



Town of Harwich

DRAFT

Open Space and Recreation Plan

March 1, 2017

TOWN OF HARWICH
OPEN SPACE AND RECREATION PLAN – 2017
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**TOWN OF HARWICH
OPEN SPACE AND RECREATION PLAN
2017**

I. PLAN SUMMARY

Summary of Recommendations, Goals, and Objectives

The 2017 Town of Harwich Open Space and Recreation Plan is the second update of a plan first adopted in 1998. This updated plan incorporates information and recommendations from the approved 2011 Local Comprehensive Plan and other town documents such as the draft 2013 Comprehensive Wastewater Management Plan. This plan includes an assessment of current open space and recreation needs, a statement of goals and objectives to fill the Town's needs, and an action plan in which to meet these goals.

The open space recommendations from the 1998 Open Space and Recreation Plan sought to preserve a significant amount of permanent open space at minimal cost to the Town. Utilizing proposed zoning amendments in concert with strategic land acquisitions, several hundred acres town-wide were targeted for preservation. The plan sought to create greenbelt areas containing contiguous open space as well as setting priorities for land acquisition. Along with creation and preservation of permanent open space, the plan sought to restore and protect associated natural resources.

Recommendations pertaining to recreation included enhancement, protection, and linkage of existing trail corridors, more active recreation facilities, greater utilization of the Harwich Community Center, and improved access to recreational facilities for disabled residents.

The most significant change in the 2010 Open Space and Recreation Plan update was a recognition that with increased land ownership and stewardship, increased attention must be given to land management issues. Whether focusing on land acquisition or management, original goals from the 1998 Open Space and Recreation Plan are still valid in the 2017 Open Space and Recreation Plan:

- ✧ Preserve and enhance the management of open space in Harwich
- ✧ Protect natural resources and community character through growth management strategies
- ✧ Preserve and enhance groundwater and surface water; coastal water and adjacent shoreline areas; inland and coastal wetlands; and wildlife and plant habitats
- ✧ Preserve and enhance opportunities for passive and active recreation in the natural environment to meet the needs of both residents and visitors

II. INTRODUCTION

A. Statement of Purpose

The 2017 Open Space and Recreation Plan bridges vision statements from the approved 2000 and 2011 Town of Harwich Local Comprehensive Plans.

From 2000: “We see the residents of Harwich coming together to support those actions that will enhance the small town atmosphere that is prized by current residents and visitors alike. The outcome will be a pleasant environment for living, working, recreation and shopping with enhancement of existing village centers and commercial areas. We will take those actions necessary to provide for the appropriate use of land and a variety of housing types, residential densities, and neighborhoods in order to maintain social diversity. All actions will be consistent with the carrying capacity of Harwich’s natural environment, the Cape Cod Commission’s Regional Policy Plan, and the ability to support the required infrastructure.”

From 2011: “We cannot fail to recognize, protect and enhance the vitality of our cultural, recreational and natural assets that are so essential to our residents, non-resident taxpayers, and seasonal guests alike ... Pursuit of this vision pays homage to our unique coastal environment and vibrant New England traditions of independence and self-determination.”

The 2017 Open Space and Recreation Plan uses the above statements of purpose and establishes a comprehensive framework to guide the Town toward providing and protecting a greater quantity of quality open space and recreational facilities.

B. Planning Process and Public Participation

The 2017 Open Space and Recreation Plan draws from the 1998 and 2010 Open Space and Recreation Plans and the 2000 and 2011 Town of Harwich Local Comprehensive Plans. A number of public meetings and public hearings were held over several years to allow the public the opportunity to comment on the content of the Local Comprehensive Plan. In addition, discussions of various Local Comprehensive Plan elements took place with other Town agencies, and various governmental bodies. Open Space and Recreation is a very important subject to the Town and a topic that was discussed at length at meetings of the Planning Board, Real Estate and Open Space Committee, Conservation Commission, Trails Committee and Youth and Recreation Commission to come to a consensus on the direction the community should take to provide for more and better passive and active recreation opportunities.

The Planning and Conservation Departments were the primary researchers and writers of the draft 2017 Open Space and Recreation Plan update. Key department heads, such as the Natural Resources Director and the Recreation Director were asked to review and update relevant sections of the 2010 plan. Various boards and committees - the Planning

Board, Conservation Commission, Recreation and Youth Commission, Real Estate and Open Space Committee, Trails Committee, and Bikeways Committee were asked to review and comment on Goals and Objectives from the 2010 plan.

In June 2015, Conservation and Planning Department staff posted an online community survey and circulated paper copies of the survey at Town Hall, the Brooks Free Library, and the Harwich Community Center. Survey responses (Section VII.1) provided an important gauge of public attitudes towards open space and were considered carefully in preparation of this draft Open Space and Recreation Plan.

The initial draft was prepared based on the above input and submitted to the Executive Office of Energy and Environmental Affairs (EOEEA) in July 2015.

Following receipt of a comment letter from EOEEA in November 2015, the draft plan was presented to the public at a public hearing held by the Conservation Commission on January 28, 2016. The public hearing was well advertised with e-mails sent to Town committees, a notice on the Town website, and advance news articles in the local newspaper (see Appendix A). Both verbal and written comments on the draft plan were received at the public hearing.

III. COMMUNITY SETTING

A. Regional Context

1. Location

Harwich is located in the Lower Cape area, approximately twenty-four miles from the Cape Cod Canal and roughly twenty-seven miles from Provincetown, the tip of the Cape. It shares borders with Dennis to the west, Brewster to the north, and Chatham to the east. A common boundary with Orleans (to the northeast) exists in Pleasant Bay. Harwich is generally within twenty minutes driving time of Hyannis and Orleans, two nearby centers of economic activity. It is also along the way to the Cape Cod National Seashore and Chatham which are visited each year by a great number of tourists.

Figure 1 shows Harwich's location on Cape Cod

Cape Cod, which comprises all of Barnstable County in Southern Massachusetts, is a sandy, resort-oriented peninsula within easy driving distance of three metropolitan areas: Boston; Providence, RI; and New Bedford/Fall River. Cape Cod is a convenient destination for residents of these areas seeking the various travel and tourism related features the Cape has to offer. Although less convenient, the Cape is a reasonable drive away from many other growing northeastern metropolitan areas, including New York City; Hartford, Connecticut; Albany, New York; Montreal, Quebec; Manchester, New Hampshire; and Portland, Maine. Given its accessibility and appealing natural and built features, it is reasonable to expect continued levels of high seasonal activity on Cape Cod.

2. Attractive Resort, Second Home and Retirement Area

Cape Cod is widely known as a resort area. Each year, a large number of people visit Cape Cod, especially in the summer. While the average length of stay by overnight visitors has diminished in recent years, the number of day trippers has increased. This is one factor which has contributed to the increase in traffic volume over the Cape's two access bridges. Lodging, restaurants, gift shops, and recreational facilities have proliferated over the years to accommodate the ever-growing visitor demand. In Harwich, the number of motels has declined while second homes have increased. Many of these homes are rented weekly throughout the summer.

The number of retirees on Cape Cod has grown considerably in recent years. A clean and beautiful environment, relatively low property taxes and a generally slower pace of life are factors which continue to draw more and more retired residents

3. Access

Harwich can be reached by many different approaches, the most heavily traveled being Route 6, a limited access state highway. There are two Route 6 interchanges (Exits 10 and 11) in Harwich which provide safe and convenient access to the interior areas of the Town. Another state highway running east-west through Town is Route 28, which provides access to commercial and salt water beach areas. Harwich may also be approached from the north via Routes 124, 137, 39 and Depot Street; from the east and southeast via Queen Anne Road and Route 137; and from the west via Old Chatham Road, Depot Street, Route 28 and Lower County Road. Bus transportation has increased with the addition of the Flex Bus service to Hyannis and Provincetown.

The Town is also accessible via three marinas on Nantucket Sound, and Chatham Airport which is roughly ten minutes from Harwich Center. No rail service exists.

4. Town Interrelationships

There are seven areas of Town which share certain common aspects and influences with portions of Harwich's neighboring towns. These are identified briefly below:

South Harwich/South Chatham – These two areas share similar levels of mixed residential and commercial development along Route 28, as well as a compatible scale of architecture and character.

East Harwich/Chatham – Environmental features such as Muddy Creek, the Pleasant Bay Area of Critical Environmental Concern, and zones of contribution to public water supply wells are common to these two areas.

East Harwich/Brewster at Route 137; East Harwich/Brewster at Route 124; East Harwich and Pleasant Lake/Brewster at Long Pond; Pleasant Lake/Brewster at Seymour's Pond – Each of these four areas enjoy a general consistency of land use and character. All four have recreational ponds in common.

North Harwich/Brewster at Westgate Road and at Depot Street – These areas have a similar rural and somewhat remote character which is enhanced by the considerable amounts of undeveloped, publicly owned land in both towns.

North Harwich/South Dennis at Great Western Road and at Depot Street – Industrial uses in both communities are fairly consistent and compatible except at the Depot Street border where there is a conflict of land use between residential and industrial. This industrial area bears no evidence of a town boundary running through it and can be viewed as a single geographic place.

West Harwich and Dennisport at Route 28 and at Lower County Road – The density, styles, and quantities of residential and commercial uses in these areas are generally consistent between towns. The most prominent common aspect is the seasonal nature of many of the uses.

5. Growth Implications

The Town's growth has slowed since 2000. However, large tracts of residential land remain undeveloped, particularly in the Six Ponds District bounded by Routes 6, 124 and 137 and by Queen Anne Road. Proximity to Nantucket Sound and the ocean has caused considerable redevelopment activity with smaller homes being demolished and larger houses built. Related to this is the existing and potential pressure for more retirement housing due to Harwich's location in resort/retirement areas.

The Town is seeking to channel commercial development to its existing villages and designated zoning districts. Efforts are being made to revitalize Harwich Center and to continue modest upgrades in Harwich Port. The greatest current growth potential is in East Harwich, and the Town is exploring new zoning that will change this location from commercial to a pedestrian-friendly mixed-use district.

While growth rates are likely to remain modest, much of the Town's remaining undeveloped land is subject to further development. The Town will seek continued protection of existing open space areas and expansion of open space and recreation amenities to balance any new development that occurs.

6. Institutional Relationships

In March 1990, Cape Cod voters established the Cape Cod Commission, a regional land use planning and regulatory agency with powers to regulate Developments of Regional Impact. Under the Cape Cod Commission Act, sub-areas within one or more towns can be designated "Districts of Critical Planning Concern". Harwich took advantage of this designation in 1999 by creating the Six Ponds District of Critical Planning Concern. This designation enabled special district zoning bylaws to be created to guide and regulate growth and protect critical resources within the Six Ponds area.

The Cape Cod Commission also prepares and updates the Barnstable County Regional Policy Plan, which provides consistent and specific guidance for the development of land use plans and regulations in each of the Cape's fifteen towns. The Act encourages the

creation of local comprehensive plans which are consistent with the goals and policies of the Regional Policy Plan. Those towns which produce plans which are certified as consistent with the regional plan are entitled to assess and collect impact fees on new development and enter into development agreements. Such agreements allow for negotiations between the Cape Cod Commission, a town, and a developer to establish the specific development regulations that will apply to the subject property during the terms of the agreement.

The Commission's authority to directly regulate large developments has an impact on the issuance of local permits. Under the Act, a municipal permitting agency such as the Planning Board or Board of Health, must suspend its review of an application for a development which meets one or more of the thresholds for Developments of Regional Impact (DRIs), immediately upon determining that it qualifies as a DRI. Once a decision approving the development is issued by the Commission, local review may resume.

7. Inter-jurisdictional Arrangements

Portions of Harwich are involved in the following two inter-jurisdictional arrangements:

- a. Pleasant Bay Area of Critical Environmental Concern (ACEC) – The Towns of Harwich, Chatham, Orleans and Brewster have land in the Pleasant Bay ACEC. The towns, together with the Pleasant Bay Resource Management Alliance, have prepared and updated a Pleasant Bay ACEC Resource Management Plan. Recent work includes a study of hydrodynamic scenarios to determine the optimal culvert size to improve flow between Muddy Creek and Pleasant Bay and distribution of information on best practices for fertilizer use.
- b. Drinking Water Resource Protection Districts (DWRPDs) – Harwich, Brewster, Chatham and Dennis have cooperated to establish mutually supportive DWRPDs in order to protect the drinking water supplies which straddle town boundaries. The 2008 Harwich Annual Water Quality Report cited a recent study of the Monomoy Lens by the United States Geological Service which concluded that we are using 4% of the available water for our water supply.

The Towns of Harwich and Chatham are formulating a Memorandum of Understanding to have wastewater from East Harwich treated at the Chatham Wastewater Facility.

B. History of Community

The Upper Cape Towns of Sandwich, Barnstable and Yarmouth were incorporated by 1639. The "Pamet Lands", including the Outer Cape Towns of Orleans, Eastham, Wellfleet, Truro and Provincetown were purchased in 1644 and incorporated as Nauset in 1646. The territory in between these towns included Indian land and part of the land known as "Purchases or Old Comers Reserve". John Wing appears to have been the first settler in this new territory in 1658 in what is now Brewster. In 1667, an Indian Chief gave John Mecoy a thirty-six acre parcel of land in what is now Harwich Center. Gershom Hall, the first white man to reside in Harwich, settled on this land in 1668.

By 1694, there were enough settlers in the territory to support a minister, this being a requirement for application for incorporation by the General Court of the Massachusetts Bay Colony.

This large tract of land, the largest in Barnstable County, remained intact until 1772, when the southeastern part was set off to Eastham. In 1803, after a bitter struggle, the north parish and the south parish separated into the Towns of Brewster and Harwich.

By 1820, Harwich had evolved into seven villages, each with its own school and at least one general store. Most also had a tavern and hall. Along Nantucket Sound ships were constructed in West Harwich, fishing and shipping prevailed in Harwich Port, and farming supplemented fishing activities in South Harwich. Harwich Center was the mercantile and intellectual hub. North Harwich was a center for farming and light industry, and cranberry cultivation was prominent in Pleasant Lake.

Farming, although common in the 18th century, never thrived in Harwich due to sandy soil and limited land for large-scale farming. As more and more land was cleared and farmed, the soil became depleted and runoff affected the quality of local watersheds. Forests eventually returned, though as secondary growth of smaller trees. By the end of the 19th century farming, other than cranberries and strawberries, declined on Cape Cod.

While other crops were limited, cranberry growing thrived in Harwich from the mid-19th century into the 20th century. Commercial cultivation of cranberries began in Harwich in the 1840s. In the 1860s Harwich was Barnstable County's leading producer with 209 acres under cultivation. The construction of a railroad line between Harwich and Orleans resulted in rapid delivery to increasing markets. In 1900, 12% of the work force in Harwich were working in agriculture, almost all in cranberry growing. Many were immigrants from Cape Verde who began arriving in Harwich in the 1880s.

The 18th and 19th centuries also were characterized by maritime activities in Harwich. One significant limitation was the lack of harbors on Nantucket Sound. Between 1845 and 1853 nine wharves were built in Harwich. Around 1850, Harwich was homeport for 48 vessels which produced 14,605 barrels of fish. At the start of the Civil War, commercial fishing was the mainstay of the local economy. Commercial shipping expanded rapidly to meet wartime needs, but fishing declined after the war. Larger vessels required deeper harbors. Many harbors began to silt because of erosion caused by deforestation. Because of their open location on Nantucket Sound, Harwich piers had an ongoing problem with storms and winter icing.

In 1887, fifty men dug a channel by hand from a coastal pond, creating Wychmere Harbor. A town pier was built there in 1927. Allen Harbor was dredged in 1905, opening its narrow outlet to the sea. In 1968, a tidal inlet known as Andrews River was dredged to create Saquatucket Harbor and a new marina was built there.

A modest amount of manufacturing activity took place in Harwich throughout the 19th century. Introduction of the sewing machine in the 1850s led to opening of an overall factory in Harwich in 1865. North Harwich was the home of a cotton and woolen mill; a small fleet of boats was built in West Harwich out of native lumber; Harwich Port activities included manufacturing soap, weaving palm fronds into hats and mats, and manufacture of fishermen's boots and slippers; and there was a tannery in South Harwich.

A new economic activity on the Cape and Islands, tourism, began in the late 19th century as travel became easier. The train and especially private cars made the Cape accessible. Early on, tourism was characterized chiefly by individual purchase of 2nd homes and adaptive use of large homes and inns for seasonal guests. Later, the popularity of railroad travel encouraged construction of large resort hotels, frequently oriented toward railroad customers. After 1920, a tremendous increase in auto usage permitted seasonal visitors to build anywhere they chose. This time period also reoriented hotels and other service facilities toward the rapidly expanding highway network.

After World War II, purchase of 2nd homes accelerated. Many old homes were sold and torn down to make way for larger, more modern residences. Subdivisions were constructed. The number of people retiring year round to the Cape increased significantly. Between 1940 and 2003, Cape Cod's population increased 515% with Harwich at 489%. Concerns grew about overdevelopment, rising home prices, and increased demand on water and other resources.

Today, Harwich encompasses 20.93 square miles of land area with 10.9 miles of tidal shoreline. It is located in the 10th Congressional District, The Plymouth, Cape and Islands State Senatorial District. With miles of rivers and marshes and a coastline of sandy beaches dotted with the Town's four picturesque harbors, Harwich has the unique ability to provide every form of aquatic activity available: quiet canoeing and kayaking through the great marshes or the Herring River, water skiing on Long Pond, deep sea fishing out of the harbors, fly fishing in several of the smaller ponds, or swimming and sunbathing on the sandy Nantucket Sound and Pleasant Bay beaches.

Harwich has been fortunate to have had the foresight to maintain public access to all of these activities. However, with the demand for private ownership that comes with rapid growth the Town must strive to continue to plan ahead, expand ownership and increase the access to these amenities to insure availability to future generations.

1. State Register of Historic Places

The Captain James Berry house in West Harwich and the South Harwich Methodist Church were added to the State Register of Historic Places in 1986. The Chase Library in West Harwich was added to the National Register of Historic Places in December 2014.

2. Existing Historic District

The Harwich Center Historic District was designated as such by the Town in 1973 and added to the State Register of Historic Places in 1975.

3. Historic Resources Inventory/Survey

The Harwich Historical Commission, with the help of an architectural/cultural history consultant, from 1992-1993, conducted an historic resources survey for the Town of Harwich. The historic survey accomplished several goals: identified approximately 250 structures constructed before 1940 (this number is probably a quarter of the amount that was built during that time); provided an important historical record of community resources; helped to raise public appreciation and understanding of local historic properties and sites; formed the basis for actions that the Historical Commission, the Planning Board, and other town bodies undertake; alerted local government officials that historic properties are a legitimate area of concern; and provided the ground work for the development of a preservation plan for the Town.

The Harwich Historical Commission is updating the historic survey in 2016 to identify all homes at least 100 years old.

4. Inventory of Prehistoric or Archaeological Resources

An archaeological survey of the Pleasant Bay area was completed in 1987 and considered seventy archaeological sites in that estuary system. Harwich was identified as potentially being home to several sites in areas such as the Herring River and Muddy Creek. Fresh water areas were an important focus of prehistoric civilizations.

5. Scenic Landscapes

Harwich has many different types of scenic landscapes, which include;

- * almost eleven miles of tidal shoreline along Nantucket Sound and Pleasant Bay;
- * four harbors, where Round Cove is the only naturally occurring one and Wychmere, Allen's and Saquatucket were once pond and/or marsh areas dredged out to the sound to provide protection for sea vessels;
- * many bogs which are scattered throughout Harwich providing year-round scenic enjoyment;
- * twenty-two freshwater ponds and two reservoirs;
- * two scenic river corridors: Herring River and Muddy Creek; and
- * over 320 acres of forests, water and wetland in the Bells Neck Road/Salt Marsh/Reservoir Area.

Through purchases using Cape Cod Land Bank and Community Preservation Act funds, the Town has been able to acquire additional scenic landscapes including several cranberry bogs and significant areas of undeveloped pond frontage.

6. Culturally Significant Landscapes

Each of Harwich's seven villages contains culturally significant landscapes involving historic village centers, churches, scenic roads and other parts of the built environment. Many of these resources are described in the village hearings held during the preparation of the previous Open Space and Recreation Plan (Appendix A).

The 2007 Heritage Landscape report for Harwich describes a number of sites that are part of the town’s cultural heritage landscape, defined as “the special places created by human interaction with the environment that help define the character of a community and reflect its past.” Sites range from environmental (Great Swamp Cranberry Bog) to neighborhood (Ocean Grove) to cemetery (Kelley Street and Old Methodist).

C. Population Characteristics

1. Size

Harwich experienced rapid population growth between 1960 (3,725 population) and 2000 (12,386 population) according to the US Decennial Census data. The rate of growth has slowed from a 58% increase in population between 1960 and 1970 to a 21% increase between 1990 and 2000 and an almost level population since 2000. American Fact Finder estimates from the US Census Bureau indicate a 2013 population of 12,223.

2. Distribution and Density

For voting purposes, the Town is divided into 4 precincts. Precinct 1 is made up of all of West Harwich and parts of Harwich Port and Harwich Center. Precinct 2 includes all of South Harwich and a portion of Harwich Port. Precinct 3 includes most of East Harwich and Pleasant Lake. Precinct 4 includes most of North Harwich, and portions of Pleasant Lake and Harwich Center. Populations for the precincts are as follows (from 2015 Town of Harwich Census):

Precinct 1: 3,105
Precinct 2: 2,994
Precinct 3: 3,153
Precinct 4: 3,018

The highest level of year-round occupancy has historically occurred in North Harwich, while Pleasant Lake, East Harwich and Harwich Center areas are also predominantly year-round occupancy. Density for the Town of Harwich is 563 persons per square mile or .91 persons per acre. Regions within the Town have widely differing densities: West Harwich and portions of Harwich Port contain older waterfront neighborhoods with dwellings on lots of less than 5,000 square feet, while parts of North Harwich contain dwellings on lots of several acres.

3. Age/Sex Composition

Harwich, like much of Cape Cod, has a higher than average share of residents over 65. Statewide, 14.1% of the population fell into this age group in 2013. In Harwich they represented 27.5% of the Town’s population. Residents aged 0 to 24 made up a slightly lower share in Harwich at 33.2% as compared to 41.7% in all of Massachusetts. According to the 2010 US Census, the average age of Harwich residents was 51.0 years compared to 39.2 years in Massachusetts.

4. Environmental Justice Population

The Massachusetts Office of Energy and Environmental Affairs lists one Environmental Justice census block in Harwich. Environmental Justice populations are those deemed to

be most at risk of being unaware of or unable to participate in environmental decision-making or to gain access to state environmental resources. In Harwich, the identified census block qualifies for designation as an Environmental Justice area because it has a median annual household income at or below 65% of the statewide median income.

The Harwich Environmental Justice area constitutes portions of Harwich Port and Harwich Center (see Figure 2). While average income may be low, property values in Harwich Port are well above state and county averages. The area is characterized by an older population with an average age well above other parts of town, the county and the state. Fortunately, for the many elderly residents who rely on retirement rather than earned income, property taxes are relatively low. Most homeowners are able to continue living in their homes despite very modest incomes. Older residents who rent their homes benefit from the availability of several single-family and multi-family projects in Harwich Port and Harwich Center.

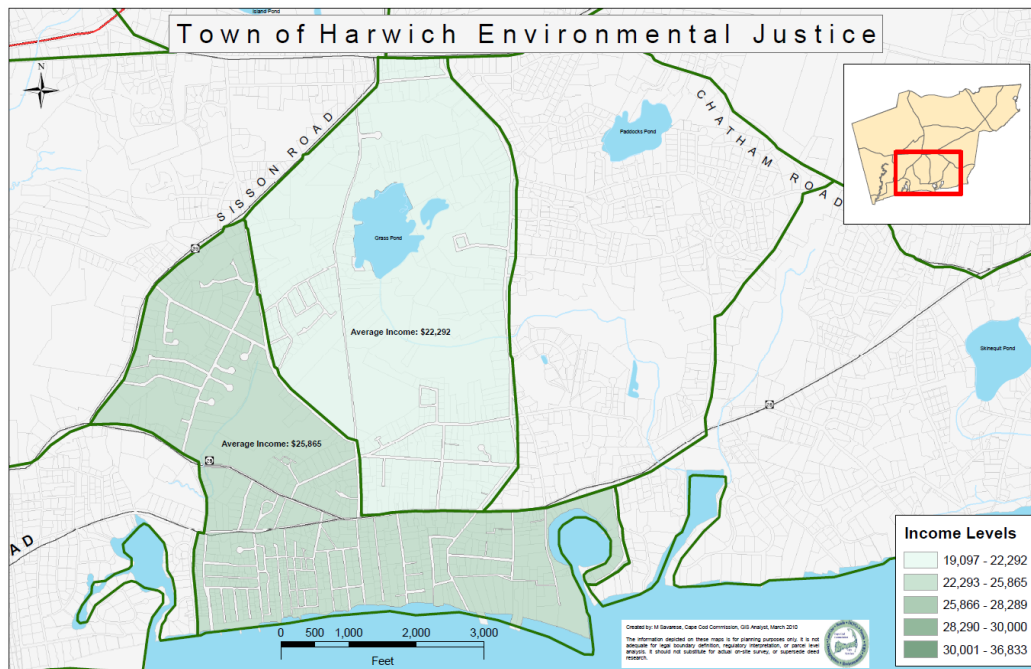


Figure 2: Environmental Justice area in Harwich

The Environmental Justice area in Harwich does not suffer for lack of access to environmental resources. Beaches and harbors are within a short walking distance. Walking trails and natural areas are plentiful in the immediate vicinity. Residents have full access to environmental decision-making in town, and several town board members reside within the Environmental Justice area.

5. Economy

a. Resource Based Industries

Cranberry Farming

Approximately 200 acres of bogs in Harwich are depicted in Figure 11, “Open Space Inventory”. However, several of these bogs, such as the “Bank Street Bogs”, are no longer being used for growing cranberries. The cranberry-growing industry suffered from a 1999 price collapse, but activity has increased in recent years. Statewide, the average yield in 2008 was 182 barrels per acre at an average price of \$57.60 per barrel.

Fishing/Shell-fishing

There has been a recent decline in the number of active year-round fishermen. Regulation changes to increase fish populations have made it more difficult for fishermen to make a living. The total value of fish and shellfish landed in Harwich declined from \$2.2 million in 2005 to \$1.2 million in 2007.

The Town has actively encouraged shellfish activity in recent years. The Town began rearing shellfish in its Wychmere Harbor Shellfish Laboratory in 1994 and has grown 26.7 million quahog seed since then. In 2007 shellfish from the lab were seeded in Herring River, Allen Harbor, Wychmere Harbor, Saquatucket Harbor, Pleasant Bay/Muddy Creek, and Round Cove. Family harvests in 2007 yielded an estimated 646 bushels of quahogs, 30 bushels of oysters and 277 bushels of softshells.

Areas suitable for shellfish have been designated by the Massachusetts Division of Marine Fisheries with collaboration of local shellfish constables and fishermen. The areas include sites where shellfish beds have been located from 1970-present. There may or may not be shellfish in these areas, but these areas are potential shellfish habitat. A site-specific survey would better determine shellfish presence and distribution. These mapped areas have favorable habitat conditions for species of shellfish such as oysters, quahogs, razor clams, scallops, and soft-shell clams. In Harwich, no new water-dependent structures are permitted within state or town-mapped shellfish habitat in order to protect this resource.

The conservation commission requires mitigation in the form of the addition of shellfish to the marine environment in return for permitting docks in waters that are not considered important shellfish habitat and do get permitted.

b. Income and Employment

According to American Factfinder estimates from the US Census Bureau for 2013, Harwich had a median household income of \$62,927 per year. This is slightly higher than Barnstable County (\$60,526) and lower than Massachusetts (\$66,866). Harwich has a greater share of its population with mid-level incomes. The percentage of families with income between \$25,000 and \$100,000 per year is 64.4% which is higher than both Barnstable County (56.6%) and Massachusetts (46.5%). Family income in Harwich is less pronounced at either end of the income range. 4.1% of Harwich families have an income of more than \$200,000 per year, below that of Barnstable County (6.5%) and Massachusetts (10.8%). The percentage of people below poverty level also is lower in Harwich (3.5%) than in Barnstable County (6.0%) or Massachusetts (8.1%). Income derived from work is lower in Harwich (66.8%) than in Barnstable County (69.8%) or

Massachusetts (78.7%). Correspondingly, income from Social Security and retirement is higher in Harwich.

According to American Factfinder estimates from the US Census Bureau for 2013, fifty percent of Harwich residents are in the labor force compared to fifty-five percent in Massachusetts. Reflecting the state of the local economy, the percentage of service occupations in Harwich (19.6%) is slightly above those in Barnstable County (18.4%) and considerably higher than Massachusetts as a whole (15.8%).

The 2014 Community Development Strategy for the Town of Harwich describes employment in the town as follows: “The seasonal and retirement nature of the community creates jobs, particularly in the construction and service sectors – landscapers, painters, repairmen, restaurant workers, retail clerks, etc. However, younger workers are challenged to raise families on income from jobs that often are less than year-round. Much of the public sector’s focus is on jobs that will pay higher wages and will provide full-year employment. Technological improvements, such as the Open Cape Telecommunication Infrastructure project (LCP p40), seek to attract both companies that will choose to locate in our beautiful setting and individuals who can conduct business via computer connections from their primary or second home.”

D. Growth and Development Patterns

1. Patterns and Trends

As Section III.B demonstrated, Harwich developed as a coastal town where farming, fishing and whaling were the main industries until the latter part of the 19th century. Village centers tended to spring up along the shoreline, where commercial businesses and residences mixed.

After the railroad made its way to the Lower Cape area, hotels were built to bring the many tourists who were escaping the ever-growing urbanized areas for the tranquility of the seashore. Tourism is now the main industry on Cape Cod and in Harwich. Businesses which cater to tourists are found in most all village centers in all towns in Barnstable County.

This section describes existing patterns of development and discusses how regulatory controls and development pressures may affect how the character of Harwich changes as it approaches build-out.

a. Local Land Use Controls

Zoning was first adopted by Harwich Town Meeting in 1951. The original Zoning Bylaw established a minimum lot size of 7,500 square feet for a dwelling which was subsequently amended to 10,000 feet in 1959, and 15,000 square feet by 1967. The minimum frontage requirement was seventy-five feet until it was changed to 100 feet in 1971.

The original bylaw facilitated the basic land use patterns in place today: commercial along Route 28, 200 feet either side of the highway, and the remainder residential and agricultural. It remained unchanged until 1964 when it was amended to include a Conservancy District which was a predecessor to the Wetlands Protection Act (non-zoning). Other amendments between 1966 and 1970 created the Highway and Shopping District which is today's CH-2 Zone at Routes 137 and 39, and Industrial Districts which are portions of today's IL Zones along Great Western Road and Queen Anne Road.

As of May 1988, the minimum required area for single-family purposes anywhere in Town became 40,000 square based on a finding that one unit per acre feet was the maximum acceptable density to protect the drinking water supply. The minimum required frontage became 150 feet. Any new lots created after that date must contain at least 40,000 square feet and 150 feet of frontage in order to accommodate a single-family dwelling. Lots in existence prior to that date may be buildable if they were lawfully created and meet the minimum area and frontage requirements of the Zoning Bylaw in effect at the time of layout.

More than half of existing built upon parcels are substandard lots, in areas of existing high densities. Density differentials have produced a variety of different neighborhoods. High densities may impact: Pleasant Bay Area of Critical Environmental Concern, John Joseph's Pond, Buck's Pond, Hinckley's Pond, Herring River, West Reservoir, Sand Pond, Grass Pond, Allen's, Wychmere, and Saquatucket Harbors, Skinequit Pond, Red River, and the immediate shoreline of Nantucket Sound.

b. Existing Zoning Districts

The Town of Harwich is divided into twelve zoning districts, which are designated as follows:

Residential – Rural Estate	R-R
Residential – Low Density	R-L
Residential – Medium Density	R-M
Residential – High Density 1	R-H-1
Residential – High Density 2	R-H-2
Residential – High Density 3	R-H-3
Commercial – Village	C-V
Commercial – Highway 1	C-H-1
Commercial – Highway 2	C-H-2
Industrial – Limited	I-L
Multi-Family Residential – Low Density	M-R-L
Multi-Family Residential – Low Density 1	M-R-L-1

Figure 3 indicates the current zoning district designations.

In addition, the Town has created six zoning overlay districts, as follows:

Village Commercial Overlay District

Harwich Center Overlay District	
Personal Wireless Service Overlay District	P-W-S
Elderly Affordable Housing	E-A-H
Drinking Water Resource Protection District	W-R
Six Ponds Special District	

Of the six overlay districts, the Drinking Water Protection District and Six Ponds Special District are significant for purposes of water resource protection.

c. Year 2000 Analysis of Development Potential and Impacts

The 2000 Harwich Local Comprehensive Plan (LCP) discussed the potential for additional growth in Harwich in the Land Use/Growth Management chapter. The potential for almost 2,800 new residential dwelling units together with the increase in traffic volume anticipated by the increase in residences, led to the recommendation in the LCP that the acquisition of open space could reduce the potential impact on town services and town roads.

The Land Use/Growth Management chapter of the 2000 LCP also states that the quality of life and economy in Harwich are closely tied to the quality of the natural environment. The chapter states that water quality protection is one of the significant resource concerns:

“The quality of the Town’s drinking water and its recreational waters and wetlands depends on effective management strategies as more people inhabit the Town and as more year-round occupancy occurs. Since we have largely inherited the development patterns that continue to threaten these resources, the solution lies in reducing future development potential and mitigating the pollution impacts of existing land uses.”

In addition,

“Environmentally sensitive areas are known and mapped and must be part of an aggressive and strategic land protection program before development further destabilizes the natural balance of the Town’s water resources. Other unique habitats must also be included in this approach. In addition, the findings of the Priority Land Acquisition Assessment Project, June 1999, prepared by the Cape Cod Commission, indicate a need to secure certain strategic lands in Harwich for future water supply.”

The possibility of buildout development was of great concern to the Town’s citizens. Table 1 from the 2000 EOE A Buildout Analysis indicated the following additional development potential in Harwich:

Table 1 Additional Development Potential and Impacts

Developable Land Area (sq ft)	172,063,133
-------------------------------	-------------

Developable Land Area (acres)	3950
Residential Lots/Dwellings	2780
Commercial/Industrial Buildable Floor Area (sq ft)	3,698,060
Residential Water Use (gpd)	256,705
Commercial/Industrial Water Use (gpd)	277,355

From EOEI Buildout 2000 for Harwich

The Town of Harwich Local Comprehensive Plan, approved by Town Meeting voters in May of 2000, suggested the use of several key concepts to allow development to occur in Town without diminishing property owners' rights.

a. Adoption of a “no net change” philosophy in terms of ultimate population and commercial space potential. This philosophy reflects a desire by the Planning Board to achieve a win/win outcome for the Town and property owners such that the former can encourage the cooperation of the latter in achieving the Town’s planning goals without placing an undue burden on property owners. This approach requires managing growth by shifting development pressure from sensitive to less sensitive areas through incentives and reasonable regulations.

b. Recognition that change and growth are natural components of a healthy and vital community; that working with and managing such growth for the optimum benefit would be more appropriate than attempting to stop it; that maintaining and enhancing the tax base is an interest shared by every resident; and that overall property values are directly related to the quality of the Town’s scenic, natural and cultural resources.

c. Establishment of seven growth centers; four for mixed commercial and residential usage and three for industrial and other job-producing activities.

d. Enhancing the village atmosphere of existing activity centers by allowing more residents to live near and help support area businesses.

e. Guiding development pressure to the growth centers by allowing the transfer of development rights from outlying commercial and residential areas to certain growth centers. Such a shift of development activity would help relieve specific natural resources of the threats of excessive development activity. It will also help prevent the complete sprawl of residential and commercial development throughout the Town.

f. Providing for adequate public facilities and amenities in the growth centers to aid their vitality as this would enhance their desirability as a destination.

- g. Providing realistic incentives for:
- * Inclusion of affordable housing in new development and redevelopment.
 - * Design of new construction that is compatible with the existing character in each village, especially where historic resources are concentrated.
 - * Clustering of new residential development to preserve permanent open space and wildlife habitat.

* Transfer of development rights between two parcels

d. Year 2014 Analysis of Development Potential and Impacts

Buildout studies were updated in connection with the Comprehensive Wastewater Management Plan and the East Harwich growth center. Using those buildout studies, the Planning Department in 2014 prepared a long-term (“40-year”) growth estimate to be used both for wastewater planning and preparation of land use/development controls. Growth estimated from the 2014 analysis are shown in Table 2.

Residential growth estimates are reasonably consistent with the year 2000 buildout estimate of 2,780 additional residential dwellings and the year 2014 long-term growth estimate of 2,624 dwelling units. After accounting for current zoning, the latter included just under 400 additional units to be built in villages and 40B affordable housing projects.

In contrast, commercial/industrial growth estimates are far apart with the year 2014 growth estimate of just under 1.0 million square feet that is far below the year 2000 buildout estimate of almost 3.7 million square feet. A review of existing development shows that most residential lots are developed to their full zoning potential (e.g. 1 dwelling per acre). However, existing commercial/industrial lots are often developed to less than full zoning potential either because lot coverage is not maximized or because most buildings are 1-level rather than the 2 or 3 levels permitted by zoning. The higher estimate from year 2000 may be more appropriate as a theoretical buildout figure. However, the lower estimate from year 2014 is a more accurate reflection of long-term growth potential.

**Table 2: HARWICH "40-YEAR" GROWTH
PREFERRED SOURCE FOR WASTEWATER AND GROWTH PLANNING**

WATERSHED or DISTRICT	Residential (Dwelling Units)			Commercial/Industrial (Square Footage)		
	Existing	Total for Long-Range Planning	% Increase	Existing	Total for Long-Range Planning	% Increase
East Harwich Village Center	0	250	na	312,424	600,000	92%
Balance of Muddy Creek/ Pleasant Bay	1,689	2,120	26%	198,185	210,000	6%
Herring River	3,561	4,400	24%	1,285,912	1,650,000	28%
Allen Harbor	422	500	18%	73,921	100,000	35%
Wychmere Harbor	157	190	21%	35,714	40,000	12%
Saquatucket Harbor	1,296	1,600	23%	328,884	380,000	16%
Red River	1,372	1,600	17%	216,291	270,000	25%

Harwich Port and Other	2,339	2,800	20%	287,772	450,000	56%
TOTAL	10,836	13,460	24%	2,739,103	3,700,000	35%
COMMENTS						
WMVP is "Watershed Multi-Variant Planner", a planning tool from the Cape Cod Commission. MEP is the "Massachusetts Estuary Project".						
Residential build-out estimates from WMVP and MEP are consistent and reasonable. They show that 2,233 dwelling units may be added to an existing 10,836 units, an increase of 20%. For planning purposes a further townwide addition of about 400 units to accommodate village growth and 40B projects is included, bringing the total increase to 24%.						
WMVP commercial/industrial build-out estimates are much higher than MEP except for Pleasant Bay. In general, the WMVP estimates should be adjusted downward. An overall increase of 35% is recommended, a growth rate that is higher than residential.						

From Harwich Planning Department, April 2014

The key concepts from the 2000 Local Comprehensive Plan are still appropriate today. These concepts are being implemented with such efforts as:

- Channeling future growth to mixed-use growth centers, such as East Harwich, where wastewater and other infrastructure may be provided economically.
- Encouraging stronger cluster provisions in areas such as the Six Ponds Special District.
- Balancing residential and commercial/industrial growth with continued protection of open space including:
 - Continued acquisition of important open space parcels
 - Placing restrictions on municipal land that is appropriate for conservation purposes
 - Conducting research and establishing title on “owners unknown” parcels.

e. Land Use Compatibility

Generally residential uses are compatibly oriented relative to non-residential uses. North Harwich Industrial Zone, west of Depot Street, if developed as zoned, would impact significantly on adjoining residential uses. Industrial growth at Headwaters Drive and Route 124 and along Queen Anne Road could create visual impacts and threaten the quality of life in these areas. Residential uses on the north side of Old Colony Road would be impacted by commercial development of the south side frontage of that road, as current zoning would permit. Several cases of non-conforming, non-residential uses in residential zones exist throughout the Town; some producing more conflict than others. Conflicts may arise as a result of expansions of these uses. General compatibility exists along town boundaries and is expected to continue.

2. Infrastructure

Existing infrastructure in Harwich has influenced development patterns. The size and quality of roads, availability of bike paths and sidewalks, as well as the availability of public water and public sewers will continue to shape the character of the community, the density of development, and the quality of life.

a. Roads

There are approximately 430 miles of public and private, paved and unpaved roads in Harwich. The town is connected to neighboring towns and the region through two exits onto Route 6, and other roadways (Routes 28, 137, 124, and 39) that provide mobility to and within village centers and commercial areas. In addition to the local collector roads, there are many roads that have scenic and historic values that help define Harwich's character.

b. Bicycle Facilities

Bicycle travel through Harwich is facilitated by the entire road network, a segment of the Cape Cod Rail Trail and a Harwich spur. Bicycle traffic in Town is growing at a tremendous rate. Each summer, more and more residents and visitors of all ages explore the Town and other parts of Cape Cod by bicycle. Commutation by bicycle is also growing in numbers.

Bicycle traffic on the Rail Trail, Harwich spur and Harwich roadways will most likely continue to increase with the growing population of bicyclists who want to save energy, reduce congestion, protect the environment, and tour Cape Cod.

From the transportation perspective, only the Rail Trail and Harwich spur provide adequate separation between bicycle and motorized vehicle traffic. In all other cases, bike traffic must mingle with cars and trucks on narrow roadways, some with no shoulder.

Ideally, bicycle traffic should be physically separated from the lanes for motorized traffic, when practical, or routed along roads with relatively low vehicular traffic volumes. In Harwich, only busy arterial and major collector roadways link areas of activity among the Town's seven villages. This condition, together with significant projected increases in motor vehicle traffic provide a formula for poor safety which would also discourage the use of the bicycle as an alternative to the car.

The Rail Trail in Harwich provides for exclusive passage of bicycles and pedestrians from the Dennis town line near Depot Street to the Brewster boundary at Seymour Pond. The Harwich spur connects to the Cape Cod Rail Trail on the west side of Harwich Center and continues east through Harwich Center and South Harwich to the Chatham line. Off-street parking for the Rail Trail exists on Headwaters Drive and at Hinckley's Pond and Route 124. Many people park in the lot behind Town Hall to access the spur. Informal parking occurs where the trail intersects with Town roads.

The Rail Trail and spur are outstanding recreational assets. Until the development of the spur, the Rail Trail did not provide any practical linkage between any villages in Harwich. Only Pleasant Lake has an establishment – a general store – that is complementary to bicycle travel and accessible off of the Rail Trail. The spur provides easy access to Harwich Center, and bicycles are often seen parked outside local stores. Even with the spur, no links exist between Harwich Center and any of the sound-side villages or the growth center in East Harwich. Safe bicycle links between villages would

improve resident mobility, greatly enhance the environment for tourism, and help maintain village vitality.

c. Walking Facilities

i. Transportation Oriented Walking Facilities

Walking has consistently been one of the most popular recreation activities of Harwich residents and visitors. Walkers can be seen on every roadway in Town, with or without sidewalks. A significant number of off-road trails also provide opportunities for recreational walking. In the 2015 Open Space and Recreation survey, more respondents (88%) expressed an interest in improving walking/hiking trails than any other type of recreational facility.

As a mode of transportation, however, walking is constrained by the lack of safe facilities through and between activity centers in the Town. Harwich Center, Harwich Port, West Harwich, and more recently East Harwich contain some sidewalk facilities; however, connections between these activity centers can be greatly improved. High priorities in Appendix B include connections from Harwich Center to Harwich Port and from Harwich Port to Julien Road east of Saquatucket Harbor. Recently, the Massachusetts Department of Transportation has shown an increased commitment to construction of sidewalks when state highways are being repaved or upgraded.

Sidewalk needs include upgrade of existing facilities and construction of new facilities. In many locations, pedestrian and bicycle needs overlap. A number of recommended sidewalk/bike path improvements are recommended in Appendix B.

ii. Recreation Oriented Walking Facilities

Most villages have informal walking trails. The less developed areas, such as East Harwich, Pleasant Lake, Harwich Center and North Harwich have the most trails over public and private land. Over the last several years, as private land is developed, these informal trails are being lost. The Trails Committee has been marking and identifying walking trails, and in 2008 published a comprehensive trail guide. A current version of the trail guide is available on the Harwich Conservation Trust website at <http://harwichconservationtrust.org/trails/>.

The abundant trail facilities offer opportunities for extended links and contact with high quality and varied wildlife and plant habitats as well as many scenic vistas. These features appear to be under-emphasized assets. Any protection or enhancement of wooded trails would be an investment in the Town's ability to draw visitors who appreciate a natural setting. The availability of good quality trails also tends to enhance the values of nearby real estate.

One obvious deficiency is the lack of linkage of natural areas by off-road foot and/or bridle trails. Another major problem is the lack of protection of trails traversing private property. There are no bylaw provisions in 2010 which promote the preservation of trail

corridors when land is developed. Nor is there any clear delineation of which trails have proscriptive rights for public passage.

The most effective way to preserve trail corridors would be to acquire the land itself or an easement for public use. With appropriate regulatory amendments, trail continuity between parcels could be required of new development provided the preferred locations are clearly marked on a plan for trail facilities.

d. Public Transportation

Residents of Harwich have access to many different types of public transportation within the Town boundaries and in the surrounding towns.

i. Air Services

Air service is provided to and from the Cape by several local airports. Two of the closest to Harwich are the Chatham Municipal Airport and Barnstable Municipal Airport in Hyannis.

ii. Bus Service

The Cape Cod Regional Transit Authority (CCRTA) provides the “b-Bus” service, the “Flex,” and the Hyannis to Orleans (H2O) services in Harwich. The b-Bus is a seven-day-a-week, door-to-door bus service for trips of any purpose. Anyone can make an appointment by at least 4 p.m. the day before they need a ride, and by 4 p.m. on Friday for weekend and Monday service. The b-Bus picks up scheduled riders and takes them to and from their destinations. This service is also coordinated with medical trips to Boston hospitals.

The Flex bus serves the area between Harwich and Provincetown and has been operating since 2006. This service is unique as the bus follows a defined route, picking up and dropping off passengers at designated stops. The bus will also “flex” off its route (see <http://theflex.org/offroute.htm>). The driver will re-route the bus to locations within $\frac{3}{4}$ mile (see <http://theflex.org/routemaps.htm>) of its usual route when a passenger has made a reservation to do so (2 hours or more in advance).

The H2O runs, generally, along Route 28 between Hyannis and Orleans Monday to Saturday. The service is a traditional fixed route bus service with two designated stops in Harwich; Harwich Port on Route 28 (near the Chamber of Commerce) and at the Harwich Shaws Market. The bus will also stop along the route if a patron flags them down.

iii. Ferry Service

Ferry service to Nantucket and Martha’s Vineyard is provided by two ferry companies in Hyannis, Woods Hole, and Falmouth. A ferry company operating out of Saquatucket Harbor provides service to Nantucket. This service has provided a boost to the Town’s economy.

iv. Park & Ride

A Park & Ride lot is provided at the junction of Route 6 and Route 124 (at Exit 10) for those who carpool. Considerable parking capacity was still available at this State-owned facility as of 2015.

e. Public Water Supply

The Harwich Board of Water Commissioners and Harwich Water Department are responsible for maintaining, providing, conserving, and protecting the Town's water supply; installing and maintaining water mains, storage tanks, pumping stations, and other appurtenances; and organizing and implementing the flushing program.

The Board and Department maintain six well-fields which include 329 acres of land around Harwich. Three well-fields, Pleasant Bay, Puritan Lane, and Westgate Road, have no pumping stations, while the other three, Chatham Road, Holmes Forest, and Bay Road, have two or more. Another eighty acres in various locations are tank sites and open land.

f. Sewage/Septage Facilities

There is currently no public sewage system in the Town of Harwich.

The Harwich Board of Health and Harwich Health Department oversee the design, installation, and maintenance of private septic tanks. The Board of Health is the policy-making and enforcement body for these services.

The Town of Harwich's Wastewater Management Subcommittee (WMS) was formed in 2007 to oversee the wastewater planning initiative. The WMS's stated purpose is to develop a Town-wide management plan for improving the quality of Harwich's water resources, consistent with the local comprehensive plan for development. The Comprehensive Wastewater Management Plan (CWMP) will deal with potential sources of pollution to Town water resources and must be flexible enough to incorporate changing development patterns and technology updates. A major goal of the process is to promote the public's understanding of the issues and build consensus on the goals and alternative solutions including non-point source pollution management. The plan also balances the water resource needs with the ability to finance the recommended improvements. The Committee advises the Board of Selectmen on matters pertaining to the improvement and protection of water resources.

In February 2013, a Draft CWMP was submitted as part of an Environmental Notification Form (ENF) to the Massachusetts Environmental Policy Act (MEPA) Unit of the Massachusetts EOEEA. This document is undergoing review concurrently by the Cape Cod Commission as a Development of Regional Impact (DRI) and for consistency with the county's wastewater plan.

Draft recommendations of the Draft CWMP include:

- A master plan to be implemented in eight phases

- Two projects to enhance natural attenuation, one in the Saquatucket Harbor watershed and the other in the Pleasant Bay watershed
- Connection to the existing Chatham wastewater treatment facility to serve areas of East Harwich and the Pleasant Bay watershed
- A later phase of construction of a second wastewater treatment facility near the Harwich landfill site to serve Wychmere, Allen and Saquatucket Harbor watersheds and portions of the Herring River watershed
- Non-infrastructure strategies to enhance environmental protection.

IV. ENVIRONMENTAL INVENTORY AND ANALYSIS

A. Geology, Soils, and Topography

1. Geology

The peninsula of Cape Cod is a product of the ice sheets of the Pleistocene Epoch, a relatively insignificant fragment of geologic time which began approximately one million years ago and ended about 12,000 years ago. The physical features of Cape Cod are a result of depositional processes with the last advance and retreat of the ice sheets. Maximum glacial advance occurred between 18,000 and 25,000 years ago, and the ice front receded northward, probably off Cape Cod, about 15,000 years ago (U.S. Geological Survey, 1976). The predominant physical features are moraines and outwash plains. Two moraines, the Buzzards Bay Moraine trending southwest-northeast, and the Sandwich Moraine trending east-west, are identified by hills and depressions and are composed of till mixed with well-soiled and stratified sand, gravel, and silt. The Mashpee Outwash Plain, east and south of the Buzzards Bay and Sandwich Moraines, slopes southward to Nantucket Sound and stretches from Chatham in the east to Falmouth in the west. Harwich occupies part of this extensive plain. Nearly all of the material comprising this part of the plain consists of stratified sand and gravel deposited by streams of glacial melt-water; individual particles are quite rounded, the result of abrasion as the material was transported by these streams. In parts of Harwich, outwash deposits overlay moraine deposits.

Elevations are highest in the northeastern section where they reach to about 100 feet north of Pleasant Bay Road. From here, the plain slopes generally toward the south and west, with elevations of about fifty to sixty feet in the northwestern part of the Town and near sea level along the southern shoreline. The amount of gravel and its coarseness increases from west to east. It is thus inferred that the part of the plain occupied by Harwich was constructed from materials transported from a source to the northeast.

Among the more prominent features of the landscape are a series of ice-block or kettle hole ponds, both large and small. Blocks of ice which broke from the main body of the glacier during its retreat became stranded and partly buried in the sands and gravel deposited from shallow, many-branched and abrading streams of glacial melt-water. As the ice blocks melted, cavities in the plain surface resulted. The elevation of a pond's surface indicates the approximate elevation of the local water table, or surface of the underground saturated zone. Pond elevations decrease from about thirty feet along the northern part of Town to sea level along the shore, where Wychmere Harbor and Allen's Harbor occupy ice block holes formed at elevations below sea level. Smaller ice blocks became buried in the outwash sands, and upon melting, caused the land surface to slump, thus forming the numerous potholes or kettle holes dotting the landscape.

Narrow, steep sided outwash channels or furrows that trend in a southwesterly direction are believed to have been formed during late glacial time when the deposits were subject to permafrost conditions. Some of the channels presently hold streams, such as Herring

River, fed by Hinckley's, Long and Seymour Ponds. Other channels are now dry, such as that below Buck's Pond between Chatham and Orleans Roads.

Recent changes in the landscape have not been extensive. The shoreline has been smoothed and eroded by the action of waves and currents. Silt and clay have been deposited in low areas of marshes subject to tidal flooding and organic matter has accumulated in the marshes and in the bottoms of kettle holes that were at or below the water table.

2. Soils

The following section describes the General Soils Associations found in the Town of Harwich.

a. Carver Soils on Level to Moderate Slopes

This general soil area occupies about seventy percent of Harwich. An extensive tract occupies the southern part of the Town and smaller tracts are scattered throughout the Town. Carver soils have a coarse sand surface that is underlain by deep deposits of coarse sand that contains streaks of gravel mostly quartz and feldspar grains with very few dark minerals present. The 0 – 15% slope Carver coarse sand is generally suitable for development.

b. Cranberry Bog – Tidal Marsh Association

This general soil area occupies about fifteen percent of Harwich. Most is found in the southern part of the Town where there are extensive areas of marsh and cranberry bogs. Smaller tracts occupy drainage-ways and sites adjacent to ponds. About sixty percent of the association is made up of cranberry bog, twenty-five percent is tidal marsh and the balance is made up of an assortment of sandy mineral soils that are water saturated for extended periods of time. Cranberry bogs are areas where about a foot of sand has been added to the surface of the original organic soils. The composition of tidal marshes vary greatly, but may have a thick organic surface layer.

c. Carver Soils on Moderately Steep to Very Steep Slopes

This general soil area occupies about fifteen percent of Harwich. Tracts are scattered throughout the northern two-thirds of the Town. Carver soils have a coarse sand surface that is underlain by deep deposits of coarse sand, pebbly in many places and containing a few cobblestones in some places. There are few dark weatherable minerals in the Carver soil material.

See Figure 3 for delineation of Harwich soils.

3. Topography

The 1967 Master Plan describes the town's topography:

“The terrain is fairly level in the southern portion of the Town along Nantucket Sound, rising to elevations of 15 to 20 feet m.s.l. on the western and central portions of Route 28. The central and northern portions of the Town contain several rolling hills with elevations of 70 to 80 feet m.s.l. but in general, land in these areas lies between elevation of 50 to 60 feet.”

The same hold true today, except that several large sand pit parcels have large depressions within them following extensive soil removal activity.

B. Landscape Character

When viewed from the air, one can see the large areas still available for recreation in the Town of Harwich. Dotted by sixty three ponds, large and small; acres of cranberry bogs; miles of rivers and marshes; a coastline of sandy beaches and three picturesque harbors on the south side and Round Cove to the east, Harwich enjoys the ability to provide every form of aquatic activity available.

In addition, Harwich hosts Hawksnest State Park, the Cape Cod Rail Trail, town forests, and acres of town conserved and privately conserved open space, which together with freshwater and saltwater wetland systems, buffers to cranberry bogs and other undeveloped lands, and water district properties, create an extensive network of wooded or naturally vegetated landscapes.

Harwich has been fortunate to have had the foresight to maintain public access to many of these resources. However, as development pressures continue, bringing with them the demand for private land ownership, the Town must continue to plan ahead, expand public landholdings to maintain the town’s rural character, and increase access to these amenities to insure availability to future generations.

C. Water Resource Protection

The Town of Harwich faces many of the same challenges that Cape Cod faces as a region, many of which relate to water-quality. The protection of open space in watersheds that drain to sensitive water resources is one tool that Harwich has implemented with a measured level of success. Un-development of built-up areas and protection of pristine areas are effective tools for eliminating and averting water-quality impacts in sensitive watersheds stemming from wastewater discharges, stormwater runoff, and hazardous materials & wastes resulting from land-use development.

1. Connecting Open Space to Sensitive Water Resources

Discrete geographic areas that drain to surface-water bodies or water-supply wells comprise Cape Cod’s watersheds. The Cape’s watersheds are influenced by the region’s geology which is characterized by highly permeable soils, high infiltration rates and minimal over-land runoff. In the absence of appreciable surface runoff, the watersheds

are defined by groundwater flow paths influenced by streams, ponds and estuaries into which groundwater discharges.

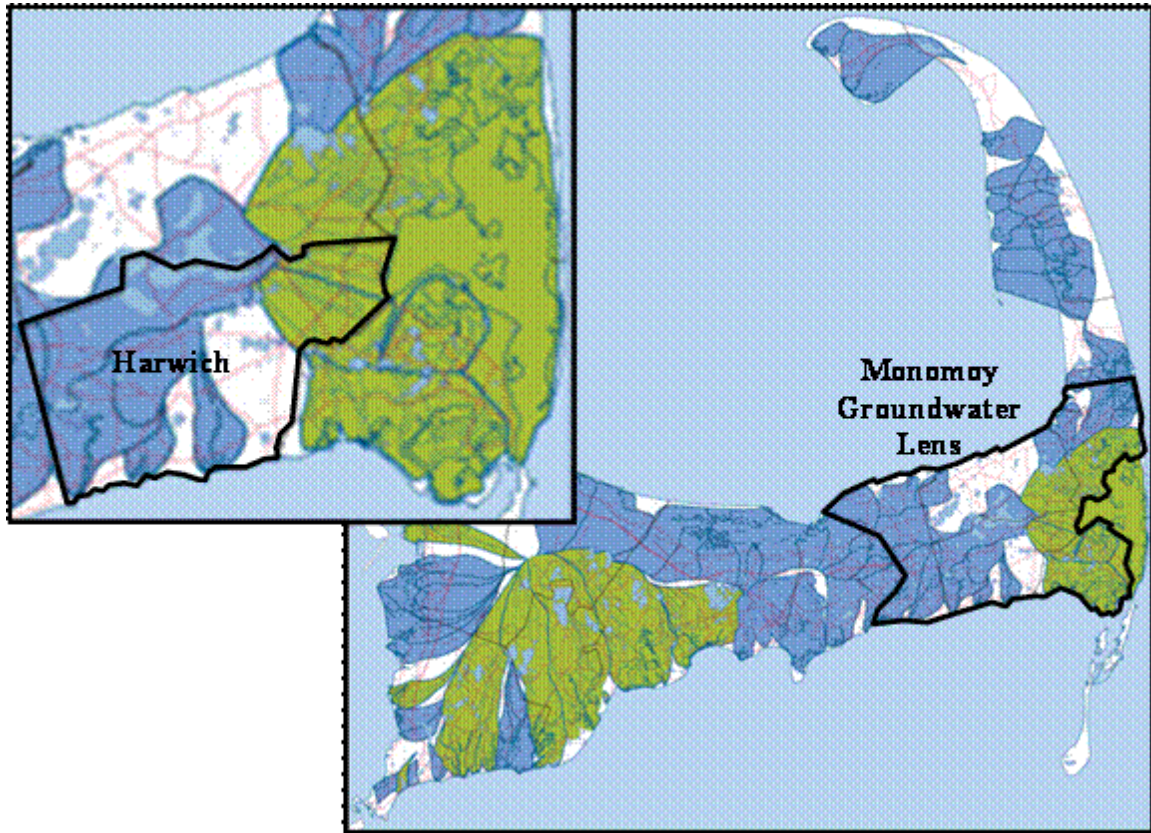


Figure 5: Cape Cod watersheds from Regional Policy Plan Water Resources Classification Map II. The map integrates MEP-delineated watersheds (green) and interim watersheds delineated by the Cape Cod Commission (blue) pending finalized MEP watersheds. Watersheds that discharge to open ocean are shown in white.

The Cape’s watersheds are being mapped by the Massachusetts Estuaries Project (MEP), which is evaluating the ability of Cape Cod’s estuaries and marine embayments to assimilate nitrogen loads from their watersheds. Watersheds that have been delineated under the MEP, together with target watershed-nitrogen loads, are available to the public at <http://www.oceanscience.net/estuaries/reports.htm>.

Watersheds in the Town of Harwich are confined to the Monomoy groundwater lens (Figure 4). The Monomoy lens, one of six groundwater lenses that comprise the greater Cape Cod aquifer, is a unit of fresh water stored in pore spaces of the glacial deposits to which Cape Cod owes its existence (Figure 5). The lens, derived from precipitation and buoyed above denser saline groundwater, flows and discharges to coastal waters that comprise the lens’ boundaries: Cape Cod Bay, the Bass River in Dennis, Nantucket Sound, Pleasant Bay, Nauset Beach, Town Cove and Rock Harbor.



Figure 6: Hydrogeologic cross-section of the Monomoy Groundwater Lens modified from USGS Hydrologic Atlas HA-692, 1986 (vertical exaggeration x10).

Some Monomoy watersheds transcend town boundaries such that land uses in shared watersheds affect water quality in neighboring towns. For example, groundwater beneath the Town of Brewster discharges to Long Pond and ultimately drains to Hinckleys Pond and the Herring River system in Harwich. Similarly, groundwater originating in Harwich ultimately discharges to the Swan River in Dennis and to the Monomoy River (Muddy Creek) which is shared with the Town of Chatham. In this way, activities and development occurring in one town affect water quality in another and may require regional solutions. For example, cooperative discussions are being undertaken by the Towns of Harwich and Chatham to jointly address impaired water quality in the Monomoy River.

2. Effects of Land Use on Water Quality and the Role of Open Space Protection

Open space protection, when implemented in conjunction with other tools such as wastewater, stormwater and educational solutions, offers an important tool for restricting development in sensitive water-resource areas and preserving natural aquifer-recharge areas. Land-use development that generates wastewater, fertilizers and runoff from de-vegetated and paved areas increases contaminant loads to groundwater. Water-quality impacts vary depending on the source and nature of the contaminant loads and the receiving waters.

a. Drinking Water

Open-space protection in areas that contribute to Cape Cod's public drinking-water supplies has played an important role in assuring the availability of safe drinking water. The Federal designation of Cape Cod's aquifer as a Sole Source Aquifer underscores the aquifer's importance as the region's only source of drinking water. The Cape Cod Aquifer has required extensive management as a drinking-water source because it also receives wastewater discharges, primarily from individual on-site septic systems distributed across the Cape, stormwater runoff, pesticides, excess fertilizers that leach to the water table, and occasional spills of hazardous materials. Communities across the Cape have initiated and implemented effective wellhead protection strategies and regulations that have generally achieved an acceptable level of drinking-water protection. Important components of this effort include State, regional and local regulations that restrict land uses in Zone II wellhead protection areas (Figure 6), some of which

transcend municipal boundaries. The State's Source Water Assessment and Protection (SWAP) report for Harwich's water supply identifies potential sources of contamination, including sources in neighboring towns.

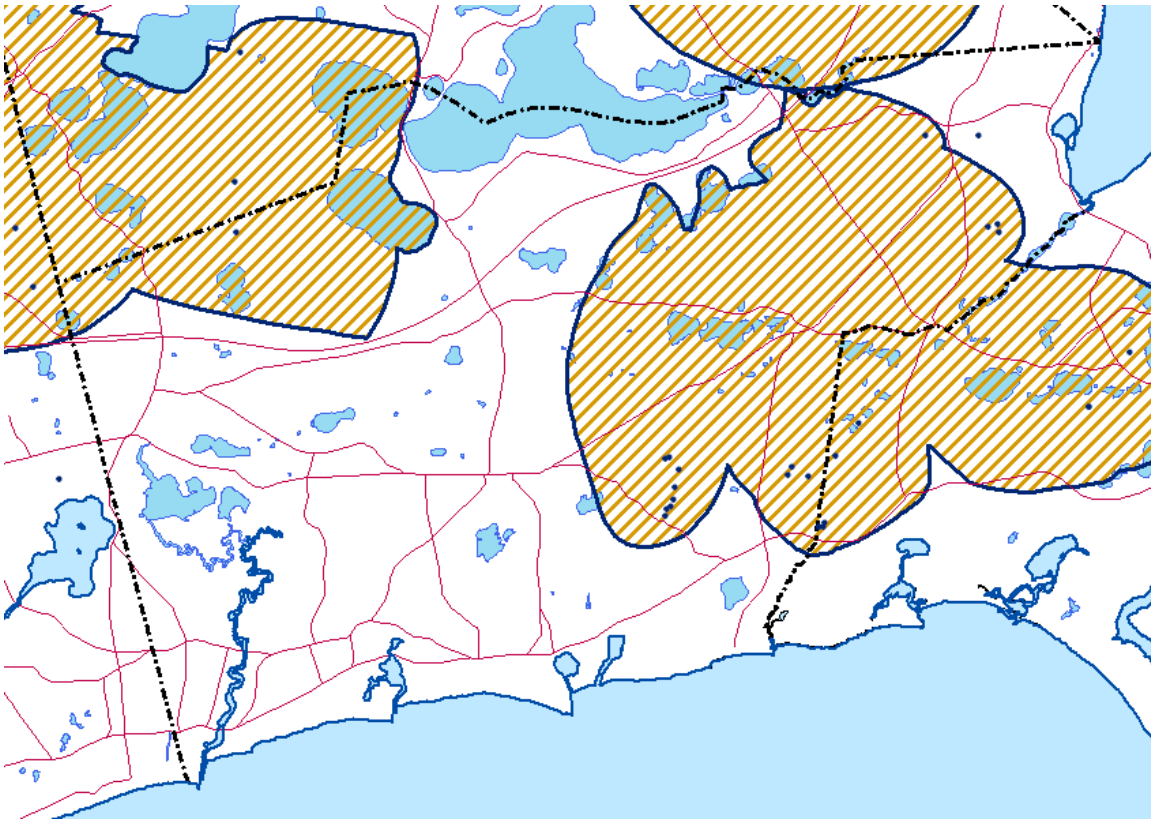


Figure 7: Zone II Wellhead Protection Areas (orange) in the town of Harwich and neighboring communities.

The [Harwich Water Department](#) pumped 768 million gallons of water from the Monomoy lens in 2007 to supply approximately 9,700 accounts (2006). The influx of vacationers to Cape Cod during the summer season roughly doubles the volume of water that is pumped relative to the off-season. The Monomoy Capacity Study prepared by the Cape Cod Commission in 1996 evaluated the amount of development that the Monomoy Lens can accommodate while continuing to protect drinking-water quality. In addition to projecting a significant summer water-supply deficit at buildout that would need to be addressed with new public sources, the study also anticipated that nitrogen-loading concentrations in contributing areas for public water supplies could exceed the regional goal of 5 milligrams-N per liter with an increase in year-round home conversions. The State has established a 10 mg-N/L limit for nitrate-nitrogen in drinking water in recognition that elevated concentrations of nitrate in drinking water may result in methemoglobinemia, or blue-baby syndrome, a condition that inhibits the uptake of blood-oxygen. Elevated concentrations of nitrogen in groundwater often indicate general water-quality impairment from land-use development. Drinking-water standards have not been promulgated for emerging contaminants such as pharmaceuticals and personal-care products (PPCPs) being released to the environment in treated wastewater.

The Town of Harwich has added **one new well** to its inventory since 1996. A survey of second home owners published by the Commission in 2009 indicates that 22% of respondents expect to convert their seasonal homes to their primary residence within the next fifteen years. The Monomoy study evaluated the option for towns to purchase developable residential properties as one of many tools to protect drinking-water quality. More recently, regional incentives have been created for increased development densities outside sensitive watersheds, where adequate wastewater and stormwater infrastructure is provided, balanced by incentives elsewhere for redevelopment, un-development and open-space preservation.

b. Ponds & Lakes

The [Cape Cod Pond and Lake Atlas](#) (2003, Cape Cod Commission) catalogues 63 ponds in the Town of Harwich, 20 of which are great ponds exceeding 10 acres. Table 2 inventories some of the ponds by name, size in acres, amount of accessible area, and the facilities available at each.

Pond Name	Size (acres)	Access (acres)	Facilities
Long Pond	743	99	2 boat ramps, picnic area, swimming, fishing
Sand Pond	27	114	dock, parking, recreational facilities
Hinckley's Pond	171	28	parking, swimming
Bucks Pond	29	25	skating, swimming, boat ramp
John Joseph's Pond	19	25	skating, swimming, boat ramp
Flax Pond	15		
Seymour Pond	181	02	hunting, fishing; although warm water fish population and access is available, pond is not heavily fished; public beach (3 pkg. sp.); surrounding low swamp area has high wildlife potential, low vegetation offers shelter and food to both waterfowl and upland game.
Robbins Pond	28	None	hunting, fishing; high wildlife potential; varied vegetation offers shelter and food attracting both waterfowl and upland game; ideal spawning area for alewives.
Island Pond	4.5±	Yes	no public facilities
Walkers Pond	25	Yes	
Aunt Edies Pond	21	None	fishing; private land
Grass Pond	23	5	5 acres Conservation Land; eel ramp
Skinequit Pond	15		6 acres bog; 2 acres upland; Conservation Area; herring/alewife run
Cahoon Pond	29		
Mud Pond	7	None	private

Olivers Pond	13	Yes	D.E.M.; perch fishing; duck hunting
Hawksnest Pond	30	Yes	D.E.M.; fishing; bird watching
Paddocks Pond	7	Yes	private; fishing; duck/geese breeding and migratory area.
West Reservoir	100±	Yes	Conservation Commission; boating; bird watching; fishing; jogging roads; bridle paths; most popular in town.
East Reservoir	25±	Yes	Conservation Commission; same as West Reservoir
Andrews	6		Conservation Commission; same as West Reservoir
Cornelius Pond	16	yes	private; no public activities
Mill Pond	10	yes	private; no public activities
Black Pond	9	limited	D.E.M.; no public activities; some trapping; hunting

Table 2: Select Ponds in Harwich

Pond and Lake Water Quality Considerations

Open space protection is important to water-quality in fresh surface waters because these waters are particularly vulnerable to development along their up-gradient shorelines. The Cape Cod Pond and Lake Stewardship (PALS) program has consistently sampled up to seventeen locations annually in sixteen of Harwich's ponds, typically in July, August, and/or September. Additionally, for nearly 15 years, citizen volunteers have been collecting water quality data on behalf of the Harwich Natural Resources Department.

The ponds in Harwich are primarily kettle ponds, formed as depressions left by ice blocks following the retreat of the glaciers. In their original state, the ponds on Cape Cod are naturally clear and acidic due to few sources of nutrients and soils of granitic origin. The pond water surface is often a reflection of the groundwater table.

Section 5 of the draft Comprehensive Wastewater Management Plan (CWMP) contains a detailed assessment of freshwater ponds in Harwich based on the PALS sampling program. Testing involved collecting Secchi depth readings, vertical profiles (multiple readings with depth) of temperature, pH, and dissolved oxygen (DO), and two discrete samples (top and near bottom of the pond) for analysis of phosphorus, total nitrogen (TN), and chlorophyll-a concentrations. As shown in Figure 7, a number of those ponds are impaired or have some impairment of water quality.

The CWMP recommends a number of steps that should be taken to protect or restore Harwich's ponds:

1. Continue monitoring
2. Perform an Inventory of All Stormwater Pipes Draining to Ponds
3. Investigate Other Potential Contaminant Sources
4. Investigate the Feasibility and Applicability of Alternative Wastewater Management Practices

5. Determine uses and ponds to support.

In 2007, the Towns of Harwich and Brewster undertook a major alum treatment to rehabilitate water quality in Long Pond. The project was an in-lake 'solution' with the goal of neutralizing internal nutrient sources already in the pond sediments, as opposed to external watershed sources such as wastewater, fertilizer and stormwater runoff. In 2012 Harwich issued a contract to study the causes of algal blooms in Hinckleys Pond. The study recommended several action steps, but funding for implementation of those actions has not yet been approved.

c. Coastal Waters

The Town contains five estuary systems, three embayments and four miles of shoreline on Nantucket Sound.

An estuary is the area around the mouth of a freshwater stream or river where it meets salt water. An estuary can take the form of a wide marsh or an enclosed harbor. There are five estuary systems in Harwich:

- Herring River
- Red River
- Allen's Harbor
- Saquatucket Harbor
- Muddy Creek (Monomoy River)

Salt water embayments are water bodies which are surrounded by land except for a channel area through which tidal waters flow. There are two such water bodies in Harwich; Wychmere Harbor and Round Cove. Shellfishing is often prohibited in both water bodies from April/May through November.

In addition, Harwich shares shoreline and contributing watershed area with Orleans and Chatham to a large embayment, Pleasant Bay. The Bay has historically been a very productive resource for finfish and shellfish. Since the breach of the North Beach barrier beach in Chatham in 2007, the tidal flushing action in the Bay has become more aggressive, leading to even healthier conditions. The fine quality of the Bay's ecosystem qualified it for designation as an Area of Critical Environmental Concern (ACEC) which requires rigorous scrutiny of new construction, alterations, filling, and dredging projects in or around the Bay below ten foot above mean sea level. The changes in water quality resulting from the breach are still being studied.

A private organization called the Friends of Pleasant Bay, in concert with Town Health Officers and other environmental professionals, is initiating a study of the sources of contaminants entering Pleasant Bay from the land well above the ACEC limits. Results from the study may indicate actions the town can take to further mitigate impacts to the Bay.

Coastal Water Quality Considerations

Land-use development increases nitrogen loads to coastal waters where, unlike phosphorus, nitrogen is efficiently transported by groundwater, through Cape Cod's sandy aquifer, to coastal waters where nitrogen is typically the limiting nutrient. Work conducted by the MEP shows that a limited amount of nitrogen is removed from groundwater as it passes through wetlands and surface-water bodies. However, *existing* nitrogen loads being transported to Cape Cod's coastal waters generally exceed critical nitrogen thresholds determined by the MEP and excessive algal growth and loss of faunal habitat are being observed in coastal waters for which critical limits have not yet been determined by the MEP.

Open space protection and conservation will not mitigate existing nitrogen loads unless it is accompanied by un-development. Existing wastewater discharges, primarily from septic systems compliant with Title-5 regulations, comprise the single largest source of excess nitrogen entering Cape Cod's coastal waters. In addition to excess nitrogen loads, elevated bacteria counts resulting from failed Title-5 septic systems and inadequate stormwater infrastructure force the closure of shellfish beds. Cape Cod is increasingly looking to comprehensive wastewater management to address the pollution of its coastal waters. The procurement and protection of open space can help to keep the problem from getting worse.

d. Recommendations: An Integrated Approach

To protect its water resources, the Town of Harwich should:

- Identify water resources and watershed areas where water-quality protection is a priority. The areas may compliment the Town's wastewater planning effort by targeting watersheds not being addressed through wastewater management, such as pond and lake recharge areas.
- Evaluate an appropriate mix of conservation and passive recreational uses consistent with and complementary to other water-quality protection goals and strategies that the Town may be considering, such as wastewater and stormwater management.
- Continue to acquire target properties and work with local conservation organizations to set up conservation restrictions already being undertaken by the Save Land – Save Water Initiative.
- Develop educational programs so that the public has the opportunity to learn about the importance of open-space preservation and conservation to their water resources.

These tasks may be best achieved in conjunction with comprehensive watershed-management planning. The State guidance document [Water Resource Management Planning: A Guide for Towns and Communities \(2006\)](#) provides guidance for development of such a plan.

D. Flood Hazard Areas

1. Description

Significant areas of Harwich are within federally designated flood hazard areas. The areas most threatened with structural damage from flooding are concentrated in North, West, South Harwich and Harwich Port. Based on an update of flood hazard maps in 2014, there are approximately 2,500 acres of flood hazard areas in Harwich. These areas are shown in Figure 8. In 2014, approximately 920 structures in Town were in a flood hazard area.

2. Considerations

In order for Harwich to participate in the National Flood Insurance Program, new structures and substantial alterations of existing structures must have a first floor elevation at or higher than the base flood elevation shown on the official flood insurance maps for the Town. In addition to these measures, it is suggested by the Federal Emergency Management Agency (FEMA) that construction in the flood hazard areas be minimized. FEMA also recommends any necessary construction along the coastal flood areas be kept as far from the water as possible.

Emergency preparedness plans by the U.S. Army Corps of Engineers include a projection of the land area which would be inundated during an intense, high tide hurricane storm surge. The storm surge could be a wall of water as high as twenty feet which would roll up onto and inundate much of the lower third of the Town. Figure 8 is attached to demonstrate this information.

E. Wetlands

1. Freshwater Wetlands

Wetlands are defined by Massachusetts General Law (M.G.L. Ch. 131, Section 40) according to the type and extent of wetland vegetation species present in a given location. These plant species will almost always indicate the presence of water at or near the land surface. Approximately thirteen percent of the Town's land area is wetland. Figure 8 shows the extent and distribution of freshwater wetlands in Harwich.

Fresh water wetlands are an extremely valuable natural resource. They help disperse and absorb flood waters, recharge and purify groundwater, provide habitat for wildlife, especially during climatic extremes, denitrify acid rain and excess fertilizer, serve to absorb heavy metals and pesticides, and support unique flora.

The greatest threat to wetland areas is inappropriate development resulting in removal, filling, contamination and/or siltation of wetland areas. Fortunately, state and local wetland protection laws, administered by the Conservation Commission, work to prevent encroachment on wetland resources. However, the scope of the Commission's review is limited to construction activities within 100 feet of a vegetated wetland. In many cases, development impacts on wetlands originate farther away than 100 feet. Also, under state

and local regulations, development is permissible within the 100 foot buffer, and often, Conservation Commission denials of inappropriate development within the buffer area are overturned by a Superseding Order from the State Department of Environmental Protection (DEP).

The adoption of the Rivers Act in 1996 provides protection to the two hundred foot buffer to rivers, typically overlapping the wetland buffer areas and often expanding the area of protection to these resources.

Some communities have included conservancy districts in their zoning regulations to maintain the greatest local control of development on or near environmentally sensitive land. A recent study which reviewed and analyzed regulatory controls in the four towns abutting Pleasant Bay recommended that Harwich upgrade its zoning regulations to include conservancy district regulations so as to be consistent with its neighboring towns' resource protection regulations. The conservancy district concept should be further investigated in Harwich.

Cranberry Bogs are wetlands by definition but are composed of artificially established vegetation for agricultural purposes. The process of cranberry growing requires groundwater at or just below the surface of the ground, occasional flooding of the plants and an adequate supply of sand.

Cranberry bogs are necessary components of the cranberry industry in Harwich and in Southeastern Massachusetts as a whole. In Town, they were and remain an important part of the local economy. They are also a primary determinant of the character of several areas of the Town and are of great interest to visitors. Environmentally, they provide habitat to certain turtle and salamander species and offer food for wildlife. Negative groundwater impacts may result from cranberry farming which involves the application of certain pesticides, fungicides and fertilizers. Many of these contaminants, when applied properly, are designed to break down into harmless substances before mingling with the underlying or down stream groundwater. However, mechanical and/or human error can result in the release of hazardous substances into the groundwater. Organic farming methods, which use no synthetic fertilizers, are beginning to be popular.

2. Salt Water Wetlands and Beaches

Saltwater wetlands include beach areas and wetlands with plant communities capable of persisting in a saline or brackish (mixture of salt and fresh) environment. Approximately 366 acres in Harwich contain saltwater wetlands, mainly in the Herring River and Red River marsh systems. Figure 8 shows the extent and distribution of salt water wetlands in Harwich.

There are fourteen public saltwater beaches in Harwich and numerous other private ones. See the [Harwich Cape Cod, Massachusetts - Harwich Department of Recreation, Parks & Fields and Beaches](#) website for more specifics about the Town's beaches, their use, and accessibility.

The discussion of salt marshes in the critical habitats section summarizes the value of this wetland type and threats to its viability. The same threats to estuary resources as discussed above apply to salt marsh environments.

Beaches are an extremely important resource in Harwich because they are the focus of so many of the Town's visitors. Erosion, overuse, and debris are the primary threats to beach resources. In addition, the south shore is threatened by an invasive species of seaweed (*Codium fragile* ssp. *Tomentosoides*) that has rendered the beaches unpleasant for beach users.

F. Vegetation

1. Upland Vegetation

Oak woodlands and Pitch Pine forests are the dominant vegetation of Harwich forests. Various expressions of the vegetation reflect local site conditions such as slope, slope position, land use history and past disturbance events. Under-story vegetation is primarily shrubby vegetation, including Black Huckleberry and Low Bush Blueberry with areas of Scrub Oak.

Residential development has increased within the forested urban interface area over the past two decades warranting more management issues. The forested land provides important habitat for many wildlife and plant species and serve also as a water supply and recharge area for the town. Managing the town forests for their conservation and water source values, as well as reducing wildfire hazards and protecting public safety are priorities.

There are three primary upland forest communities in Harwich:

Pitch Pine – Oak Forest/Woodland (Oak Dominant)

This woodland type has an over-story with Oak being dominant and some Pines. The under-story has a component of Black Huckleberry with occasional concentrations of Scrub Oak and other shrubs. The shrub layer is low and sparse.

Pitch Pine – Oak Forest/Woodland (Pine Dominant)

This woodland type has an over-story with Pitch Pine being dominant and some Oaks. Some of the pines may have a considerable amount of lower branches. The under-story is the same as the oak dominant woodland.

Right-of-Ways (Shrub Heath)

These areas are primarily dominated by Little Blue Stem, Pennsylvania Sedge, non-native species, Low Bush Blueberry, Black Huckleberry, occasional concentrations of Shrub Oak and other shrubs. The shrub layer is low and relatively sparse.

Natural vegetation areas, both large and small, are important to the preservation of the rural character on Cape Cod and particularly in Harwich. The more natural vegetation

left intact as the town develops, the more likely Harwich will maintain a rural image. Since visitors and residents appear to enjoy the unique Cape Cod ambiance maintained by the extensive natural vegetation in Town, then the retention of such vegetation is important to the preservation of the Town's appealing character and heritage.

Aside from the aesthetic value trees and other vegetation provide, they are necessary components of the regional and global ecosystem. They provide valuable wildlife habitat, temperature moderation, air purification, and removal of pollutants from precipitation and have considerable impact on energy consumption in residences.

Public shade trees are found in Harwich's 6 parks, 19 memorial squares, the grounds of 13 Town-owned buildings, 16 Town-owned cemeteries, and along public streets. These trees are maintained by the Public Works Department. Each year, a seasonal employee of the department plants new shade trees in the above locations with the assistance of the Cape Cod Regional Technical High School's Horticultural class. Recently planted species include October Glory Maple, Crimson King Maple, Bartlett Pear, and Kwanzan Cherry.

2. Wetland Vegetation

There are two distinct types of wetland vegetation; salt marsh and freshwater. Salt marsh vegetation exists in several well-defined areas in Town where individual species can tolerate salinity and tidal inundation. Two dominant species further define salt marshes into low marsh and high marsh. These are the coarse, broad-leafed salt marsh cord grass and the smaller salt meadow grass or salt hay, respectively.

Where the high marsh meets upland vegetation goldenrod, blackrush, and panic grass will thrive. Marsh areas near the coast where freshwater seeps from the ground to meet tidal salt water, is often colonized by cattails and phragmites.

In Harwich's freshwater wetlands, the primary naturally occurring vegetation types are red maple, black tupelo, alder arrow-wood, high-bush blueberry, willows, and milkweed. These and other species provide valuable food and protection for various wildlife species and are important components of the Town's pleasant natural setting. Freshwater wetlands are impacted by development by-products such as siltation and polluted effluent and runoff. The Wetlands Protection Act, administered locally by the Conservation Commission and State-wide by the Massachusetts Department of Environmental Protection (DEP), provides significant protection of wetlands. However, the Act limits scrutiny of development proposals to an area within 100 feet of any wetland on or near the development parcel and within 200 feet of a perennial stream.

In the early 2000's, the Conservation Commission wrote a Bylaw for no new disturbance to be allowed without a variance within the 0-50' buffer zone to any wetland. The citizens of Harwich formally adopted this as a Bylaw at Town Meeting, and it has served to protect numerous acres of waterfront from over-development over the past decade.

Cranberry vegetation occurs in cultivated and abandoned freshwater bog areas in significant quantities in Harwich.

3. Critical Habitats

In addition to its more common upland and wetland habitats, Harwich has several critical habitat types. Resources identified in the Cape Cod Critical Habitats Atlas, published 1990, by the Association to Preserve Cape Cod, are summarized below.

Significant or Critical Habitats

Coastal Plain Ponds

Aunt Edies Pond

Hawksnest cluster: Wilkers Pond, Black Pond, Hawksnest Pond, Olivers Pond

'Exit 11' cluster: Mill Pond, Cahoon Pond, Grassy Pond, Mud Pond

Josephs Pond, Bucks Pond, and two others in vicinity

Seymour Pond, Black Pond

Fish Runs

Herring River, West Harwich

Cold Brook, Harwich Port

Andrews River, Harwich Port/South Harwich

Red River, South Harwich

Muddy Creek, East Harwich

Cedar swamps

North of Bay Road

East of Lothrop Ave

Salt Marsh

At Herring River

At Saquatucket Harbor

At Red River

Barrier Beach

At Herring River

At Doanes Creek

At Wychmere Harbor

At Saquatucket Harbor

Red River Beach

Figure 9 delineates the location of these critical habitat types.

a. Summary of Critical Habitats

i. Coastal Plain Ponds

The majority of coastal plain pond communities in New England are found on Cape Cod, and Harwich hosts several excellent examples. These pond communities are specialized due to the typically shallow, sandy bottom, with seasonal water level fluctuations that may leave the pond nearly dry by summer's end. These water level changes enable several globally rare species to thrive where elsewhere hardier species may out-compete

them. Coastal plain pond species can survive prolonged periods of drought or flooding. Pond shores are sensitive to vehicle and foot traffic.

ii. Cedar Swamps

Cedar swamps, and particularly those found in the coastal plain of Cape Cod, are found in low depressions where standing water, poor soils and low nutrient environments support a specialized community of Atlantic white cedars and red maples, sometimes mixed with pitch pine and white pine. This disappearing resource supports nesting birds and some mammals, and may provide breeding habitat for amphibians if appropriate conditions exist.

iii. Salt marshes

Salt marshes form in areas of tidal inundation, typically protected from wave energy by barrier beaches or spits. Peat develops in the higher marsh where salt hay is typically found; salt marsh cord grass is found in the lower marsh or intertidal area. Salt marshes support a wide array of wildlife, from shore and song birds to owls and hawks, and some smaller mammals. Salt marshes are also key in protecting shellfish and fisheries, and provide storm damage prevention and flood control.

iv. Barrier Beaches

Barrier beaches are typically low lying spits of land, comprised mostly of shifting sands, which support a variety of plants and animals. The harshness of the environment requires that the natural inhabitants have developed specialized strategies for survival, which in turn makes them vulnerable to changes in their habitat. Piping plover, Common terns, beach grass and beach pea are species often found on barrier beaches.

v. Vernal Pools

Harwich also hosts numerous vernal pools, many of which have been only recently inventoried and certified through the Natural Heritage and Endangered Species Program (see Figure 9), thanks in large part to the efforts of volunteers working with the Harwich Conservation Trust. A vernal pool is an ephemeral pool or small body of water, appearing in late winter/early spring as winter snow melts and spring rains pool in depressions. Typically the pool has dried and disappeared by midsummer, making vernal pools inhospitable for fish, which would otherwise eat the amphibian egg masses and larvae. The lack of fish make vernal pools ideal breeding grounds for certain amphibians and invertebrates, who will only reproduce in these temporary habitats, and typically return to their birth pool year after year. While certain regulatory protections are afforded to vernal pools once certified, the restrictions on development only affect the area of the pool itself and a 100 foot buffer around it. Since the amphibians that breed in vernal pools also require significant upland areas for the remainder of their lifecycles, there are significant conservation considerations for upland areas beyond the 100 foot buffer (up to 1,000 feet for wood frogs, for example).

G. Fisheries and Wildlife

1. Inventory of Birds, Fish, Mammals and Reptiles

Several management plans for town conservation areas have recently been completed. The following inventory of birds, fish, mammals and reptiles in Harwich is taken from the plans for the Bells Neck and Island Pond Conservation Areas, as well as from observations by the Harwich Conservation Administrator.

<u>Birds</u>	<u>Mammals</u>	<u>Fish</u>	<u>Reptiles</u>
Tree Swallow	Red Fox	Small Mouth Bass	Painted Turtle
Yellow Rumped Warbler	Coyote	Large Mouth Bass	Snapping Turtle
House Finch	White Tailed Deer	Perch	Red Eared Slider
Purple Finch	Raccoon	Sunfish	Kemps Ridley Sea Turtle
House Sparrow	White Footed Mouse	American Eel	Wood Turtle
American Gold Finch	Meadow Vole	River Herring	Eastern Box Turtle
Song Sparrow	Striped Skunk	Blue Back Herring	Black Racer Snake
Carolina Wren	Virginia Opossum	Pickrel	Northern Water Snake
Brown Headed Cow Bird	Eastern Cottontail Rabbit	Black Sea Bass	Ribbon Snake
Northern Cardinal	Muskrat	Cod	Common Garter Snake
Northern Mockingbird	Woodchuck	Scup	Loggerhead Sea Turtle
Grey Catbird	Eastern Chipmunk	Tautog	Leatherback Sea Turtle
Black Capped Chickadee	Grey Squirrel	Cunner	Green Sea Turtle
American Robin	Black Squirrel	Striped Bass	Hawksbill Sea Turtle
American Crow	Red Squirrel	Flounder	Eastern Red-Backed Salamander
Blue Jay	Field Mouse	Fluke	Northern Two-Lined Salamander
Eastern Starling	Brown Rat	Bluefish	Spotted Salamander
Red Winged Blackbird	Fisher Cat	Dogfish	Eastern Newt
Common Grackle	River Otter	Tuna	
Mourning Dove	Harbor Seal	Pollack	
Belted Kingfisher	Gray Seal	Haddock	
Marsh Wren	Harp Seal	Smelt	
Red Tail Hawk	Humpback Whale	Cusk	
Northern Harrier	Minke Whale	Blue Shark	
Sharp-shinned Hawk	Fin Whale	Mako Shark	
Killdeer	Right Whale	Great White Shark	
Herring Gull	Common Dolphin		
Osprey	White-Sided Dolphin		
Laughing Gull	American Mink		
Ring Billed Gull	Bats		
Canada Goose	New England Cottontail		
Mallard Duck			

Bufflehead			
Great Horned Owl			
Great Blue Heron			
Wild Turkey			
Ruffed Grouse			
Woodcock			
Cooper's Hawk			
White Throated Sparrow			
Northern Oriole			
Brown Thrasher			
Green Heron			
Yellow Bellied Sapsucker			
Ruby Throated Hummingbird			
White Breasted Nuthatch			
Eastern Bluebird			
Horned Grebe			
Broad-winged Hawk			
Red Breasted Merganser			
Green Winged Teal			
Mute Swan			
Mallard Duck			
Bufflehead			
Great Horned Owl			
Great Blue Heron			
Wild Turkey			
Black Crowned Nigh Heron			
Double Crested Cormorant			
Hairy Woodpecker			
Red Bellied Woodpecker			
Eastern Kingbird			
Bank Swallow			
Red Throated Loon			
Northern Flicker			
Greater Yellowlegs			
Greater Black Backed Gull			
Least Tern			
Common Tern			
Yellow Billed Cuckoo			
Tufted Titmouse			
Rufous-sided Towhee			
Chestnut Warbler			
Piping Plover			
Sandpiper			
Snowy Egret			

2. Wildlife Habitat and Corridors

Over the last 40 years, considerable land areas in Harwich have ceased to function as wildlife habitats for certain species such as deer, pheasant, fox and coyote, due to development of the land. However, such creatures are still seen within developed areas but they appear there in search of food rather than to mate or nest. Several large tracts of undeveloped land do exist which support an abundance of species. Among these, the Town Forest, and all well fields, Hawksnest State Park/Oliver's Pond property, publicly owned portions of the Herring River marsh, and the Reservoir Area are permanently protected from encroachment by development.

Areas which are unprotected from development include two 100+ acre tracts on both sides of Route 137 between Route 39 and Round Cove Road, 100+ acres between the Headwaters Drive developments and Route 6, land on either side of Island Pond Trail between the Bike Trail and Route 124, land south of Route 6 between the western end of Spruce Road and Aunt Edie's Pond, and land to the north and west of the Holmes Town Forest.

Important wildlife corridors include the Bells Neck and Coy Brook areas in West Harwich, land in North Harwich connecting to the Punkhorn in Brewster, land in East Harwich connecting to Hawksnest State Park and to Thompson's Field/water department land, and the Monomoy River corridor leading to Pleasant Bay. While some corridors do exist, many protected areas are not linked to each other and are isolated by roads and development. This arrangement has severely restricted the movement of deer herds and thereby limited their viability in this area of the Cape. The annual incidence of smaller animal kills on roadways is further evidence of the conflict between development and wildlife habitat.

Historically, clustered subdivisions in Harwich have yielded modest open space land adjacent to buildable parcels. Little thought has been given to the suitability of these areas for wildlife habitat or corridors to other habitat. Subdivision and zoning bylaws should be amended to improve the quantity and quality of open space. Provisions may include:

- A. Increase in percentage of land required to be preserved for open space in clustered subdivisions.
- B. Evaluation of land to be preserved for open space to ensure meaningful contribution towards protection of wildlife habitat and corridors.
- C. Establishment of conservation easements/restrictions.
- D. Establishment of a transfer of development rights (TDR) program.
- E. Prohibition of development in existing or expanded wetland buffer zones.

3. Diadromous fish runs

Diadromous fish include anadromous fish that live in marine waters and undergo springtime spawning runs to freshwater habitat and catadromous fish (only American eel) that are born in marine waters and have springtime runs to live in freshwater habitats. The following four diadromous species are native to Harwich waters: Atlantic tomcod (*Microgadus tomcod*), Atlantic eel (*Anguilla rostrata*), alewife (*Alosa pseudoharengus*), and white perch (*Morone americana*).

Little is known about the presence of tomcod spawning habitat in Harwich. All species are important forage for a wide range of fish and wildlife and once supported valued commercial and subsistence fisheries. Diadromous fish receive specific protection under Massachusetts Wetland Protection Act and Chapter 130 laws that define the management of marine fisheries.

The following is a list of diadromous fish runs in Harwich:

A. Herring River, West Harwich.

Species: alewife, American eel, white perch, Atlantic tomcod.

Migratory Corridor: Herring River.

Spawning and Nursery Habitat: West Reservoir, Hinkleys Pond, Seymours Pond, and Long Pond (including the connected Black, Smalls and Greenland ponds).

Spawning and Nursery acreage: 1119 acres.

Notes -- The Herring River was formerly one of largest herring runs on Cape Cod. The tomcod spawning habitat in Herring River is not known (possibly near Rt. 28). Herring River tributaries to Robbins Pond and Flax Pond (Coy Brook) were historically known to have herring runs.

B. Cold Brook, Harwich Port

Species: American eel.

Migratory Corridor: Saquatucket Harbor, Carding Machine Brook and Cold Brook (Bank St. Bogs).

Spawning and Nursery Habitat: Grass Pond

Spawning and Nursery acreage: 15-20 acres.

Notes -- Cold Brook was a former river herring run with occasional recent observations, although passage is not presently possible upstream of bogs. An eel ramp (pump supplied) was installed upstream of Bank St. to pass juvenile eels in 2008 by the Mass. Division of Marine Fisheries and is seasonally managed by the Town of Harwich and Harwich Conservation Trust.

3. Andrews River, Harwich Port/South Harwich

Species: American eel.

Migratory Corridor: Saquatucket Harbor, Andrews River (former Gorham Bogs).

Spawning and Nursery Habitat: no freshwater impoundments.

Spawning and Nursery acreage: in stream only.

Notes -- The history of a herring run in the Andrews River 2009 is uncertain. American eels are present and juvenile eels were observed in 2009.

4. Red River, South Harwich (Chatham border at tidal mouth).

Species: alewife and American eel.

Migratory Corridor: Red River

Spawning and Nursery Habitat: Skinequit Pond

Spawning and Nursery acreage: 15 acres.

Notes -- The Red River herring run has declined sharply in the last two decades and is presently at very low levels of abundance.

5. Muddy Creek, East Harwich (Chatham border)

Species: alewife, white perch, Atlantic tomcod and American eel.

Migratory Corridor: Pleasant Bay to Muddy Creek.

Spawning and Nursery Habitat: Ministers Pond and Mill Pond (primarily in Chatham).

Spawning and Nursery acreage: 20-25 acres.

Notes -- Large numbers of juvenile eels and dozens of river herring were observed in the upper Muddy Creek below Queen Anne Road during 2007-2008. Mass. Division of Marine Fisheries installed a passive-flow eel ramp to outflow pipe below Queen Anne Road in 2008.

4. Rare, Threatened and Endangered Species

The Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program maintains a list of vascular plants, invertebrates and vertebrates observed in Harwich that are considered endangered, threatened, or of special concern. This list is shown as Appendix C. The Natural Heritage and Endangered Species Program also publishes maps biennially indicating estimated habitats of rare and endangered species. These habitat maps, copies of which are available for viewing in Town Hall, are for use with the Massachusetts Endangered Species Act and its implementing regulations, as well as with the Massachusetts Wetlands Protection Act. The maps also serve as a planning tool for considering the most sensitive habitats in Harwich, and helping to prioritize open space acquisitions and direct appropriate locations for development activities.

Although habitats of the listed species are varied, the most common threat to all is development, which destroys, disturbs or impacts the habitats.

H. Scenic Resources and Unique Environments

1. Scenic Landscapes

Many scenic landscapes in Harwich occur naturally while many others have been created as part of the built environment.

a. Shoreline

With nearly eleven miles of tidal shoreline running from the Herring River to Red River and along Pleasant Bay, Harwich provides expansive views of the coastal areas and Nantucket Sound. While many of the direct water views are in private ownership, numerous views from public land exist. However, unless these beach areas are approached under human power, most shoreline views have limited access due to parking constraints.

b. Harbors

The four harbors in Harwich are valuable components of the Town's historically diverse and scenic landscape. Wychmere, Allen's, and Saquatucket, all feeding into Nantucket Sound, were not naturally occurring harbor areas to shelter boats from the rough sea. Up until the late 1800's small boats would anchor between a sandbar, two-thirds of a mile from shore and the shoreline. Larger ships would dock at piers built along the coast of the sound.

In 1899, a passage in Harwich's Salt Water Pond, or Oyster Pond, was cleared out to the sea through appropriations from the state and has been well maintained as the artificial outlet Wychmere Harbor ever since.

Allen's Harbor, a onetime overgrown marsh area, was dredged and a channel opened in 1926 through private enterprise money.

Saquatucket Harbor, also a salt marsh at one time was developed by the state as a town marina in 1969.

Round Cove, a natural outlet to Pleasant Bay and eventually the Atlantic Ocean, is a unique resource as it sits just below a stretch of Route 28 in East Harwich.

c. Bogs

Many cranberry bog areas in Town, on Bank Street, Great Western Road, Pleasant Lake Avenue, Hoyt Road, Kelly Street, Pleasant Bay Road, Depot Street, Oak Street, Factory Road and Old Main Street define a part of the rural character of Harwich. These low-lying wetlands are both beautiful and a significant commercial resource enjoyed by many year-round. Harvest time draws onlookers, and the winter season's cold temperatures create the perfect shallow ice rink for skaters and hockey players when the water in the bog freezes and provides a protective shield for the cranberry plants below. During the transitional seasons when frost is a risk, many bogs take on the appearance of ponds as they are submerged under water to protect the crops.

d. Ponds

The fresh water ponds and reservoirs in Harwich provide valuable year-round scenic resources as well as recreational resources.

No two ponds in Harwich are alike and no two views of the same pond are alike. Views of Long Pond are enjoyed from boats, from the bike trail along Route 124 and Sequattom Road, or from either of the town beaches on Long Pond Drive and Cahoon Road. Bucks Pond and others are enjoyed from the houses nestled in the woods around the shore. Hawksnest Pond and other coastal plain ponds remain undeveloped, and may be enjoyed by hikers and boaters.

Oliver's Pond was permanently established as one of the few great ponds (10+ acres) on Cape Cod with no development on any of its shoreline. Its protected status was assured when the Town, the State, and the Nature Conservancy joined forces to acquire it.

e. River Corridors

The Herring River and Muddy Creek (Monomoy River) corridors are special places for canoeing, hiking, taking in nature, and preserving the history surrounding these areas. Muddy Creek leads out to Pleasant Bay and Herring River runs from Long Pond to Nantucket Sound. Several land conservation efforts, including partnerships between the town and the Harwich Conservation Trust, have resulted in protected views to these important resources.

f. Bells Neck Road/Salt Marsh/Reservoir Area

One of the most breath-taking scenic landscapes in Harwich is the conservation land in the Bells Neck Road/Reservoir area. The Herring River winds its way from the sound through West Harwich to the salt marsh of North Harwich, and into the West and East Reservoirs before it stretches farther north to the ponds in Pleasant Lake. Over 320 acres of forests, water and wetland are home to many species of animals and plant life. This vast natural area lends a very rural aspect to the Harwich landscape and is at its most beautiful in the fall and the moments surrounding sunset.

In 2014, the town purchased an additional 6 acres along the Herring River, immediately adjacent to the Bells Neck Conservation Area. At town meeting in 2015, the town was authorized to purchase another 4 acres, again expanding the Bells Neck Conservation Area. Now, the town owns the entire shorefront around the West Reservoir. The Herring River, one of the largest herring runs in the state, goes into the west reservoir, a fresh water body, before continuing to additional freshwater ponds where the herring spawn. Protection of the River is critical, and these two land purchases have ensured that these areas will be protected in the future.

2. Major Characteristic or Unusual Geologic Features

As noted in Section IV.A, a prominent geologic feature of the Town's landscape is the series of ice-block or kettle hole ponds, both large and small scattered throughout the Town.

3. Cultural and Historic Areas

Because of the large numbers of culturally significant landscapes in Harwich involving historic town centers, churches, scenic roads and other parts of the built environment, the discussion of these elements which contribute to the character of the Town will be broken down according to the village under which they fall.

a. Harwich Center

Harwich Center has the existing local historic district located within it. Roads within this village have homes and clusters of structures which also lend to the cultural landscape of the Town. Main Street, from Sisson Road to Kelley Street; Oak Street, from Main Street to the High School; Parallel Street, from Forest Street to South Street; Kelley Street, from Main Street to Lothrop Avenue; Chatham Road, from Main Street to Long Road; and Pleasant Lake Avenue, from Main Street to just past Park Street, further demonstrate the historic character of this village.

The First Congregational Church at the corner of Main Street and Pleasant Lake Avenue is a major historic centerpiece of the village center. Public structures such as the three schools, Brooks Library, Brooks Academy Museum, Town Hall, and the Brooks Park gazebo impact the village from a cultural standpoint, making it the institutional center of the Town. The high school property on Oak Street has been the location of many public events, including the popular Cranberry Harvest Festival fair grounds, semi-professional baseball games, and the location of several wooded paths beside the school building.

Three other areas in Harwich Center that contribute to the cultural landscape are Brooks Park, Island Pond Cemetery, and Cranberry Valley Golf Course. Brooks Park has historically been the gathering place for Town events and celebrations. Today, residents and visitors can hear the Town Band on a summer evening, peruse a craft fair, or enjoy the playground, the tennis courts, or a ball game.

Cranberry Valley, Harwich's only 18-hole golf course, is steadily growing as one of the places for golfers to spend time perfecting their favorite sport.

Island Pond Cemetery, although very different in use from the above-mentioned recreational spots, blends the scenic and cultural landscapes by intermingling nature and sentimental monuments and provides a unique look at Harwich's past and those who lived here.

b. East Harwich

Several scenic roads involving the built environment and/or natural environment run through East Harwich.

The Pleasant Bay Road/Route 39 area, most of Church Street, and Queen Anne Road between Route 39 and Church Street have the greatest concentration of pre-1900 homes in East Harwich. The Harwich portion of Route 28, along Pleasant Bay and Round Cove, provides one of the best glimpses of Pleasant Bay (from a public highway) of the four towns adjoining this body of water.

Evergreen Cemetery and the Methodist Church Cemetery, like Island Pond Cemetery, contribute as much to the historic character of East Harwich as the significant structures in the village.

c. South Harwich

South Harwich's cultural landscape stems mostly from the pre-1900 structures along Route 28 and parts of Gorham Road, Old County Road, Uncle Venie's Road and Deep Hole Road. These buildings and grounds demonstrate the pattern of construction which occurred along the village's main thoroughfares during the eighteenth and nineteenth centuries. The South Harwich Methodist Church and cemetery further add to this picture.

d. Harwich Port

Harwich Port's village center along Route 28 (Lower County Road to Bank Street) and surrounding streets are reminiscent of the traditional New England central business areas with commercial businesses, banks, and restaurants intermingling with residential structures. The Pilgrim Congregational Church, the one-time Methodist Campground area, and the many former Captain's houses and other homes on Route 28, Bank Street, Miles Street, South Street, and Snow Inn Road, together, create the character of Harwich Port that is all its own, unlike any other village in Harwich or on the Cape.

Wychmere, Allen's, and Saquatucket Harbors and the Harwich Port Golf Course contribute to the recreational element of the built environment's cultural landscape. All are relatively recent additions to Harwich's overall landscape, but clearly serve as special places. Sailing and fishing are still major past-times of Harwich residents and visitors alike. People identify the Town with its harbors, and this association makes the village of Harwich Port a strong boat-oriented community.

The Harwich Port Golf Course, for many decades, has been a centerpiece of the village and serves a portion of the Town's golfing residents and visitors. It is also an important open space resource because of the unique character it imparts on the village.

Mount Pleasant Cemetery serves as a lasting reflection on the lives of early Harwich residents.

e. West Harwich

West Harwich, just like the other villages, has a character of its own. Unlike Harwich Port's commercial strip along Route 28 with businesses and some residents set close to the road, West Harwich is very similar in appearance and atmosphere as it was earlier in this century, with many of the stately homes set back from Route 28 but with businesses now operating within them. The facades and structures themselves have not changed much.

Route 28, Depot Street, Smith Street, Chase Street, Riverside Drive, Silver Street, Division Street, Belmont Road, and the Old Mill Point neighborhood encompass the majority of the historic structures in the village which establish a large portion of the overall character. Between Route 28 and the large waterfront homes are an abundance of

cottages along the many roads leading to salt water which define the vacation home atmosphere in this area.

f. North Harwich

North Harwich historically has been known as the Cape Verdean Center of the Town and the village center reflects the remnants of its culture and history best along Depot Street, Main Street, and Queen Anne Road. Pre-1900 structures, large and small homes, and barns/garages, are clustered together on these few roads close to the street line. The active cranberry bogs and dispersion of development clusters amidst open spaces and woodlands enhance this village's rural heritage.

g. Pleasant Lake

Pleasant Lake, with fewer than twenty-five pre-1900 homes scattered along Pleasant Lake Avenue and Queen Anne Road, relies more on its natural resources to define the character of the village. The old railroad layout, now the bike path, winds through the village providing extraordinary views of Hinckley's Pond, Long Pond, and Seymour Pond. This route facilitates imagining what it might have been like to travel the Town/Cape by train.

The Pleasant Lake General Store, once known as Bassett's General Store, has been the commercial area and centerpiece of the village for over a century. A train depot, overlooking the bogs and ponds, once stood where the parking area for the bike path and Hinckley's Pond Beach now exists. That part of the built environment disappeared with the end of the train system to the Lower Cape.

4. Areas of Critical Environmental Concern

The watershed to Pleasant Bay, including portions of Harwich, Brewster, Orleans and Chatham, has been designated as an Area of Critical Environmental Concern. The Pleasant Bay ACEC was designated by the state in 1987 due to the "outstanding natural resources on a regional and statewide level, including well-preserved and largely unaltered barrier beaches and islands, approximately 1200 acres of saltmarsh, and thousands of acres of tidal flats, numerous fresh and saltwater ponds, and a significant estuarine habitat. The barrier beaches also provide storm damage prevention.... Pleasant Bay is extremely important as a transitional area between two biogeographic provinces. As such, the biological communities of the Bay contain some species at their most northerly range and others at their most southerly range. This wealth of biodiversity and the sensitivity of the organisms living at the extent of their ranges requires greater protection for such a unique resource area." (from the designation document, 1987) Pleasant Bay is the first ACEC for which a management plan was completed, including the cooperation of the towns contributing to the watershed. Ongoing efforts by the Pleasant Bay Alliance (www.pleasantbay.org) have resulted in additional studies and management efforts to protect the bay and its natural resources.

In addition to the actions that the participating towns may take in response to the recommendations in the management plan, development projects proposed within the

ACEC boundaries receive greater state regulatory scrutiny than similar projects not located in an ACEC.

Many of the scenic resources and unique environments described in this section are depicted in Figure 10, Unique and Scenic Features.

I. Environmental Problems

1. Hazardous Waste Sites

Three types of groundwater pollution hazardous waste sites have been identified: petroleum contamination, landfill, and septage lagoons.

Approximately five petroleum contamination sites can be found in Harwich; three in Harwich Port along Route 28, one in North Harwich on Depot Street, and one in Pleasant Lake in the area of the Cape Cod Regional Technical High School.

Two landfill hazardous waste sites are known to exist in Harwich; two in North Harwich in the vicinity of the Town Disposal Area and off of Lothrop Avenue in the Town's major wetland resource surrounding the Herring River. The Town Disposal Area housed the septage lagoons as of 1991. These facilities were closed as of 1992 because of their potential as a hazardous waste site.

2. Landfills

As was mentioned above, there are at least two known landfills in the village of North Harwich that may be potential environmental problems.

3. Erosion

Soil erosion is a naturally occurring event. However, this process is accelerated with the removal of vegetative cover and the alteration of natural grades. Erosion can lead to unstable ground and detrimental siltation of ponds, waterways, and wetlands. Soil disturbances adjacent to roadways often cause soil to be transported by rain and wind from a work site to natural low spots, usually wetlands, and street storm drains. The siltation of wetlands damages their ecological function and excess soil in storm drains prevents their proper operation and causes tax dollars to be spent to clean them out.

Naturally occurring erosion from storms and routine wave action has been controlled to some extent by man made structures such as jetties and groins. However, such actions may have worked against soil retention by causing more intense scouring or sand starvation of beaches. The jetties at Wychmere and Allen's Harbors and at the Herring River have large voids between the rocks which allows sand from the west to be sucked through them and accumulate in the channels. The jetty at the Herring River also malfunctions by allowing sand to wrap around it into the river channel. The maintenance of these waterways is necessary to support local and state fishing and recreational activities, but is an ongoing public expense.

Generally, the Town's Nantucket Sound shoreline has remained stable over the past twenty-five years. Comparisons of aerial photographs of the shoreline indicate only subtle movements of the top of the bank of the barrier beaches. Three exceptions are the beach at Old Mill Point which has lost from thirty feet to eighty feet of beach (in West Harwich near the Herring River outlet), the beach between Atlantic Street Beach and the Allen's Harbor channel (in Harwich Port), and the beaches just to the east of the Wychmere Harbor channel (in Harwich Port). The latter two are conveniently nourished periodically by the spoil from dredging of the respective channels.

The two breaches of the barrier beach in Chatham has caused severe erosion and lost homes in Chatham and produced significantly higher tides in Pleasant Bay. It is not yet known how this condition will affect soil retention along the bay. It has been demonstrated that the breach has fostered greater flushing action of the bay and this may accelerate erosion along some beach areas, but may also inhibit siltation of the channel into Round Cove. This may affect the availability of dredge spoils from the channel to be used as beach nourishment at the public beach at Bay Road and Route 28.

Coastal research has suggested that structural improvements such as seawalls are inadvisable for erosion mitigation because they only redirect the wave energy to scour another area either to the side or the foot of the structure. Any erosion mitigation measure proposing a structure must be studied carefully so that the problem is not shifted elsewhere, resulting in unintended consequences.

There are no specific guidelines or regulations for the controls of soil erosion in Harwich. The only regulatory agency which routinely requires soil retention measures for new development is the Conservation Commission. However, the Commission's review powers are limited to disturbances within 100 feet of vegetated wetland. Many of the sources of soil erosion which impact on wetlands are much farther away than 100 feet. No soil retention measures which would prevent the clogging of Town and private storm drains, are required by current regulations.

4. Accretion

In most other areas along the shoreline where there has been no recent erosion, sand has actually accreted (accumulated) and vegetation has extended seaward. However, this should not be viewed as a permanent gain. The natural occurrence of storms, extreme high tides, and high winds can change the face of the shoreline rapidly.

The primary areas of accretion are on the westerly side of jetties and breakwaters since these are where migrating grains of sand become trapped as they drift with the water current from west to east. One significant consequence of such accretion activity is the net increase in land area. Examination of new development potential for parcels subject to accretion is warranted.

5. Chronic Flooding

Flood Hazard areas were identified in Figure 8 and in Section IV.D, earlier. No areas have been identified as having chronic flooding, although many parts of Town are in low-lying areas.

6. Sedimentation

No significant sedimentation problems have been identified for the Town of Harwich as being a threat to the environment.

7. Development Impact

It appears that the greatest threat to the environment is inappropriate development, either being constructed in a sensitive area or too great a density for an area to handle.

Many high density development areas exist in Harwich. These include some areas of West Harwich, Harwich Port, South Harwich, the Great Sand Lakes area of East Harwich, and the residential area between Long Pond Drive and Long Pond in Pleasant Lake (the western end of the pond). To decrease the potential environmental threats or problems in the areas, innovative technologies for waste disposal are being used.

With data distributed from the Massachusetts Estuaries Project (MEP) about nitrogen impaired coastal waters, the Town of Harwich is now evaluating wide scale wastewater treatment including public sewerage. Mitigation efforts including proactive open space acquisition in nitrogen impaired watersheds will continue to play an important role in reducing nitrogen load from new development and also reducing the town's wastewater treatment infrastructure costs long-term.

8. Forestry

The climate of Cape Cod (Harwich) is humid and characterized by a moderate to large annual temperature range, with a well-developed winter and summer seasons. Precipitation is ample in all months and favors development of forests. The vegetation exhibits a maritime influence. Prevailing winds are out of the southwest from April through October, and from the Northwest from November through March. Winds from the northeast are associated with storm events, bringing wind, rain and cold damp air. Precipitation maximums occur during the winter months and minimums usually occur in late May through July. Salt exposure and intense wind events may damage vegetation. Pines are especially susceptible to wind-throw, uprooting, crown and branch damage. Most winter storms bring the Cape storm surges from the ocean. Periodic defoliation of trees (especially Oaks) by forest insects such as the gypsy moth or the newly arrived winter moth increases the exposure of sunlight to the under-story shrubs. This dry and acidic environment slows the decay of organic matter and leads to accumulation of litter and duff.

Harwich is moving forward on management plans for conservation areas with the community. Those efforts need to be expanded to include forest resource management plans. Protecting upland forest resources should supplement our Wetland Regulations. Except for vernal pools, upland forested areas are not now protected.

We have a very active Trail Committee that has been working to link upland conservation areas to wetland and pond resources. We now have a town-wide trail guide and trails have been marked with markers and kiosks. They are now working on linking our resources to those in adjacent communities.

9. Ground and Surface Water Pollution

The most common source of groundwater pollution is the single-family residence. Even at one home per acre, water is returned to the ground at a slightly diminished quality. Where densities exceed one home per acre, groundwater becomes less pure. Many of the areas in Town not suitable for public or private water supply purposes are developed at extremely high residential densities. While this condition does not threaten public water supplies, it ultimately affects water quality where fresh water meets salty water and in certain ponds.

The fresh/salt water interface and discharge of pollutants from the fresh water occur where the fresh water on the surface of the lens meets the salt water which supports or buoys the lens. The interface area can fluctuate due to tide level, water table elevation, and well water withdrawal. Insufficient pressure from the fresh water side will result in salt water intrusion and may threaten private coastal wells. Storm inundation may also threaten coastal well quality.

Many other constituents have a negative impact on groundwater quality. These include:

- * Hydrocarbons from combustion fuels such as oil, gasoline, and diesel fuel which enter groundwater from spills, underground leaks, and polluted runoff;
- * Solvents and other industrial and household chemicals which enter groundwater from spills, runoff, and improper disposal;
- * Agrichemicals such as pesticides, fertilizers, herbicides, etc. used in farming and domestic lawn and garden care which enter groundwater from normal application, runoff, and misuse;
- * Septage treatment and landfill by-products which enter groundwater by leaching through the soil;
- * Road de-icing compounds which enter ground and surface waters via road runoff and uncovered storage.

These threats may materialize in almost any location. Most business and municipal activities routinely involving hazardous material handling are regulated and closely monitored, and there are controls over spills, deliberate dumping, or improper use of hazardous materials. Adequate opportunities for proper disposal of household hazardous wastes is significant to groundwater quality.

10. Others

a. Global Warming and Climate Change

A commonly discussed phenomenon of weather is the concept of global warming, a gradual increase in the average temperature of the earth. There is now consensus among the scientific community, and increasing acceptance by the lay public, that climate

change is a reality, and that considered actions to mitigate the impacts and adapt to the changes are appropriate.

The impacts to a coastal community such as Harwich from a prolonged warming trend could be quite severe as polar ice caps melt and sea level rises. However, more precise data is needed before specific mitigating measures can be formulated.

b. Air Quality

Due to the prevailing southwesterly and westerly wind patterns, Cape Cod is directly downwind from the Providence, Rhode Island metropolitan area. This means that air quality in Harwich is largely determined by pollutant levels in Providence. Air quality is monitored in Providence but not on Cape Cod. According to the 1988 Air Quality Data Summary published by the Rhode Island Department of Environmental Management, only one pollutant – ozone – out of nine monitored pollutants, had exceeded the Federal Air Quality Standards in Rhode Island in 1988. All other levels were well below the standards.

Locally, the major source of air pollution is combustion engines. Ambient air quality can be expected to diminish in the summer months when more traffic exists and the temperature is higher. The Rhode Island Air Quality Data Summary states that ozone appears to be more concentrated during hot weather.

If good air quality is to be maintained, measures to minimize or reduce traffic volumes may be necessary.

V. INVENTORY OF LANDS OF CONSERVATION AND RECREATION INTEREST

Open space or open land may be defined as land that does not contain substantial buildings, other structures, roads or other impervious surfaces. Ownership and use of open space varies greatly. An individual residential lot may contain open space used solely by that owner. A clustered subdivision may contain perimeter open space owned and used by a group of homeowners. Agricultural parcels, notably cranberry bogs in Harwich, are kept open for annual growing of crops. Golf courses, either public or private, maintain substantial acreage for recreational use. Undeveloped land, including the above examples either publicly or privately owned, may be open now but subject to potential future development and therefore not legally protected as permanent open space. Another category of unprotected land is termed “owners unknown”, meaning that clear title ownership of certain parcels is unknown. Such land could be developed and thereby removed from open space acreage once clear title is established.

Legally protected permanent open space is important for the protection of drinking water supplies, public scenic views and wildlife habitat among other open space values. There are many acres of open land owned by the town or by a non-profit organization such as

the Harwich Conservation Trust, and the town continues to refine its comprehensive analysis of legally and permanently protected open space holdings.

As noted in the regional policy plan, open space has helped define Cape Cod's heritage and economy. Open space, and the rural character it imparts, is one of the region's most valuable assets. Marshes, beaches, farms and woodlands contribute directly to key industries on Cape Cod, attracting tourists and providing areas for farming and cranberry growing, hunting, fishing and swimming. The continued integration of open space into the fabric of the landscape and the lives of Cape residents will define the Cape's future.

Appendix D contains a list of all open space lands in Harwich owned by the Town, by the State and by semi-public conservation trusts. Each parcel includes acreage, deed information, current use, condition, recreation potential, grant information if known, public access, zoning district and degree of protection. Additional information on ADA accessibility is provided in Appendix E. The amount of protected open space land has increased significantly since the recommendations of the 1998 Open Space and Recreation Plan, largely due to land purchases funded by the Land Bank and Community Preservation Act. Figure 11 depicts all public and semi-publicly owned lands along with selected other open space land. The Town has undertaken a significant effort to update information on all open space parcels, and that effort is continuing beyond the submission of this Open Space and Recreation Plan.

Appendix D has been updated by adding publicly acquired and protected parcels between 2010 and 2015. The following discussion summarizes the inventory of public lands according to the level of protection afforded each.

A. Protected Lands

1. Town Owned

Appendix D includes 188 parcels held by the Board of Selectmen for a variety of purposes. Parcels used for conservation or recreation purposes include 41 associated with beaches or landings, 8 on or adjacent to a bike path, 2 in the town forest, 5 parks, and 6 associated with ponds or bogs. Additional analysis is needed to determine which of the remaining parcels held by the Selectmen are protected for open space, which should be formally dedicated as open space, and which are suitable for other municipal purposes.

Appendix D also includes 1 parcel associated with the historical commission, 3 with parks and recreation, and 41 with the water department.

Since 2010, the Towns of Harwich and Chatham jointly acquired several adjacent parcels to protect municipal water supplies. 4 of those parcels are included in the Harwich Conservation Commission list below. 3 parcels with over 18 acres were acquired by Chatham and assigned to the Board of Selectmen.

2. Conservation Commission

All land held under the care of the Conservation Commission is afforded protection from development under Article 97 of the state constitution, and is considered permanently protected open space. Approximately 172 parcels with over 958 acres of Town-owned land falls under the Conservation Commission's jurisdiction. The Harwich Conservation Commission is charged with the following duties: overseeing the management of Town-owned bogs, garden plots, wetlands, and conservation land; leasing Town-owned bogs and garden plots; seedling distribution; and holding hearings to determine wetland issues and to review development plans for wetland conflicts.

Since 2010, 7 additional parcels with over 36 acres have been acquired by the Town and added to the Conservation Commission's jurisdiction.

3. Recreation Facilities

The Recreation and Youth Commission oversees approximately 60 parcels with over 100 acres devoted to Town beaches, parks, and memorial squares; organizes year-round and summer programs for Town youth, and; handles the sale of beach stickers. The Cranberry Valley Golf Course is a 200 acre public course owned and operated by the Town.

4. State Owned

The Commonwealth of Massachusetts owns and manages Hawksnest State Park, a combination of more than a dozen parcels with over 200 acres, in East Harwich.

5. Semi-Public Lands

Approximately 89 parcels with 338 acres of land has either been given to or purchased by the Harwich Conservation Trust. In addition, the Chatham Conservation Foundation holds 5 parcels with 9 acres in conservation in the Town of Harwich.

Since 2010, the Harwich Conservation Trust has acquired 19 additional parcels with over 53 acres.

B. Unprotected Parcels

1. Agricultural Lands

According to the 2006 Harwich Assessor's data, approximately 232 acres of privately-owned land in Harwich are used for agricultural purposes, 58 acres of which are associated with cranberry production. The Town, in an effort to promote cranberry cultivation, owns at least ten acres of bogs which it leases, and at least six acres of upland which are open to the public, for a fee, for gardening purposes.

2. Forest Land

Vacant land makes up approximately 13% of the total land in Harwich (1,904 acres), according to the 2006 Harwich Assessor's data. Much of this privately owned land is forest land that has the potential to be developed at any time according to the zoning district in which it is located. Approximately 840 acres has been deemed undevelopable, likely due to the presence of wetlands.

3. Less-Than-Fee Interests

Nearly 1,100 acres of wetlands can be found in Harwich and the Town has control over a large amount. The rest is privately owned, but cannot be built upon or encroached upon through the protection of the Wetlands By-law the Town has in effect which is under the jurisdiction of the Conservation Commission.

4. Private Recreation Lands

At least fourteen private/commercial recreational facilities exist in Harwich, totaling approximately 133 acres. Appendix F indicates the site, location, village, area in acres and facilities provided at each site.

5. Cape Cod Regional Technical High School

Cape Cod Regional Technical High School is located in the village of Pleasant Lake on approximately 67 acres of Pleasant Lake Avenue just northeast of the Route 6/Exit 10 interchange. Details of the school facilities and its location can be found in the school's website at <http://www.capetech.us/>.

C. Distribution of Open Space Land

Open space lands in Harwich are described in this section's inventory, in Appendix D, and in Figure 11. These lands are well-distributed throughout each of the town's seven villages.

West Harwich, Harwich Port and South Harwich all benefit from close proximity to Nantucket Sound and its numerous public beaches. Red River Beach in South Harwich, Bank Street Beach in Harwich Port, and Pleasant Road Beach in West Harwich all have public parking areas available to local residents and visitors with beach parking stickers.

Harwich Center is the hub of governmental services. Open space and recreation lands include Brooks Park, the Community Center and other ballfields. The Cape Cod Rail Trail for bicycles and pedestrian trails at Island Pond also serve Harwich Center.

East Harwich is bounded by two large open space areas – Hawksnest State Park and the Isabel Smith Conservation Area along Muddy Creek. This area also is served by a public beach on Pleasant Bay.

North Harwich enjoys close proximity to the largest open space area in Harwich, the Bells Neck Reservoir. Additional trail access includes a small parking area on Depot Street next to the Cape Cod Rail Trail and a newly constructed parking area for hikers on Great Western Road.

Pleasant Lake has access to two public beaches on Long Pond, the largest freshwater lake in Harwich.

VI. COMMUNITY VISION

A. Description of Process

The needs, opinions, and goals of Town citizens have been determined from a series of surveys, questionnaires and public meetings held over the past 40 years.

1. The previous Open Space and Recreation Plan documented numerous events between 1967 and 1998.
2. Spring 2000 – Update of Harwich Local Comprehensive Plan approved at Town Meeting.
3. May 2009 – Open Space and Recreation Survey distributed by the Planning Board at the Annual Town Meeting. 239 survey responses were compiled.
4. June 2009 – public meeting of boards and committees to review draft Open Space and Recreation Plan.
5. December 2009 – public meeting held by Planning Board for input on open space issues for the 2010 Local Comprehensive Plan.
6. April 2010 – public meeting of boards and committees to review updated Open Space and Recreation Plan.
7. August 2009 through January 2011 – public meetings and hearings for input into adoption of 2011 Local Comprehensive Plan.
8. 2013-2014 – public meetings and hearings on Draft Comprehensive Wastewater Management Plan.
9. June 2015 - public meetings of boards and committees to update Goals and Objectives for 2017 Open Space and Recreation Plan.
10. June 2015 – Open Space and Recreation Plan conducted online and via printed copies at Town Hall, Community Center, and Brooks Free Library.

B. Statement of Open Space and Recreational Goals

The principles and vision articulated in the 2000 Town of Harwich Comprehensive Plan were utilized to complete the first Open Space and Recreation Plan. The four primary objectives from the previous plan remain valid for the 2017 plan:

1. **Strategic acquisition of environmentally sensitive properties** with a focus on acquisition of properties that are contiguous with existing conservation land.
2. **Optimal protection of the Town’s natural resources** that make Harwich a pleasant and desirable place to live, including an aggressive and strategic land protection program.
3. **Protection and enhancement of the Town’s character** through preservation of key elements of the Town’s natural and built environments, including restoration of damaged or degraded resources.
4. **Development of Village Centers** with respect for natural and man made systems.

With the adoption and acceptance of this Open Space and Recreation Plan, the Town of Harwich will be working to preserve and enhance the management of open space in Harwich and protect natural resources (such as groundwater and surface water, coastal

water and adjacent shoreline areas, inland and coastal wetlands, and wildlife and plant habitats) and community character through growth management strategies while increasing the opportunities for passive and active recreation in the natural environment and managing the handling and disposal of solid and hazardous waste products.

The following analysis of needs represents the effort to preserve and protect the resources we have while dealing and living with the growth that will continue to occur in our town during the next five years.

VII. ANALYSIS OF NEEDS

A. Harwich Open Space and Recreation Survey

Previous surveys were conducted in 1987 with 167 responses and in 2009 with 239 responses. An updated survey was conducted in 2015 with both hard copy and on-line versions available to the general public. A total of 379 survey responses were received with the large majority returned electronically.

70% of responses were from full-time residents, and 12% were from part-time residents. The latter was a considerable increase from 1.7% in the previous survey. 17% of respondents identified themselves as visitors or “other”.

85% of respondents said it is “very important” for the Town to continue to acquire and preserve open space and natural areas in Harwich. An additional 10% responded that it is “important”. 5% responded that continued acquisition and preservation is “neutral” or “not important”.

The survey asked, “How important is it to preserve” each of the following resources. The numbers below indicate the percent of respondents who replied “important” rather than “neutral” or “not important”. Responses are ranked in order:

Type of Resource	“Important”
Land for protection of groundwater, drinking water and watersheds	99%
Wildlife habitat areas, such as woodland, wetlands and rare species habitat	96%
Areas around ponds and lakes	90%
Beach land and access points for recreational needs	90%
Areas within watersheds near harbors, bays and coastal waters	89%
Natural land to support walking trails	83%
Aesthetics/scenic views and vistas	79%
Agricultural land and farmland	78%
Tracts of land linking open space parcels	78%

Another question asked respondents to rate the quality of existing recreational facilities. With options ranging from “excellent” (5 points) to “poor” (1 point) the weighted average for each facility is given below. Facilities are ranked from highest to lowest.

Recreational Facility	Weighted Average
Bike trails	4.42
Athletic fields (e.g. soccer, football, baseball)	4.33
Golf courses	4.29
Walking/hiking trails	4.28
Bird watching/nature enjoyment	4.24
Parks	4.00
Tennis courts	3.91
Playgrounds	3.84
Existing town facilities for boating and fishing	3.84
Beach parking and amenities	3.72

Two open-ended questions were “What are your favorite conservation areas in Harwich” and “What are your favorite recreational facilities in Harwich”. The top four responses to each question were as follows:

Conservation areas - Bells Neck (125 responses), Thompson Field (63), Bank Street Bogs (44) and Hawksnest (28).

Recreation areas - beaches (118 responses), bike path (67), Brooks Park (39) and Community Center (26).

The survey asked respondents to rate the importance of future recreation facilities. The numbers below indicate the percent of respondents who replied “important” rather than “neutral” or “not important”. Responses are ranked in order:

Future Recreation Facility	“Important”
Walking/hiking trails	88%
Bike trails	84%
Parks	81%
Bird watching/nature enjoyment	76%
Beach parking and amenities	75%
Public boating and fishing	65%
Community gardens	59%
Playgrounds	53%
Dog/pet walking areas	45%
Athletic fields (e.g. soccer, football, baseball)	36%
Swimming pool	30%

Tennis courts	27%
Golf courses and driving ranges	23%
Basketball courts	23%
Outdoor track	21%
Horseback riding areas	20%
Hunting areas	14%
Skateboarding	12%

Responses for two specific facilities are worth noting. There has been a recent debate about whether the town should construct a public swimming pool. Responses were fairly evenly split among “Important” (32.1%), “Neutral” (34.8%) and “Not Important” (33.1%). A number of write-in comments both supported and opposed a swimming pool.

A strongly debated topic at the 2015 Annual Town Meeting was whether hunting should be permitted on town-owned land in the Bells Neck areas. Survey responses for hunting areas were “Important” (14.6%), “Neutral” (23.8%) and “Not Important” (61.6%).

The full results of the survey may be found in Appendix G.

B. Resource Protection Needs

The Town of Harwich is located in a very environmentally sensitive area. The Town’s proximity to the coast as well as its dependence on the Monomoy Groundwater Lens for drinking water make environmental protection everyone’s concern. Preserving open space for water supply protection was the number one concern expressed by residents in the 2015 Open Space and Recreation survey (Section VII.1). Numbers two and three on the survey were wildlife habitat areas and areas around ponds and lakes, respectively.

Resource protection is also critical to the Town of Harwich’s financial well-being due to the Town’s dependence on tourism and real estate. Any degradation of the natural resources would have a negative impact on tourism and real estate values. The Town’s beaches, coastline and wetlands are all important attractions for visitors, residents and wildlife. Wildlife either viewed or hunted is also an important draw for the town. If the resources were to become damaged due to overbuilding or pollution, the Town of Harwich and its residents would suffer.

The Town of Harwich’s resource protection needs are consistent with those detailed by the Cape Cod Commission in the Cape Cod Regional Policy Plan. Maintaining wildlife corridors and large patches of existing heterogeneous habitat types are an important step in maintaining the viability of wildlife habitat. Protection of significant areas is also an area of particular focus. High priority areas include:

- Zones of contribution to public water supply wells;
- Recharge areas to nitrogen-sensitive marine embayments;
- Potential public water supply areas;

- Rare species habitat and other critical habitat and natural communities, including the state’s BioMap and Living Waters Map; and
- Unfragmented forest habitat adjacent to previously protected open space
- Diadromous (e.g. alewife/river herring) fish runs

C. Community Needs

The 2015 Open Space and Recreation Survey (Section VII.1) addresses recreation needs in Harwich. Issues of access are particularly important, with walking/hiking trails and bike trails identified as the greatest needs. Other frequently selected recreation needs are parks, bird watching/nature enjoyment areas, and beach parking and amenities. The responses of local residents are consistent with goal #1 of the Massachusetts 2012 Statewide Comprehensive Outdoor Recreation Plan (SCORP). That goal is to “increase the availability of all types of trails for recreation”. Appendix B describes numerous bicycle and sidewalk improvements that are proposed to improve recreational biking and walking in Harwich.

The 2012 SCORP discusses the unique characteristics of Cape Cod and the Islands which are “known for their abundance of coastal resources and amenities”. As a result, “land protection is extremely important to this region of the state”. These characteristics are reflected in Section VIII of this plan, Goals and Objectives, including Goal III, Identify Future Open Space Acquisitions and Goal VI, Objective 4, “Protect the public interests on the coast, including rights for fishing, fowling, and navigation and expand, where appropriate, public access to the shoreline, through acquisitions or donations and provision of facilities”.

Goal #3 of the 2012 SCORP is to “Invest in recreation and conservation areas that are close to home for short visits”. Harwich’s approach to this goal is to spread improvements throughout all villages in the town. Examples of this approach are found in Goal IV, Enhance Trail Systems Within Open Space Areas; Appendix B, Priority Sidewalk/Bicycle Facility Improvements; and Appendix H, Community Facilities, Existing Recreation Facilities and Needs.

The 2012 SCORP discusses variability of the state population, including the needs of different age groups. In Harwich, according to 2013 US Census statistics, seniors over age 60 constitute 37.1% of the town population as opposed to 20.0% statewide. As noted in the Harwich Council on Aging 2009-2019 Strategic Plan, the Town’s senior population may be segmented into three groups – “boomers”, age 60 – 70; middle range, age 71 – 85; and elderly, age 85+. The latter two groups may be further divided into active and sedentary populations. The Strategic Plan recommends that programs and services be identified to meet the needs of each group. A wide range of existing and proposed facilities suitable for seniors, from tennis courts to walking trails to swimming pool, are described in the appendices of this Open Space and Recreation Plan.

Accessibility must be addressed for handicapped persons. ADA accessibility on town-owned parcels is itemized in Appendix D. The ADA Self-Evaluation Report, Appendix

E, documents recreation facilities that have suitable access and those that do not. The latter will serve as a basis for future improvements. Identified needs for recreation facilities, as listed in Appendix H, include several rest rooms that will meet ADA accessibility standards.

D. Management Needs

Due to the Town's success in preserving almost 400 acres over the past 15 years, management of these properties is now one of the most pressing needs for the Town of Harwich. Since the last Open Space and Recreation Plan was approved in 2010, the Town has made impressive advances in management of key conservation areas including Thompson's Field, Bells Neck and Island Pond. The Harwich Conservation Administrator documents the following management activities over the past 5 years:

Thompson's Field Conservation Area:

- 1) Maintaining current open field habitat on the portion of Thompson's Field south of the bike trail by annually mowing, and removal of Poplar trees and other invasives such as Bittersweet, Honeysuckle, and Autumn Olive in order to expand field habitat and encourage native plant growth. This is as per the approved Land Management Plan for the area.
- 2) Planting of native wildflowers on the south side to provide a food source for pollinators.
- 3) Thinning of young pitch pines and oaks on the side of Thompson's Field north of the bike trail. This area was once an open field habitat and this has been allowed to become overgrown with very thick stands of these trees in the past 20 years. This poses a large wildfire threat due to their density, as well as has caused loss of sandplain grassland/heathland habitat; a globally rare habitat. Starting in 2012 with the help of AmeriCorps Cape Cod, other volunteers, and assistance from other town departments, we have been able to thin the trees from about 6 acres of land on this side. Native grass and shrub species have re-grown, and we have even attracted a rare butterfly, the Hoary Elfin, to this area as a result of this management. We plan on continuing to thin out the pines and oaks as per the Land Management Plan.

Bells Neck Conservation Area and Island Pond Conservation Area:

In 2011 the Harwich Conservation Commission hired an environmental consulting group to do Land Management Plans for the Bells Neck Conservation Area and the Island Pond Conservation Area. Over a 12 month period, this firm documented all flora and fauna found in these areas, and made management recommendations for the area. In 2012, these Land Management Plans were adopted by the Conservation Commission. The town is working on eliminating social trails, curbing illegal dumping by putting up surveillance cameras, and putting up natural trail blocks to eliminate car and ATV use on the trails. The town has also built a new parking area for the northern section of the Bells Neck Conservation Lands on the north side of Great Western Rd. This area is delineated by split rail fence and has a kiosk made by the Boy Scouts. This parking area is visible from the road for better policing as opposed to the location where people used to park to access the conservation land.

10-Parcel Stewardship Report:

Coinciding with the Bells Neck and Island Pond Land Management Plans, the Conservation Commission had the consultants do a 10-parcel Stewardship Report. This report detailed the management needs of each of these parcels.

With over 2400 acres under the custody of 7 different entities, management will continue to play an important role in achieving resource protection and community needs. The efforts of town organizations like the Conservation Commission, Trails Committee, and Real Estate and Open Space Committee as well as private organizations like the Harwich Conservation Trust and other volunteers will be coordinated to help develop and execute land management plans. Plans will help not only to enhance access to these public spaces, but also to protect from misuse, invasive species and other forms of degradation.

VIII. GOALS AND OBJECTIVES

After analyzing the open space and recreation needs of the Town, the following goals and objectives were formulated to help the Town of Harwich effectively meet those needs by better management of existing resources and preservation of future ones.

Goal I Maintain an Inventory of Existing Town-Owned Properties and Identify Appropriate Uses

Objective 1. Regularly update town-owned land inventory to include a list of all parcels, ownership, acquisition information, deed restrictions and accessibility. Maintain all information in the town's GIS system.

Objective 2. Identify existing and potential uses for all parcels.

1. Identify Town-owned parcels of high open space value and determine whether protection for open space purposes is in place.
2. Recommend conservation or other restrictions where needed to provide protection for parcels identified above. Alternatively, without formal restrictions, transfer care, custody and control to the Harwich Conservation Commission.
3. Identify parcels currently designated for general municipal purposes. If not needed for open space, consider use of these parcels for other purposes.

Goal II Implement Land Management Plans for Existing Conservation Properties

Objective 1. Pursue recommended actions from land management plans that have already been completed. Completed plans include Thompsons Field, Isabel Smith, Bells Neck and Island Pond.

Objective 2. Prepare additional land management plans. The Town Forest has been identified as a location for a new land management plan.

Goal III Identify Future Open Space Acquisitions

Objective 1. Identify parcels for acquisition by the town that would contribute to the town's open space goals and objectives. Encourage acquisition of parcels that abut existing conservation and open space land. Particular emphasis should be placed on:

- Zones of contribution to public water supply wells,
- Potential public water supply areas,
- Recharge areas to nitrogen-sensitive marine embayments,
- Marine areas susceptible to flooding,
- Rare species habitat and other critical habitat and natural communities, including the state's BioMap and Living Waters Map,
- Diadromous fish runs,
- Unfragmented forest habitat adjacent to previously protected open space, and
- Parcels which need restoration.
- Extensions of existing public trails.

Objective 2. Prioritize parcels for acquisition based on town goals and objectives, parcel availability, and availability of funds.

1. Use the Real Estate and Open Space Committee's new ranking system as part of the prioritization process.

Goal IV Enhance Trail Systems Within Open Space Areas

Objective 1. Maintain the existing network of trails for public use and enjoyment on Town-owned parcels and facilities. Develop trails on newly acquired Town parcels and connect to existing trails. Include interior and connecting trails on Town-owned parcels (where pedestrian and bicycle traffic would not be detrimental) in other detailed trail action plans. Involve all Town departments and committees responsible for land in this planning process.

Objective 2. Coordinate with regional trails and studies, such as the Cape Cod Commission Pathways Program, Cape Cod Rail Trail and the Cape Cod Bicycle Feasibility Study (in connection with the Cape Cod National Seashore).

Objective 3. Prioritize the acquisition of land and easements that will enhance the existing trail network. Work towards a permanent network of wooded looped trails throughout the Town.

Objective 4. Determine appropriate levels of access, parking and sanitary facilities at sensitive locations. Mark or otherwise post the trail network from Objective 1.

Objective 5. Review the State plan for maintenance and improvements at Hawksnest Pond. Coordinate efforts with town boards and committees to provide connections to other town trails and to ensure that trails and access points are compatible with the neighborhood.

Objective 6. Identify ancient ways or lost trails and attempts to preserve them and include them, where feasible, in the proposed network from Objective 1. Ancient ways shall be considered natural resource values available to the public.

Objective 7. Develop an action plan to protect, enhance, and preserve the trail systems from Objective 1, including passive use, protection of public safety and natural resource values, and deterrence of non-passive uses detrimental to the trails or Town-owned parcels such as dumping, trail obliteration or vandalism.

Goal V Protection of Natural Resources and Community Character Through Growth Management Strategies

Objective 1. Encourage development patterns that concentrate new development within or near existing villages and developed neighborhoods and away from important open space areas.

1. Encourage infill development within existing villages and moderate levels of new development in commercial or mixed-use zoning districts within or immediately adjacent to villages.
2. Discourage development in or adjacent to open space areas identified in this Open Space and Recreation Plan.

Objective 2. Balance the impact of new development with measures to protect existing open space and to preserve additional open space.

1. Require adequate setbacks to prevent development from encroaching on environmentally sensitive areas.
2. Require new open space parcels to connect to existing open space land and/or to protect habitats, water resource areas, or other important conservation amenities.
3. Minimize areas of disturbance and retain natural vegetation to the greatest practical extent.
4. Encourage public access through open space areas.

Objective 3. Involve appropriate town boards/commissions in review of development activities that may impact open space areas.

1. Both Planning Board and Conservation Commission should participate in review of projects designated as Developments of Regional Impact.
2. The Planning Board should seek input from the Conservation Commission concerning open space goals during development reviews.
3. Seek additional input from committees involved in open space, such as the Real Estate and Open Space Committee and Trails Committee.

Goal VI Preserve and Enhance the Following Natural Resources: Groundwater and Surface Water; Coastal Water and Adjacent Shoreline Areas; Inland and Coastal Wetlands; and Wildlife and Plant Habitats

Objective 1. Maintain the overall quality and quantity of Harwich’s ground water to ensure a sustainable supply of high quality, minimally treated drinking water.

1. Maintain Board of Health Regulations for maximum cumulative nitrate-nitrogen loads in protected areas and in growth centers.
2. Develop and implement a private well monitoring program with specific attention to withdrawal volumes and water quality.
3. Develop water conservation goals and devise a system for achieving the stated goals.
4. Promote a landscaping ethic that incorporates native species and other plantings which can grow well in the Cape Cod climate without use of fertilizer and chemical additives. Develop bylaws through the Conservation Commission that limit the use of fertilizers and chemical additives in wetland buffer zones.
5. Maintain an adequate hazardous waste spill response capacity.
6. Implement the following drinking water resource protection measures as needed:
 - A. Maintain the water resource protection zoning overlay districts and their accompanying zoning regulations
 - B. As data from testing identifies viable future water supply areas, they should be mapped and included within the scope of the prevailing drinking water resource protection measures. Land acquisition in the designated areas should be made a high priority
 - C. Develop and implement roadway snow removal management strategies that minimize the total application of salt and other harmful de-icing chemicals.
7. Develop and implement a program to protect delineated water resource recharge areas which includes the following measures:
 - A. Completion of appropriate nutrient loading analysis of each recharge area, including inter-town analyses of shared water resources
 - B. Development of recharge area management plans which will include nutrient loading guidelines and requirements for new development, upgrading of existing septic systems when affected property is sold or re-developed, responsibility and awareness programs for all property owners, and establishment of land acquisition priorities as needed.
8. Pursue appropriate measures to assure the sufficiency of the public water supply needed to meet the projected year-round and seasonal water demand at build-out.
9. Continue the pursuit of water resource recharge area delineation, as needed.
10. Provide public education programs on measures to protect water quality.

Objective 2. Preserve and improve the ecological integrity of marine and fresh surface waters.

1. Identify and adopt appropriate standards for impacts on surface waters and wetlands from septic tanks, parking areas, and erosion/sedimentation.
2. Prepare short-term and long-range plans for mitigating existing discharges of untreated public road/parking area runoff into wetlands and water bodies.
3. Upon the completion of nutrient loading analysis outlined in Objective 1, identify and prioritize impacted marine and freshwater habitats, and seek funding for small-scale remedial projects. Such restoration projects should complement larger wastewater and recharge planning goals in Objective 1 and 3, and can provide immediate public education benefits while proceeding on a shorter schedule.

Objective 3. Encourage the use of public and private sewage treatment facilities in appropriate areas where they will advance the goals of this plan and where they can be adequately managed and maintained.

1. Establish and/or streamline the permitting process to the greatest practical extent for innovative waste water treatment technologies
2. Continue the work of the Water Quality Task Force (now the Wastewater Implementation Committee) to develop and implement sewage treatment facility criteria including when such facilities would be required, where they may be permitted, how to design, construct and maintain them, and provisions for long-term maintenance/replacement.

Objective 4. Protect the public interests on the coast, including rights for fishing, fowling, and navigation and expand, where appropriate, public access to the shoreline, through acquisitions or donations and provision of facilities.

1. Develop and implement coastal protection/development guidelines and requirements which will specify or include the following:
 - A. Existing public rights-of-way to coastal waters shall not be interfered with or obstructed
 - B. Criteria for maintaining views of saltwater bodies
 - C. Incentives for private development to provide public walkways and/or other access to the shorelines
 - D. Establishment of public access to beaches that are nourished by publicly funded projects
 - E. Any changes of a use from water-dependent to non-water-dependent must include one or more of the following public benefits:
 1. Provision on-site of new public access to the shoreline in the form of parking space, walkways, and/or new public views of the shoreline
 2. Provision off-site(within the Town) of coastal facilities such as rest rooms at beaches, additional land, parking or other coastal facilities for public use.
 - F. The maximum first floor elevation for all new structures and the base flood elevation for the subject site.

- G. Prohibition of construction on coastal dunes.
- H. Minimum building setbacks from coastal bank or dune.
- I. Guidelines for reconstruction of structures following their destruction by a natural disaster.
- J. Guidelines for minimizing pedestrian and bicycle, boat and automobile traffic through critical wildlife and plant habitat areas
- K. Criteria for private and public dredging projects, including provisions for Town determination of where dredge material is to be deposited.
- L. Design criteria for storm water systems in coastal areas so that such systems could function properly after a one foot rise in mean sea level.

Objective 5. Preserve, manage and restore coastal areas so as to safeguard and perpetuate their biological, economic, and aesthetic values.

1. Adopt a “no boat waste discharge zone” within three miles of the Harwich Shoreline in Nantucket Sound and for all of Pleasant Bay in Harwich.

Objective 6. Control development in high hazard areas in order to minimize the loss of life and structures and the environmental damage resulting from storms, natural disasters, and sea level rise.

Objective 7. Maintain and improve coastal water quality to allow shell-fishing and/or swimming in all coastal waters as appropriate, and to protect and re-establish coastal ecosystems which support shellfish and finfish habitat.

1. Seek funding for specific water quality improvement projects adjacent to important town shellfish and finfish habitat.

Objective 8. Preserve, protect and enhance the quality and quantity of inland and coastal wetlands in Harwich.

1. Review Wetland Regulations to determine adequacy of current buffer width. Prohibit construction or disturbances of natural vegetation within designated buffer width for non-water dependent uses with appropriate exceptions such as access pathways and vista pruning, except when no other feasible alternative to such construction or disturbance exists.
2. Develop criteria and standards for how wetlands may be altered and under what circumstances, including the installation of utilities.
3. Provide incentives to restore altered or degraded wetlands, buffer areas and ponds and to remove invasive plant species.
4. Develop/maintain guidelines for best management practices for wetland related agriculture.
5. Develop regulations for soil erosion and sediment control for all properties within 100 feet of a vegetative wetland to prevent siltation impacts on wetlands.
6. Pursue amendment to the existing Town of Harwich Wetland Bylaw so as to improve wetland protection by including the following types of provisions:

- A. Expansion of Conservation Commission jurisdiction beyond 100 feet where appropriate
 - B. Improved enforcement.
 - C. Consider Bylaw amendments that restrict the use of fertilizer and pesticides in the buffer zone and improve the function of vegetative canopy and riparian buffer in the no disturb zone adjacent to wetlands.
7. Promote the enhancement of vegetative shading and riparian buffer and reduction of sediment inputs along migratory routes of diadromous fish runs identified in Section IV.G.

Objective 9. Continue to prevent the loss or degradation of critical wildlife and plant habitats, minimize the impact of new development on wildlife and plant habitats, and maintain existing populations and species diversity.

- 1. Incorporate the following guidelines into Town Bylaws and Regulations as appropriate for each of the respective land development permitting agencies:
 - A. Guidelines for determining significant impact of development on rare wildlife and plant habitats
 - B. Guidelines and requirements for when and how to do a habitat management plan
 - C. Guidelines for habitat assessment
 - D. Guidelines for maintenance/restoration of habitat
 - E. Design requirements for open space to provide best possible protection and quality of habitat.
- 2. Develop a priority list for land acquisition adjacent to critical wildlife and plant habitats such as shellfish growing areas, endangered plants and wildlife habitat, diadromous fish runs, and salt marsh.

Goal VII Management of the Handling and Disposal of Solid and Hazardous Waste Products

Objective 1. Continue management of an integrated solid waste system that includes source reduction, recycling, and composting and divert the maximum practical amount of municipal solid waste from incinerator and landfill through recycling and composting programs.

- 1. Continue to require adequate space for and access to recycling areas with incentives for the provision of common storage facilities for commercial and industrial developments.
- 2. Continue to provide adequate town facilities and programs to recycle, compost, and process all forms of solid and routine hazardous wastes and make usable by-products available to the public over time.

Objective 2. Manage the disposal of hazardous wastes generated by Harwich households and businesses in an environmentally sound manner.

- 1. Develop and distribute a hazardous waste management manual for all business licensees and home owners.

2. Continue to provide collection programs such as Household Hazardous Products (HHP).
3. Implement a responsibility and awareness program regarding hazardous wastes for all property owners in well recharge areas and recharge areas to ponds and embayments.
4. Restrict uses involving the routine handling and storage of hazardous waste from water resource recharge areas.
5. Consider adoption of a toxic and hazardous materials bylaw or regulation.

Goal VIII Preserve and Enhance Unique Natural and Manmade Features and Resources

Objective 1. Develop guidelines for sensitive design of development on, or adjacent to prehistoric or historic archaeological sites. Include a process for review of proposals subject to the guidelines.

Objective 2. Preserve scenic resources and unique environments as identified in Section IV.H.

1. The Historical Commission should use demolition delay bylaws to the extent possible to preserve existing historic buildings.
2. The town should use CPC funding and seek outside funding to preserve important historic buildings at their original site.
3. The Real Estate and Open Space Committee should identify and acquire sites suitable for the relocation of historic buildings where preservation at the original site is not possible.

Objective 3. Provide permanent historic interpretive materials for areas frequented by large numbers of tourists, such as Wychmere and Saquatucket Harbors, the Herring River Corridor, and the Cape Cod and Old Colony Rail Trails, and promote understanding and appreciation of the rich history of the Town.

1. Historical Commission should recommend the locations and designs for interpretive facilities to the Board of Selectmen for construction through Town Meeting.
2. Develop promotion programs for appreciation of Town's historic resources and history.

Goal IX Preserve and Enhance Opportunities for Passive and Active Recreation to Meet the Needs of Both Residents and Visitors

Objective 1. Maintain and improve existing recreation facilities.

1. Pursue funding for construction of improvements at existing recreation facilities as identified in Appendix I.
2. Develop management plans for maintenance of existing facilities.

Objective 2. Pursue opportunities for new recreation facilities to meet the needs of the community.

1. The Recreation and Youth Commission should identify locations where additional recreation land is needed and should coordinate with the Real Estate and Open Space Committee to seek acquisition of land. Where new development is proposed in these areas, the Recreation and Youth Commission should coordinate with the Planning Board to designate open space land for recreational purposes under subdivision review requirements.
2. Pursue funding for construction of sidewalk and bicycle facilities as identified in Appendix B.

Objective 3. Construct facilities to provide for reasonable access by disabled persons to recreation facilities and natural areas including:

- A. Beach access ramps and boardwalks
- B. Braille signage in appropriate locations
- C. TDD equipment where audio programs are offered
- D. Wheelchair accessible trail facilities
- E. Accessible comfort stations.

Develop a detailed action plan to provide these access improvements including articles for funding at Town Meeting or identification of other funding sources.

IX. FIVE-YEAR ACTION PLAN 2017- 2022

Table 3 below provides a five-year action plan to accomplish the goals and objectives set forth in Section VIII. Those action items proposed to be completed following the adoption of this plan have the highest priority, although all items are important. Other than outlining the process by which to follow to implement the goals and objectives, this action plan should also assist in guiding future planning efforts to protect existing natural resources, acquire open space and create more and better recreational opportunities for the Town.

Table 3: Five Year Action Plan

Objective #	Action Item	Responsible Party¹	Funding Source
PRIORITY ACTIONS, 2017-2019			
Goal I, Action 2	Identify Town-owned parcels of high open space value and determine whether protection for open space purposes is in place.	CC, RE	In house
Goal I, Action 3	Recommend conservation or other restrictions where needed to provide protection for parcels identified above. Alternatively, without formal restrictions, transfer care, custody and control to the Harwich Conservation Commission.	BS, RE	In house
Goal I, Action 4	Identify parcels currently designated for general municipal purposes. If not needed for open space, consider use of these parcels for other purposes.	RE, BS	In house
Goal II, Action 1	Pursue recommended actions from land management plans that have already been completed. Completed plans include Thompsons Field, Isabel Smith, Bells Neck and Island Pond.	CC	In house
Goal II, Action 2	Prepare additional land management plans. The Town Forest has been identified as a location for a new land management plan.	CC	CPA, WHIP, Barnstable Co., State grants
Goal IV, Action 5	Review the State plan for maintenance and improvements at Hawksnest Pond. Coordinate efforts with town boards and committees to provide connections to other town trails and to ensure that trails and access points are compatible with the neighborhood.	TC	MA parks, in house

Objective #	Action Item	Responsible Party¹	Funding Source
Goal VI, Action 3	Encourage the use of public and private sewage treatment facilities in appropriate areas where they will advance the goals of this plan and where they can be adequately managed and maintained.	BH, WIC	In house
Goal VIII, Action 1	Develop guidelines for sensitive design of development on, or adjacent to prehistoric or historic archaeological sites. Include a process for review of proposals subject to the guidelines.	HC,PB	In-house
Goal IX, Action 1	Maintain and improve existing recreation facilities (Brooks Park).	REC	In-house, CPA
Goal IX, Action 2	Pursue opportunities for new recreation facilities to meet the needs of the community (Sidewalk and bicycle facilities from Appendix B).	REC, RE, PB	CPA, State grants
LONG-TERM AND ON-GOING ACTIONS THROUGH 2022			
Goal I Maintain an Inventory of Existing Town-Owned Properties and Identify Appropriate Uses			
1	Regularly update town-owned land inventory to include a list of all parcels, ownership, acquisition information, deed restrictions and accessibility. Maintain all information in the town's GIS system.	PD	In house
Goal III Identify Future Open Space Acquisitions			
1	Identify parcels for acquisition by the town that would contribute to the town's open space goals and objectives. Encourage acquisition of parcels that abut existing conservation and open space land.	CC, RE, TC PB, BS	In house
2	Prioritize parcels for acquisition based on town goals and objectives, parcel availability, and availability of funds.	RE, BS	CPC, DEP, MA Land Grants
Goal IV Enhance Trail Systems Within Open Space Areas			
1	Maintain the existing network of trails for public use and enjoyment on Town-owned parcels and facilities. Develop trails on newly acquired Town parcels and connect to existing trails. Include interior and connecting trails on Town-owned parcels (where pedestrian and bicycle traffic would not be detrimental) in other detailed trail action plans. Involve all	TC, CC,RE HCT, REC	In house

Objective #	Action Item	Responsible Party¹	Funding Source
	Town departments and committees responsible for land in this planning process.		
2	Coordinate with regional trails and studies, such as the Cape Cod Commission Pathways Program, Cape Cod Rail Trail and the Cape Cod Bicycle Feasibility Study (in connection with the Cape Cod National Seashore).	CC, TC, PD	In house
3	Prioritize the acquisition of land and easements that will enhance the existing trail network. Work towards a permanent network of wooded looped trails throughout the Town.	TC, CC, RE HCT, REC	Barnstable County Land Management Program, State Greenways and Trails Program
4	Determine appropriate levels of access, parking and sanitary facilities at sensitive locations. Mark or otherwise post the trail network from Objective 1.	TC, CC	In house
6	Identify ancient ways or lost trails and attempts to preserve them and include them, where feasible, in the proposed network from Objective 1. Ancient ways shall be considered natural resource values available to the public.	TC	In house
7	Develop an action plan to protect, enhance, and preserve the trail systems from Objective 1, including passive use, protection of public safety and natural resource values, and deter non-passive uses detrimental to the trails or Town-owned parcels such as dumping, trail obliteration or vandalism.	TC, CC	In house
Goal V Protection of Natural Resources and Community Character Through Growth Management Strategies			
1	Encourage development patterns that concentrate new development within or near existing villages and developed neighborhoods and away from important open space areas.	PB	In house
2	Balance the impact of new development with measures to protect existing open space and to preserve additional open space.	PB	In house
3	Involve appropriate town boards/commissions in review of development activities that may impact open space areas.	PB, CC, RE, TC	In house
Goal VI Preserve and Enhance the Following Natural Resources: Groundwater and Surface Water; Coastal Water and Adjacent Shoreline Areas; Inland and Coastal Wetlands; and Wildlife and Plant Habitats			

Objective #	Action Item	Responsible Party¹	Funding Source
1	Maintain the overall quality and quantity of Harwich's ground water to ensure a sustainable supply of high quality, minimally treated drinking water.	BH, CC	In house
2	Preserve and improve the ecological integrity of marine & fresh surface waters.	BH, CC, PB, NR	In house, DEP
4	Protect the public interests on the coast, including rights for fishing, fowling, and navigation and expand, where appropriate, public access to the shoreline, through acquisitions or donations and provision of facilities.	BS, PB, CC, NR	In house
5	Preserve, manage and restore coastal areas so as to safeguard and perpetuate their biological, economic, and aesthetic values.	BS	In house
6	Control development in high hazard areas in order to minimize the loss of life and structures and the environmental damage resulting from storms, natural disasters, and sea level rise.	PB	In house
7	Maintain and improve coastal water quality to allow shell-fishing and/or swimming in all coastal waters as appropriate, and to protect and re-establish coastal ecosystems which support shellfish and finfish habitat.	NR	State coastal grants
8	Preserve, protect and enhance the quality and quantity of inland and coastal wetlands in Harwich.	CC, AG	In house
9	Continue to prevent the loss or degradation of critical wildlife and plant habitats, minimize the impact of new development on wildlife and plant habitats, and maintain existing populations and species diversity.	CC, PB, NR, RE	In house, CPA, grants
Goal VII Management of the Handling and Disposal of Solid and Hazardous Waste Products			
1	Continue management of an integrated solid waste system that includes source reduction, recycling, and composting and divert the maximum practical amount of municipal solid waste from incinerator and landfill through recycling and composting programs.	PW	In-house
2	Manage the disposal of hazardous wastes generated by Harwich households and businesses in an environmentally sound manner.	PW	In-house

Objective #	Action Item	Responsible Party ¹	Funding Source
Goal VIII Preserve and Enhance Unique Natural and Manmade Features and Resources			
2	Preserve scenic resources and unique environments as identified in Section IV.H.	HC,RE	CPA, County/State grants
3	Provide permanent historic interpretive materials for areas frequented by large numbers of tourists, such as Wychmere and Saquatucket Harbors, the Herring River Corridor, and the Cape Cod and Old Colony Rail Trails, and promote understanding and appreciation of the rich history of the Town	HC, BS	CPA, In-house
Goal IX Preserve and Enhance Opportunities for Passive and Active Recreation to Meet the Needs of Both Residents and Visitors			
3	Construct facilities to provide for reasonable access by disabled persons to recreation facilities and natural areas	REC	In-house

- 1) AC – Agricultural Commission
- BH – Board of Health
- BS – Board of Selectmen
- CC – Conservation Commission
- HC – Historic Commission
- NR – Natural Resources Director
- PB – Planning Board
- PD – Planning Department
- PW – Public Works Department
- WIC – Wastewater Implementation Committee
- RE – Real Estate and Open Space Committee
- REC – Recreation and Youth Commission
- TC – Trails Committee

Open Space and Recreation Plan

Appendices A to H

HARWICH Division Of Marine Fisheries Weighs In On Shellfish Lab

The state Division of Marine Fisheries has issued comments on the proposal to remake the Lucas fish house along the Herring River into a shellfish nursery by Farm View Realty Trust. The report cites the need to protect winter flounder during spawning and juvenile development as well as diadromous fish passage for both juvenile and adults in the river. DMF is recommending time of year restrictions be put in place for inward and outward fish migration in the spring and fall. Silt producing activities should be prohibited from Jan. 1 through June 30 and Sept. 1 through Nov. 15. DMF says the project represents improvements to the current habitat conditions by removing debris and replanting salt marsh, but recommends removing a bulkhead or lowering the profile of the structure, as has already be recommended by Conservation Administrator Amy Usowski. The DMF report also makes it clear the applicant must have a propagation permit issued by DMF, stated Eileen Feeney, a fisheries habitat specialist with the agency. The conservation commission continued the notice of intent hearing on the fish house reconstruction project two weeks ago in the absence of the report. The commission was scheduled to meet again on Wednesday night and take action on the request.

The Cumberland Farms reconstruction project in Harwich Port may be coming back to the planning board next month. Little information is available about the status of the project, which has been tied up in litigation for more than a year. Cumberland Farms sued the planning board after the board ruled the project did not satisfy the requirements of the zoning bylaw. The site layout is not in keeping with the historic development patterns of Harwich Port's village center, the board concluded. Selectmen scheduled an executive session on Tuesday night to discuss the status of the lawsuit.

The conservation commission will hold a public hearing on the draft 2016 Open Space and Recreation Plan on Thursday, Jan. 28 in town hall. Last approved in 2010, the plan must be updated to allow the town to remain eligible for land grants for the purchase of open space. The draft 2016 plan contains revised goals and objectives including a comprehensive review and inventory of existing town-owned properties, land management plans for existing conservation properties, and a process to identify future open space purchases. The plan also includes results of the open space survey conducted last June. The complete draft plan is available on the town of Harwich website.

Open Space And Recreation Plan Gets Airing Tonight

by William F. Galvin

HARWICH — Residents will have the opportunity Thursday evening to provide input into the town's 2016 Open Space and Recreation Plan, which must be updated every five years. The planning and conservation departments have been shaping the latest version of the plan.

Conservation Administrator Amy Usowski said the plan was last updated in 2010. The latest version is a combination of many other plans in town, including the Local Comprehensive Plan and the draft Comprehensive Wastewater Management Plan.

"The 2001 Local Comprehensive Plan provides the basic tenets which serve as our guiding light," Town Planner David Spitz said of the 2016 Open Space and Recreation Plan. Spitz said a survey conducted by the town last June also played a major role in this plan.

There was tremendous support for open space, drinking water, groundwater and watershed protection, Spitz said of the 300 people responding to the survey. He said 99 percent of respondents rated those natural resources as important or very important. "There is a very strong interest in open space in town," he said.

Ninety percent of the plan addresses open space with 10 percent about recreation, said Spitz. The document includes sections on community setting, environmental inventory and analysis, community vision and updated goals and objectives and a five-year action plan.

Approval of the plan also plays a key roll at the state level, since it will make the town eligible for grants, especially those the town has used over the years to assist in purchasing open space parcels, such as the 6.5-acre Verrochi property along the Herring River. That 2013 purchase was assisted by a \$206,700 state grant.

be developed.

Speaking of Thompson's Field, Usowski said there are no action items relating to regulating dogs there. She said the conservation commission has taken that off the table and there are no plans to bring anything to town meeting this spring. The commission is re-evaluating the situation,

**"We have so much open space, it's wonderful,
but we have to manage it."**

AMY USOWSKI, CONSERVATION ADMINISTRATOR

Usowski said the conservation commission plays a major role in the management of open space.

"We have so much open space, it's wonderful, but we have to manage it," Usowski said. "The plan talked about protecting, managing and town character. We're taking what we already have and managing it better." The commission also works closely with the real estate and open space committee on criteria for acquiring open space.

She said map and management systems are being updated. Management plans are already in place for Thompson's Field, Bells Neck Conservation Areas and Island Pond. Usowski said in the next five years a management plan for the Town Forest will

she said.

The plan looks at growth and development patterns. It cites resident growth of nearly 2,800 new dwellings predicted in the 2000 Local Comprehensive Plan and the impact of increased traffic relating to the additional residences. That led to a recommendation in the Local Comprehensive Plan that acquisition of open space could reduce the potential impact on town services and town roads.

The plan states residential growth estimates are reasonably consistent with the 2000 buildout estimate of 2,780 additional residential dwellings and the year 2014 long-term growth estimate of 2,624 dwelling units. After accounting for current

zoning, the latter included just under 400 additional units to be built in villages and 40B affordable housing projects.

In contrast, commercial/industrial growth estimates are far apart with the year 2014 growth estimate just under one million square feet, far below the year 2000 buildout estimate of almost 3.7 million square feet. A review of existing development shows that most residential lots are developed to their full zoning potential. However, existing commercial/industrial lots are often less than fully developed either because lot coverage is not maximized or because most buildings are one level rather than the two or three levels permitted by zoning.

The higher estimate from year 2000 may be more appropriate as a theoretical buildout figure. However, the lower estimate from year 2014 is a more accurate reflection of long-term growth potential, the plan states.

Spitz said the town is about 80 percent built out. The 15 to 20 percent of remaining lots are hard to find leaving little room for residential growth. "These are a lot of things I've been saying for a while," Spitz said.

The plan needs the approval of the planning board. The state approved the draft plan last fall, providing 13 items the town had to respond to. One of the more important was "more public process," hence the public meeting this week. The meeting will begin Thursday, Jan. 28 at 6:30 p.m. in the hearing room in town hall.

< APP A INSERT POWERPOINT >

APPENDIX B – PRIORITY SIDEWALK/BICYCLE FACILITY IMPROVEMENTS

Sidewalks and bicycle facilities may overlap. This appendix lists priority routes for new or upgraded facilities. Depending on available rights-of-way and other local conditions, facilities may include separated bike paths (preferred 8 to 10' asphalt width), paved road shoulders for bike lanes, concrete or asphalt sidewalks with or without curbs, and various other combinations.

VILLAGE CONNECTIONS

Harwich Center to Harwich Port

The highest priority is a direct connection between these two village centers:

Bank Street (Harwich Port to Harwich Center) – One of the Town's most heavily used sidewalks is the connector between Harwich Port and Harwich Center. Construction of a bike path would be difficult due to available right-of-way. Upgrades of the existing sidewalk/road shoulder are recommended, particularly at unsafe locations where sidewalk and roadway mingle at the same grade level on the inside of a curve.

Forest Street (Sisson Road to South Street) – a new facility would be desirable on this scenic roadway; however proximity to wetlands may make an upgrade difficult.

South Street (Sisson Road to Forest Street) – if construction of a Forest Street facility proves to be unfeasible, South Street may be a suitable alternative.

BEACH CONNECTIONS

Bank Street Beach – Heavy foot traffic, including many small children, creates a high safety risk to pedestrians on the narrow, winding portion of Bank Street south of Route 28 with poor visibility around curves.

Red River Beach

Uncle Venie's Road – This road carries significant volumes of foot traffic to and from the beach. Many curving sections and high traffic volumes make pedestrians vulnerable.

Julien Road/Old Wharf Road – New sidewalks from Route 28 would carry beach-related foot traffic more safely over heavily traveled, narrow, curvy roads.

Earle Road Beach – with Town ownership of an adjacent parcel, a sidewalk could be easily constructed along Earle Road from Lower County Road to highly used Earle Road Beach.

Pleasant Bay Beach – a sidewalk is recommended along Bay Road from Church Street due to the narrow, winding nature of the road and the many beach-using pedestrians.

ALONG MAJOR HIGHWAYS

The Massachusetts Highway Department has indicated that it will construct sidewalks coincident with road maintenance projects on Route 28. Priority areas are listed below:

Route 28

Harwich Port east to Julien Road – this portion of Route 28 is the highest priority for a new sidewalk. There is potential for heavy pedestrian traffic due to tourist destinations. Safe room for walking does not now exist.

Harwich Port west to Lothrop Road – this length of sidewalk would complete a connection from the village past a major supermarket and other commercial enterprises.

West Harwich – existing sidewalks are intermittent and sometimes in poor condition. Renovations and connecting segments are recommended.

Route 124 – extension of the bike trail to Cape Cod Regional Tech School would improve accessibility for students.

Lower County Road – funding should be restored for a previously-planned project that would provide more level grades and ADA accessibility along existing sidewalks.

Long Pond Drive - construction of bike shoulders from Route 124 to Route 137 would link existing or proposed bike networks along the bike trail and in East Harwich. This segment also would facilitate a future bike loop through Brewster.

RAIL TRAIL CONNECTIONS

Several possibilities exist for construction of a separated path between the rail trails and Route 28. Such a facility would extend the existing family-oriented bicycle network and would improve accessibility to commercial enterprises along the Route 28 corridor. While an 8 to 10 foot wide asphalt path may be the most suitable for bicycle travel, lesser widths or paving alternatives may be appropriate in some conservation-oriented locations. Any type of facility should meet ADA accessibility standards. “Share the road” or other links to villages and beaches would further improve accessibility. Options include:

Bells Neck Road – from the bike trail to Smith Street with links to Route 28.

Lothrop Road – from the bike trail to Route 28. Links along Gilbert Lane and Earle Road would enable further connections to villages and beaches.

Thompson Field –from the bike trail to Chatham Road. Links along Oliver Snow Road and Gorham Road would enable connection to Route 28 in the vicinity of Saquatucket Harbor.

Depot Road – a northerly extension from the bike trail would connect to Route 39 and then to the East Harwich pedestrian/bike network. A southerly extension from the bike trail would connect to Route 28. This facility would require a safety evaluation of a Route 28 pedestrian crossing.

APPENDIX C - RARE AND ENDANGERED SPECIES

DIVISION OF FISHERIES AND WILDLIFE - RECENT RARE SPECIES ELEMENT OCCURRENCES IN HARWICH

Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
Bird	<i>Charadrius melodus</i>	Piping Plover	T	T	2006
"	<i>Ixobrychus exilis</i>	Least Bittern	E		1993
"	<i>Parula americana</i>	Northern Parula	T		1984
"	<i>Rallus elegans</i>	King Rail	T		1974
"	<i>Sterna dougallii</i>	Roseate Tern	E	E	2007
"	<i>Sterna hirundo</i>	Common Tern	SC		2007
Butterfly/Moth	<i>Catocala herodias gerhardi</i>	Gerhard's Underwing Moth	SC		1920
"	<i>Papaipema sulphurata</i>	Water-willow Stem Borer	T		2006
Dragonfly/Damselfly	<i>Enallagma laterale</i>	New England Bluets	SC		2000
"	<i>Enallagma pictum</i>	Scarlet Bluets	T		2004
"	<i>Enallagma recurvatum</i>	Pine Barrens Bluets	T		2001
Fish	<i>Notropis bifrenatus</i>	Bridle Shiner	SC		1956
Reptile	<i>Terrapene carolina</i>	Eastern Box Turtle	SC		2007
Segmented Worm	<i>Macrobdella sestertia</i>	Leech	SC		1977
Vascular Plant	<i>Amelanchier nantucketensis</i>	Nantucket Shadbush	SC		2007
"	<i>Carex mitchelliana</i>	Mitchell's Sedge	T		1919
"	<i>Crocianthemum dumosum</i>	Bushy Rockrose	SC		1988
"	<i>Dichanthelium dichotomum</i> ssp.	Mattamuskeet Panic-grass	E		1918
"	<i>Dichanthelium ovale</i> ssp. <i>pseudopubescens</i>	Commons's Panic-grass	SC		2007
"	<i>Lachnanthes carolina</i>	Redroot	SC		2002
"	<i>Liatris scariosa</i> var. <i>novae-angliae</i>	New England Blazing Star	SC		1918
"	<i>Listera cordata</i>	Heartleaf Twayblade	E		1916
"	<i>Nabalus serpentarius</i>	Lion's Foot	E		1918
"	<i>Opuntia humifusa</i>	Prickly Pear	E		1918

Taxonomic Group	Scientific Name	Common Name	MESA Status	Federal Status	Most Recent Observation
Vascular Plant	Persicaria setacea	Strigose Knotweed	T		1919
"	Polygonum puritanorum	Pondshore Knotweed	SC		2003
"	Rhexia mariana	Maryland Meadow Beauty	E		1918
"	Rhynchospora scirpoides	Long-beaked Bald-sedge	SC		1986
"	Sabatia kennedyana	Plymouth Gentian	SC		2006
"	Sagittaria teres	Tereta Arrowhead	SC		2002
"	Sphenopholis pensylvanica	Swamp Oats	T		1919
"	Utricularia resupinata	Resupinate Bladderwort	T		2002
"	Utricularia subulata	Subulate Bladderwort	SC		1928

STATUS CODES

E = Endangered

T = Threatened

SC = Special Concern

Most Recent Observation

This field represents the most recent observation of that species in a town. However, because they are rare, many MESA -listed species are difficult to detect even when they are present. Natural Heritage does not have the resources to be able to conduct methodical species surveys in each town on a regular basis. Therefore, the fact that the "Most Recent Observation" recorded for a species may be several years old should not be interpreted as meaning that the species no longer occurs in a town. However, Natural Heritage regards records older than twenty-five years historic.

These data were extracted from the database of the Natural Heritage and Endangered Species Program in September 2008.

APPENDIX D – OPEN SPACE LANDS

(Insert Page)

APPENDIX E: ADA SELF-EVALUATION REPORT

A survey of town open space and recreation facilities was conducted by the town's designated ADA Coordinator in the summer of 2016 with assistance from members of the Disability Rights Committee. The complete report, with photos included, is available from the Harwich Planning Department.

PUBLIC PARKING LOTS

Headwaters Drive Parking Lot: The parking lot is sandy and no handicapped accessible spaces including no van access spaces. The parking lot is approx 210 ft in length divided by 11 feet wide parking spaces = 19 ½ spaces with additional spaces along the fence. Bike Path itself is 110 inches wide.

HARBORS

Allen Harbor:

Bathrooms have a 6 inch lip and are not therefore accessible. The doors to the bathrooms are 29 inches wide.

There is one handicapped accessible parking spot with a 5ft access aisle.

This parking spot along with all of the others need to be re-painted/striped as it is difficult to see the striping.

Access to the boats: 3inch lip makes it not accessible wood (this can be easily fixed). Aluminum ramp is 32 inches and the pier is wide enough. The blue handicapped parking sign is up to code however, located on the telephone pole.

Saquatucket Harbor:

Has 7 universal handicapped parking spaces

Handicapped bathrooms: 1 men's 1 women's ramp with rails

You can get to the Main Office by using the ramp from the parking lot that wraps around the outside of the building.

However, to get from the parking lot to the boats, you have to access the parking lot to the drive /road to do it and wrap around the building, because there are several sets of steps down from the Main Office area down to the boats. The ramp to the boat floats is

30 inches wide under one arbor and the second arbor is 24 inches wide. Floats are 36 inches or greater themselves. There is a lip from the drive through flat surface area to the ramped area that cannot be adjusted because of the nature of the structure.

The Main Office

The pull entrance door to the interior of the office building is accessible, leaving enough access space to enter in a wheelchair.

The main office inside while not designated as a public area - the entrance door to the interior main office is 28 inches wide, swings in with no handle-push to enter. The main counter top is 36 inches high.

Public restrooms are handicapped accessible: toilets, faucets/fixtures, mirror, grab bars and space in front of toilet.

Wychmere Harbor

Bathrooms have a step to get to threshold the width was 31 inches the door opening was less. The boat ramp is accessible but no accessibility onto boats large lip-no floats private boat area.

Herring River Dock: When I surveyed this property the float and ramp to the dock itself was taken up for the winter. The parking lot is sand and crushed gravel. There are no handicapped accessible parking spots or van accessible spots. The ramp up to the dock is **not in compliance** as it is 5ft high and 9 ft long and 4 ½ ft wide and a **30 degree incline**

BEACHES

NOTE: Beaches that do not have lifeguards, are not permitted to provide handicapped surf chairs.

Brooks Road Beach (off Lower County Rd.)

No bathrooms, 10 spaces 2 handicapped accessible spaces. This beach does not have Lifeguards and therefore handicapped surf chairs are not transported to this location.

Earle Road Beach

Newly expanded parking lot. 81 spaces in parking lot including 9 universal Handicapped accessible spaces including van accessible spaces.

New completely accessible bathrooms just re-done.

This beach is guarded and provides handicapped accessible surf chairs to the public.

Grey Neck Beach

Small parking lot;1-2 handicapped spots-no van accessible handicapped spots

This beach does not provide Lifeguards therefore handicapped surf chairs are not transported to this location.

Pleasant Road Beach

This Beach has 81 parking spaces and 3 universal handicapped parking and van accessible spaces. This beach has lifeguards and therefore provides handicapped accessible surf chairs to the public. This beach currently has a handicapped accessible port a potty bathroom. The Harwich Recreation Department has received a cost estimate of \$75,000 to re-do the bathrooms alone in this location.

Atlantic Avenue Beach

10 parking spaces. No handicapped parking at all. No bathrooms at all. This beach does not provide Lifeguards therefore handicapped surf chairs are not transported to this location.

Bank Street Beach

57 regular parking spaces and 4 Handicapped accessible bathrooms accessed by ramp. Universal handicapped accessible spaces, including van accessible space. Boardwalk is accessible from the parking lot but ends at the end of the boardwalk. This beach is guarded, therefore transportation of handicapped surf chairs is made available.

Red River Beach

186 car parking lot with 10 universal handicapped spaces including van accessible spaces. Handicapped accessible bathrooms. This beach has lifeguards and therefore provides handicapped accessible surf chairs to the public.

Pleasant Bay Beach Parking

PONDS

Sand Pond

This Pond location has bathrooms that are very old but they are handicapped accessible. There are no painted lines for parking spaces, the estimated number is 50-70 spaces no handicapped spaces or van accessible spaces are included. No surf chairs at this location. Stairs to the pond make the pond itself not accessible.

Seymour's Pond (Rte 124)

This pond area is not handicapped accessible at all. This area has 3 parking spots, none of them are handicapped and there are no bathrooms available. This pond does not provide Lifeguards therefore handicapped surf chairs are not transported to this location.

Hinkley's Pond

This pond area is not handicapped accessible at all. This area has 3 parking spots, none of them are handicapped and there are no bathrooms available. This pond does not provide Lifeguards therefore handicapped surf chairs are not transported to this location.

Long Pond Wixon Cahoon

This area has a dirt lot, is not accessible and does not have any bathrooms on site. This pond does not provide Lifeguards therefore handicapped surf chairs are not transported to this location.

Long Pond Fernandez Bog

66 spots/70 parking spots, handicapped accessible, new handicapped accessible bathrooms wheelchairs are there and they can get assistance from lifeguards to transport surf chairs

TRAILS

Coy Brook

Island Pond Trail

Isabel Smith (Monomoy River)

Robbins Pond

Bells Neck Trail-This Kiosk provides a map of the trails. The parking is all sand and no marked spaces. There is no handicapped parking spaces designated, including no van access parking. The trails are up and down hills and have many roots and brush in and over parts of the trails that could impede an able bodied person from traversing the path if not paying careful attention.

Thompson's Field: This field has 2 entrances Chatham Rd. side and Rte 39 side. Both parking lots have sand and crushed gravel and Chatham Road has a semi circle drive and Route 39 has a bigger parking lot. There are not any handicapped parking spaces or van access handicapped parking spaces at either entrance to this site. An electric wheelchair resident told me he walks with his child and wife and dogs in this field entering on the rte 39 side.

Texeira Property: Texeira Kiosk also says to the right “Frances Worrell walking trail”. There are 2 large rocks in front of the walking path entrance with 35 inches between the rocks. This is enough space to get a wheelchair through but purposely prevents cars or 3 wheeler type of vehicles from driving down the walking path. Parking is sand with no handicapped access or handicapped parking spaces. The trail is wide enough for wheelchairs. Sand makes a wheelchair, walker, cane, crutches etc very difficult to traverse making the participant at risk for falls.

OTHER

Harwich Community Gardens: No signage until you are on top of the site. No sign for handicapped access gardens. This is a wonderful asset to Harwich and it should be very clearly marked. **This can be easily rectified.** The entrance and the gardens are all sand terrain and no handicapped accessible spaces. The Handicapped accessible gardens are 2 heights one height is 16 inches at the lower level and 27 inches in the upper level. The water is easily accessed on the grounds adjacent to the gardens by 4.5 feet. These plots are open to any Harwich resident for a fee per season basis.

Brooks Park

Handicapped accessible parking spaces and van accessible space. Handicapped accessible bathrooms including stall, height of sinks and fixtures.

Golf Course

Wixon Pier

Round Cove

APPENDIX F - PRIVATE RECREATION FACILITIES

<u>#</u>	<u>SITE</u>	<u>LOCATION</u>	<u>VILLAGE</u>	<u>MAP</u>	<u>PARCEL</u>	<u>AREA IN ACRES</u>	<u>FACILITIES</u>
1	Stone Horse Yacht Club	Harbor Road	HP	8	S3 S4 S5	2.33	300' of tidal frontage outdoor recreation (boating) handicap accessible restroom & concession 40 boat slips & moorings 35 car parking area
2	Harwich Port Tennis	Off Freeman Street	HP	15	A7-1	2.5	4 tennis courts 25 car parking area
3	Locario Tennis Courts	Route 28	WH	12	G3-B	2.51	4 tennis courts 20 car parking area
4	Wequassett Resort & Golf Club	2173 Route 28	EH	115	S1-1 S1-2 S1-3	21.5	5 tennis courts boating & hiking 25 car parking area
5	Harwich Port Boat Works	Harbor Road	HP				20 boat slips & moorings 300' tidal frontage summer 40 car parking area winter 100 car parking area
6	Allen Harbor Marina	Lower County Road	HP	12	Y1-56 Y1-57B Y1-58B	3	70 boat slips & moorings 1 comfort station summer 50 car parking area winter 0 car parking area (boat storage)
7	Allen Harbor Yacht Club	Lower County Road	HP	13	P1-3	3	60 boat slips & moorings 200' tidal frontage 1 comfort station summer 50 car parking area winter 0 car parking area (boat storage)
8	Harwich Port Golf Club	Forest St. & South St.	HP	13 22	G1-A S1-B S1-C	77	9 hole golf course summer 60 car parking area winter 60 car parking area

<u>#</u>	<u>SITE</u>	<u>LOCATION</u>	<u>VILLAGE</u>	<u>MAP</u>	<u>PARCEL</u>	<u>AREA IN ACRES</u>	<u>FACILITIES</u>
9	Snow Inn Resort Tennis Courts	Route 28	HP/SH	24	T2	5.67	6 tennis courts pro shop/comfort station 73 car parking area
10	Hall's Go Carts	Route 28 & Sisson Road	HP	21	W1	3.85	go cart track large parking area
11	Grand Slam Entertainment	322 Route 28	HP	12	H5	3.31	batting cages w/9 pitching machines & bumper boat pool/small parking area
12	Trampolines	298 Route 28	HP	12	H1	1.64	12 trampolines small parking area
13	Weatherdeck Miniature Golf Course	168 Route 28	WH	11	T3-A	6.26	18 hole miniature golf course 60 car parking area
14	Harwich Junior Theater	105 Division Street	WH	10	P2	0.27	performance theater small parking area
TOTAL						132.84	

APPENDIX G: 2015 COMMUNITY SURVEY

All responses

(379)

2015 Harwich Open Space and Recreation Plan Community Survey

The Town is in the process of updating its Open Space and Recreation Plan, which is necessary to qualify for state reimbursement programs for acquisition and protection of important open space. This survey is being conducted to understand the needs and concerns of Harwich's citizens and visitors.

"Open Space" in this survey is defined as "public and privately owned undeveloped lands which are important for a variety of reasons, including recreation, agriculture, forestry or simply because of their scenic qualities and their contribution to the overall character of the town." Please take a few minutes to answer all of the applicable questions. Please drop off your completed survey by **Friday June 19, 2015** at Town Hall (box at the Conservation Dept. counter), the Community Center or the Brooks Free Library. The survey is on-line at: <https://www.surveymonkey.com/s/1213860>.

1. How important is it for the Town to continue to acquire and preserve open space and natural areas in Harwich? (372)

317 Very Important 37 Important 12 Neutral 6 Not important

2. How important is it to preserve: (362)

	Important	Neutral	Not Important
a. Agricultural land and farmland	281	66	11
b. Wildlife habitat areas, such as woodland, wetlands (fresh and salt marsh) and rare species habitat	347	9	3
c. Land for protection of groundwater, drinking water and watersheds.	357	4	0
d. Areas around ponds and lakes	327	31	1
e. Aesthetics/scenic views and vistas	287	67	6
f. Beach land and access points for recreational needs	326	30	2
g. Tracts of land linking open space parcels	283	68	10
h. Areas within watersheds near harbors, bays and coastal waters	322	25	2
i. Natural land to support walking trails	300	53	6

3. What Town actions do you favor to preserve and protect open space? (please check all that apply) (347)

- Cooperative land conservation efforts between public and private entities
- Town purchase of land using Community Preservation funds
- Town purchase of land even if it means additional taxes
- Mandatory dedication of open space by developers
- Conservation Restrictions/Easements – purchased/acquired
- Zoning that encourages Open Space Conservation
- Other, please specify: _____

4. How do you rate the quality of the following *existing* recreational facilities?

(321)

	Excellent	Good	Average	Below average	Poor
a. Athletic fields (e.g., soccer, football, baseball)	124	128	24	2	1
b. Tennis courts	53	142	56	10	0
c. Parks	78	149	60	9	0
d. Golf courses	110	118	27	2	1
e. Playgrounds	51	127	68	12	0
f. Bike trails	154	139	18	2	0
g. Existing town facilities for boating and fishing	49	147	58	13	3
h. Walking/hiking trails	128	149	88	3	2
i. Bird watching/nature enjoyment	116	137	36	3	1

**APPENDIX H - COMMUNITY FACILITIES
SUMMARY OF EXISTING RECREATION FACILITIES AND NEEDS**

The Recreation & Youth Department oversees 84 acres of town beaches, parks and ball fields and organizes year-round and summer recreation programs for residents of all ages

EXISTING FACILITIES	IDENTIFIED NEEDS
OCEAN BEACHES	
Red River – 196 car parking lot, restrooms	Repave parking area
Bank Street – 61 car parking lot, restrooms	Repave parking area
Earle Road – 90 car parking lot, restrooms	
Pleasant Road – 84 car parking lot, restrooms	Repave parking area
Other – Pleasant Bay, Belmont Road, Beach Road, Gray Neck Road, Brooks Road, Wah Wah Taysee Road, Wyndemere Bluffs, Zylpha Road, Atlantic Avenue, Sea Street, Merkel Beach and Neel Road	
POND BEACHES	
Fernandez Bog – approx. 70 car parking lot, restrooms	Pave parking area
Sand Pond – approx. 60 car parking lot, restrooms	New restroom facilities
Cahoon Pond – parking and boat ramp	New restroom facilities with storage area
Other – Seymour Pond, Hinkleys Pond, Wixon Memorial and Bucks Pond	
PARKS	
Brooks Park – tennis courts, basketball court, playground	Additional parking, tennis practice area, additional restroom facility, walking trail, expanded playground
Doane Park	
Exchange Park	
Wychmere Overlook	
BALLFIELDS	
Brooks Field – baseball, restrooms	
Senior Memorial Field – softball	
Potters Field – softball	
McPhee Field – soccer	
Whitehouse Field	New fencing
Veterans Memorial Recreation Complex (Community Center) – baseball, softball, multi-use area, walking path	
COMMUNITY CENTER	Explore construction and maintenance costs for new swimming pool