or treated to prevent impacts from heavy metals, hydrocarbons, bacteria, viruses, nitrate-nitrogen, phosphorous or other contaminants entering surface waters and wetlands.

Strategies

- The Town should continue to implement the Phase II Stormwater Management Plan developed with Woodard & Curran.
- The Site Plan Committee shall review stormwater management proposals for compliance with best management practices for all commercial and institutional uses. Regulations should also be developed to include residential uses in sensitive environmental areas that generate significant quantities of stormwater.
- The town should continue to fund stormwater connections and upgrades installed by DPW when roadways are opened for construction or other purposes.
- Swimming pool water shall not enter stormwater management systems. Develop and adopt regulations that set out best management practices for swimming pool water disposal. Best management practices for this activity include dispersing the water over lawn and landscaped areas where runoff into wetlands, fresh or coastal waters or stormwater management systems will not occur.

Action 2.7.1.4 All appropriate town regulatory boards and committees shall adopt, through regulation, Low Impact Development (LID) standards for stormwater management.

Section 2.8 Hazardous Materials and Waste Management

Goal 2.8.1 Prevent contamination of the environment and public water supply through best management practices for hazardous materials and hazardous waste.

Action 2.8.1.1 Support and expand recycling programs to reduce waste volumes and disposal costs.

Action 2.8.1.2 Enhance programs to prevent illegal dumping.

Strategies

- Explore increasing household hazardous waste days and/or adding once or twice per year grace for large goods fees at transfer station.
- Explore curbside pick-up. Retain free recycling drop off.
- Continue funding to protect open space from illegal dumping by restricting unauthorized vehicular access with the use of fences, plantings and gates.
- Ordinances prohibiting dumping should be reviewed for appropriate penalties.

Goal 2.8.2 Prevent contamination of the environment and public water supply through monitoring and enforcing regulations for fueling and servicing operations and underground fuel storage tank replacement.

Action 2.8.2.1 Ensure annual enforcement of required underground fuel tank replacements.

Action 2.8.2.2 Ensure that airport operations do not negatively impact public water supply.

Strategies

- The recent Cape Cod Commission Development of Regional Impact decision for the Barnstable Municipal Airport expansion includes provisions to address potential impacts to natural resources from airfield operations. In the event that the DRI permit is not exercised these protections shall be incorporated under existing regulatory schemes. The Barnstable Municipal Airport, the Town of Barnstable and the Cape Cod Commission should work to develop a master plan for future airfield uses.
- Cape Cod Airfield in Marstons Mills lies within groundwater protection district. Operations at this town facility should adequately protect natural resources including drinking water supply.

Action 2.8.2.3 Continue to maintain the town wide inventory of commercial fueling, fuel storage and vehicle maintenance operations including marine uses and unauthorized operations.

Goal 2.8.3 Prevent contamination of the environment and public water supply through best management practices for lawn and landscape chemicals.

Action 2.8.3.1 Lawn and landscaping chemicals pose a threat to fresh and marine waters, wetlands and sensitive environmental areas.

Strategies

- Retain natural vegetation wherever possible by clustering commercial and residential developments to the greatest extent possible. Standards for percentage of naturally vegetated area will vary according to the character and density of each land use category.
- Require a minimum of 6" of loam beneath new lawns and landscaped areas to provide some attenuation of lawn and landscape chemicals.
- To help reduce the amount of nitrogen in coastal waters and phosphorous in fresh waters, encourage the use of native species which require fewer applications of nutrients. Encourage the use of low impact/organic lawn and landscape products.

Action 2.8.3.2 Ensure that golf courses and agricultural uses such as cranberry growing employ best management techniques that minimize fertilizer and pesticide use.

Strategy

- Any new golf course or redevelopment of an existing golf course should limit greens and increase rough areas to minimize impacts of fertilizers and pesticides.
- Inventory active cranberry bogs and map in relation to sensitive environmental areas including GP and WP zones. Research existing regulations and determine if an education or regulatory program is necessary.

Goal 2.8.4 Prevent contamination of the environment and public water supply through best management practices for road de-icing.

Action 2.8.4.1 Identify methods to reduce road and parking lot de-icing applications in a safe and cost effective manner.

Strategies

- Continue Brewer Soluble Concentrate de-icing program. Support and continue DPW policies for moderate de-icing and reduction of environmental impacts from chemicals and sand through new technology and methods.

- Through education and other appropriate means, encourage similar de-icing methods for private parking lots, roadways and driveways.

Goal 2.8.5 Prevent contamination of the environment, coastal waters, sensitive coastal habitat, public and private recreation areas through proactive measures to prevent and prepare an off shore oil spills.

Action 2.8.5.1 Advocate for and support state and federal legislation and/or regulations to require:

- Double hulled vessels for shipping of petroleum products and other hazardous materials.
- Require local tug escorts to ensure that best practices for navigation are used.

SECTION 2.9 Public Education for Natural Resource Protection

Goal 2.9.1 Local residents should be involved in protection of natural resources so they can help maintain and improve the quality of life in their neighborhoods.

Action 2.9.1.1 The Town should continue public education efforts for water resource protection and planning through cooperation with other organizations.

Strategy

- Local schools should use ponds, wetlands, woodlands, grasslands and coastal habitats to illustrate principles of water quality and the aquatic ecosystem through means such as field trips, taking samples for testing, or presentations by town staff.

Action 2.9.1.2 Advocate use of water saving devices to reduce the need for additional water supplies and thereby lessen impact of pumping on groundwater and pond levels.

Action 2.9.1.3 Protect public health and ensure that private well water quality meets drinking water standards by encouraging owners to test water quality regularly. The town should map and monitor test results.

Strategies

- Through public education, encourage owners of private wells to perform water quality tests for bacteria, inorganics, and nitrogen every two years.

- Through public education, private well owners should be encouraged to test for volatile organic compounds at least every five years, and more frequently in locations near gas stations and similar uses.
- The town should enter private well water quality data on the GIS system so that problem areas can be mapped and identified as soon as possible.

Action 2.9.1.4 Discourage the use septic system additives. This does not include additives that may be required for alternative treatment systems.

Strategies

- Discourage through public education the use of septic system cleaners such as solvents such as TCE, TCA and naphthalene. Educate local businesses about the impacts of these products.
- Develop a small public education program to alert homebuyers and homeowners about maintenance requirements for septic systems and private wells, including the potential for upgrade requirements. Information should also be developed regarding fees for public water supplies and sewers.
- Continue education efforts about managing septic systems through a brochure mailing and articles in the Barnstable Bulletin to encourage regular pump out of septic systems. Systems should be checked at least every three years to determine if pumping is required.

Action 2.9.1.5 The town should continue educational programs, such as distributing a brochure with each transfer station sticker and articles in the Barnstable Bulletin, to educate residents about non-toxic household cleaners and the proper use and disposal of paints and stains.

Action 2.9.1.6 The town and the county should continue public education by securing additional funding to continue existing efforts to inform businesses of their responsibility for the proper storage and disposal of hazardous materials.

Action 2.9.1.7 Information on underground fuel tanks and re-routing of buried fuel lines should be added to public education groundwater protection material. The serious financial consequences of a leak should be emphasized.

Action 2.9.1.8 Encourage turf management techniques which reduce water and fertilizer needs through public education.

Strategies

- Encourage, through the site plan review process and public education, planting of drought and disease-resistant native species and plants common to Cape Cod to reduce water, fertilizer and pesticide use.
- Through public education, discourage the routine use of lawn chemicals. Encourage turf management, which reduces need for fertilizers: plant drought and disease-resistant lawn grasses; use water and lime in lieu of fertilizer; and use water insoluble fertilizer.
- Develop an education program to inform citizens and businesses including professional landscaping and lawn services of the effects of fertilizers, pesticides and herbicides on nearby coastal and fresh waters.

Action 2.9.1.9 High priority should be given to enforcement of existing regulations on development in the flood plain and to public education about flood action and flood proofing. Town officials should make available materials describing simple and inexpensive means of flood proofing, which may be obtained from agencies such as FEMA.

Strategies

- On developed land, private and public property owners should be educated and encouraged to maintain undisturbed natural buffer areas of 50-foot width around wetlands.
- Establish a public information program that informs the boating community about environmental and public health impacts of direct discharge of treated or untreated sanitary waste to coastal waters.
- Educational brochures should be distributed when mooring permits are renewed or new permits are obtained.
- Educate the public about the need and means for proper disposal of oil and other waste materials from boats. Include information about the disposal facility at the transfer station. Disposal sites at marinas and town landings should be watertight and allow secure storage until collection. All waste left in barrels at town landings should be collected by DPW after weekend accumulation.

Action 2.9.1.10

To reduce the amount of contaminants entering coastal waters from animal wastes, a public education program should be developed including effective signage in appropriate locations. Particular attention should be given to posting signs at Ways to Water. Regulations regarding waterfowl feeding and domestic animal waste cleanup may help control this problem.

Distribute this information at town licensing locations, veterinarian offices, pet boarding, grooming and care facilities.

Strategy

- The Board of Health should explore implementing barn regulations.

Action 2.9.1.11 Through a signage program vehicle, boat and pedestrian traffic should be discouraged in sensitive coastal areas as well as in wetlands, dunes, shallow estuarine areas, shorebird breeding and habitat areas.

Strategy

- Continue to prohibit storage of boats, seasonal piers, and floats on salt marshes, dunes, and other sensitive areas. Particular attention should be given to enforcing this on Town property.

Action 2.9.1.12 Develop and implement a program to educate owners of developed property about the environmental benefit from maintaining undisturbed natural buffer areas around freshwater wetlands and ponds. This program should include the proper placement and permitting process for unpaved pedestrian access paths and vista pruning.

Strategy

- Install informational signage at Ways to Water for ponds that describe allowed uses, and its ecology, significance and history. Explore grant funding for this program.

Section 2.B

Open Space and Recreation

OPEN SPACE AND RECREATION

To address the Cape Cod Commission requirements for Open Space and Recreation planning the Town's most recently approved Open Space and Recreation Plan (OSRP) is hereby incorporated into the CP.

The OSRP was completed by the Town in November 2005. Following the state mandated format, the OSRP includes many issue areas that are also addressed in other CP sections. The Open Space and Recreation Plan in its entirety is included in the Appendix. Since the OSRP has already been approved by the town, state and Cape Cod Commission, the OSRP will be incorporated in its original form.

The Open Space and Recreation Plan in its entirety can be viewed on the Town website at:

<http://www.town.barnstable.ma.us/GrowthManagement/ComprehensivePlanning/OpenSpaceRec/OpenSpace.asp>