

# Town of Yarmouth 2015 Draft Open Space and Recreation Plan

Draft #4 June 18, 2015



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## SECTION 1: PLAN SUMMARY

This 2015 Open Space and Recreation Plan (OSRP) is an update to the 2007 OSRP. The OSRP is a dynamic document that needs periodic updating to accurately reflect the current conditions and the needs and goals of the Town. The update builds upon the earlier plan by continuing to inventory recreational and natural resources of the community, and incorporating the goals of protecting these unique resources for both its citizens and visitors, and acquiring suitable additional open spaces. The plan also details goals for the maintenance, upgrade and expansion of existing recreational facilities and programs, and expansion of active recreational opportunities.

Significant progress has been made in the preservation of open space and expansion of recreational opportunities since the previous 2007 Open Space and Recreation Plan. These include the addition of community gardens and a farmers market, improvements to the Sailing Center, expansion at the Flax Pond Recreation Area, equipment for the Fred Thacher Route 6A playground, a new Dog Park, addition of Mill Creek and Chase Brook pocket parks, improvements to Veterans Park at Packets Landing along the Bass River, and multiple invasive species removal projects.

The 2015 Update was developed through a planning effort involving several local boards and committees, and a public participation process conducted under the guidance of the Open Space and Recreation Project Team (OSRP Team). The OSRP Team is comprised of Town Staff from Conservation, Planning, Natural Resources, Community Development, Parks & Recreation and the Public Works Department.

The Plan includes a wide range of information on our community and residents, environmental resources and challenges, current open space and natural lands, recreational facilities, and community goals and needs. This information was used to develop a five year action plan of specific tasks to be accomplished to meet the community goals related to open space and recreation. The general goals and objectives identified in the 2015 OSRP include the following:

1. Maintain and manage open space and conservation properties.
2. Expand the amount of open space and conservation land.
3. Protect and improve environmental resources, water quality and open space.
4. Preserve and protect open space and natural environments through land use management, while balancing the need for economic development.
5. Provide year-round active recreational opportunities and increase public awareness of Town-owned land, facilities and programs.

Using these general goals, more detailed Action Items were developed to outline how these goals will be met, which are summarized below:

### *Regulatory/Zoning Changes to Explore:*

- ~~• Explore the creation of additional Village Centers along Route 28 to promote redevelopment of blighted properties, create additional housing units of various types and encourage redevelopment over green field development.~~
- Explore the adoption of Chapter 40R to establish Smart Growth overlay zoning districts to promote housing production, mixed land uses, compact design, walkable communities and

preservation of open space. A state approved overlay would make Yarmouth eligible for payments from a Smart Growth Housing Trust Fund, as well as other financial incentives.

- Explore changes to the existing Cluster Development Bylaw to ease restrictions and promote use of cluster style developments that preserve meaningful, larger tracts of open space.
- ~~Continue to review and comment on development and redevelopment projects through Design Review and Site Plan Review processes to promote incorporation of open space, buffer and parking lot trees, and landscaping.~~
- Expand applicability of existing land clearing and alteration of natural topography bylaw to reduce clear cutting of properties in advance of development, which impact aesthetics and encourage invasive species growth.
- ~~Investigate the adoption of tree canopy preservation regulations to preserve large diameter trees.~~
- Explore ways to reduce nitrogen loading, which may include:
  - aAdoption of Stormwater Management Regulations that are applicable throughout the community that include stormwater treatment to reduce nitrogen and phosphorous discharges and protect environmental resources.
  - Continue participation in the Section 208 water quality planning, pursue planning and design efforts to address nitrogen loads in wastewater, and consider implementation of fertilizer regulations.

#### *Non-regulatory:*

- Evaluate properties for acquisition that would protect environmental resources, drinking water, plant and wildlife habitats, wildlife migration corridors, passive recreation opportunities, preserve large tracks of undeveloped land, and those that abut existing conservation lands.
- Pursue mechanisms for funding the maintenance and management of open space and conservation properties including invasive species management, land management activities and enforcement of appropriate and legal use of conservation lands.
- Protect and improve environmental resources, water quality and open space through promotion of tidal restoration projects and wetland restoration projects, invasive species removal, dredging projects, and public education on best management practices near wetland resources.
- Expand active recreational opportunities through updating the Master Plan, construction of the Cape Cod Rail Trail (CCRT) extension, completion of the expansion at the Sailing Center and Phase 2 improvements at Flax Pond, and completion of the Dog Park and other phased improvements at Sandy Pond Recreation Area.
- Expand use of existing recreational facilities and programs by coordinating of programs between various Town Departments (Parks & Recreation, Libraries and the Senior Center), updating ways-to-water mapping, inventorying needs for public access to water, and promoting awareness through a multi-media approach.

- Maintain and upgrade existing facilities through exploration of various funding options, addition of amenities such as Wi-Fi and lending library at town beaches, and address deficiencies in hardscape courts such as basketball and tennis courts.
- Maintain and enhance Yarmouth's recreational shellfish resources through the continued purchase of seed stock, possible addition of other shellfish up-wellers and continued pursuing of funding for stormwater improvements to promote shellfish restoration.

## **SECTION 2: INTRODUCTION**

### **2.1 Statement of Purpose**

The purpose of this 2015 Open Space and Recreation Plan is to outline specific actions that can be taken by the Town to manage, protect and improve Yarmouth's natural resources and open space; provide ample opportunities for active and passive recreation for Yarmouth residents and visitors; and to provide a framework for decision-making by Yarmouth's residents, Town officials, and Town Staff.

Significant progress has been made in the preservation of open space and expansion of recreational opportunities since the previous 2007 Open Space and Recreation Plan. These include the addition of community gardens, improvements to the Sailing Center, expansion at the Flax Pond Recreation Area, equipment for the Fred Thacher Route 6A playground, a new Dog Park, additional sports fields at DY High School and Station Avenue Elementary school, restoration of the DY tennis courts, Mill Creek and Chase Brook pocket parks along Route 28, creation of a beach at Thacher Town Park, creation of a farmers market, improvements to Packets Landing including the Veterans Park development a park area and small marina, and multiple invasive species removal and trail improvement projects. Much of the funding for these projects has come from the Community Preservation Act adopted by the Town in 2005. Yarmouth is committed to the preservation of our Open Space parcels and Recreation facilities to build community character and enhance quality of life for residents and visitors alike.

### **2.2 Planning Process and Public Participation**

The previous 2007 OSRP was a comprehensive overhaul of the 2001 Plan and was prepared with the assistance of the consulting firm Horsley Witten Group. As such, much of the information contained in the 2007 OSRP is still relevant and the 2015 OSRP is an update to reflect progress made and outline new goals and objectives based on changes in demographics, public policy and stakeholder input. This plan was also prepared to adhere to the *Open Space and Recreation Plan Requirements* developed by the Massachusetts Division of Conservation Services.

This 2015 Yarmouth Open Space and Recreation Plan (OSRP) was developed through a planning effort involving several local boards and committees, and a public participation process conducted under the guidance of the Open Space and Recreation Project Team (herein referred to as the OSRP Team), whose members included:

- Kerry Muldoon, Conservation Administrator
- Kathy Williams, Town Planner
- Karl vonHone, Department of Natural Resources Director
- Karen Greene, Department of Community Development Director
- Pat Armstrong, Parks & Recreation Director
- Rob Angell, Interim Department of Public Works Director
- Austin Cahill, Economic Development Planner

The Goals and Objectives of this Plan were developed based on the results of an Open Space Recreation Plan Survey, conducted by the Town in 2015, in conjunction with institutional knowledge from Town Staff. The Project Team also held public meetings with the Planning Board on June 3, 2015; the Conservation Commission on June 4, 2015; and the Board of Selectmen on June 9, 2015 [and June 23, 2015](#) to receive public comments on the draft Plan. In addition, members of the Open Space Committee and the Recreation Commission were invited to the Planning Board Public Meeting to solicit their input. The Planning Board and Conservation Commission meetings were publicized in the local media, and properly posted at Town Hall and on the Town's website. - Furthermore, the draft OSRP was submitted to the Cape Cod Commission (CCC) for their input. **Comments from the public meetings and the CCC have been incorporated in this Plan.**

Public participation was an integral part of the planning process. In addition to the public meetings noted above, the OSRP Team took the following further actions to encourage public input:

- The Open Space and Recreation Plan Survey was published on the Town website and distributed to a variety of Town Committees and Boards, as well as hard copies being distributed throughout ~~T~~town.
- The Draft Open Space and Recreation Plan was available at Town Hall and on the Town website.
- A brief summary of the Plan and identification of the locations for further information was incorporated into the monthly Recreation and Library Newsletters. [A press release was publicized in the Yarmouth Register Newspaper, included as a front page "news" item on the Town Website, posted on Channel 18 and noticed to the Yarmouth Chamber of Commerce.](#)
- [A legal notice was advertised in the Yarmouth Register Newspaper to announce the Conservation Commission will be reviewing the 2015 draft Open Space and Recreation Plan at the June 4, 2015 meeting.](#)

## Acknowledgements

In addition to the members of Town Staff who participated in the development of this Plan, members of the following Boards, Committees and Commissions provided valuable input and assistance in development of the 2015 Open Space and Recreation Plan.

### Board of Selectmen

Erik Tolley, Chairman  
Tracy Post, Vice Chairman  
Norman Holcomb, Clerk  
Michael Stone  
James Quirk

### Planning Board

Norman Weare, Chairman  
Brad Goodwin, Vice-Chairman  
Ken Driscoll, Clerk  
Thomas Roche  
Christopher Vincent  
Angela Philbrook

Conservation Commission

Edward Hoopes, Chairman  
Thomas Durkin, Vice Chairman  
Philip Johnston, Clerk  
Joan Carr  
Rick Bishop  
Audrey Russano  
Ruth Rauss

Recreation Commission:

Dorcas McGurrin, Chairman  
Debbie Clark, Vice Chairman  
Steve Sozanski  
Josh Medeiros

Open Space Committee:

Jack Mulkeen, Chairman  
Heather McElroy

## **SECTION 3: COMMUNITY SETTING**

### **3.1 Regional Context**

Yarmouth is located in the middle of Cape Cod, commonly referred to the “bicep” of Thoreau’s famous description of Cape Cod shaped like a bended arm (see Map 0: Regional Locus). By way of land, it is located 70 miles from Boston and 250 miles from New York City. Yarmouth encompasses 28.2 square miles of land area, or 18,047 acres, and is bounded on the north by Cape Cod Bay, on the east by the Town of Dennis, on the south by Nantucket Sound, and on the west by the Town on Barnstable. The significance of having two shorelines lies in the diversity offered by the two distinctly different marine ecosystems, which ultimately results in different recreational activities.

Three villages make up the Town of Yarmouth: West Yarmouth, Yarmouth Port, and South Yarmouth. Each village has distinctive characteristics formed by over 350 years of history, which is shaped by the Town’s seaside heritage. To gain a true perspective of the historic charm of Yarmouth, one must stray from the major roadways of Route 6 and Route 28 and travel the backroads and along scenic Route 6A.

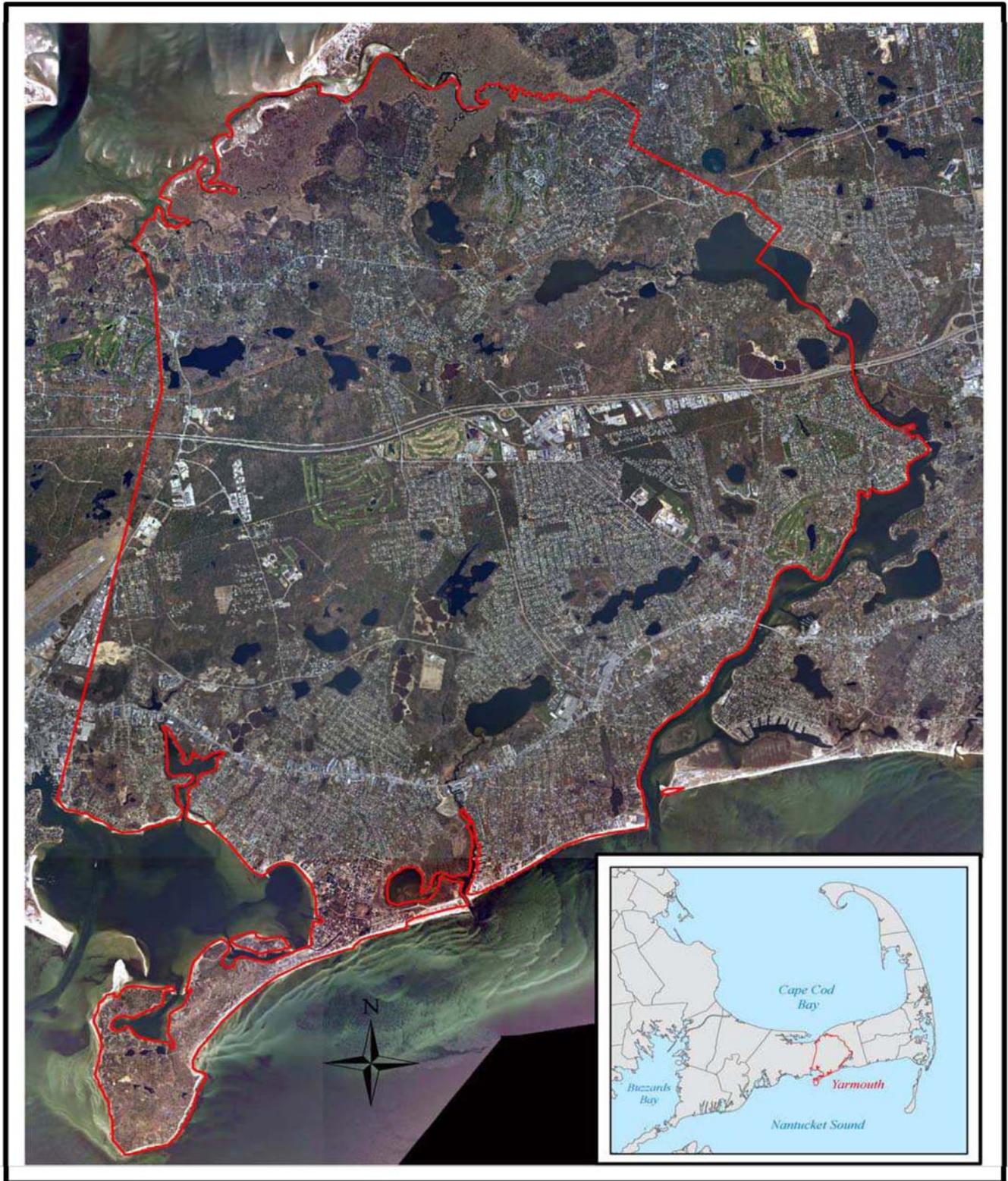
Yarmouth participates in regional natural resource planning with surrounding Cape Cod communities, the Cape Cod Commission, Section 208 Planning, Massachusetts Coastal Zone Management Advisory Committee, Barnstable County Health Department, Shellfish Task Force, and other regional organizations. In addition, protection of the Bass River and Chase Garden wetland ecosystems require a close partnership with the Town on Dennis. Yarmouth has also worked directly with the Town of Barnstable on several planning issues, including wellfield protection, airport expansion, and coastal plain pondshore preservation.

### **3.2 History of the Community**

The Town of Yarmouth is rich in history beginning with English settlers from the Mayflower arrival. The Town is broken into five historic districts to protect and manage the Town’s historic resources: 1) Taylor Bray Farm; 2) Northside Historic District; 3) Bray, Thomas Farm Historic District; 4) Yarmouth Campground Historic District, and 5) the South Yarmouth – Bass River Historic District. There are also three National Register Sites in town: the Judah Baker Windmill, Taylor Bray Farm, and the Baxter Gristmill. In addition, Yarmouth shares a regional historic district, Old Kings Highway Regional Historic District; with its neighbors, which encompasses the entire north side of town, north of Route 6.

English settlers first arrived in the 1630s when many generations of Native Americans (the Wampanoag Nation) lived here. At that time, Yarmouth was known as “Mattacheese”, meaning planting lands by the sea. In 1638, a Mayflower passenger, Stephen Hopkins, was granted a leave of Plymouth Colony to erect a house in Mattacheese, and cut hay to winter his cattle, provided he did not withdraw himself from the Town of Plymouth. By 1639, three farmers (Anthony Thacher, John Crowe, and Thomas Howes), were responsible for the first permanent settlement of Mattacheese. In 1640, Mattacheese had been renamed Yarmouth, possibly after a seaside town in England, and by this time, 28 families made their home here. Most were farmers, but others worked trades serving the new colonial outpost, including that

**Map 0 – Regional Locus Map**



of a tailor, cobbler, goldsmith, and carriage maker. Many descendants of the Town's first settlers still live in Yarmouth today.

According to folk lore, within the boundaries of Mattacheese were specific regional areas, which carried into names still in use today in the area: Quivet and Sesuit are names of two necks of land in Dennis, and Nobscusset is a street name in Dennis. Parts of Yarmouth that frame Cape Cod Bay are still called Hockanom.

Like the rest of early Cape Codders, Yarmouth settlers were farmers first and fishermen on the side. But, as the population grew, and the soils became depleted by forest clearing and windborne erosion, more and more Yarmouth citizens looked to the sea for sustenance and profit. In the 1700s, Yarmouth citizens helped to develop the whale fishing industry, first alongshore and then far offshore. In the 1800s, a full scale, multi-faceted maritime economy developed in Yarmouth with north-side sailing fleets communicated daily with Boston, ferrying Cape Cod livestock and produce, and four wharves were built along the Bass River where boatbuilding commenced.

The Bass River, along with Hyannis and Chatham were the major south side ports of Cape Cod in this early 1800s period (MHC 1987). Trading brigs sailed between Yarmouth and the British West Indies. Captain Asa Eldridge of Yarmouth was renowned worldwide when he established the record for fastest sailing time in 1854 (dock to dock in 13 days) from New York to Liverpool in the clipper ship "Red Jacket." Ebenezer Sears, a Yarmouth native, was the first captain to round the Cape of Good Hope in an American vessel (Snow 1946).

By 1840, Massachusetts provided half of the fishery products of the United States and Yarmouth was part of that effort, particularly in the cod and mackerel fisheries. By 1863, however, changes in fishing technology favored large cities with packing plants and the last of the Yarmouth offshore fishing fleet had been sold. Except for an inshore fishery, Yarmouth retired from the sea, in league with other Cape Cod towns, whose economy and populations declined through the latter half of the nineteenth century. Downturns in coastal trade, collapse of the whaling industry, and post-Civil War recession were responsible for emigration.

Yarmouth turned back to the land for economic pursuits. Cranberrying, a labor-intensive enterprise capable of employing displaced sailors and Civil War veterans, became the primary agricultural venture. The 1850s and 1860s were a time of "Cranberry Fever" in Massachusetts, and Yarmouth's five acres of planted bogs in 1854 grew rapidly to as many as 165 acres planted by 1889. Cranberrying altered the environment in many ways: cedar swamps and other wetlands were displaced to make working bogs, dikes were used to impound streams (Plashes Pond is one such manmade reservoir), adjacent embankments were mined for sand, and isolated ponds were given artificial outlets and their water levels manipulated with flumes.

Yarmouth Port continued to serve as the Town's primary business core in 1900, with grocery stores, printing shops, a tailor, a meat market, a bank and an insurance company. The Cape Cod railroad extended to Willow Street at the western edge of Town by 1854, and ten years later, the railroad was extended through Town to Orleans, supplanting sailing as the primary means of regional transport.

The advent of the automobile brought about subtle but inevitable change. By 1920, Yarmouth's population began its rebound from the nineteenth century decline, as the idea of Cape Cod as a summer resort took firm hold. Men found jobs building homes in developments along the southern coastal areas and the foundation of the tourist economy took shape. Yarmouth's character as a seaside resort was entrenched by the 1950s, spurred by the post-World War II boom. Beachfront motels blanketed the south side where warm waters and sandy shores providing excellent swimming and sunning conditions. Route 28 supplanted Route 6A as the Town's new linear commercial core, since there was more room for businesses to grow there and it was proximate to the resorts.

Over the past 50 years, many of the former summer tourists have purchased homes and retired to Yarmouth, producing the largest user group of the Cape's service economy (CCC 1994). This large and still growing retirement community has produced a greater awareness about "quality of life" issues in Yarmouth and on Cape Cod.

### 3.3 Population Characteristics

Yarmouth's year-round population has seen a steady increase since the 1960s, with a small decline in the past decade with the 2010 Census. As shown in Table 3.1, the largest growth occurred between 1970 and 1980 where there was an increase in population of approximately 35% (from 12,033 to 18,449). The population density per square mile of land in Yarmouth has shown similar growth patterns. Table 3.1 shows the population density for the town in persons per square mile. With an estimated 28.2 square miles, the 2010 population density for Yarmouth is 844 housing units per square mile.

**Table 3.1 – Yarmouth Population Characteristics**

<b>Year</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2010</b>
Population	12,033	18,449	21,174	24,807	23,793
% Change from previous Decade	NA	34.8	12.94	14.6	-4.1%
Population Density (person/square mile)	427	654	750	880	844

Population Data Source: U.S. Census Bureau.

Population Density is based on Town of Yarmouth area is approximately 28.2 square miles

As the population of year round residents has increased so has the Town's need for housing. In 2013, Yarmouth had 17,448 housing units. Of these, approximately 50% were owner occupied, which is slightly lower than the Massachusetts average of 56.4%. Yarmouth's renter occupied housing units is at 16%, compared to 33.6% for the state. Based on our tourism economy and second home market, Yarmouth sees a larger percentage of housing for seasonal or recreational use of almost 30% compared with 4.2% for the state. It is also important to note that the Town's affordable housing goal is to develop a mixture of rental and ownership types, choice in housing styles, and price ranges, with an emphasis on providing additional rental units. Much of Yarmouth is either currently developed or used for recreation, conservation and well

protection. The greatest residential growth potential for Yarmouth is in the redevelopment of existing parcels with the Town promoting in-fill and redevelopment projects over new green field housing developments.

Yarmouth's year-round population is predominantly middle-aged and older with a median age of 52.2 years of age. In the year 2000, there was a fairly dramatic shift to a larger retiring age population (ages 45-65), with a 32% increase in this age group compared to the 1990. Although the most recent US Census (2009-2013) demonstrated that the population in Yarmouth ages 45-64 decreased by 12.8% to a total of 5,352, they also represent the largest age group comprising 22.6% of the population. Another predominant feature of the Town's population is that it is fairly homogeneous by race. In 2000 only 3.76% of the population was non-white; by 2009-2013 the percentage had increased to 5.8%, but was still below the nation-wide and State-wide levels.

In 2009-2013 in Yarmouth 17,448 households were counted (an increase of 5,928 units from 2000), out of which 16.7% had children under the age of 18 living with them, 45.7% were married couples living together, 9.9% had a female head of household with no male present, and 40.9% were non-families. Thirty six percent of all households were made up of individuals rather than families, and 19.1% had someone living alone who was 65 years of age or older. The average household size was 2.05 persons and the average family size was 2.62 persons. There has been a decline in average household sizes and fewer school age children, indicating that there are fewer families in Yarmouth. Projections indicate that this trend will continue in the next decade, leaving Yarmouth with increasing numbers of older residents and fewer young families. Table 3.2 summarizes the changes in Yarmouth Demographics of Age Group between the years 2000 & 2009-2013 (U.S. census data).

**Table 3.2 - Yarmouth Demographics (U.S. Census)**

Age Group	2000	% of Total	% Change From 1990	2009-2013	% of Total	% Change From 2000
Under 5	1,084	4.4%	-5.4%	837	3.5%	-22.7%
5-14 years	2,484	10.0%	20.2%	1893	7.9%	-23.8%
15-24 years	1,842	7.4%	-15.1%	1944	8.2%	+ 6.3 %
25-44 years	5,789	23.3%	8.7%	4683	19.8%	- 19.1%
45-64 years	6,139	24.7%	32.2%	5352	22.6%	- 12.8%
65 years & over	7,469	30.1%	13.1%	7313	20.8%	+ 2%
<b>Total</b>	<b>24,807</b>	<b>100%</b>	<b>14.6%</b>	<b>23,726</b>	<b>100%</b>	<b>-4.4%</b>
Median Age	48.7			52.2		

\*Source: U.S. Census Bureau, 2009-2013 Population Estimates, 2000 Census and 1990 Census.

Employment opportunities on the Cape are limited with fewer management level or professional jobs and a large number of lesser paying retail and service oriented jobs associated with our tourism economy. This also results in a fluctuation in the unemployment rates between winter and summer (approximately 10% to 5%, respectively in 2014). The year-round permanent population of Yarmouth is economically poorer than other Cape Cod communities. According to the 2009-2013 Census, Yarmouth ranked 14<sup>th</sup> out of the Cape's 15 communities for Median

Household Income. Table 3.3 summarizes the Median Family Income and Per Capita Income statistics for Yarmouth from 1990 to 2009-2013, as compared to the State of Massachusetts. The Town's median household income consistently lags behind the State figures.

**Table 3.3 -Income Statistics for Yarmouth**

Income Year	1990		2000		2009 – 2013	
	Yarmouth	State	Yarmouth	State	Yarmouth	State
Median Family Income	\$33,282	\$44,367	\$48,148	\$61,664	\$67,826	\$84,900
Per Capita Income	\$15,042	\$17,224	\$22,731	\$25,952	\$34,096	\$35,763

These statistics indicate that while most types of recreational facilities should be expanded to serve all residents, consideration should be given to less expensive recreational opportunities that would be enjoyed by older residents. For example, walking trails, scenic lookouts and sidewalks may be more appropriate than extensive active recreation facilities (such as tennis or basketball) or private health clubs.

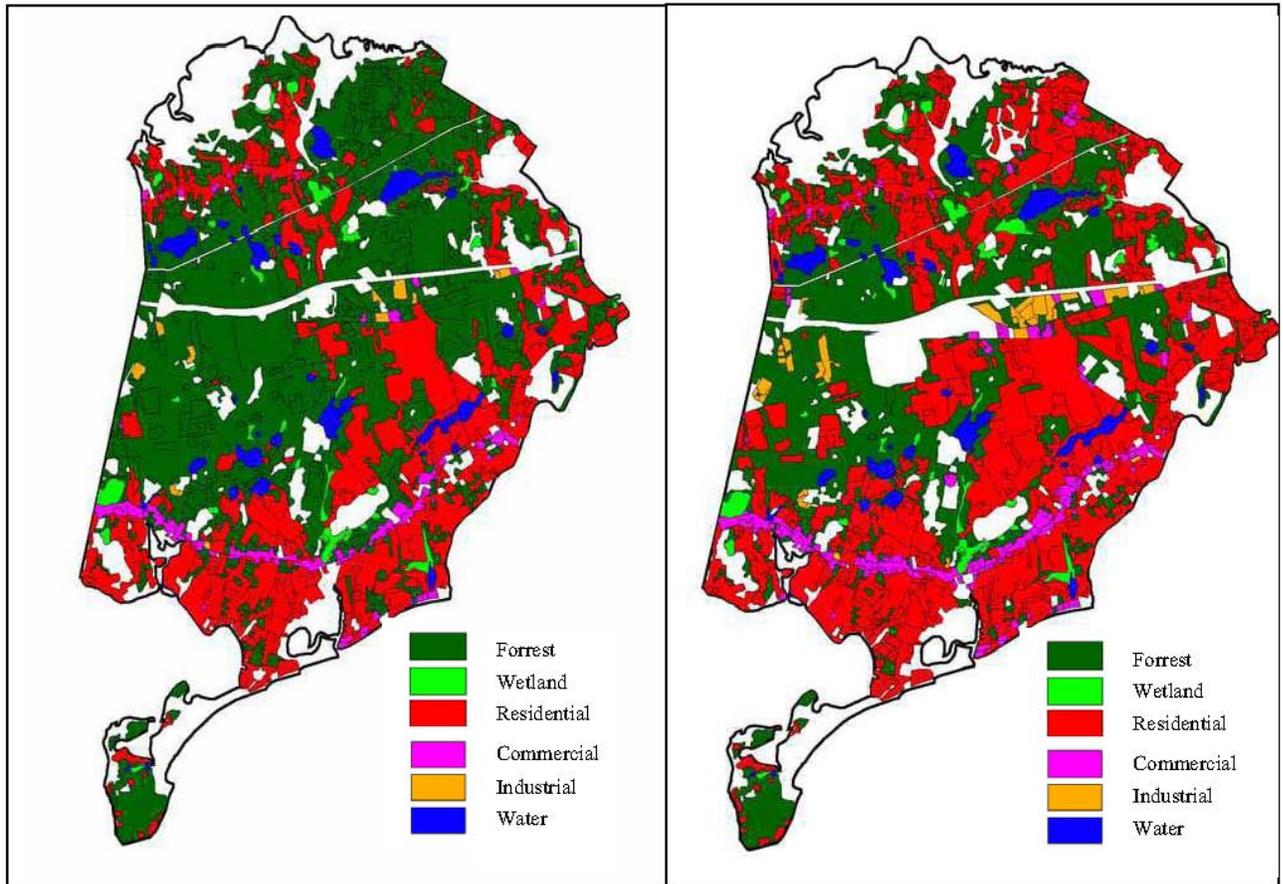
### 3.4 Growth and Development Patterns

In the past forty years, Yarmouth has lost more than half of its forested acreage, as shown in Figures 3.1 and 3.2. As can be seen in Map 1 - Zoning Districts, a large portion of the Town is residentially zoned. These maps depict the increase in residential land use within the town.

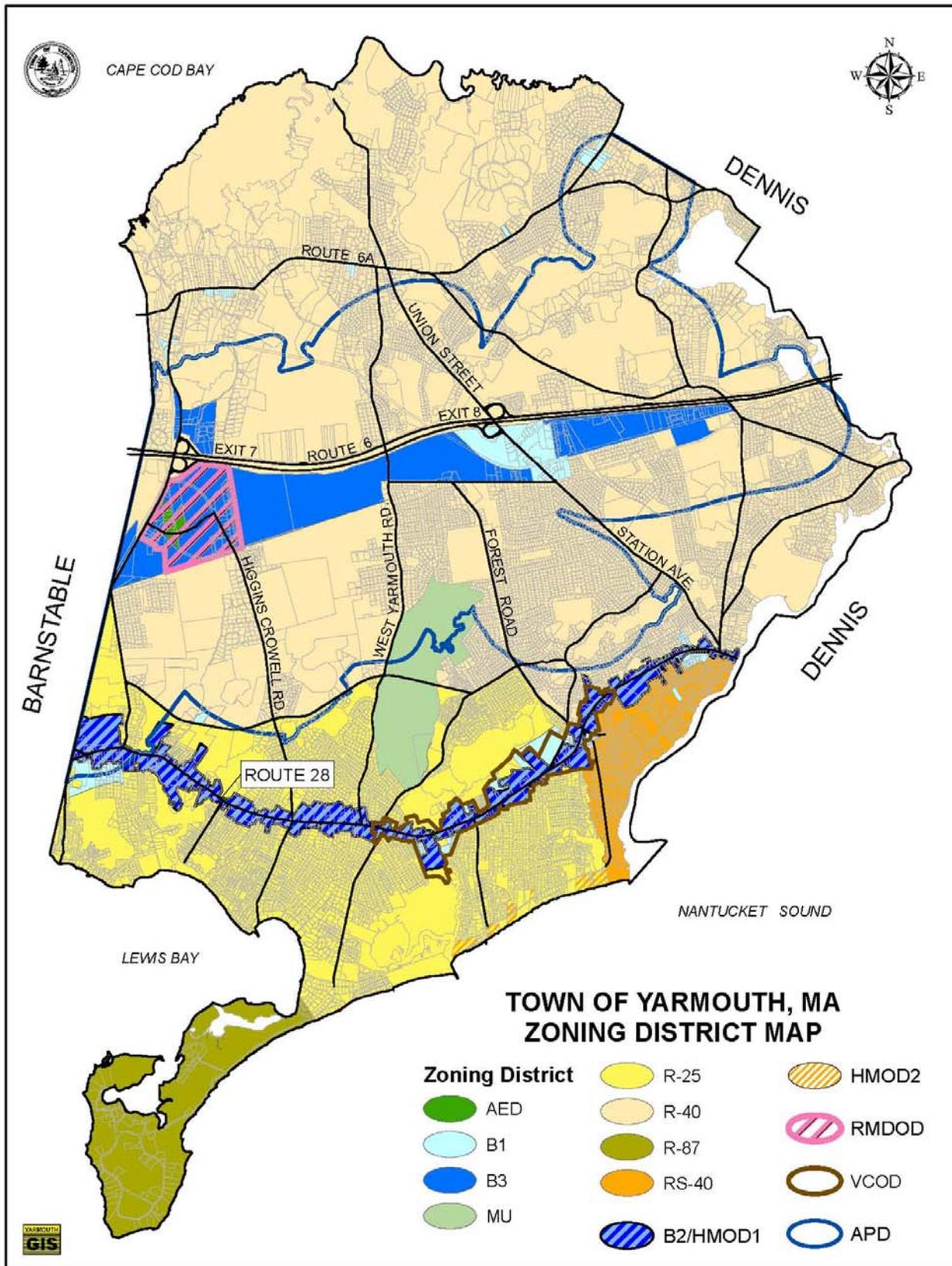
Although the population in Yarmouth is projected to increase slowly over the next 20 years, additional affordable housing, senior housing and housing for seasonal workers will continue to be needed. The area for privately owned, undeveloped, potentially buildable land is less than 700 acres. These factors may increase competition between development and land conservation interests. However, Yarmouth's Zoning Bylaw actively encourages the redevelopment of existing properties into residential housing through various zoning initiatives. In addition to zoning bylaw initiatives, the Affordable Housing Program actively subsidizes the redevelopment and reuse of existing properties into affordable housing.

Figure 3.1 1971 Land Use

Figure 3.2 1999 Land Use



Map 1 – Zoning Districts



## SECTION 4: ENVIRONMENTAL INVENTORY and ANALYSIS

All of Yarmouth's surface water bodies, including its harbors, ponds, wetlands, and the shoreline, are sensitive resources. The Town's natural resources, physical development, and social structure create unique problems and opportunities for open space/conservation and recreation planning. This section examines how these features influence policy.

### 4.1 Geology, Soils, and Topography

The major features of the landscape of Yarmouth were formed during the retreat of the Wisconsin glacier about 15,000 years ago. Coinciding approximately with what is now Route 6, the glacier's final southern migration is marked by the terminal moraine. The morainal hills include the Town's high spots (German Hill and Prospect Hill), steep slopes, and pockets of clay soils. Large boulders (glacial erratics) are strewn across the moraine. This is Yarmouth's most rugged landscape, and not surprisingly, its last frontier for development. Prospect Hill is situated in what is now the Boy Scouts of America – Camp Greenough, while a town water tower dominates German Hill. (See Map 2A.)

Most of West and South Yarmouth is comprised of outwash plain deposits, sands and gravels sorted by melt water running south off the glacier. The generally flat surface is pitted in places where blocks of ice became separated from the main mass of the glacier, were buried in the drift and later melted, leaving steep sided depressions, known locally as kettle holes. The deeper depressions extend below the water table and now contain ponds.

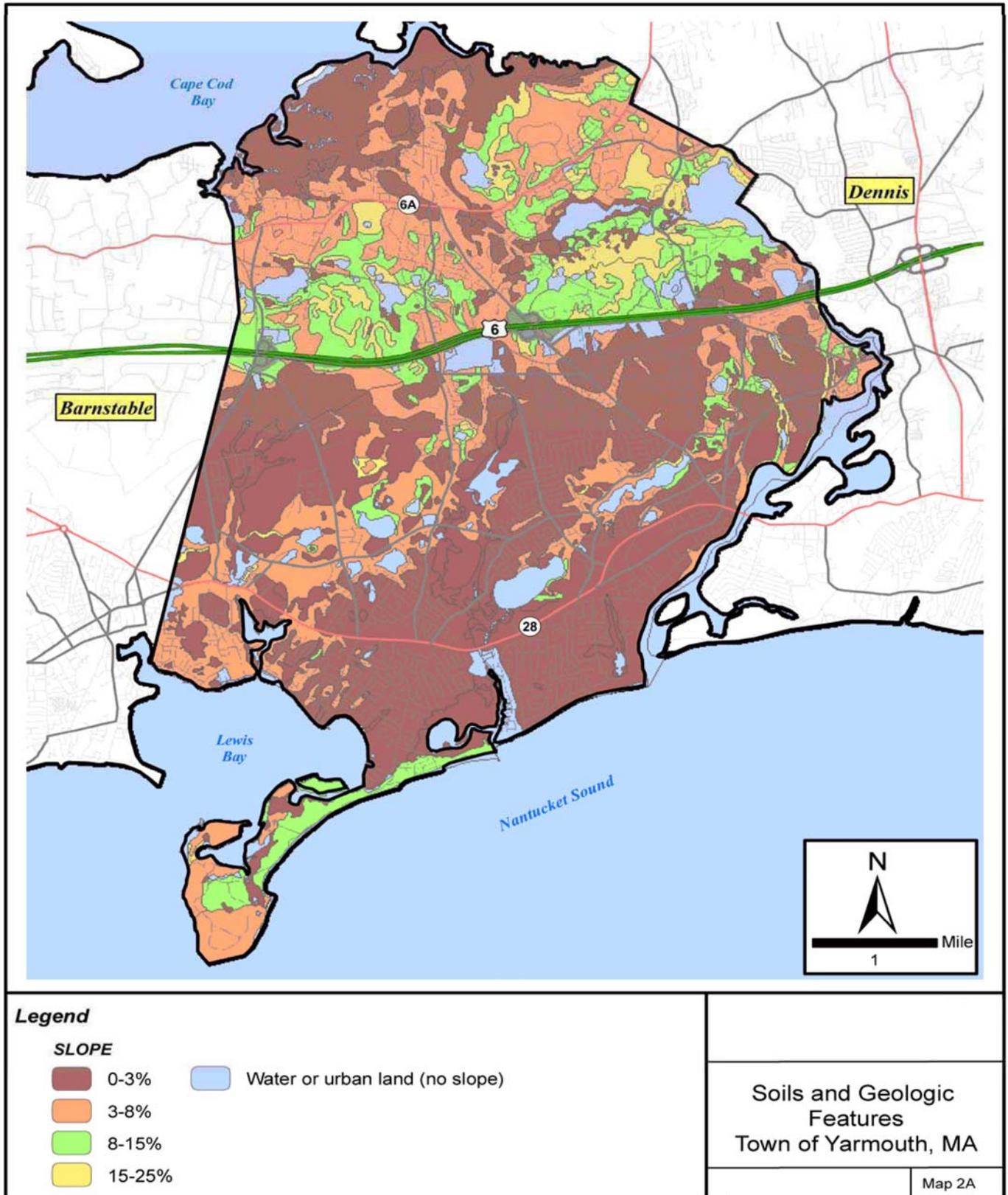
Great Island is a kame deposit of mostly medium to very coarse sand and gravel with a few thin, discontinuous layers of till (unsorted soils). Large to very large boulders are present, including soakers found along the rim of the island, a hazard to inshore boaters. The unique stone lighthouse (light abandoned in 1859) at Point Gammon, the only one of its kind on the Cape, was built in 1816 with local kame granite boulders.

Glacial lake and lake bottom deposits are found inside the Cape Cod Bay shoreline. The high moraine acted as a giant earth dam, causing a temporary lake to form, with silts and clays settling out as well as sands and gravel. One of the outlets for this lake ran through the moraine from White's Brook to Parker's River, accounting for the discontinuous moraine ridge. The richest soils are found in this north part of Town.

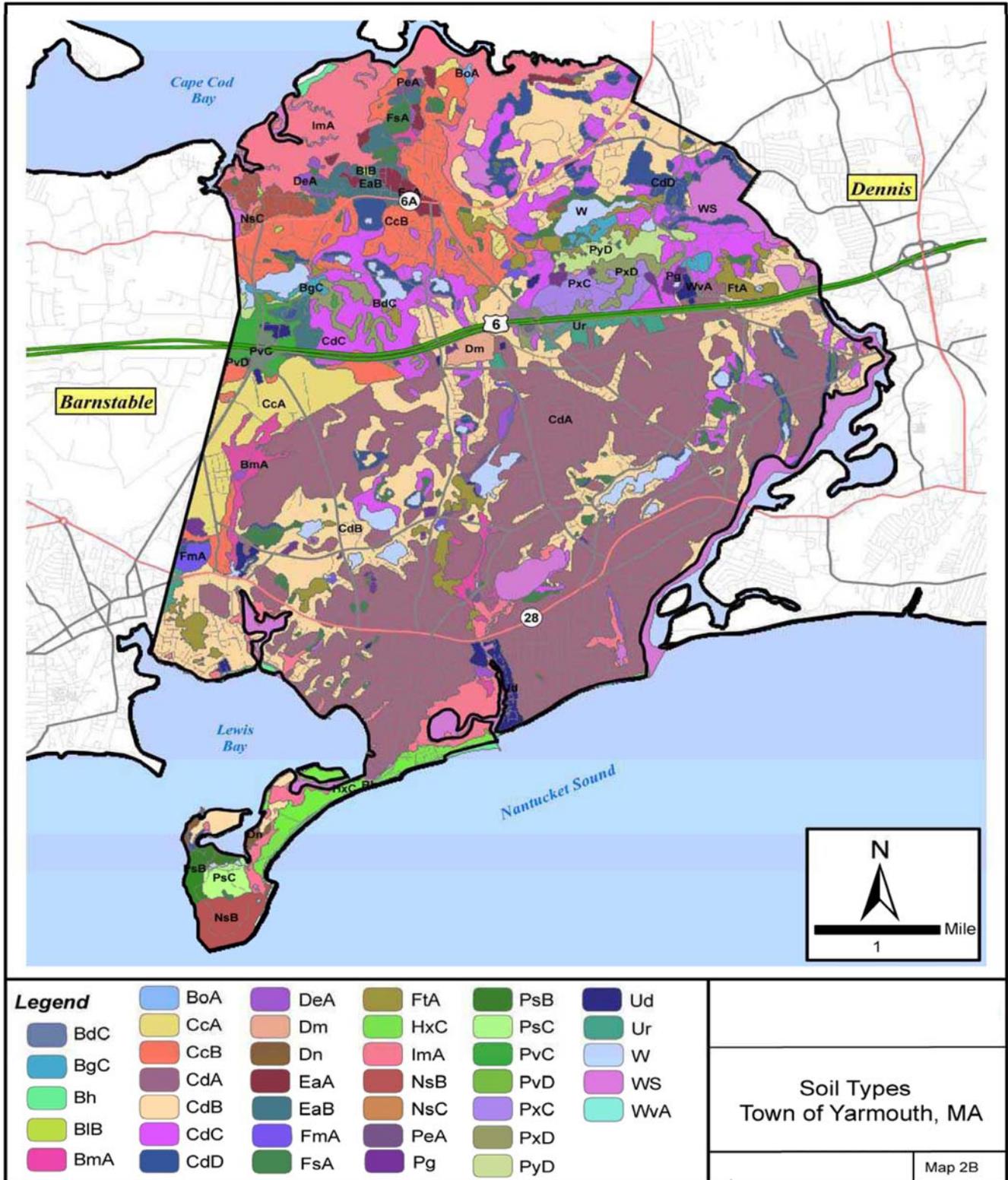
Different soils result from complex interactions among surficial geological forces, topography, climate, and plant and animal decomposition. The U.S. Natural Resources Conservation Service (NRCS) classifies soils by type and three general associations are found in Yarmouth (see Map 2B), as follows:

1. *Carver Coarse Sands*. Carver coarse sands comprise about three-quarters of the Town's area. These porous, nutrient poor soils, typically associated with the outwash plain, are usually found on level or gently sloping land. Most of Yarmouth's freshwater ponds are found here. Carver soils have few limitations for development, but, ironically, the readily permeability of the soils allow potential contaminants to reach the water table.

Map 2A – Soils and Geologic Features



Map 2B – Soil Types



(See Soil Type Key in Appendix C)

2. *Plymouth/Barnstable Till Series.* Another upland soil type is the Plymouth/Barnstable till series. Primarily associated with the hilly moraine areas near Route 6, these porous soils are very stony and boulder-strewn and comprise about ten percent of the Town's area. Steep slopes and exposed boulders and occasional clay layers can pose development issues. These areas were neglected by development throughout Yarmouth's history and much of it now has been acquired by the Town as conservation areas.
3. *Nantucket Class Soils.* An upland soil which comprises only two percent of the Town's area, but which is an important agricultural soil is the Nantucket class, found on the north side, north of Route 6A near Hallett's Millpond. Perhaps not surprisingly, this locale coincides with the first colonial settlement in Yarmouth, where small farmsteads benefited from the relatively rich soil. Another pocket of Nantucket loam is located at the southern end of Great Island (Point Gammon) overlying a kame deposit. None of this soil type supports any commercial agriculture in Yarmouth now. The northern pocket is fully developed with residential units.

To date, neither soils nor topography, with the exception of wetlands, has proven to be an effective impediment to development. Thus, retaining open space by relying on natural development constraints (e.g., soils) is not a realistic approach in Yarmouth.

## 4.2 Landscape Character

One of the most appealing aspects of Yarmouth's landscape is its 39 miles of coastal shoreline. Yarmouth has approximately 1,230 acres of salt marsh, and the broad sweeping views of these "meadows," as the colonists knew them, is breathtaking from the Bass Hole Boardwalk. The large tidal range (ten feet on Cape Cod Bay, three feet on Nantucket Sound) presents different perspectives even at the same location during various times of day.

Scenic vistas such as the Bass River bridge crossings at Route 28 (historically, the Lower Bridge), Highbank Road (the Upper Bridge), and Route 6 (the Mid-Cape Highway) are cherished by Yarmouth residents and visitors. Bass River flows north-south, almost dividing Cape Cod in half, and is the first location on the Cape's major highway where motoring arrivals first view salt water. Numerous ponds and cranberry bogs provide inland vistas in the absence of open pastures and meadows. The primary pond views comprise the Town's largest freshwater bodies: Dennis Pond from the heavily-traveled Willow Street (Exit 7 off the Mid-Cape Highway) and Long Pond from Station Avenue (Exit 8).

Visually-accessible cranberry bogs are found along Route 28 in West Yarmouth, West Yarmouth and Buck Island Roads, Route 6, and the Beaton Bog at the intersection of White Rock Lane and Union Street (purchased by the Town Land Bank in 2001).

Culturally, the Main Street of Yarmouth Port village is a visually distinctive part of Massachusetts. In fact, the Old Kings Highway (Route 6A) was chosen as one of the ten Most Outstanding Scenic Byways in America in 1993 by Scenic America. The Cape Cod Commission classified Old Kings Highway west of Union Street in Yarmouth Port as having a top-rated High Concentration of Scenic Elements and two major open scenic views.

Route 28 is currently receiving the attention of Yarmouth citizens and businesses. In the past decade, the Town has worked arduously to promote redevelopment of Route 28 to eliminate blighted properties through proactive zoning initiatives to encourage private redevelopment. The Town has also taken an active role- ~~in un-developing properties along Route 28~~ inby acquiring rundown or blighted properties and converting them to parks, many with scenic vistas along Route 28. Some of these un-development projects include:

- Sea Holly Park which has a fishing/observation deck adjacent to Parkers River which replaced a rundown motel.
- Chase Brook Park which replaced the former Rascal's Saloon. The Park offers a scenic trail to views of Mill creek and a large viewing platform with built in benches for the public to enjoy. The trail also highlights native vegetation to Cape Cod and offers wildlife habitat.
- Anniversary Park at the corner of North Main and Route 28 which used to house an old gas station.
- The 1750 house, located at 281 Route 28, West Yarmouth, was replaced with a vista viewing park with a handicap accessible viewing platform overlooking Mill Creek and handicap accessible picnic tables.
- Veterans Park at Packet Landing Park adjacent to the Bass River along Route 28 and Crowe's Purchase next to the Parker's River along Route 28, both offer seating areas to enjoy river views. Further amenities at Packet Landing are in the planning stages.

~~The Town also owns a 21-acre parcel adjacent to the Parkers River along Route 28 which had long been planned for a public/private marina. However, a Financial Feasibility Analysis, completed in 2013, determined the marina would not be financially self-sustaining. The Town continues to be proactive with the parcel, investigating other development options with an emphasis on uses that promote year round business, and includes some public recreational areas.~~

Golf has always played a big part in Yarmouth's visual character, and its several current golf courses now lend some vivid green to the more muted colors of the natural landscape. In fact, Yarmouth can boast the first golf course in Cape Cod history, the Wayside Golf Links in Yarmouth Port, stretching between White Rock Lane and Dennis Pond, designed between 1870 and the late 1880s (Semprini, 1998). The oldest, still-active course documented on the Cape is the Cummaquid Golf Club, chartered in 1895.

The mix of historical architecture and natural splendor is what attracts many tourists to Yarmouth. Yarmouth wears its colors proudly: the gold of its marshes, the silver of its beaches, the blues of its ponds, the greens of its woods, and the reds of its bogs.

### 4.3 Water Resources

The Town of Yarmouth is located in the Mid-Cape area, within the Cape Cod Watershed. The Cape Cod Watershed is a coastal river drainage area lacking the characteristic, large, main stem rivers and associated tributary systems common to the other watersheds of Massachusetts. Larger coastal embayment segments are fed by smaller freshwater and estuarine recharge areas comprising tidal creek and marsh systems (DeCesare 2002). Yarmouth has five sub-watersheds including the Bass River, Parkers River, Lewis Bay, Mill Creek and Chase Garden Creek. The Bass River, the most prominent sub-watershed in the Town, drains over 10,000 acres of land. Yarmouth contains a wealth of water resources with over 39 miles of salt water shoreline and 29 freshwater ponds. It is no surprise that Yarmouth's water resources are the primary focus for its recreation activities with a mix of swimming, fishing, shellfishing, hunting and boating available.

Access to the water is available through the Town's 13 salt and fresh water beaches as well as the Town's 4 marinas, and 550 permitted moorings. Boating access is available at the nine public marine-based boat ramps, including the recently refurbished Wilbur Park along the Bass River at Highbank Road. Of the 29 freshwater ponds in Yarmouth, ten are over ten acres in size which entitles public ownership and access. The majority of the ponds in Yarmouth are kettlehole ponds, formed by the last glacial recession. The surface level of most of the ponds in Yarmouth is equivalent to the water table, thus when the water table is low in the summer months the ponds shrink to expose a wide shore. The ponds serve as habitat for a diverse array of wildlife including eight different fish species: yellow perch, pumpkinseed sunfish, brown bullhead, chain pickerel, largemouth bass, alewife, golden shiner and American eel.

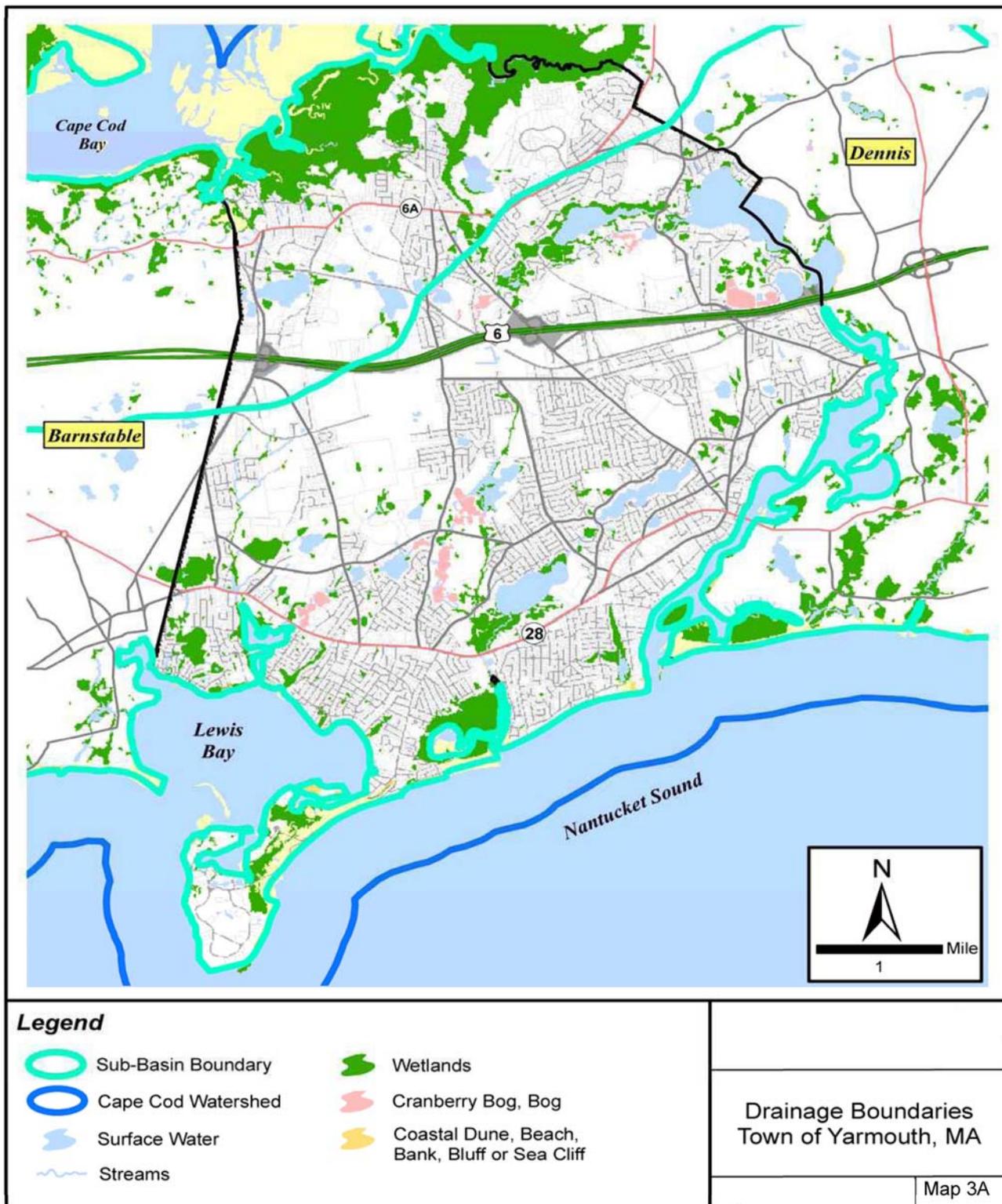
~~Overall, the surface water in Yarmouth is considered high quality as reported by the Massachusetts Department of Environmental Protection. Of concern is the finding that non-point sources of bacterial contamination have contributed to high counts of bacteria during the summer season. Surface water quality in Yarmouth can be a cause for some concern due to non-point sources of pollution and the protection of water resources is necessary to ensure compliance with long term water quality standards. The Massachusetts Estuaries Project (MEP) has also identified that nutrient (nitrogen) reductions are needed to help restore and preserve long-term water quality in Bass River, Parkers River and Lewis Bay estuaries Yarmouth. (AMEC Earth & Environmental, Inc. (2009). Several ponds including~~ Additionally, Long Pond, Swan Pond, Follins Pond, Run Pond, and the upper reaches of Bass River have had signs of degraded water quality and significant micro/macro algae and aquatic vegetation blooms that have resulted in limited areas of eutrophication. This may result in hypoxia, which is the depletion of oxygen in the water which may cause death to aquatic organism. ~~and Miss Thacher's Pond have been documented to suffer from eutrophication, a process that deteriorates pond quality.~~ The Town cannot afford to let its wetland supply diminish or deteriorate as they serve as the primary habitat and food source for the majority of wildlife in the area, as well as providing for natural pollutant removal.

Yarmouth has been very active in protecting its wetland resources, as evidenced by the adoption of a wetland bylaw that goes above and beyond the minimum state standards and buffers. In addition to the wetland by-law, the Town also protects its water surfaces by regulating stormwater runoff and illicit connections and discharges to the municipal storm drain system. Compliance is also being met under the 2006 Massachusetts Stormwater regulations and the

EPA Stormwater guidance. More recently, the Town has been diligently preparing for the National Pollutant Discharge Elimination System Phase II MS4 permitting program (NPDES). As part of the preparation, the Town has begun mapping the storm drain systems, preparing and documenting the Stormwater Pollution Prevention Plan (SWPP) and created a Town Staff Oversight Committee. The MS4 stormwater permit is anticipated to require additional Best Management Practices including addition street sweeping, catch basin cleaning, public education and additional sampling and monitoring.

Yarmouth's groundwater is served by the Sagamore Lens, with the Bass River as its easterly discharge point. It is important to note that the freshwater lens in Yarmouth is particularly thin relative to other areas, thus Yarmouth is more vulnerable to potential contamination. As a result, the Town voted in 1989 to adopt a Water Resource District to protect its ground water from potentially hazardous uses. Yarmouth has also addressed concerns over development in flood zones by participating in the National Flood Insurance Program (NFIP). Several of Yarmouth's existing buildings lie in its floodplain consisting of salt marshes and upland areas of lower elevation near the shoreline and along tidal rivers.

Map 3A – Drainage Boundaries



### 4.3.1 Salt Water Bodies

As previously discussed, the Town's landscape character and 39 miles of salt water shorefront are the primary focus of informal outdoor activities and form the background for the Town's tourist-based economy, including swimming, fishing, shellfishing, hunting, and boating. These activities are spread throughout the Town's marine areas: Lewis Bay, Bass River, Parker's River, Nantucket Sound, Bass Hole, and Cape Cod Bay. Major public bathing beaches are at Gray's Beach on Cape Cod Bay and numerous sandy beaches along Lewis Bay and the Sound, the largest and most popular of which are Seagull Beach at the mouth of Parkers River, and Bass River Beach, at the mouth of Bass River. The primary boat anchorages are found in Lewis Bay, Bass River, and a small town dock in Bass Hole.

Surfcasting for bluefish and striped bass is a popular pastime along the beaches on the north and south sides. Baitfishing is frequently conducted from the Bass River Bridge (Route 28). Yarmouth was successful in obtaining grant funding to redevelop Wilbur Park along the Bass River at Highbank Road. The 2012 improvements included a renovated boat ramp, new fishing pier, additional parking spaces with a new storm drainage system, landscaping and a picnic area.

No beaches are open to Off Road Vehicles (ORVs), as it is inappropriate on the north side, with its extensive marshes, and unnecessary on the south side, with its frequent town landings and beaches.

Tidal Restrictions are common problems in coastal communities. The Town has been proactive to eliminate tidal restriction to help restore wetlands and preserve open space. Since 2006, the Town has worked with local, state and federal agencies to help alleviate environmental detriment and increase healthy flushing of our coastal ecosystems. A summary of tidal restoration projects is provided in Table 4.1.

**Table 4.1 - Improved Tidal Restrictions**

Year	Location	Yarmouth Village	Surrounding Properties Affected	Activity
2006	Crab Creek	Yarmouth Port	Abuts Crab Creek Conservation Area, connects Mill Pond and Follins Pond	Replaced failing culvert
2008	Bass Creek	Yarmouth Port	Part of Callery-Darling Conservation Area	Replaced under-sized culvert
2009	Unnamed channel located under Shore Road	West Yarmouth	Abuts Town Conservation land, connects Lewis Bay to upstream salt marsh	Replaced under-sized culvert
2011	Long Pond Drive Fish Run	South Yarmouth	Connects Long Pond to Herring Brook and serves as a fish run for migrating alewives	Replaced failing culvert
on-going	Parker River Bridge	South Yarmouth	Parkers River and associated salt marsh and abuts Meadowbrook Conservation Area	Continue effort to finalize bridge design to replace under-sized bridge
on-going	Cape Cod Rail Trail Bass River Bridge	South Yarmouth	Bass River, connects upstream to Dinah's Pond, Kelley's Bay & Follin's Pond	Continue effort to finalize bridge design to replace under-sized former railroad bridge

### 4.3.2 Fresh Water Bodies

The Town's primary freshwater resources are its ponds, totaling 400 acres of surface area. These ponds are scattered throughout the Town, primarily in the geologic areas of outwash plain and glacial lake deposit; none occur in the rugged moraine (see Maps 2A and 2B). Ten of the 29 ponds are greater than or equal to ten acres in size, which classifies them as Great Ponds of the Commonwealth, and means the public owns them and is entitled to access, whereas smaller ponds can be owned privately by surrounding landowners and public access can be prohibited. Only two of Yarmouth's Great Ponds (Long Pond and Flax Pond) have been officially surveyed as greater than ten acres in area by State engineers, but clearly others meet the test (MWRC, 1970). Eight of the smaller ponds are privately owned, but have public access through publicly-owned land around their shores. Nine ponds are completely private, being smaller than ten acres, and have shorelines owned wholly by private landowners. At least ~~five~~<sup>four</sup> ponds have been enhanced by manmade diking or dredging, including Tom Matthews Pond, Plashes Pond, Reservoir Pond, Miss Thachers Pond and Baxter's Mill Ppond. A summary of all ponds is provided in Table 4.2.

Table 4.2 - Pond Characteristics

Pond Name	Surface Acreage*	Max. Depth (ft.)*	Shore Length (miles) Activities	Public Access
<b>Official Great Ponds:</b> (public; surveyed by state engineers)				
Long Pond, S.Y.	57	30	23	Town ramp, beach
Flax Pond, S.Y.	9.5	20	0.4	Flax Pond Rec. Area
<b>Presumed Great Ponds:</b> (public; surface area greater than 10 acres)				
Dennis Pond, Y.P.	47.8	18	1.2 (undeveloped)	Town beach, trails
Horse Pond, W.Y.	30.3	19	0.85	Through wellfield
Big Sandy Pond, W.Y.	19.4	20	0.66	Poor, through subdivision
Greenough Pond, W.Y.	26.4	25	1.2	Through Boy Scout Camp
Little Sandy Pond, W.Y.	14	26	0.6	Through wellfield
Bassetts Lot Pond, W.Y.	7.2	20	0.4	Through wellfield
<b>Private Ponds with Public Access:</b> (less than 10 acres, but publicly-owned frontage or access)				
Elishas Pond, Y.P.	10.2	20	0.52	Town land, Elisha Pond Rd.
James Pond, S.Y.	4.7	30	0.29	Through State Police HQ
Jabez Neds Pond, W.Y.	7.5	20	0.43	Through YCT land
<del>Miss Thachers Pond, YP</del>	<del>5.0</del>	<del>8</del>	<del>0.28</del>	<del>Town land off Starbuck Ln.</del>
Perch Pond, Y.P.	4.5	20	0.28	Town cons. land on Ridgewood
Turtle Pond, S.Y.	4			Bass River Golf Course
Tar Pond, W.Y.	1			Through Middle School
Crow Pond, W.Y.	0.7			Through wellfield
<b>Private Ponds:</b> (less than 10 acres; no public access; surrounded by private property)				
Miller Pond, Y.P.	5.8	20	0.38	Through Botanic Trails
Long Pond, Y.P.	8.3	25	0.63	From Willow Street
Little Greenough Pond, Y.P.	4.5	20		In Boy Scout Camp
Muddy Pond, Y.P.	5			In Boy Scout Camp
Great Island Pond, W.Y.	5			Subdivision open space
Halfway Pond, W.Y.	3.9		0.28	Private, multi-owners
Lily Pond, S.Y.	3.1	24	0.23	Private, subdivision park
Cat Swamp Pond, S.Y.	2.5			Blue Rock Golf Course
Howes Pond, Y.P.	2.2	15		Private, one owner
<b>Manmade Ponds:</b> (private ponds, no access unless by deed or unless publicly owned)				
Plashes Pond, W.Y.	44		1.6	Wholly town-owned
Tom Mathews Pond, W.Y.	35.6	5	0.95	Through Rod & Gun Club
Baxter Millpond, W.Y.	4.4	5	0.87	Rt. 28 town mill site
<del>Miss Thachers Pond</del>	<del>5.0</del>	<del>8</del>	<del>0.28</del>	<del>Town land off Starbuck Ln</del>
Reservoir Pond, Y.P.	7		0.38	Wholly town-owned

\* Information from the Cape Cod Commission 2002 Pond and Lake Atlas.

Recreationally, the most important swimming ponds are Dennis Pond, Long Pond, Flax Pond, and Little Sandy Pond, all of which have important Town conservation/recreation land abutting them. Long Pond (S. Yarmouth) is the only one available for trailered boats (~~a Town Bylaw prohibits gasoline powered engines on all Town of Yarmouth fresh water ponds (outboards) greater than three horsepower~~), and most pond boating is limited to canoes, kayaks, rowboats, and other small craft. Dennis Pond and Long Pond (S. Yarmouth) are the major freshwater fishing ponds. The Massachusetts Division of Fisheries and Wildlife (DFW) inventoried Dennis Pond and classified it as a 50-acre, warm water pond located one mile southwest of Yarmouth

Port, off Route 6A. Six fish species were observed. Listed in order of abundance these include yellow perch, largemouth bass, chain pickerel, pumpkinseed, brown bullhead and golden shiner. The DFW report continued to describe the pond's attributes as follows:

- Bottom sand near shore and muck in deeper water and covered with *Myriophyllum* species and the shore line with *Nuphar*, *Nympaea* and *Myriophyllum*;
- Clear water with a transparency of 10.0 feet, and mean and maximum depths of 11.0 feet and 18.0 feet, respectively;
- 1.2 miles of undeveloped shoreline; and
- Good chain pickerel and yellow perch populations, which appear to be in balance.

The DFW also inventoried Long Pond, which was classified as a 57-acre natural kettlehole pond with an average depth of 14 feet and a maximum depth of 30 feet. The shoreline is developed with residential homes and Town beaches. The pond was reclaimed for warm water fisheries management in 1961. Seven species were recorded in 1992: yellow perch, pumpkinseed sunfish, brown bullhead, chain pickerel, largemouth bass, alewife, and American eel. White perch and golden shiners were also reported in a 1985 fisheries survey and are presumably still present as well. In 1992 and 1993, Long Pond was stocked with trout (rainbow, brook, and brown trout) on an experimental basis. Initial reports indicate that the stocking of these commercially important fish species was received favorably. According to DFW, the pond's primary attributes include:

- Good transparency, extending to 15 feet;
- Common aquatic vegetation limited primarily to the southern end and scattered locations near the shoreline;
- Bottom is composed of rubble, gravel and sand; and
- Fed by swamps and cranberry bogs and drains to Parker River.

Anadromous fish runs for blueback herring and alewife species extend into Baxter's Millpond (West Yarmouth), Long Pond (South Yarmouth), Labans Pond (South Yarmouth), Miss Thacher's Pond (Yarmouth Port), and Tom Matthews Pond (Yarmouth Port), where spawning occurs.

Most of the ponds in Yarmouth are classic kettlehole ponds, formed on the Cape as deep depressions in the glacial outwash left by stagnant ice blocks. Most are isolated and do not have an inlet or outlet. These ponds, dependent solely on the fluctuation in the aquifer's water table for their own surface level, often expose a broad shoreline during the summer when the water table is low. These exposed shorelines comprise the unique habitat called "Coastal Plain Pond Shores," which often harbor rare and endangered plants, such as Plymouth gentian, golden club and long-beaked bald rush, and rare animals, such as the comet darter and New England bluet (damselflies) (APCC, 1990) (see also, Section 4.4 on Vegetation).

The significance of Yarmouth's ponds lies not in their importance for boating, as is the case in other Cape Cod towns, but rather the fact that they are the town's primary sites for rare plant and animal species and should be protected as sensitive habitat. In fact, the Dennis Pond Complex (composed of Dennis Pond, Miller Pond, Muddy Pond, Big and Little Greenough Ponds, Elishas Pond, and Perch Pond) is identified by The Nature Conservancy and the Massachusetts Natural

Heritage and Endangered Species Program (NHESP) as one of the most important coastal plain pondshore complexes in the State, owing to the abundance and diversity of rare species there. In addition, very few landowners still control major portions of those pond shorelines. These pond fronts should be considered a top priority for protection by the community.

#### 4.3.3 Surface Water Quality

~~The Although (All of Yarmouth's waters are generally of high quality, though problem spots exist. Although The Massachusetts Department of Environmental Protection (DEP) has listed nearly all coastal waters of Cape Cod as s-all-of-the-marine (salt) waters of Yarmouth as Class SA, suitable for shell fishing harvesting without depuration and excellent habitat for seagrass ([https://sp.barnstablecounty.org/ccf/public/Documents/208%20Final/Cape\\_Cod\\_Area\\_Wide\\_Water\\_Quality\\_Management\\_Plan\\_Update\\_March\\_2015-Printable.pdf](https://sp.barnstablecounty.org/ccf/public/Documents/208%20Final/Cape_Cod_Area_Wide_Water_Quality_Management_Plan_Update_March_2015-Printable.pdf)), there overall water quality), and. a the top salt water ranking, meaning they are an "outstanding resource" whose purity should be suitable for all types of water recreation, including swimming and shellfishing. All freshwater ponds are included in Class B, the top freshwater ranking for ponds not used as a source of a public drinking water supply. The Oen-going management is needed to of protecting the long-term health of our coastal water and freshwater ponds important. at risk. These ponds All waterbodies must be maintained at a high level of purity and shall not be degraded by point source discharges, such as sewage outfalls. In fact, All surface water bodies are vulnerable to it is non-point sources of pollution such as (road stormwater runoff, septic systems, lawn maintenance, pet waste etc.) which that comprise the mostre immediate threat to water quality of ponds and bays in Yarmouth.~~

One of the two most significant ponds in Town described previously, Dennis Pond and Long Pond, were sampled by the Cape Cod Commission through its Pond and Lake Atlas program (PALS). Dennis Pond was sampled for surface water quality parameters in 1948, 2001, and 2002. In 1948, the July 12 temperature and dissolved oxygen (DO) readings indicated a well-mixed lake with similar readings at the surface and near the bottom. In 2001, similar conditions existed. All of the 2001 PALS concentrations for *chlorophyll a*, Total Phosphorous (TP) and Total Nitrogen (TN) were less than the current Cape Cod "impacted" thresholds. Comparison of Dennis Pond nutrient and Secchi readings (whether one can see the instrument on the Bottom of the pond, measuring water clarity) to the other ponds sampled during the 2001 PALS season placed Dennis Pond among the 34 least impacted ponds on Cape Cod in 2001.

The 2001 and 2002 PALS sampling events appear to be the first water quality samples collected from Long Pond. The conditions in Long Pond during this sampling season indicate a more degraded pond system. Dissolved Oxygen (DO) readings shows well mixed conditions to approximately 6 meters, but deeper than 6 meters DO concentrations become anoxic (<1 ppm). All of the *chlorophyll a*, TP, and TN concentrations measured in Long Pond exceed the current Cape Cod "impacted" thresholds. High nutrient concentrations observed in the deepest samples are likely mixing into the epilimnion (top-most layer in a thermally stratified water body) and creating opportunities for occasional algal blooms. The deep portions of the pond are impaired by the lack of oxygen, prompting nutrient release from sediments. Review of historic information by the Cape Ceod Commission from other ponds reviewed in the PALS program suggest that the current conditions are a reflection of impacts from shoreline development over the last 50 years. The Cape Cod Ceommission recommends that the town consider a water

quality assessment of the Long Pond, including a more refined monitoring program to evaluate DO, nutrient, and *chlorophyll a* concentrations throughout the summer, a sediment characterization, a land use assessment of shoreline and watershed properties, and a forecast of whether water quality is likely to continue to worsen.

Eutrophication is the process by which a pond experiences algal blooms, oxygen depletion, fish kills, noxious odors and visual deterioration as a result of excessive nutrient inputs (usually from runoff and septic systems). Some of Yarmouth's smaller ponds are (anecdotally) presumed to suffer from some level of eutrophication, similar to conditions that have occurred in Long Pond (S. Yarmouth) and Miss Thacher's Pond over the past decade.

The Town's Water Resources Protection Study documented the recharge areas to major ponds and coastal embayments and estuaries. Recharge areas are land areas that contribute ground water flow to surface water bodies, such as ponds, streams and bays. Recharge areas are much more relevant on Cape Cod, where sandy soils readily transmit groundwater, rather than land surface watersheds that contribute most water to ponds and bays off-Cape. Land uses within recharge areas significantly influence surface water quality. The report found that non-point sources of bacterial contamination have been responsible for excessively high counts of bacteria in ponds and tidal streams off and on during the summer season. Shellfish beds have been closed periodically as a result, and occasionally even public swimming beaches (freshwater Long Pond, South Yarmouth, and saltwater Colonial Acres) have been closed due to bacterial contamination. In 2001, for the first time, public bathing beaches were closed in August along Lewis Bay, owing to high bacteria counts. However, beach closures are relatively rare, especially since the completion of various drainage improvement projects, though it is unclear whether the closures were related to increased contamination or simply due to more testing required by the Beaches Bill approved by the State in 2000.

Freshwater ponds on the Cape tend to be naturally acidic due to a lack of alkaline materials in the soils, and accelerated acidification seems apparent in several ponds. Between 1983 and 1985, the Acid Rain Monitoring Project (ARM), coordinated by the University of Massachusetts at Amherst, sampled 3,370 surface waters throughout the State and found that 5.5 percent were acidified, 16.8 percent were critical, 20 percent were endangered, and 21.7 percent were highly sensitive (in descending order of degradation.) Yarmouth was one of only 25 towns throughout the State (one of seven on the Cape) that ARM considered to be the most highly acidic (EOEA, 1990). Ironically, the high acidity keeps the pond waters attractive for swimming because the water looks very clear and feels "soft".

In the past five years, measures have been taken to restore some fresh and brackish ponds. Experimental windmills have been installed by the Town Natural Resources Department at Run Pond and Swan Pond on the south side to pump oxygen into the lower depths to decrease stagnation. The Army Corps of Engineers is conducting a reconnaissance study to determine flow upgrades at Miss Thacher's- Run Pond. The Cummaquid Long Pond Association has secured permit approval to remove exotics and dredge Long Pond off Willow Street, but no action has yet been taken (Hall, 2001).

#### 4.3.4 Floodplains

Yarmouth participates in the National Flood Insurance Program (NFIP), which requires that new development or substantial redevelopment, within Special Flood Hazard Areas (SFHAs) must meet Massachusetts Building Code construction requirements, but does not prohibit development. Flood velocity zones, or VE-Zones, are land areas where storm surge or direct wave action occurs. A 1988 analysis by the Massachusetts Coastal Zone Management Office (CZM) found that in the 1970s Yarmouth had 35 buildings clearly located in the V-Zone, primarily near Englewood Beach and Hyannis Park (also at the mouth of Parkers River). Hurricane Bob and the 1991 Halloween Storm damaged some houses near Seagull Beach. State and local wetlands protection regulations and Massachusetts Building Code help to properly construct and maintain developments in high hazard areas. Town staff work together with applicants to avoid building structures within a hazardous coastal area that are likely to be threatened by flooding, waves or erosion.

On July 16, 2014, the Town adopted new Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs). The FIRM maps define the Special Flood Hazard Areas in Yarmouth. The SFHAs are predicted to be flooded in a major flooding event and are areas where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced. Property owners in these areas are mandated to purchase flood insurance if they have federally backed bank mortgages. Refer to Map 3B for SFHAs in Yarmouth. Yarmouth may also be more susceptible to shoreline retreat due to climate change due to its low-lying coastline and tidal rivers that extend inland.

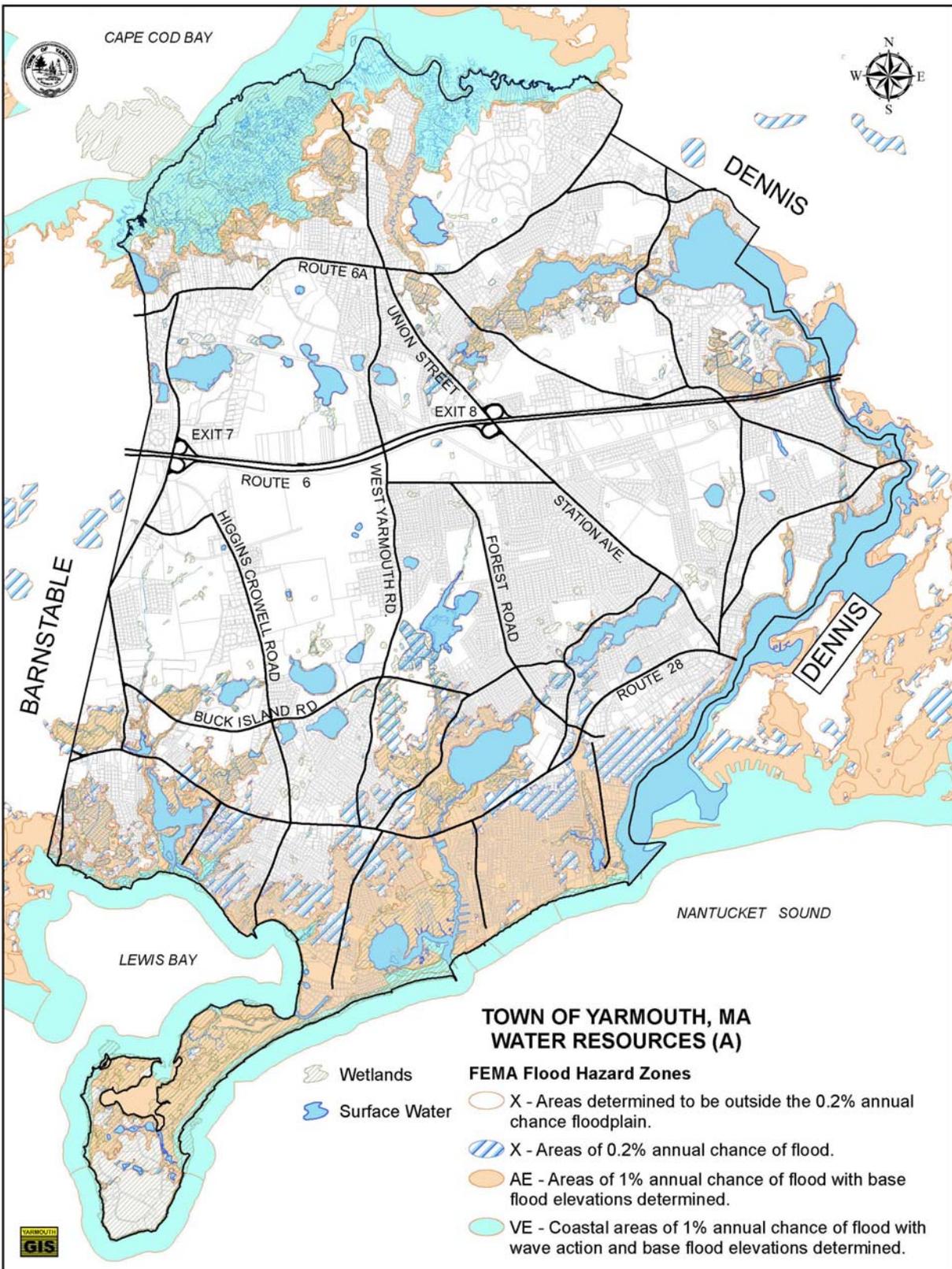
#### **4.3.5 Wetlands**

Wetlands, both fresh and salt water types, are the food factory and habitat for most of Yarmouth's wild animals. Fortunately, Yarmouth is blessed with a diversity of wetlands, in type, size and distribution, scattered evenly throughout the Town.

A 1990 University of Massachusetts study found that Yarmouth had 290 acres of freshwater wetlands, 324 acres of cranberry bogs and 1,115 acres of saltwater wetlands. A 1985 CZM report on barrier beaches identified 1,230 acres of salt marsh in Yarmouth, located primarily along the north side, but also along Parker's River, fringing Bass River, and elsewhere. (This difference in salt marsh acreage figures is due to differences in survey/study methodology, not loss of habitat.) A salt marsh's high biomass makes it excellent habitat for birds, shellfish, and finfish nurseries. About two-thirds of commercially-important finfish spend a portion of their life cycles feeding or spawning in or near salt marshes.

As with Yarmouth's ponds, most freshwater wetlands are dependent on water table fluctuations, rather than surface runoff, to ensure the soil saturation necessary for wetland plants. Most wetlands are at low elevations, close to the water table and the sand and gravel soils readily transmit groundwater through wetlands. Wetlands play an important role in filtering out contaminants from freshwater and reducing flooding during major storms.

Map 3B – Water Resources – FEMA Flood Hazard Zones



In addition to the Town's administration of the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, S.40), the Town simultaneously administers a local wetlands protection bylaw (adopted 1980) that strengthens the minimum State performance standards, such as adding a 100-foot jurisdictional area to land subject to flooding, and asserting jurisdiction over the first 300 feet of coastal and pond recharge areas. In addition, wetlands replication as a mitigation strategy is not allowed under the Town bylaw, even though it is allowed under State law under certain circumstances. Also, no structure may be built within 50 feet of a wetland edge and a 35-foot vegetated upland buffer to wetlands must be maintained. Established in 1961, the Yarmouth Conservation Commission is one of the oldest in Massachusetts.

#### 4.3.6 Groundwater Resources

In 1982, the US EPA designated all of Barnstable County as a Sole Source Aquifer in recognition of the region's complete reliance on groundwater as its potable water supply. Yarmouth is served by the Sagamore Lens, the largest of six discrete components of the aquifer. This lens provides water for all of the Cape towns from Bourne to Yarmouth; Bass River serves as its easterly discharge point. ~~Acknowledging that inter-town cooperation is needed to manage the quantity and quality of this aquifer, Yarmouth has participated with these towns and county agencies on groundwater plans, such as the 1987 State of the Aquifer Report by the Cape Cod Planning and Economic Development Commission. As a sole-source aquifer, inter-town cooperation is needed to manage the quantity and quality of this aquifer. One such example is the emergency water supply interconnections Yarmouth has with the Dennis Water District, the Barnstable Fire District and the Hyannis Fire District.~~

Of the 46 inches of precipitation that falls on the Cape in a typical year, about 16 inches ~~reach~~reaches the water table underground to replenish or "recharge" the aquifer. The freshwater lens in Yarmouth is thin (less than 20 feet in water table depth through most of the Town) relative to other towns in the Sagamore Lens, which can make it relatively more vulnerable to potential contamination. ~~The 1988, Town Water Resources Protection Study identified several groundwater issues needing resolution. Road salt contamination (from a state highway department stockpile off Higgins Crowell Road and Route 6 runoff) closed a Town well in 1972. Other Town wells near Route 6 experience moderately elevated sodium levels from runoff. Town wells north of Long Pond are located in an area of "near-saturation development" of small lots with septic systems and the wells "have shown a dramatic trend of increasing nitrogen levels over their 27-year history" (IEP, 1988).~~

~~Each year the Water Department conducts more than 1,000 water quality tests on public supply well samples taken Town-wide. In 1999-2014 no samples exceeded the allowable limits for any one potential contaminant.~~

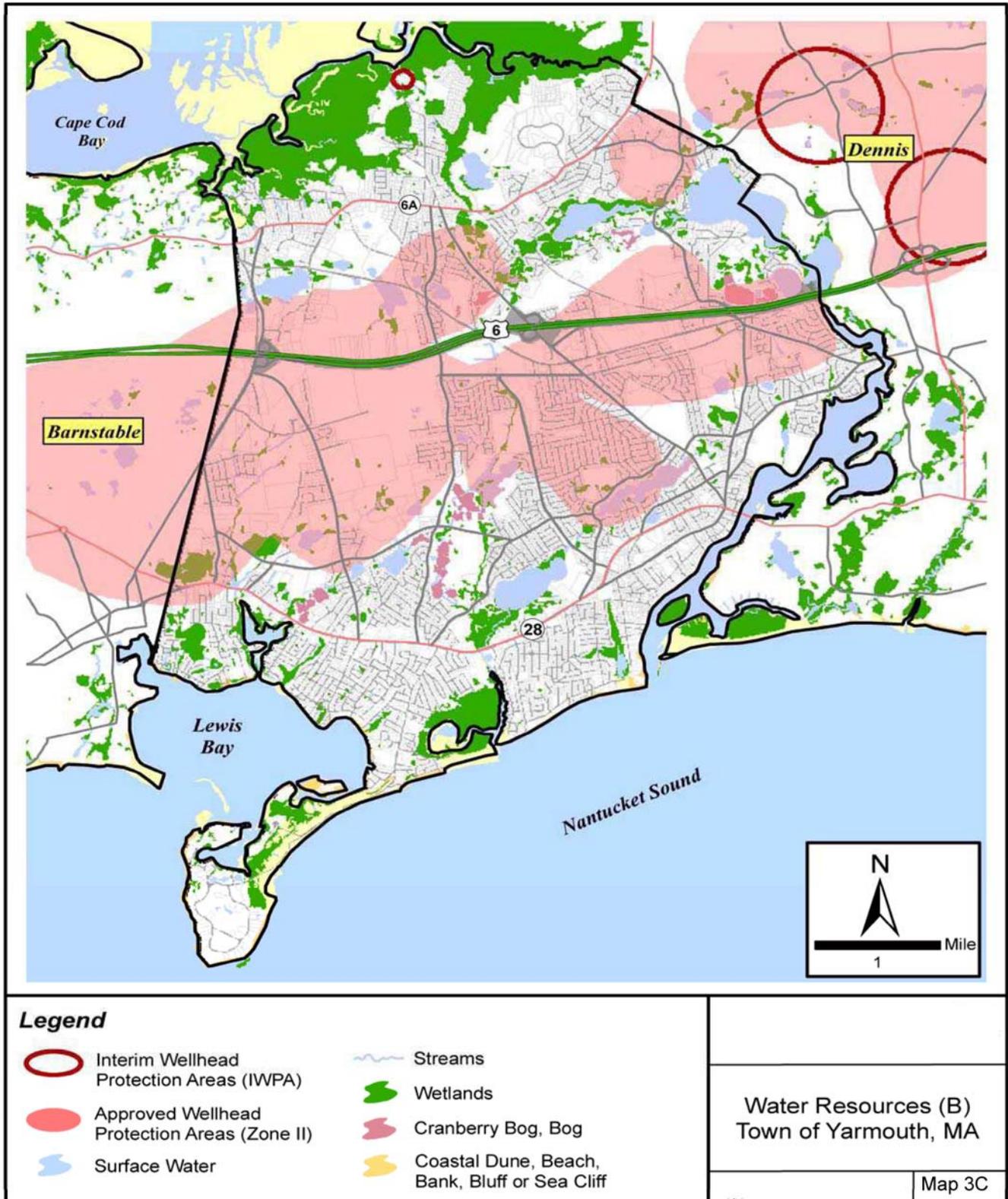
~~To protect this valuable resource, Yarmouth's 1989~~ In 1989, Yarmouth-Town Meeting adopted a Water Resource District to protect land within recharge areas to the 24 wellfields from potentially hazardous uses, such as underground fuel tanks and hazardous materials storage. In 2001, the District was modified to conform to DEP-approved Zones of Contribution boundaries (See Map 3C). A 1994 study by the US Geological Survey found that only about 5.6 percent of the Sagamore Lens land area was useful for siting new public supply wells. While exact acreage for Yarmouth is not available, the report's map shows only limited areas near the West Yarmouth ponds and near Greenough Pond as potentially suitable. In all, the Town Water

Department controls approximately 1000 acres of land around its 24 wells, which are critical areas for open space protection due to their extreme importance to maintaining water quality.

Yarmouth's water supply system is regularly tested and highly regulated by the Massachusetts Department of Environmental Protection (DEP). Due to these protective measures and regulations, the water supply is generally of high quality. In addition to testing for bacteria, lead, copper and other contaminants, the 24 water supply wells are regularly tested for nitrates. Nitrate levels in drinking water are of particular concern due to significant health risks for pregnant woman and infants. Nitrate can be naturally occurring through decomposition of organic material, from agricultural use, and from septic system discharges.

The US Environmental Protection Agency (EPA), and DEP, have set a Maximum Contaminant Level (MCL) for Nitrate of 10 parts per million (ppm). Although Yarmouth is relatively developed and relies on individual septic systems for waste water management, the average concentration of nitrate from all 24 wells is less than 2 ppm, well below the MCL. There have been some incidents of spiked nitrate readings greater than 5 ppm but less than 10 ppm for wells 4, 5 and 11. However, the average nitrate levels for these wells do not exceed 5 ppm, with the exception of well 11 which may be slightly over 5ppm. All other wells have average nitrate levels well below the 5 ppm.

Map 3C – Water Resources B



#### 4.4 Vegetation

In 1620, the *Mayflower* Pilgrims described Cape Cod's vegetation as primarily forests of oaks, pines, sassafras, juniper, birch and holly. As the population developed, residents decimated the woods to build wharfs, ships, houses, salt vats, fences, windmills and firewood consumed by the colonists' open fireplaces. By the 1800s, much of the settled parts of the Town was denuded of woodland, which Thoreau remarked left a "barren and desolate country...such a surface, perhaps, as the bottom of the sea made dry land day before yesterday" (Thoreau, 1951). Unchecked forest fires claimed some of the remaining forest stands, notably in May 1843 when 4,000 acres of woodland in South Yarmouth burned and in June 1873 when a square mile of northeast Yarmouth Port was charred.

By 1890, as the Town's population dwindled and farms collapsed, the forest crept back and an observer reported that the "intervening region of land [between the Yarmouth villages] of four or five miles is densely covered with oak, pine, birch, cedar and other woods" (Deyo, 1890). This type of forest community is still dominant today. By 1916, State and local forestry officials had cultivated white pine plantations on parts of Cape Cod, including Yarmouth.

Because the opportunistic species of pitch pine and oak are not of millable quality (and pitch pine is essentially ignored as a fuel wood), the new forest of Yarmouth does not face the same commercial threat that the original one did. Today, the threat to forestland is primarily from displacement by residential development. If Yarmouth can be said now to exhibit a suburban pattern of development, perhaps the pivot point was around 1984, when urbanized acreage (land used for residential, commercial, industrial, transportation, and waste purposes) finally outstripped forest land.

Despite its scarcity of rich and varied soils, Yarmouth still supports some interesting plant communities in addition to the typical pitch pine and oak (red, black, scrub, scarlet oaks) association found throughout Cape Cod. There are areas where white pine (*Pinus strobus*) predominates and even some small plantations of red pine (*Pinus rubus*). Yarmouth Port's Main Street once was shaded by a mile of arching elm trees, planted by historian Amos Otis and others in the middle 1800s (Snow, 1946), but they have all fallen victim to Dutch Elm disease and hurricanes in the past 50 years. A new disease-resistant American elm, developed by the Elm Research Institute of Westmoreland, NH, is being introduced around Cape Cod.

Other tree species found scattered throughout Town include red maple (*Acer rubrum*), black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), gray birch (*Betula populifolia*), tupelo (*Nyssa sylvatica*), and American beech (*Fagus grandiflora*). The pine/oak forests, by themselves, are of limited value from a wildlife standpoint because of their short height, crown density and the poor quality of the dominant soil association. When a wetland, cranberry bog or power line plant community occurs adjacent to the woodlands, the wildlife value of both the open and wooded areas is greatly enhanced.

The habitat significance of the woodlands of Yarmouth primarily lies in its ability to provide migratory corridors and refuge for wildlife from the heat and openness of the beaches, marshes, and developed lands. The recreational value of these wooded areas for humans is remarkably similar. For much of the off-season, the great recreation areas of the beaches are not as popular

as one might expect because of the exacerbated cold there. Woodlands offer important shelter and relief from the bitter winds off the Bay and Sound.

Rare plants in Yarmouth protected under the 1991 Massachusetts Endangered Species Act include those listed as Endangered, Threatened, and Species of Special Concern, in descending order of rarity. Pondshore species comprise the primary rarities, including Threatened golden club (*Orontium aquaticum*), inundated horned-sedge (*Rhynchospora inundata*), and adder's tongue fern (*Ophioglossum vulgatum*), and Special Concern species, such as Plymouth gentian (*Sabatia kennedyana*), long-beaked bald-sedge (*Rhynchospora scirpoides*), pondshore knotweed (*Polygonum puritanorum*), redroot (*Lachnanthes caroliana*), and terete arrowhead (*Sagittaria teres*). A cedar swamp plant, the heartleaf twayblade (*Listera cordata*), is an Endangered species. Open field or sandplain grassland plants include the Endangered Mattamuskeet panic-grass (*Dichanthelium mattamuskeetense*) and four Special Concern species: common's panic-grass (*Dichanthelium commonsianum*) and Wright's panic-grass (*Dichanthelium wrightianum*), bushy rockrose (*Helianthemum dumosum*) and New England blazing star (*Liatris scariosa* var.).

Coastal or brackish plants include three Special Concern species: saltpond pennywort (*Hydrocotyle verticillata*) and bristly foxtail (*Setaria geniculata*) and American sea-blite (*Suaeda calceoliformis*) (see Appendix A). State regulations prohibit the taking or habit alteration of these species without a State permit.

#### 4.5 Fisheries and Wildlife

Yarmouth is located at the juncture of two major wildlife zones: the Virginian and the Acadian biogeographic regions. Cape Cod separates the warm Gulf Stream waters of Nantucket Sound (northern edge of the Virginian zone) from the cold Labrador Current coursing down through the Gulf of Maine into Cape Cod Bay (southern edge of the Acadian zone.) Marine species composition, from seaweed to squid to marine mammals, is different between these two sides of Yarmouth. In many ways, it is the marine life of Yarmouth which is more diverse and interesting than its terrestrial fauna. Yarmouth's Cape Cod Bay shoreline is the innermost area proposed by the National Marine Fisheries Service as critical habitat for the endangered North American right whale (*Eubalaena glacialis*).

The waters of Yarmouth also support a wide array of pelagic birds, such as fulmars, gannets, shearwaters and alcids (guillemot, murre, razorbill) all attracted to the abundant baitfish. The north side marshes are one of only five Cape embayments identified as important wintering areas for black ducks, a National Species of Special Emphasis (US EPA, 1987). Shore birds include terns (common, least and an occasional roseate) and piping plovers, all listed as protected rare species in Massachusetts. The Massachusetts Audubon Society's (Audubon) Coastal Waterbird Program notes that the barrier beaches at the mouth of Bass Hole are a "very important nesting colony" for shorebirds, though predators, such as raccoons and gulls, have disrupted the colony in recent years. In addition, Seagull Beach and Great Island, on Yarmouth's south side, have recently been colonized by piping plovers, the latter spot having become perhaps more attractive due to dredge spoil deposition.

While a complete inventory of birds is not available for Yarmouth, other important or interesting breeding birds include osprey, northern parula (warbler), pine warbler, orchard oriole, eastern bluebird, savannah sparrow, sharp-tailed sparrow, eastern meadowlark, red-tailed

hawk, killdeer, woodcock, horned lark, ruby-throated hummingbird, eastern phoebe, great horned owl, willet, and mute swan (Veit & Petersen, 1993). The osprey in particular is a success story, as it has flourished on the Cape and in Yarmouth since its reintroduction in the 1980s. In fact, Mill Pond is no longer listed as Estimated Habitat under the State Endangered Species Act because the osprey has become so common there (Hall, 2001). Please see Appendix A for a complete list of Rare Species, as identified by the Natural Heritage and Endangered Species Program.

According to NHESP, rare animal species found in Yarmouth include the Eastern box turtle, which prefers woodlands with access to water, and rare invertebrates, such as dragonflies (comet darter), damselflies (New England bluet, barrens bluet) and moths (water willow stem borer). The Hawes Run wetland in West Yarmouth is particularly important for rare dragonflies. Significant new conservation land around the Run has been acquired by the Town.

Mammals in Yarmouth include the common assemblage: red and gray squirrel, white-tailed deer, raccoon, red fox, rabbit, skunk, otter, opossum, shrew, muskrat, bat, weasel, mice and voles. In recent years, a top-of-the-food-chain predator, the eastern coyote, has extended its range throughout all of Cape Cod and is seen throughout Yarmouth, particularly along salt marsh edges, where they stalk mice and voles.

Reptiles and amphibians (Herpetofauna) are commonly found within or near wetland resource areas, as wetlands play a critical role in the development and life cycle for these species. The following list provides a brief overview of herpetofauna found in Yarmouth. Reptiles include common snapping turtle, spotted turtle and eastern box turtle. Snakes include eastern garter snake, northern black racer and northern ringneck snake. Salamanders include redback salamander and spotted salamander. Toads include the American toad and frogs include wood frog, northern spring peepers and bull frogs.

In 1973, the U.S. Department of Agriculture conducted a natural resource inventory and reported that "the major wildlife area in Yarmouth is the marsh along the north coast". Lewis Pond and Parkers River also serve as a prime wildlife site. Wetland areas [such as Hawes Run and Town Brook] contain a high wildlife potential. A prime wildlife area can be found around Mill Pond (USDA, 1973). The 1980 Yarmouth Conservation-Recreation Plan identified prime wildlife habitats north of Route 6A, the Dennis Pond Complex, between Higgins Crowell Road and West Yarmouth Road, north of Swan Pond, Great Island, and woodlands between Mill Pond and the high school.

In 2001, The Compact of Cape Cod Conservation Trusts, Inc. (the "Compact") completed a four-year inventory of Cape Cod wildlife habitats, including individual parcel data for each town, using a Geographic Information System (GIS) computerized mapping program. The results found seven critical large wildlife habitats on the Cape outside of the National Seashore. One of these seven is the extensive marsh-shrub thicket area of Yarmouth Port north of Route 6A. Thus, this area can be considered regionally significant as well as locally important. Other local priority areas found in The Compact's analysis were the Dennis Pond Complex, German Hill woodlands, north of Mill Pond, Pine Street (partly purchased by Land Bank in 2000), Higgins Crowell Road wellfields, Great Island, Flax Pond, Hawes Run, and Town Brook.

In 2012, the Massachusetts Division of Fisheries and Wildlife identified BioMap2 Core Habitat and Critical Natural Land for Yarmouth. Refer to Map 4-?? for the BioMap2. Numerous core habitats were identified that promote long-term stability for Rare Species as identified by the Massachusetts Endangered Species Act (MESA); for Other Species of Conservation Concern as identified by the State Wildlife Action Plan; and for exemplary natural communities and intact ecosystems, such as vernal pool, forested areas, wetlands and water bodies. Refer to Appendix A for a complete list of Rare Species, as identified by the Natural Heritage and Endangered Species Program ~~and Map 4-?? showing significant natural resource areas including rare species.~~

The BioMap2 also identified critical natural landscapes that are capable of sustaining a wide array of species and habitats. These areas include large tracts of mainly naturally vegetated areas consisting of contiguous forests, wetlands, rivers, lakes, ponds and their buffers, as well as coastal habitats such as barrier beaches and salt marshes. Of the estimate 3,232 acres of critical natural landscape identified in Yarmouth, approximately 1,180 acres or 36.6% is currently protected.

Wildlife corridors enable animals, particularly upland mammals, to migrate to new territories in search of food or breeding grounds. Wildlife corridors also provide open space and cover so that animals can travel often undetected and uninhibited. Biologists estimate that undisturbed linear areas of a minimum of 300 feet in width are necessary for many species to feel comfortable moving through an area. Despite the presence of residential development throughout the Town and its continuing saturation, wildlife corridors in Yarmouth are impressive. Yarmouth's wildlife corridors are configured so as to allow travel in all directions. It is equally important to note that most wildlife in Yarmouth can and will readily tolerate human contact. It is entirely possible to observe deer, fox, and coyote in most residential yards. A white-tailed deer could easily travel from the boardwalk at Bass Hole to the lighthouse at the southern tip of Great Island. Similarly, a coyote could walk from Independence Park in Barnstable to the Dennis Conservation Area along Setucket Road without human detection.

Yarmouth has about 500 acres of productive shellfish beds (Marine Research 1981). Species harvested recreationally include soft-shell clam, quahog, sea clam, blue mussels, ~~oysters and, intermittently,~~ bay scallops. Commercial permits are issued only for quahogs, soft-shell clams and scallops. The Town issued as many as 870 recreational permits in the mid-1990s; that number jumped to 1,100 in the year 2000. From 2000 to date, the Town issued approximately 1,000 permits a year.

Because shellfishing is a popular pastime, there is constant demand on the shellfish supply. The Town has tried to enhance natural sets of shellfish by broadcasting quahog and scallop seed purchased from private growers elsewhere. In addition, commercial aquacultural operations on marine beds leased from the Town have risen from four to six in the past five years.

Shellfishing areas which are currently closed due to bacterial contamination include upper Mill Creek in West Yarmouth, Mill Pond and Crab Creek at the head of Bass River, and the marshes on the North side (except for Bass Hole itself). Other areas are closed during the summer or immediately after rainstorms which wash pollutants into the waters. Stormwater runoff remediation continues to be implemented to correct some of the non-point pollution problems.

Anadromous fish runs (species which live in saltwater but spawn in freshwater) are a large part of Yarmouth's history. Weir Village was a major settlement in town along the upper reaches of the Bass River (Follins Pond and Mill Pond). From 1640 to 1841, fish traps or weirs were employed in this area to harvest the abundant fishery, including small striped bass, in addition to blueback herring and alewives, anadromous fish species that migrated up the length of Bass River to spawn in the fresh headwaters. The "tremendous gale" of October 3, 1841 silted up the Bass River to such an extent that the commercial fishery here was extinguished and the village was essentially abandoned.

Today, the major "herring run" exists in the Parker River watershed, running up through brackish Swan (Seine) Pond to fresh Long Pond. The major collection point for the recreational taking of herring during the spring run is at the recently renovated ditch connecting the two ponds, which may be reached by way of unimproved road west of Forest Road. Low pond water levels in recent years have hampered this run. ~~Additional fish runs are found in Bass River where it empties into Miss Thacher's Pond and Labans [aka Turtle] Pond. The latter runs under a fairway of the Bass River Golf Course. Sandy Pond in West Yarmouth has a limited herring run through Mill Creek and Baxter Mill Pond. Low pond levels in recent years and a steep ladder system have hampered this run.~~ An enclosed culvert was installed to connect the pond to the river, but Town officials determined that the run was suffering because the fish would not penetrate the long, dark tunnel. Therefore, openings in the pipe, or grate bridges, were installed to allow light and "reassure" the fish that the flow of water led somewhere. The only north side run stretches from Chase Garden Creek to Whites Brook and into Tom Matthews Pond.

Besides the direct catch of anadromous fish by persons using them for bait or food, herring and alewives are significant as the primary forage fish for other important sport and commercial species, such as striped bass and bluefish, which enter estuarine and nearshore waters. The Town of Yarmouth has made attempts to restore and enhance fish runs. The latest efforts include extending the Bass River run farther upstream to Miss Thacher's [aka Miss Nancy's] Pond, and reopening the Mill Creek run from Mill Pond to Little Sandy Pond. Please see Table 4- for a list of Rare and Endangered Species, as identified by the Natural Heritage and Endangered Species Program.

In partnership with the Massachusetts Division of Marine and Fisheries, the Town has expanded an existing artificial reef site located in Nantucket Sound. The reef was originally planned and deployed in 1978 with the assistance of Marine Fisheries. The 127 acre site is located 2.2 miles south of the mouth of Bass River. The reef is the first permitted artificial reef sites in Massachusetts. It provides near-shore fishing for anglers and a hard bottom structure for marine fish and invertebrates. According to Marine Fisheries, a survey was conducted in 2010 and found scup and black sea bass as the dominant fish species with high concentrations of fish occupying the reef area. This partnership and activity results in an enhanced ecological betterment and provides shelter for cryptic marine finfish and invertebrate species in a location that otherwise has a limited marine ecosystem.

## 4.6 Scenic Resources and Unique Areas

Though environmental educators and activists are trying to increase public appreciation of the complex ecological relationships among soils, water, plants, and animals, many people still approach the environment from primarily an aesthetic viewpoint. If it is an attractive landscape, it is valuable, according to this perspective. Fortunately, Yarmouth abounds in beautiful natural scenes that are also environmentally sensitive areas, such as: saltwater and freshwater beaches, salt marshes, forested uplands and kettleponds. Specifically, the Town is proud of the following resources, areas and features of the Town (see Map 4A and Figure 4.1):

1. ***Scenic Landscapes:*** Yarmouth's extensive coastline, bountiful salt marshes, and scattered kettleponds offer a plethora of breathtaking views (see Map 4B). In fact, Yarmouth boasts 15 of Cape Cod's finest fresh and saltwater beaches. Among these is Gray's Beach, also referred to as Bass Hole. One of the greatest attributes of this beach is the long, meandering boardwalk that crosses the saltmarsh and includes a viewing platform. However, the view of the sun disappearing into the horizon of Cape Cod Bay is what makes Gray's Beach exceptional, and one of the Cape's greatest sunset spots. In addition to Gray's Beach, Seagull Beach offers terrific views out towards Nantucket Sound with an inland view of the picturesque Lewis Pond and Parkers River marshes. Yarmouth's eastern border is made up of the Bass River and its tributaries. A boat ride through this meandering river and connected lakes reveal a mix of cottage houses and forested banks.

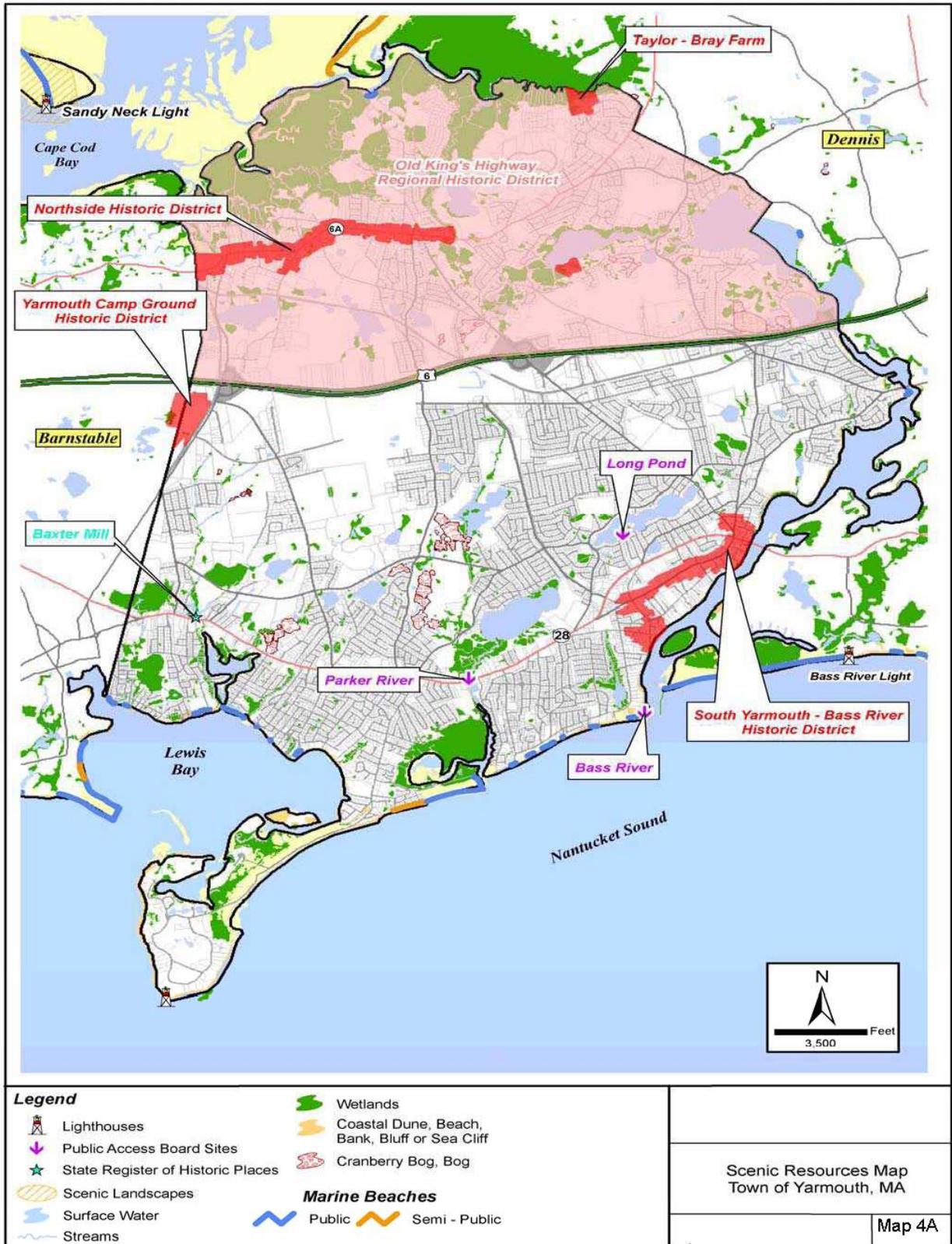
Aside from the Town's remarkable coastal and river scenery, Yarmouth also prides itself on its 1,500 acres of upland forests. A trail system beginning at the Yarmouth Historic Society allows hikers to view the rich variety of vegetation that exists here including: eastern red cedars, eastern white pines, pitch pines, apple trees, bayberry, cherry, sumac, and honeysuckle. Finally, Yarmouth contains one of Cape Cod's most traditional cultural landscapes, the long-established cranberry bog. Although the man-power required to maintain this 66-acre producing cranberry bog is beyond the Town's resources, it has been leased to a private grower at cost to preserve this venerable and charming setting.

2. ***Cultural and Historic Areas:*** Established in 1639, Yarmouth is one of the oldest towns on Cape Cod. With numerous historic buildings concentrated along Route 6A, in the village of Yarmouth Port, the setting of colonial houses with the weathered shingles creates a visual attraction that is reinforced through the community's strong connection to its past. The Town's most significant historic structures include: the Kelley Chapel, Baxter Gristmill, Captain Bangs Hallet House, Judah Baker Windmill, Thatcher House, and Crocker House. Several of these structures have been restored and in some cases relocated. Of note, the Judah Baker Windmill—built in 1791 in South Dennis—has been moved twice before eventually landing in its current location at the Windmill Park near the Bass River. This park provides visitors with an opportunity to gaze on two of the Town's most visually arresting historic and natural resources in one place. The Kelley Chapel, also moved from its original location where it previously served as a seaman's bethel in South Yarmouth, has been restored, and offers an excellent example of the colonial architecture that characterizes the village of Yarmouth Port.

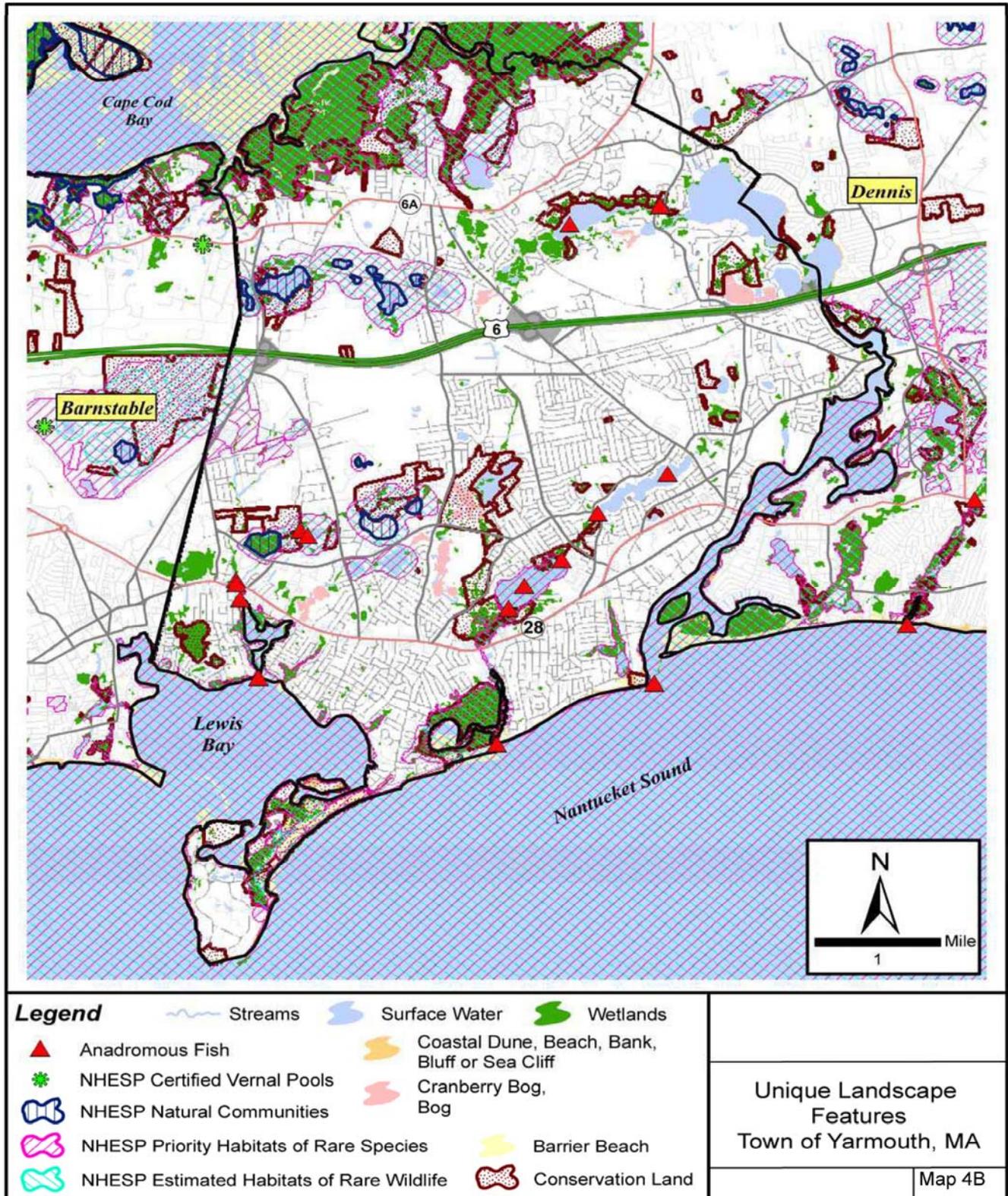
In addition to historic resources, Yarmouth also has several significant cultural resources that add to the visual appeal of the built environment. The Town has registered twelve (12) of its streets as Scenic Roadways. Nine (9) of these streets can be found in Yarmouth Port. The Scenic Roadway designations were largely established through Town Meeting votes, an indication of the citizen's strong relationship with their cultural and historic landscape. Additionally, the Town operates four marinas: Packet Landing on the Bass River, Englewood Beach on Lewis Bay, Colonial Acres on Mill Creek, and Bass Hole on Chase Garden Creek. These marinas are often used by residents and visitors alike as scenic outlooks. Not only do the marinas facilitate Yarmouth's enduring connection to its waterways, they also add to the Town's scenic qualities by providing a nautical backdrop to the village landscape.

3. ***Unusual Geologic Features:*** Yarmouth, like most of Cape Cod, was shaped by the last great glaciations of North America approximately 75,000 to 100,000 year ago. Outwash plain surfaces are commonly pocked and pitted by kettleholes. The majority of Yarmouth's ponds are an intersection between deep pitted kettleholes and the existing water table. Streams and rivers on the Cape, such as the Bass River, currently occupy giant valleys within the outwash plains. These valleys were created by ground water springs contacting the land surface when a large proglacial lake supported higher water tables.

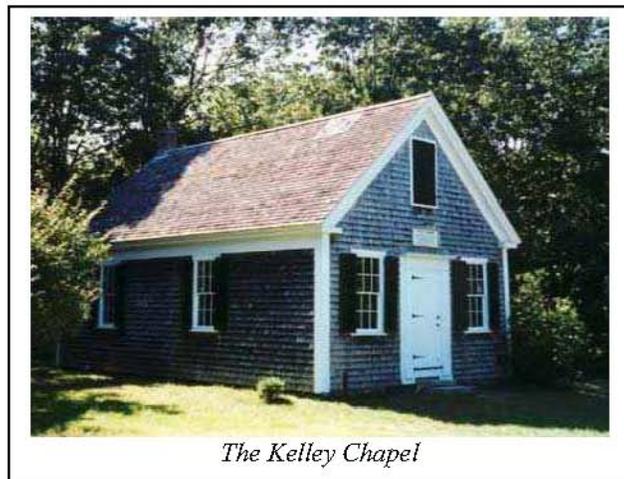
Map 4A – Scenic Resources



Map 4B – Unique Landscape Features

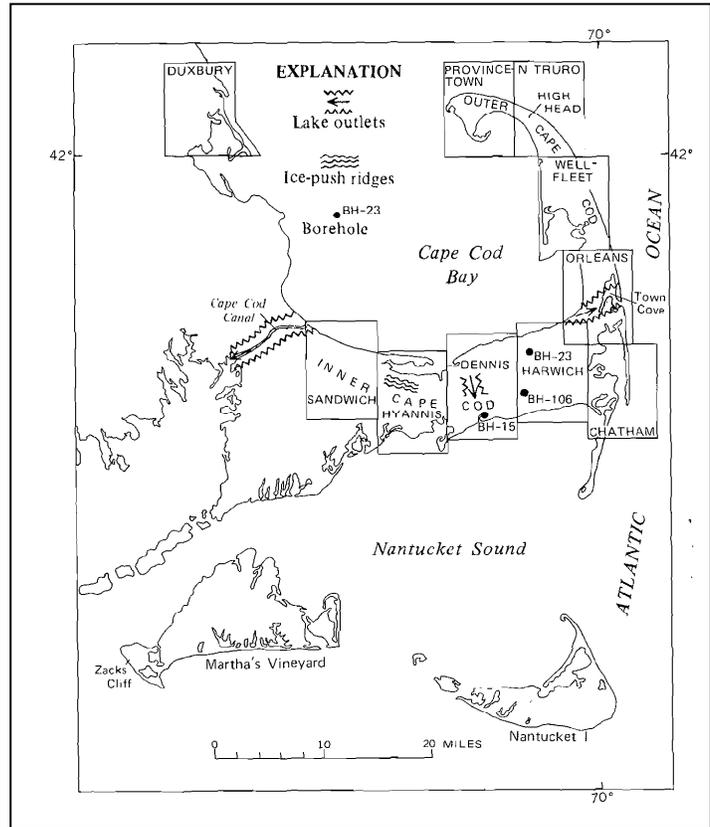


**Figure 4.1 – Scenic Resources**



**Figure 4.2. Geologic Index of Cape Cod**  
(Source: USGS Geologic Map of the Dennis Quadrangle)

Based on the Geologic Map of the Dennis Quadrangle, published by the United States Geological Survey (USGS), the Yarmouth and Dennis area is one of the proglacial lake outlets on Cape Cod (see Figure 4.2). This unique feature contributed to the deposit of the Harwich outwash plain. The Harwich outwash plain was deposited by streams that drained southward through low areas in the Sandwich moraine and the kames. Till and large boulders in the northern part of the outwash plain indicate that some deposition was directly from stagnant ice or partly buried ice block. Clayey silt within the fluvial sand and gravel was deposited by slow flowing melt water streams or in ponds caused by melting buried ice blocks.



#### 4.7 Environmental Challenges

Many challenges exist in protecting and preserving Yarmouth's unique and natural resources. Residential and commercial development pressures as well as tourism and recreation can cause detrimental adverse impacts to Yarmouth's natural environment. For example, septic systems associated with development along the coastline can contribute excess nutrient loading to Yarmouth's embayments and estuaries. Pollution and runoff from abandoned industrial sites can also impact vital groundwater and surface water resources. In addition, habitat for rare species, such as the box turtle, which thrives in wooded areas surrounding freshwater ponds, is threatened by increased development. Most of the environmental challenges that Yarmouth faces are a direct result of its development pace and pattern over the past three hundred years. The following section provides a more detailed discussion of some of the environmental challenges in Yarmouth.

~~In January of 2007, The Town conducted a Nitrogen Loading Study that outlines impacts of nitrate on Yarmouth groundwater supplies. Inputs developed using GIS and water records were used to model nitrate as nitrogen concentrations for each Zone II drinking water resource area. Each Zone II was modeled separately using the following inputs:~~

- ~~• Existing Residential: Single family houses and multi family units (no. housing units), average occupancy (people/unit), total nitrogen waste per person (lbs/person/yr), lawn~~

- ~~area per house (feet squared), lawn fertilizer rate (pounds total nitrogen/1000 feet squared/year, and percent leached).~~
- ~~• Commercial: Total land area (acres) all business water (gallons/day), all municipal water (gal/day), septic nitrogen concentration (milligrams/liter)~~
- ~~• Agriculture: Cranberry bogs (acres) and fertilizer rate (% leached)~~
- ~~• Hydrologic Data: Zone II Area (acres), pumping rate (million gallons/day), potential surface water percentage, surface water total nitrogen concentration (mg/L), precipitation total nitrogen concentration (mg/L).~~
- ~~• Future Development: Single family houses and multi-family units (no. of housing units), business water use (gal/day).~~
- ~~• Results: Existing nitrogen concentration (mg/L), buildout nitrogen concentration (mg/L)~~

~~Build-out conditions were modeled as one house per vacant lot.~~

~~The analyses indicated that three of the Town's Zone II areas fall under the category of "No Current Groundwater Concern Identified" and three of the Zone II areas are in the category of "Potential Groundwater Concern" (See Figure 4.3). Only one area, Zone II 173, which includes supply wells 4 and 5, was identified as a "Current Groundwater Concern."~~

~~Figure 4.4 shows modeled concentrations based on current and build-out conditions. Concentrations predicted based on build-out conditions are similar to concentrations based on current conditions.~~

~~Land use in Zone II 173 is primarily residential. As indicated in Figure 4.4, the model predicted concentration is 9.62 mg/L for current conditions and 9.79 mg/L for build-out conditions. Of the current concentration measurement, 7.1 mg/L is simulated from septic system effluent and an additional 2.31 mg/L from lawn fertilization. Nitrate has been detected in supply well 4 at 8.5 mg/L, near the model predicted concentration. Based on the model predicted concentration, as well as occasional high concentrations detected in wells, levels of nitrate are likely to exceed the 5 mg/L guidance value and could exceed the MCL in individual wells in this Zone II. This Zone II is therefore categorized as a "Current Groundwater Concern", an area recommended for sewerage and other nitrate reduction measures such as land conservation/preservation.~~

Figure 4.3. Nitrogen Loading Analysis – Mapped Results (Source: CDM, 2007)

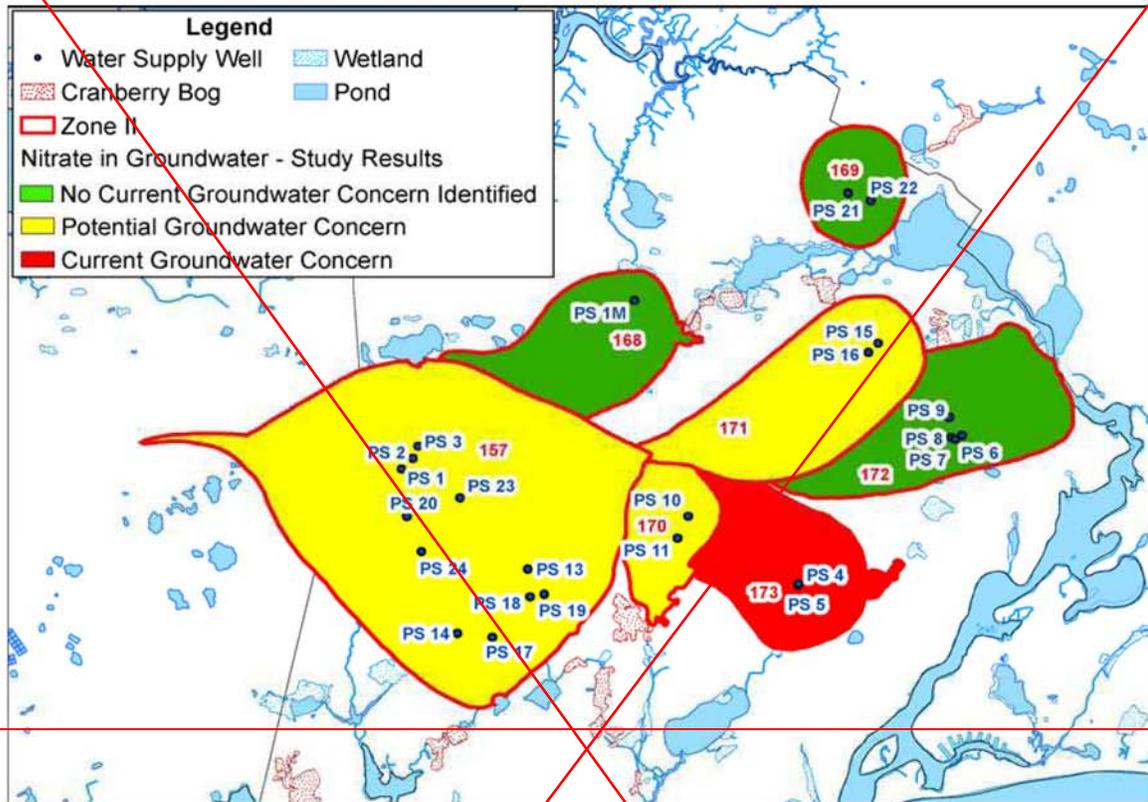
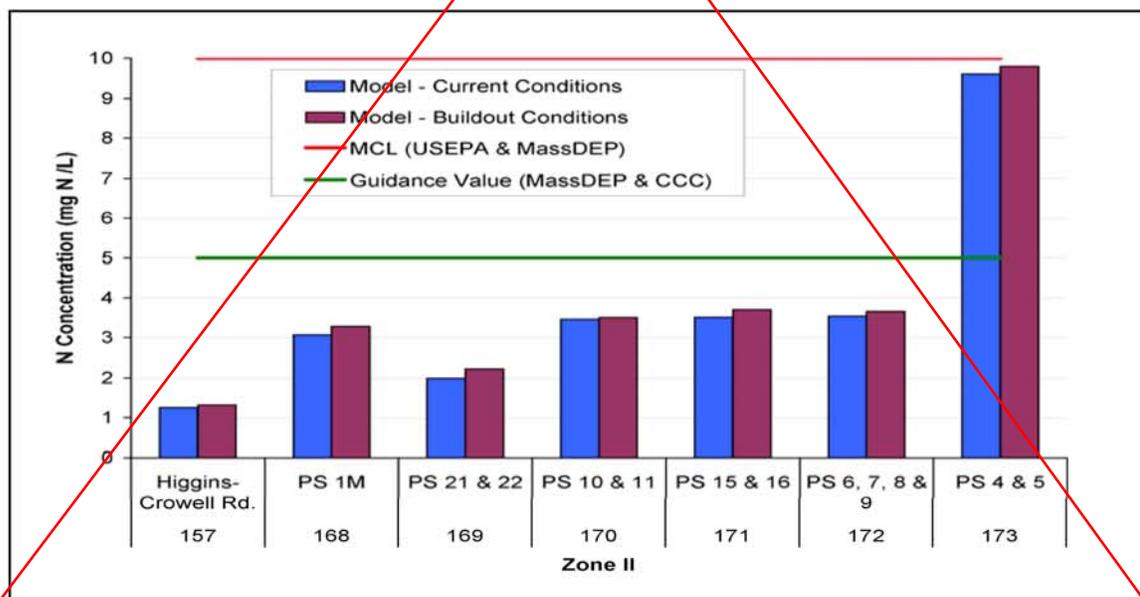


Figure 4.4. Modeled Nitrogen Concentrations (Source: CDM, 2007)



#### 4.7.1 Contamination Sites

According to MA DEP, there have been a total of 133 reported oil and/or hazardous materials releases within Yarmouth. These include releases at many different levels, including those that have been completely remediated, those that are undergoing remediation, and those that have required no further action by DEP. The list also includes multiple releases at a single site. Clean-up, environmental monitoring, and redevelopment of these sites is a top priority for ensuring public health.

A former site of significant environmental concern was Yarmouth's 57-acre Town landfill, located at 600 Forest Road in South Yarmouth, which was closed and capped in 1991, after 40 years of use. The Town decided to reuse the land for a Town recreation area, now known as Peter Homer Park. The recreation area includes a public golf course, athletic fields including softball, soccer, little league, basketball, horseshoes, bocce ball, two playgrounds which include a tot lot playground, an exercise area with a multi-use walking path in the park and other recreational features, along with ample parking. To address Yarmouth's household waste, the Town expanded the existing recycling and solid waste drop-off area, and built a construction and demolition transfer station.

#### 4.7.2 Water Resources

As mentioned previously, Yarmouth maintains 39 miles of coastal shoreline. A significant environmental challenge is protecting the sandy dunes, which provide a natural barrier to dangerous storm surges and provide valuable habitat to many species of birds and reptiles, including those that are rare. Development pressures that creep onto the shoreline threaten to erode the coastal dunes and barrier beaches. Providing an adequate buffer around these coastal resources, as required by the Massachusetts Wetlands Protection Act, is vital to the longevity of Yarmouth's coastline.

Other coastal and freshwater resource areas such as ponds, estuaries, cranberry bogs, salt marshes, and vegetated wetlands offer a natural buffer to flood waters, afford many recreational opportunities, and provide extremely valuable habitat for the wildlife that reside there including many rare species. It is important to preserve and protect these natural resource areas from development pressures and potential contamination.

The use of the navigable waterways is another problem. Space conflicts, lack of adequate shorefront access, inadequate mooring supply, and commercial versus recreational disputes all need to be addressed in addition to water quality problems. A harbor management plan has been developed and should serve as a blueprint for resolving some of these issues.

#### 4.7.3 Wastewater Impacts

One of the largest, most persistent environmental concerns throughout the Town's history is Yarmouth's reliance on individual on-site septic systems for wastewater treatment. Though most of the Town's soils are highly permeable, there are still failed systems due to overloading, particularly during the summer. Because the soils are highly permeable, nitrates and viruses are readily transmitted off-site to surface waters, particularly ponds and streams, and into the groundwater. There is insufficient depth to groundwater on many lots, leading to the design of

"mounded" systems, which can be aesthetically displeasing to many people as well as enabling development to go where it otherwise should not.

Total maximum daily loads (TMDLs) for nutrient loading for the Bass River, Parkers River and Lewis Bay estuaries have been developed by the Massachusetts Estuaries Project (MEP) conducted by the University of Massachusetts at Dartmouth School for Marine Science and Technology (SMAST). The Town of Yarmouth pursued a long-term, multi-phased wastewater management program with centralized treatment in 2011 to reduce nutrient loading to coastal waters to meet total maximum daily loads (TMDLs) for estuary/embayments along Nantucket Sound, and to support business activity centers along Route 28. Although an Environmental Impact Report and Comprehensive Wastewater Management Plan ~~were~~ developed, funding for the \$55 million construction of Phase 1 was voted down at a Special Town Meeting on September 12, 2011.

However, a driving force in continuing to move forward with wastewater management is the lawsuit filed by the Conservation Law Foundation (CLF) against the United States Environmental Protection Agency (EPA) in 2010 and again in 2011. The lawsuit challenged water quality standards approved by the EPA and claimed that it had failed to meet its obligations under the Clean Water Act to review, update and enforce a plan to stop the flow of nutrients into the region's bays and ponds from wastewater and stormwater. A settlement was reached that includes preparation of an updated water quality plan for the Cape by September of 2015. The Cape Cod Commission completed a draft of an updated Section 208 ~~Plan~~ Water Quality Plan for Cape Cod in the spring of 2015. The 208 Plan Update reflects a watershed-based approach that focuses on nutrient impacts to the Cape's estuaries, primarily caused by nitrogen in wastewater. The draft plan is currently out for public comment.

Also as part of the settlement agreement, the CCC and the Towns of Cape Cod must designate Waste Treatment Management Agencies (WMAs) by June of 2015. The designated WMA will be responsible for the implementation of the Section 208 Plan Update. Implementation will ultimately include some type of wastewater management system for the Town of Yarmouth.

#### 4.7.4 Stormwater Impacts

Yarmouth has experienced, and continues to experience a great amount of new development and redevelopment. Increased development results in an increase in impervious area, which thereby generates a larger amount of stormwater runoff. This stormwater runoff can contain many harmful contaminants, such as nutrients from fertilizers and gasoline from parking lots and roadways. Stormwater management is of particular importance in Yarmouth to protect its groundwater and surface water resources from contaminants associated with stormwater.

In 2008, the Town adopted Stormwater Management Regulations which targeted stormwater runoff and illicit connections and discharges to the municipal storm drain system. These regulations apply to construction activities, or phased development, that disturbs more than 1 acre of land that drains to any Town of Yarmouth municipal storm sewer system (MS4) that is hydraulically connected to a wetland. Applicable projects are required to obtain a Stormwater Management Permit.

In addition to the Yarmouth Stormwater Regulations, work that is within wetland jurisdiction must meet the Stormwater Management Standards outlined in the Massachusetts Stormwater Handbook. Within the Massachusetts Stormwater Handbook, stormwater management standards must be met to address water quality, groundwater recharge, and peak flow mitigation. These measures include environmentally sound site plan design, including low impact development, pollution control, structural Best Management Practices, erosion control and sedimentation control, and long term operation and maintenance plans.

Since the 2007 Open Space and Recreation Plan was developed, the Town has worked diligently improving water quality and upgrading drainage and stormwater management standards. To date, the Town installed and upgraded drainage at 26 locations that directly relate to 9 different waterbodies. These upgraded systems were comprised from the on-going list of recommended improvements from the 2007 Open Space and Recreation Plan. The work includes improvements to the drainage at Halletts Mill Pond/Mill/Keveney Lane bridge, the Senior Housing site, and the Herring Run, Bass River and Lewis Bay.

**Table 4.3 – Summary of Drainage Improvements**

<b>Year Installed</b>	<b>Location</b>	<b>Improved Waterbody</b>	<b>Type of System Installed</b>
2007	Longview Drive	Bass River	leach galleys
2007	No. Dennis Road	Bass River	leach galleys
2007	No. Dennis Road	Bass River	Same as for T-43
2007	Wing Avenue	Bass River	leach galleys
2008	Clearbrook Rd herring box	Herring Run	leach galleys
2008	Senior Housing site	Herring Run	leach galleys
2008	Senior Housing site	Herring Run	leach galleys
2008	Merchant Avenue	Bass River	leach galleys
2008	Broadway	Lewis Bay	porous pave road
2010	Nauset Lane	Parker River	leach galleys, porous pave road
2010	Niagara Lane	Parker River	porous pave road
2010	Sioux Road	Parker River	chambers, leach basin, porous pave road
2010	Mill Lane	Halletts Mill Pond Keveney Lane Bridge	leach galleys
2010	1750 House site	Mill Creek	Inn razed, park created, porous parking
2012	Route 28 B.R.Bridge	Bass River	leach galleys, gallon separator
2012	Packet Landing/Allen	Bass River	leach chambers
2012	Packet Landing/Allen	Bass River	Outlet pipe plugged
2012	Wilbur Park Entrance	Bass River	leach galleys
2012	Ancient Cemetery	Lone Tree Creek	leach galleys
2013	Nauset Lane	Parker River	leach galleys
2013	Longview Drive	Bass River	leach galleys

2013	Run Pond Road	Bass River	leach galleys
2013	Highland St	Lewis Bay	leach basin
2013	Water Street	Unnamed Wetland	leach galley <u>s</u>
2013	Highbank Road	Unnamed Wetland	leach galleys
2014	Long Pond Drive at outlet	Long Pond	leach galleys, porous pave sidewalk, rain garden

The Massachusetts Department of Transportation (MassDOT) has many drainage outlet pipes along Routes 28 and 6A that do not have stormwater pretreatment systems and are likely the largest remaining source of road stormwater pollution in Yarmouth. These roads are not within the town's jurisdiction, therefore, the town must depend upon MassDOT's efforts, and thus far, upgrades to the stormwater management system along these routes have not been discussed. The town is particularly concerned with stormwater runoff along Rt. 28 at Parkers River due to potential impacts on shellfish.

#### 4.7.5 Chapter 40B

Exempt from the purview of the Cape Cod Commission and Town zoning and development regulations, are residential projects using Massachusetts General Law Chapter 40B (comprehensive permits for affordable housing.) These projects are intended to meet a State law for providing affordable housing and elevate the Town's percentage of subsidized housing stock towards the 10% goal mandated by the State. Chapter 40B projects can also have higher densities which may result in more impacts, including to the Town's infrastructure. It should be noted that State regulations regarding wetlands and septic systems still apply to Chapter 40B projects.

#### 4.7.6 Other Environmental Concerns

General resource management problems include illegal trash dumping in conservation areas or other Town properties, unauthorized off-road vehicle use in conservation areas, invasive plant species management, deer crossing roadway conflicts, and resident Canada geese soiling golf courses throughout the year.

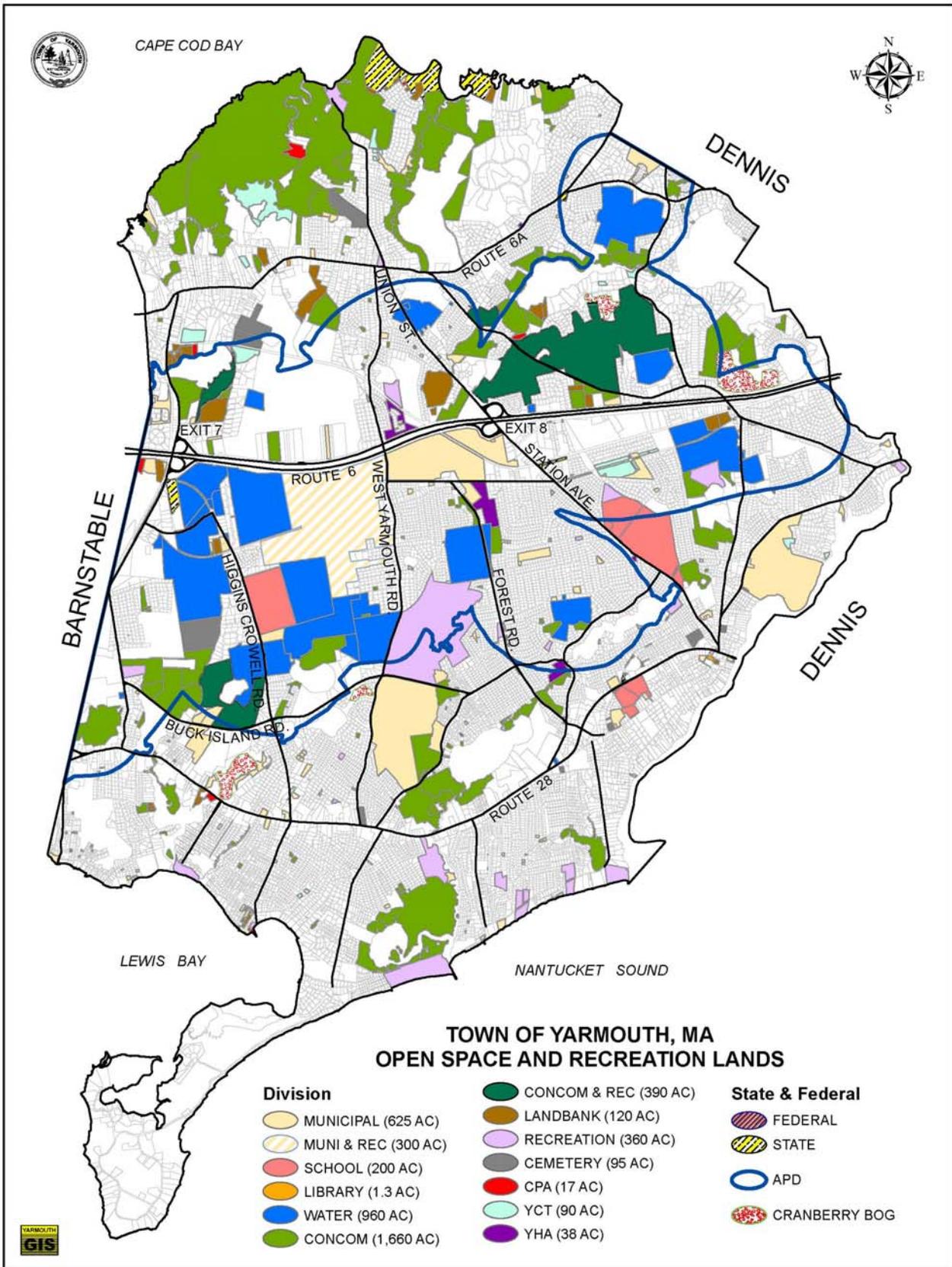
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**SECTION 5: INVENTORY OF LANDS OF CONSERVATION & RECREATION INTEREST**

The purpose of this section of the Plan is to provide an inventory of all lands in Yarmouth that are significant to open space and recreational use. Conservation areas and other notable land holdings are depicted in Map 5. Open space lands can be grouped into four major classifications: protected, permanently protected, partially protected, and unprotected lands.

- **Protected Parcels** – Land is considered protected, at the basic level, if it is municipally owned and managed. In addition, if a nonprofit entity, with a mission similar to the above local organizations (i.e., the protection of land for conservation and open space interests), owns the land, it is considered “protected” by the Town. However, these lands do not have management agreements or deed restrictions that specify the use of the property (e.g., as conservation land or open space land rather than another use).
- **Permanently Protected** - Land is considered permanently protected if the Town of Yarmouth (e.g., Conservation Commission, Recreation Division, Public Works Department including the Water or Sewer Departments), Community Preservation Committee, Yarmouth Conservation Trust or other public or private entity owns the land *and* a deed/conservation restriction has been filed at the County Registry of Deeds specifying that the land has been reserved in perpetuity as open space and devoted to conservation purposes. Specifically, the Conservation Commission manages all “Article 97” lands (referring to the Articles of Amendment to the Massachusetts Constitution), which cannot be converted to any other use without receiving a vote from the Conservation Commission, 2/3 Town Meeting and Massachusetts Legislature vote, as well as approval from the Massachusetts Secretary of Energy and Environmental Affairs (EOEEA). Please note that in 2014, open space parcels purchased with Land Bank and CPA funds were placed under a conservation restriction, with some limited exceptions such as for development at the Sailing Center and proposed development of the Cape Cod Rail Trail (CCRT) extension.
- **Partially Protected** – Private land areas regulated under Massachusetts General Law, Chapter 61, 61A and 61B: State-assessed recreational, agricultural, and forested lands, respectively, are considered partially protected. These lands have been designated by their owners for recreational, agricultural or forest land uses; and therefore, are protected as open space. However, these programs are voluntary whereby land can be sold by land owners at any time. The Town of Yarmouth thereby classifies these lands as having partial protection.
- **Unprotected Parcels** – Land is considered unprotected if it is owned by a private entity other than the private nonprofit entities listed above, and does not include a deed/conservation restriction, filed at the County Registry of Deeds, specifying that the land has been reserved in perpetuity as open space and devoted to conservation purposes.

Map 5 – Open Space & Recreation Lands



Each of these land types can be owned privately or publicly, as described in the following sections. Appendix B provides a comprehensive list of for a list of Town-owned, protected land.

## 5.1 Private Lands

There are a handful of privately-owned, protected parcels of land in Town. These parcels have permanent deed restrictions placed on the land prohibiting development, as shown in Table 5.1.

**Table 5.1 - Protected Private Yarmouth Lands**

Map/Lot	Acres	Location	Protection
1/25	14.73	Great Island Rd.	Permanent conservation restriction to The Trustees of Reservations (TTR).
2/5	7.11	Great Island Rd.	Permanent conservation restriction to TTR.
5/52	31.97	Great Island Rd.	Permanent conservation restriction to TTR.
5/66	59.27	Great Island Rd.	Permanent conservation restriction to TTR.
7/54	10.89	Great Island Rd.	Permanent conservation restriction to TTR.
7/56	88.73	Great Island Rd.	Permanent conservation restriction to TTR.
8/55	22.58	Pine Island	Permanent conservation restriction to TTR.
4/108	35.98	Smith's Point Rd.	Permanent conservation restriction to TTR.
109/2	37.4	Off Strawberry Ln.	Permanent conservation restriction to Town.
112/1	140	Off Route 6A	Permanent conservation restriction to Town.

Table 5.2 lists the largest and/or significant parcels of developable, unprotected land remaining in Yarmouth. These lands are the most susceptible land areas when it comes to development, since land is relatively scarce on Cape Cod and the competition for this land is strong. These parcels represent the last opportunity for Yarmouth to preserve significant blocks of open space.

**Table 5.2 - Unprotected Private Yarmouth Lands  
(For purchase or conservation restrictions or easements)**

Map/Lot	Acres	Location	Protection Status
33/151	0.12	Winslow Gray Road	Access easement to town for Long Pond.
33/73	0.3	Cottage Drive	Homeowners' assoc. beach on Sandy Pond.
66/108	0.25	Colburn Path	Homeowners' assoc. parking.
57/75	0.28	Nicole Avenue	Homeowners' assoc. beach on Halfway Pond.
81/13	0.25	Grandview Drive	Homeowners assoc. beach on Bass R.
90/13	0.6	Mooring Lane	Homeowners assoc. beach on Bass R.
36/9	0.74	Willow Street	Deed restriction limited to cemetery use.
101/4,5,1,2,3	20.67	Summer Street	Deed restrictions limited to cemetery use.
73/4,3,A1,P1	230	Off White Rock Rd.	Deed clause to Conserv. Commiss.
73/P1,E2,K8,	41	Off White Rock Rd.	None
68/1	8.08	Route 6 North	Deed clause to donor.
94/1	40.77	White Rock Rd.	None
80/98	37.96	Great Western Rd.	None
40/49,50	4.75	Barn Board Lane	Common area of cluster subdivision, special permit covenant.
64/39	5.11	Lumber Jack Trail	Common area of cluster subdivis., special permit covenant.
120/1	99.76	Kings Way Circuit	Common area of cluster subdivis., special permit covenant.

Map/Lot	Acres	Location	Protection Status
1/33	19.11	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
2/13	25.02	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
2/18	1.99	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
2/22	1.68	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
2/38	65.93	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
3/44	2.47	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
4/70	0.41	Wood Duck Road	Common area of cluster subdivis., special permit covenant.
4/73	7.24	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
4/75	2.24	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
4/82	1.22	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
5/53	0.74	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
5/67	0.95	Great Island Rd.	Common area of cluster subdivis., special permit covenant.
7/57	5.86	White Cedar Road	Common area of cluster subdivis., special permit covenant.
122/91 & 91.1	57.26	11 Strawberry Ln.	No protection/no restrictions.

### 5.1.1 State-Assessed Agricultural and Forested Land

The Town of Yarmouth has a number of privately owned agricultural and forested land areas as outlined in Table 5.3. Most of these land areas are fall under Massachusetts 61A: Assessment and Taxation of Agricultural and Horticultural Land, or Chapter 61B: Classification and Taxation of Recreational Land. Yarmouth does not have any land areas classified under Chapter 61: Classification and Taxation of Forested Land. These laws describe land management incentive programs where land owners can preserve these lands for their designated uses in exchange for reduced property taxes. However, these are voluntary programs whereby the land owner can opt out at any time.

All private cranberry bogs, a nursery on Union Street, as well as the Blue Rock golf course, are presently enrolled under the MGL Chapter 61A & 61B current use assessment programs.

**Table 5.3 - Chapter 61A and B Lands**

Program	Map/Lot	Acres	Location	Use
Chapter 61A	126/42	15.43	Weir Road	Working Cranberry Bog
Chapter 61A	38/4	36.92	Route 28	Working Cranberry Bog
Chapter 61A	19/1	56.10	Knob Hill Road	Working Cranberry Bog
Chapter 61A	107/13	9.9	Union Street	Holbrook Farms
Chapter 61B	100/57	44.32	North Main St.	Blue Rock Golf Course
Chapter 61B	127/71	159.51	Off Main St.	Bass River Rod & Gun Club

### 5.1.2 Areas Significant for Water Resource Protection

Protecting fresh and salt water resources from potential groundwater contamination is of extreme importance in Yarmouth for the purposes of safe drinking water, adequate wildlife habitat, and sustainable recreational opportunities. In order to protect Yarmouth's sole source aquifer from contamination sources, such as underground fuel tanks and hazardous materials storage, an Aquifer Protection Overlay District (APD) was established based upon a delineation of the zones of contribution to the public water supply wells. A 1994 study by the US Geological Survey found only limited areas near the West Yarmouth ponds and near Greenough Pond as potentially suitable for siting new public water supply wells. These areas should be ~~protected~~ considered for protection in the event that a new public water supply well is needed in the Town.

### 5.1.3 Priority Areas for Protection of Rare Species and Exemplary Natural Communities

The unique and fragile environments in Yarmouth, at the center of Cape Cod, provide for exceptional habitat to many rare species. The NHESP has recorded occurrences in Yarmouth of three Endangered species, twelve Threatened species, and nineteen Species of Special Concern. (See Appendix A for a complete list of Rare Species). Yarmouth's Cape Cod Bay shoreline is the innermost area proposed by the National Marine Fisheries Service as critical habitat for the endangered North American right whale. The shores of Yarmouth's freshwater ponds provide suitable habitat to many State-listed rare species as well, including three Threatened plants, five Special Concern plants and one Endangered plant. Open field or sandplain grasslands also provide habitat to State-listed rare plants.

According to the Massachusetts NHESP, rare wildlife species found in Yarmouth include the Eastern box turtle, which prefers woodlands with access to water, and threatened and rare invertebrates, such as dragonflies (comet darner), damselflies (New England bluet, barrens bluet) and moths (water willow stem borer). The Hawes Run wetland in West Yarmouth is particularly important for rare dragonflies. Significant new conservation land around the Run has been acquired by the Town.

### 5.1.4 Private Recreation Lands

Yarmouth has a number of private, commercial recreational facilities. South Yarmouth hosts the Blue Rock Golf Course, Mid-Cape Racquet Club, TRC-Cape Bowl, South Yarmouth Tennis Club, Bass River Sports World, Ship Shops Marina, and Pirates Cove Miniature Golf. West Yarmouth contains three miniature golf courses, Skippy's Marina and Hyannis Marina. Yarmouth Port does not have any private recreational facilities open to the public (other than King's Way golf course), though there are plenty of outdoor walking opportunities on the many large conservation areas.

## 5.2 Public and Nonprofit Lands

### 5.2.1 Public Open Space Land

The Town of Yarmouth currently holds 4,271 acres of open space land, of which more than 1,800 acres are devoted to conservation. Another major portion (960+ acres) consists of large blocks of woodland held for public water supply wells and wellfield protection. With close to 4,300 acres under its control, the Town of Yarmouth is the largest landowner in Yarmouth. As a community, Yarmouth has made a strong commitment to the setting aside of lands for public use and natural resource protection. However, a combination of factors, historical, geographical and political, has resulted in a less than perfect distribution of these lands. For example, wellfields were purchased where wells would yield (but also where land was less expensive) in West Yarmouth. Conservation areas were assembled where land was unbuildable, primarily, due to wetland soils (Yarmouth Port) or lack of access for development (along the moraine).

The Commonwealth of Massachusetts owns the Route 6 right of way in Yarmouth, running as a double-barreled, limited access highway from the Barnstable to the Dennis Town lines. The right of way varies in width, but averages 300 feet, though the actual road bed rarely exceeds 100 feet wide. The wide shoulders, therefore, provide a natural greenbelt to the highway. The Massachusetts Highway Department (or Mass Highway) also maintains garaging and salt sheds on seven acres off Camp Street, West Yarmouth. A highway rest area, including pine-shaded picnic tables overlooking Follins Pond and Dinah's Pond, is located at Taylor's Point on Route 6 westbound.

The Cape Cod Open Space Land Acquisition Act (the "Land Bank") was adopted by Yarmouth voters in November 1998. Under the Land Bank, voters adopted a three percent surcharge on property tax bills to manage a diversity of important open space resources for the use and enjoyment by the general public. The Land Bank acquired ~~more than 135~~ approximately 120 acres of land in Yarmouth prior to its replacement program, the Community Preservation Act, in 2005.

The Community Preservation Act (CPA) was adopted by the Town of Yarmouth in January 2005. At that time, the Town also approved the withdrawal of funds from the Cape Cod Land Bank for the acquisition of land. In addition, the CPA allowed the Town to generate revenue from existing local property taxes (currently 3% property tax surcharge) and acquire State matching funds for projects that qualify for funding the under the following target areas:

- The acquisition, creation and preservation of open space.
- The acquisition, preservation, rehabilitation and restoration of historic resources.
- The acquisition, creation and preservation of land for recreational use.
- The creation, preservation and support of community housing.
- The rehabilitation and restoration of open space, land for recreational use and community housing that is acquired or created using monies from the CPA fund.

Table 5.4 lists the purchase of open space and recreation lands through the Land Bank/CPA programs.

**Table 5.4 - Land Bank/CPA Open Space Acquisitions**

<b>Name</b>	<b>Map</b>	<b>Lot</b>	<b>Management</b>	<b>Funds*</b>	<b>Acres</b>	<b>Date Acq.</b>
Connecticut Avenue	16	30; 34	Selectmen	LB	1.15	1/11/2000
Englewood Beach	16	56.1	Recreation	LB/CPA	0.29	10/5/2005
86 Gleason Avenue	29	65	Selectmen	LB	0.49	11/27/2001
90 Gleason Avenue	29	66	Selectmen	LB	0.68	11/27/2001
96 Gleason Avenue	29	67	Selectmen	LB	0.60	11/27/2001
25 Prince Road	29	92	Selectmen	LB	0.42	4/11/2000
261 Route 28, WY (Rascals)	37	61	Selectmen	LB	2.59	4/13/1999
1377 Bridge Street, SY	61	78	Selectmen	LB	0.28	4/13/1999
311 Old Main Street	61	84	Selectmen	LB	0.53	4/11/2000
Old Town House Road & Industrial Park Road	74	9	Selectmen	LB	0.33	4/13/2004
Old Town House Road & Industrial Park Road	74	14	Selectmen	LB	3.16	4/13/2004
Off Willow Street (Future Rail Trail)	83	3	Selectmen	CPA	2.48	9/13/2006
Off Willow Street	83	6	Selectmen	LB	4.62	1/11/2000
Old Hyannis Road	94	4	Selectmen	LB	2.30	4/13/2004
Old Town House Road, East	100	10	Selectmen	LB	5.47	1/11/2000
Laban Lane	100	11	Selectmen	LB	3.52	1/11/2000
South Sandyside Lane and 250 Summer Street	103	30.1.1	Selectmen	LB	16.22	3/8/2004
Union Street	106	84.1	Selectmen	LB	24.67	2/6/2001
Union Street	106	122	Selectmen	LB	1.00	N/A
Off Great Western Rd	108	33	Selectmen	LB	2.93	4/11/2000
Off Great Western Rd	108	37	Selectmen	LB	2.16	4/11/2000
Knob Hill Road	110	19.2	Cons Com	LB	13.76	4/9/2002
South Sandyside Lane, Dennis Pond	112	73; 75; 76; & 71.1.1	Cons Com	LB	8.58	4/8/2003
South Sandyside Lane, Dennis Pond	112	74	Cons Com	LB	2.69	4/13/2004
Weir Road	116	56	Selectmen	LB	1.90	4/13/2004
Weir Road (262 & 270)	117	1.2, 1.3	Selectmen	LB	7.05	2/6/2001
Thacher Shore Rd	122	69	Selectmen	LB	4.25	4/11/2000
280 White Rock Road	123	153.1	Selectmen	LB	17.65	4/11/2000
Pheasant Cove Circle (Chase Garden Creek)	149	44	Cons Com	CPA	0.38	4/10/2007
Pheasant Cove Circle (Chase Garden Creek)	149	46	Selectmen	LB	0.39	1/11/2000
Pheasant Cove Circle (Chase Garden Creek)	149	49	Cons Com	LB	3.60	1/11/2001
8 Windswept Path (Chase Garden Creek)	149	10	Selectmen	LB	0.29	11/27/2001
Hockanom Road	150	34	Selectmen	LB	3.00	1/11/2000
30 Windswept Path (Chase Garden Creek)	154	1	Selectmen	LB	0.59	4/9/2002
281 Route 28 (1750 House)	38	1	Cons Com	CPA	1.73	4/10/2007
103 Pheasant Cove Circle	149	44	Selectmen	CPA	0.38	4/11/2007
86 Alms House Road	140	41	Y. Cons Trust	CPA	7.06	5/4/2010
14 South Sandyside Lane	112	72	Cons Com	CPA	2.76	4/10/2007
<b>TOTAL ACREAGE</b>					<b>151.95</b>	

The following is a brief description of the different parcels that make up the Town's most popular Town conservation and recreation areas, in terms of frequent use, and/or habitat value.

### *Sandy Pond Recreation Area*

Overview: This is one of the most popular and well-used recreation areas in town. The recreation area and playing fields are located upland of Little Sandy Pond, one of Yarmouth's freshwater ponds.

Acreage: Approx. 69.3 acres.

Access: Access and parking for the ball fields is available opposite of the Park Department Building on Buck Island Road.

Uses: Softball field, soccer/utility field, tennis courts, basketball courts, playground, restrooms, picnic area, hiking/walking trails, and access to freshwater pond with small beach.

#### Recreational

Potential: High potential for active and passive recreation.

### *Flax Pond Recreation Area*

Overview: Another one of Yarmouth's most popular and well-used recreation areas. The recreation area and playing field are located north of Flax Pond, one of Yarmouth's freshwater ponds. This recreation area is handicapped accessible. Recent upgrades include relocating the entrance off Dupont Avenue, construction of a 120+ space parking area, gazebo, changing rooms, and upgrade to Flax Lodge to include restrooms and septic system to promote year-round use.

Acreage: Approx. 16.8 acres.

Access: Access and parking is available off of Dupont Avenue.

Uses: Volleyball court, basketball court, picnic area, restrooms, hiking/walking trails, access to freshwater pond and beach, and gazebo.

#### Recreational

Potential: High potential for active and passive recreation.

### *Bass Hole Beach/Recreation Area*

Overview: One of Yarmouth Port's most beautiful areas is Bass Hole. The Bass Hole Boardwalk extends over long stretches of salt marsh, vegetated wetlands, and upland woods towards the 2½-mile Callery-Darling nature trails. Gray's Beach is located within this area. At the end of the boardwalk, benches provide a place to rest and look out over the salt marsh and the sandy shores of Dennis' Chapin Beach. At low tide you can walk out on the flats for almost a mile.

Acreage: Approx. 8.63 acres.

Access: Access and parking for the recreation area and beach is available off of Center Street.

Uses: Salt water beach, walking trail/boardwalk, gazebo, picnic area, and restrooms.

Recreational

Potential: High potential for passive recreation.

***Bass River Beach (Smugglers)***

Overview: One of Yarmouth most beautiful beaches along Nantucket Sound at the mouth of the Bass River. With the large deck with sitting areas and handicap access to the beach, the fishing pier, and the boat launch, there are a wide array of recreational opportunities in addition to enjoyment of the beach.

Acreage: Approx. 10.65 acres.

Access: Access and a large parking area for the beach and for the boat launch are available off of South Shore Drive.

Uses: Salt water beach, bathhouse, mobile food concession, boat ramp, fishing deck, and restrooms.

Recreational

Potential: High potential for active recreation.

***Taylor Bray Farm***

Overview: Taylor-Bray Farm, listed on the National Register of Historic Places, is located in Yarmouth Port. The farm was originally owned and settled by Richard Taylor in 1639 and was sustained as a prosperous working farm until 1941, primarily by the Taylor and then Bray families.

Acreage: Approx. 22 acres.

Access: Access and parking for the farm is available at 108 Bray Farm Road North.

Uses: Picnic area, woodland walking trails, working farm, community garden, and educational programs for elementary school children. The restored farmhouse is open to the public at certain times of the year and farm events are sponsored by the Taylor-Bray Farm Preservation Association and the Yarmouth Historical Commission.

Recreational

Potential: High potential for active and passive recreation.

*Peter Homer Park*

Overview: The Recreation Division redeveloped approximately 15 acres at the east end of the closed town landfill into a major recreational facility called Old Town House Road Park (Peter Homer Park). In 1997, the State approved \$1,000,000 in reimbursement from the Urban Self Help Program to match a local sum approved by Town Meeting. Its heavy use has proven its popularity since opening in 1999. In 1999 the Massachusetts Recreation and Park Association presented Yarmouth with its "Design of Facility" Excellence Award for this park.

Acreage: Approx. 15 acres.

Access: Access and parking is available off Old Town House Road near Forest Road.

Uses: The park has two soccer fields and two ball fields with lights and irrigation, a volleyball court, tot lot, picnic area, two basketball courts, shuffleboard/horseshoe, and walking trails. A bike trail extends through the length of the park as well, which is proposed to be improved and become part of the Cape Cod Rail Trail.

Recreational

Potential: High potential for active recreation.

### 5.2.2 Public Recreation Areas

The Recreation Division was created in 1979 and governs 212 acres of parks, 143 Town beaches, and more than 40 annual programs serving both youth and adults. Over the past twenty years the Division has grown to twelve full-time staff and 140+ seasonal staff. During this time, the Town acquired and/or developed the Flax Pond Recreation Area, the Sandy Pond Recreation Area, Old Town House Park (Peter Homer Park) and the Sailing Center.

According to the Town Recreation Division, there are approximately 20.5 playing fields in town, most owned by the Dennis-Yarmouth School District, but available for Town recreational use. Table 5.5 lists the Town's recreation lands.

**Table 5.5 - Town of Yarmouth Recreation Lands**

Parcel	Map/Lot	Management	Current Use	Recreation Potential	Degree of Protection	Acres
Summer St.	104.2	Conservation & Recreation	E. portion of Dennis Pond Cons. Area	Passive	Permanent (Ch 40 8C)	19.83
110 Weir Rd.	116.35	Conservation & Recreation	Open Space Bog	Passive	Permanent (Ch 40 8C)	7.25
W. Great Western Rd.	108.14	Conservation & Recreation	Large gravel pit area	Passive	Protected (basic level)	216.31
off North Main St.	100.1	Public Works	Flax Pond Recreation Area (Portion)	Active	Conservation Restriction	16.8
16 New Hampshire Ave	16.55	Public Works	Englewood Beach & Parking	Active	Permanent (Ch 40 8C)	0.82
26 New Hampshire Ave	16.56.1	Recreation	Sailing Center	Active	Protected (basic level)	0.79
Sea Gull Beach Rd.	15.23	Public Works	Sea Gull Beach	Active	Protected (basic level)	34.4
Bayview & Windmill	20.55	Public Works	Bayview Beach/Parking	Active	Protected (basic level)	0.16
Standish Way	21.49	Public Works	Colonial Acres Beach	Passive	Protected (basic level)	3.65
Standish Way	21.50	Public Works	Parking	Active	Protected (basic level)	0.23
Ocean Ave.	25.124	Public Works	Vacant	Passive	Protected (basic level)	5.54
Pine Grove Rd.	25.264	Public Works	Park	Passive	Protected (basic level)	1.96
Pine Grove Rd.	25.265	Public Works	Park	Passive	Protected (basic level)	3.26
Beachwood Rd.	25.287	Public Works	Ocean Beach	Passive	Protected (basic level)	1.18
Pine Grove Rd.	25.297	Public Works	Parkers River Beach/Parking	Active	Protected (basic level)	4.14
220 South Shore Dr	26.116	Public Works	Bass River Beach	Active	Protected (basic level)	10.65
265 South Shore Dr.	26.128	Public Works	South Middle Beach	Passive	Protected (basic level)	3
268 South Shore Dr.	26.88	Public Works	Parking	Active	Protected (basic level)	5.26

Parcel	Map/Lot	Management	Current Use	Recreation Potential	Degree of Protection	Acres
Route 28	37.8	Public Works	Baxter Mill Park	Passive	Protected (basic level)	
Reid Ave.	39.193	Public Works	Pocket Park/Reid Ave. Playground	Active	Protected (basic level)	0.84
482 Buck Island Rd.	46.24	Public Works	Sandy Pond Recreation Area	Active	Protected (basic level)	69.3
Meadowbrook Rd.	49.227	Public Works	Beach/Boardwalk	Passive	Protected (basic level)	0.43
W. Yarmouth Rd.	57.5	Public Works	Cranberry Bogs	Passive	Protected (basic level)	196
Long Pond Dr.	59.111	Public Works	Herring Run Box Park	Active	Protected (basic level)	0.09
Davis Rd	59.127	Public Works	Boat Ramp on Long Pond	Active	Protected (basic level)	0.22
Long Pond Dr.	59.43	Public Works	Herring Run Box Park	Passive	Protected (basic level)	0.13
Autumn Drive	59.63	Public Works	Grassi Park	Passive	Protected (basic level)	1.31
7 North Main St.	61.29	Public Works	Anniversary Park	Passive	Protected (basic level)	0.09
Indian Memorial Dr.	69.15	Public Works	Wings Grove Park/Parking/Beach	Active	Protected (basic level)	4.16
Indian Memorial Dr.	69.5	Public Works	Park/Gazebo	Passive	Protected (basic level)	0.58
Capt. Small Rd.	78.139	Public Works	Pocket Park in Captain's Village	Passive	Protected (basic level)	0.67
Capt. Nickerson Rd.	78.42	Public Works	Road Plantings	Passive	Protected (basic level)	0.23
635 W. Yarmouth Rd.	86.1	Public Works	Bayberry Hills Golf Course	Active	Protected (basic level)	0.94
Christmas Way	88.11	Public Works	N. of DY High	No	Protected (basic level)	0.28
Elisha Pond Rd.	106.38	Public Works	open space, vacant land	Passive	Protected (basic level)	8.3
Summer St.	113.34	Public Works	Vacant	Passive	Protected (basic level)	0.45
Route 6A	124.38	Public Works	Yarmouth Port Playground	Active	Protected (basic level)	1.39
440 Highbank Rd.	102.8.1	Public Works	Wilbur Park	Active	Protected (basic level)	2.45
Wharf Lane	130.3.2	Public Works	Mill Creek Boat Lunching	Active	Protected (basic level)	1.2
Center St.	148.5.2	Public Works	Bass Hole Parking/Boardwalk	Passive	Protected (basic level)	8.63
11 Tanglewood Rd.	30.95	Public Works	Drainage	Passive	Protected (basic level)	0.35
105 Summer St.	113.36	Public Works	Dennis Pond	Active	Protected (basic level)	0.35
107 Summer St.	113.37	Public Works	Dennis Pond Beach	Passive	Protected (basic level)	0.51
					<b>TOTAL:</b>	<b>634.13</b>

The most frequented Town recreation areas, beyond the saltwater beaches and playgrounds, are Taylor Bray Farm, the Senior Center, Peter Homer Park, Wilbur Park, and the beaches, fields, and trails at Flax Pond and Little Sandy Pond. The athletic fields and tennis courts at the D-Y High School were also heavily visited. South Yarmouth has the most active recreation facilities, primarily at the schools and Flax Pond, which are within walking distance of the majority of the village's homes.

The Town of Yarmouth owns a 2~~1~~<sup>2</sup> acre parcel of land along Route 28 west of the Parkers River, known as the former drive-in property. The site had originally been earmarked for a marine park, which included a marina basin, a boat barn (dry rack storage), a public boat ramp, a marine science education center, an operations/harbormaster facility, a marine waste disposal pump out, ~~and~~ a fueling facility, and walking trails. In 2013, the Town reviewed the financial feasibility of the marine park project and determined that it was no longer financially viable. The Town is now actively looking at other development options for this property, which may include open space and recreation opportunities.

### 5.2.3 Conservation Areas

The Town of Yarmouth currently owns approximately 1800 acres of conservation land that are protected under Article 97 by the Conservation Commission for conservation purposes. To help maintain and manage the 1800 acres of Conservation land, the Town has relied upon the on-going efforts and relationships of several civic organizations groups, including boy/girl scouts, AmeriCorps and Senior Environmental Corp. These relationships are prime examples of how to manage Conservation properties through the use of civic organizations that incorporate environmental stewardship, conservation science and natural resource management. A number of the most popular conservation areas were noted above, however, there are ~~a number several of~~ other conservation areas that have improved site conditions from these public/private partnerships; ~~perhaps not as well known to residents~~ The following list provides an update to those Conservation Areas:- as follows:

- **Meadowbrook Road Conservation Area:** This is a very unique conservation area, which consists of a long boardwalk over an extensive brackish water wetland, leading to Swan Pond. At the head of the boardwalk is a bench and rest area. Vegetation in the area includes cattails, bayberries, ferns, blueberry bushes, and a variety of wildflowers. Red maple and red cedar trees can be found in the area.

#### Recent Improvements to Meadowbrook Conservation Area:

In 2012, Ggrant funds provided by the Barnstable County Land Management Grant Program from the Barnstable County Land Grant program were used to restore the salt marsh by removing invasive species and repairing the planks and viewing platform at the end of the boardwalk. The project was a success and as a result, native vegetation has begun to restore the saltmarsh and an increase in visitors to the ~~c~~Conservation aArea has been reported. In additions, an Eagle Scout project is anticipated to be completed which will include the installation of a kiosk at the entrance to the boardwalk.

- **Horse Pond Conservation Area:** The Horse Pond Conservation Area is located on Higgins Crowell Road in West Yarmouth, near the Mattacheese Middle School. The area contains approximately 5,073 linear feet of trail, much of which skirts Horse Pond. The area primarily consists of dry, sandy soils that include a “mixed” community of oak and pine trees, and several plant species. Most of the vegetation consists of huckleberry and sweet fern (a woody plant with fern-like leaves found in well-drained, sandy soils). There is, however, a wetter forest floor within the conservation area where white oaks can be found, various mushrooms, and low ground cover, hidden from sunlight. Sassafras, greenbrier, and sweet pepperbush can also be found in this area.

*Recent Improvements to Horse Pond Conservation Area:*

~~-In 2013, a~~ kiosk and interruptive self-guided nature trail were installed at the entrance of the Conservation Area with the assistance of high school carpentry senior. The Conservation Area now offers key points of interest along the trail. In addition, an Eagle Scout service project was conducted onsite and resulted in improving the existing trail system, installing trail markers and constructing several benches at different lookout spots along the trail.

- **Callery-Darling Conservation Area:** This conservation area is located to the north of Route 6A in Yarmouth Port stretching from Homers Dock Road on the east to salt marshes west of Center Street. Parking is available at several locations providing access to a 2.4 mile trail system. This area is unique in its great diversity of ecological communities and various stages of vegetational succession. Both salt marsh and fresh water wetlands are located in the area. Large water birds such as Great Blue Heron, Marsh Hawk, Herring Gull, and a variety of ducks are found in the wetland areas, as well as more woodland species such as Ruffed Grouse, Ring-necked Pheasant and Common Quail. There is also a wide variety of wildlife habitat due to the diversity of the vegetation and topography.

*Recent Improvements to Callery- Darling Conservation Area:*

The Town ~~recently~~ completed a salt marsh restoration project within the Callery-Darling Conservation Area, titled the Bass Creek Salt Marsh Restoration Project. The project included a review of existing data (wetlands, property lines and parcels, topography, culvert details, and any low lying structures), the identification and delineation of coastal wetland resource areas, monitoring of tidal elevation, a hydrologic assessment to evaluate alternatives for improving tidal exchange, and the design and construction of appropriate restoration structures. The existing culvert was found to reduce tidal exchange to the salt marsh; therefore, it was removed and replaced with a timber-span walking boardwalk (35 feet in width), which also serves conservation purposes.

~~-In 2013, an~~ Eagle Scout service project was conducted on site that improved trail maintenance in the form of pruning and limb removal, replacing areas of the walkway, as well as extending and elevating the paths. These efforts have made the trails far more accessible and safer for residents to enjoy. ~~This service project was a prime example of environmental stewardship, conservation science, and natural resource management.~~

The Town began implementing an invasive species management program at the Callery Darling Conservation Area. The Town successfully received funding support provided by Community Preservation Grant and the Barnstable County Land Management Grant Program. The funding helped control invasive species and in return, promoted native vegetation, enhanced wildlife habitat and continued to restore the health of the Conservation Area. In addition, AmeriCorps has been utilized several times to help maintain the trail systems and remove invasive species.

- **Dennis Pond Conservation Area:** This conservation area can be assessed on Willow Street in Yarmouth Port where parking is available. The area includes a 3,285 linear feet walking trail that winds its way along a variety of woodland communities. One of the larger open woodland areas includes mixed oak and pine trees, leading to an old cranberry bog. As the bog dried out over time, red maple began growing in the bog. The dominant underbrush along the trail sides is sweet pepperbush. Numerous beech trees can be found on the high ridge on the north side of the pond. The conservation area is one of the town's most popular areas utilized for swimming, fishing, hiking, and nature-watching.

*Recent Improvements Dennis Pond Conservation Area:*

In 2012, †The Division of Fisheries & Wildlife Natural Heritage and Endangered Species Program confirmed the location of a vernal pool at Dennis Pond Conservation Area. This documents the presence of amphibian breeding habitat. ; which is the only certified vernal pool in Yarmouth.

- **Crab Creek Conservation Area:** This conservation area is located on North Dennis Road in Yarmouth Port. Trails wind along the shore of Crab Creek which connects Mill Pond to Follins Pond and eventually to the Bass River. The area is not only a good site for fishing, but has long been a favorite of crabbing enthusiasts with its abundance of blue crabs. The Crab Creek Conservation Area also supports a variety of vegetation with an old bog to the north of the trail. Some of the predominant species include red maple, blueberry, greenbriar, cranberry and pitch pine.

*Recent Improvements to Crab Creek Conservation Area:*

An Eagle Scout service project helped improve trail accessibility by removing limbs and invasive species on an existing trail. Also, a new crabbing observation platform was constructed. The platform helped eliminate the use of an eroding spot on the bank of Crab Creek. Since the construction of the new observation platform, many visitors frequently use it, minimizing potential adverse impacts to the bank.

- **Bud Carter Conservation Area:** This conservation area is located in Yarmouth Port with access points on North Dennis Road and West Great Western Road. The trail is situated on what is known as the Sandwich Moraine, a significant glacial feature left over from the last ice age of 20,000 years ago. The highest point in Yarmouth occurs within this area and it boasts two scenic vistas including a cranberry bog and views to the north and west. In addition, many side trails and loops occur within this 300 acre land tract.

*Recent Improvements to Bud Carter Conservation Area:*

AmeriCorps has worked alongside Town Staff maintaining the existing trail system, improving site access and removing invasive species. In addition, trail markers have been added to the site.

## SECTION 6 COMMUNITY GOALS

### 6.1 Description of Process and Results

A stakeholder and public participation campaign was conducted to solicit public input on the Open Space and Recreation Plan. This process was completed under the guidance of the Open Space and Recreation Project Team (OSRP Team), made up of the following Town Staff members:

- Kerry Muldoon, Conservation Administrator
- Kathy Williams, Town Planner
- Karl vonHone, Department of Natural Resources Director
- Karen Greene, Department of Community Development Director
- Pat Armstrong, Parks & Recreation Director
- Rob Angell, Interim Department of Public Works Director
- Austin Cahill, Economic Development Planner

The OSRP Team met several times throughout the course of the project and provided valuable information in the development of this plan due to their institutional knowledge and expertise in a wide range of fields.

Initial public input was solicited through an Open Space & Recreation Survey conducted in April of 2015. The survey was developed by Town Staff to find out the preferences of the residents of Yarmouth regarding conservation, recreation and open space in their town. The survey included a series of multiple choice questions and asked residents to rate each question accordingly and indicate any improvements they felt were needed. The survey was published on the Town website and distributed to a variety of Town Committees and Boards. Hard copies were also available at Town Hall, the two Town Libraries, the Senior Center and the Parks & Recreation Department. The survey results are included in Appendix D.

Utilizing information from the Town Staff and the survey results, a Draft 2015 Open Space and Recreation Plan was developed. Draft copies of the Plan were available for viewing and downloading on the Town website. Hard copies of the Draft Plan were made available to the public at the Conservation and Planning Offices at Town Hall. Public meetings were held with the Planning Board on June 3, 2015 and the Conservation Commission on June 4, 2015. Members of the Open Space Committee and the Recreation Commission were also invited to the ~~Planning Board~~these Public Meeting to solicit their input. The purpose of the meetings was to discuss the Draft 2015 Open Space and Recreation Plan and obtain input on the community's open space and recreation goals and incorporate comments into the final plan. The Town Staff provided a presentation describing the plan purpose, summarized the survey results, outlined the environmental resources and challenges, identified the currently available open space and recreational facilities, outlined past community goals, and garnered input on current goals.

The Planning Board and Conservation Commission meetings were publicized in the ~~Yarmouth Register~~ newspaper through a press release, included as a “news” item on the Town website, posted on Channel 18, noticed in the Library Newsletter and the Parks & Recreation Newsletter, and properly posted at Town Hall and on the Town’s website. ~~Notice of the meetings was also~~

provided to ~~local civic groups and~~ the Yarmouth Chamber of Commerce. In addition, a legal notice was advertised in the Yarmouth Register Newspaper to announce the Conservation Commission will be reviewing the 2015 draft Open Space and Recreation Plan at the June 4, 2015 meeting. –Input was also solicited from the Yarmouth Board of Selectmen at their June 9, 2015 and June 23, 2015 public meetings. Lastly, the draft OSRP was submitted to the Cape Cod Commission (CCC) for their input. Comments from all the public meetings and the CCC have been incorporated in this Plan.

## 6.2 Statement of Community Open Space and Recreation Goals

### Previous Open Space and Recreation Goals:

The primary goals presented by the community in 2007 were to preserve natural features and recreational opportunities. Specific objectives to achieve this goal included:

- Education and awareness of recreational offerings;
- Provide greenways as well as pocket parks in more densely developed areas;
- Additional bike trails (in planning), community center, and non-sporting programs for children; and
- Land acquisition for additional open space.

The following key elements were also learned:

- The most highly regarded open space and recreational areas were Bass River conservation & recreation areas: Bass River Beach, Bass Hole/Gray's Beach and the Bass Hole Boardwalk; Peter Homer Park (Old Town House Park), Yarmouth's Golf Courses, the Town Libraries, and the Senior Center;
- More than half of the town's residents would support tax dollars being used to develop more recreation areas;
- Most residents own a dog and would welcome a pet-friendly recreation areas;
- Most residents support the preservation and/or rehabilitation of historic resources such as Taylor Bray Farm;
- Continue efforts to protect open spaces and recreation areas;
- Establish the management of conflicting uses such as the use of recreational vehicles on conservation areas. However, it was noted the Town was doing a good job in managing existing conservation and recreation areas, with limited exceptions;
- Continue to expand open space and recreation areas in Town, increase habitat protection, provide additional recreational opportunities, ~~and~~ increase public awareness and continue management of beaches and additional bike trails;
- Importance of protecting drinking water resources through the protection of open spaces and natural areas and to consider acquiring strategically located parcels that would be important to protect drinking water resources. The Town should work hard to guide

growth away from these areas to existing developed centers through regulatory or other measures;

- The ability to provide pocket parks and a dog park are important in order to satisfy the needs of all residents;

#### Updated Open Space and Recreation Goals:

In order to update the Open Space and Recreation Goals, another survey was distributed in 2015. At the time of the survey, out of 101 responses, more than 60% indicated they were working full time residents and most respondents considered Yarmouth to be a town in transition.

- More than half of the respondents would like to see development patterns that redevelop blighted properties, provide adequate planning and conservation resources to direct development to appropriate areas, and provide for adequate review of development proposals.
- Almost all of the respondents (90%) would vote for town-supported land acquisitions to preserve open space in Yarmouth.
- Most of the respondents (76%) would support tax dollars being used for maintaining open space and conservation properties.
- More than half of the respondents would support tax dollars being used for preservation of land for water well protection, preservation of land for plant and wildlife habitat and preservation of land for environmental resources.
- The most frequently visited Open Space and Recreation Areas were as follows: Bass River Beach (Smugglers), Bass Hole/Gray's Beach, Seagull Beach, Parkers River Beach, Dennis Yarmouth High School recreational facilities, Flax Pond Recreation Area, Taylor Bray Farm, and the Senior Center. Crab Creek Conservation Area and the Dennis Pond Conservation Area were the most visited conservation areas.
- The least frequently visited Open Space and Recreation Area were as follows: Butler Avenue Playground, Marguerite E Small Elementary School, Meadowbrook Conservation Area and Raymond J. Syrjala Conservation Area.
- The most desired new or expanded facilities included public access to fresh and salt water bodies and shorelines, biking lanes along roadways, multi-use pathways (biking/walking paths), Fitness Trails, conservation areas and kayak/canoe launches.
- The least desired new or expanded facilities included pocket parks and pickle ball courts (which were tied), paddle boards, and fields for lacrosse.
- Given the option to state their feelings about the Town Places and Facilities for the age groups of young adults, active seniors and mature seniors, most respondents answered neutral. Given the option of the age group of children, most respondents were satisfied.
- Given the option to state their feelings about the Town Programs for the age groups of children, young adults, active seniors and mature seniors, most respondents were satisfied.

Our community goals incorporate the concerns expressed by residents in the past as well as incorporating additional visions for the community from the latest survey. Yarmouth's challenge is to preserve the natural and recreational qualities that make it unique, while promoting these features appropriately to attract tourism and bolster the economy.

## SECTION 7 ANALYSIS OF NEEDS

The purpose of this section is to identify the overall open space and recreation needs of Yarmouth. Where information or analyses have not changed since the last Plan, summaries of those components have been provided in the needs assessment below.

### 7.1 Summary of Resource Protection Needs

Land acquisition efforts to increase open space, and proper management of conservation areas, ensuring the protection of environmentally sensitive areas (wetlands and groundwater resources) and promoting stewardship of these areas have been consistently identified as high priorities. In addition, growth management has been identified as a community need and a tool for achieving open space protection. A list of conservation needs, central to the community's program, is described in the following sections.

#### 7.1.1 Enforce Laws for Wetlands Protection

Yarmouth's Wetland Protection Regulations strengthens the minimum performance standards set forth in the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131, S.40). These include adding a 100-foot jurisdictional area around wetland resources, asserting jurisdiction over the first 300 feet of coastal and pond recharge areas, and prohibiting the destruction of salt marshes or bordering vegetated wetlands by not allowing wetland replication as mitigation for development. No main structure may be built within 50 feet of a wetland edge and a 35-foot vegetated upland buffer to wetlands must be maintained. The Wetland By-Law (Chapter 143) establishes a Non-Criminal fine procedure for violation of the regulations. The Wetlands Protection Act also includes specified enforcement provisions including fines and/or imprisonment.

The Town of Yarmouth has also adopted Stormwater Management Regulations in 2008. These regulations apply to construction activities disturbing more than 1 acre of land that drains to any Town of Yarmouth municipal storm sewer system (MS4) that is hydraulically connected to a wetland. Applicable projects are required to obtain a Stormwater Management Permit. The objectives of the regulations are to provide for adequate stormwater treatment, groundwater recharge, peak flow mitigation, construction waste management, erosion control and long term operation and maintenance of the stormwater systems.

Many municipalities across Massachusetts are struggling to fund the stormwater management program that is required to meet local needs and the requirements of the Clean Water Act mandated National Pollutant Discharge Elimination System (NPDES) Phase 2 Program, including Yarmouth.

The Town of Yarmouth Public Works Department is committed to reducing and managing stormwater runoff. The Town has installed, and continues to upgrade drainage facilities throughout the Town to protect adjacent wetlands and groundwater from stormwater pollutants. In order to keep Yarmouth's waterbodies and sole source aquifer safe from stormwater pollutants, stormwater management ~~should~~must continue to be a ~~top~~ priority.

The Town is currently taking a comprehensive approach to stormwater management, which has involved the following undertakings:

- The Town has been, and will continue to plan drainage improvements whenever there is an improvement project near a wetland.
- The Town is in the process of adopting new rules and regulations regarding construction site runoff and illicit discharges as required by EPAs NPDES Phase II Stormwater Requirements.
- The Town has an up-to-date Stormwater Management Plan as required by EPAs Phase II NPDES Stormwater Requirements.

The Town has been and will continue to aggressively ~~w~~seek grant funding for stormwater improvements. To date, the Town has received four Coastal Pollution Remediation grants, one Chapter 319 grant, and one Wetland Restoration Program grant.

- The Town has collaborated with the Association to Preserve Cape Cod Mass Bays Program and has been part of the Cape Cod Water Resources Restoration Project which targets stormwater projects to restore shellfish beds, restoration of impaired fish passages, and restoration of tidally-restricted salt marshes.

The above listed undertakings by Public Works outlines the numerous activities that the Department handles regarding the protection of wetlands and groundwater resources, and indicates resources and funding that are required to ensure these projects are implemented. In Yarmouth, stormwater management projects and services are budgeted, to some degree, into the annual fiscal budget, but often not at amounts sufficient to meet Town-wide needs. Programs to map the drainage system and track maintenance and repair for the drainage network are expensive and often get overshadowed in the budgeting process when competing with other services such as schools, fire and police. Additional services, such as addressing drainage obstructions, responding to public complaints, and responding to emergencies such as flooding are provided by Public Works Department, but not accounted for in the stormwater budget. ~~It is recommended that~~would be beneficial for the Town to establish a long-term funding mechanism to address stormwater management needs in the community.

### 7.1.2 Critical Areas in Need of Special Protection

As described in Section 4.7, the Town will need to address the nitrogen loading issues that are negatively impacting our estuaries and groundwater. The Draft Section 208 Plan developed by the Cape Cod Commission outlined various nitrogen reduction strategies including collection sewers and wastewater treatment, stormwater management strategies and fertilizer regulations. Once developed, management strategies endorsed by the Board of Selectmen should be made explicit in Town regulations (e.g., zoning, stormwater and fertilizer regulations).

The Dennis Pond Complex, as described in Section 4.3, is identified by NHESP as one of the most important coastal plain pondshore complexes in the State due to the abundance and diversity of rare species, and the location of the only certified vernal pool in Yarmouth. To protect this resource, the Town has acquired the vast majority of land around Dennis Pond. ~~The other large tract of undeveloped land in the area is Camp Greenough (Boy Scouts of America). The Town should pursue acquisition of this property should it no longer be used by the Boy~~

~~Scouts. Other recommended measures include requiring cluster development to retain meaningful open space.~~ The Town continues to direct applicants to the NHESP for developments which may impact rare and endangered species.

The Town has adopted new FEMA Flood Insurance Rate Maps that identify Special Flood Hazard Areas in Yarmouth, which became effective on July 16, 2014. With the new regulations, additional areas in Town have been brought under the jurisdiction of the Conservation Commission and more properties must comply with building code requirements for Flood Resistant Construction and Construction in Coastal Dunes (780 CMR 120.G). As such, this requires all departments to work closely together when reviewing applications. Town Staff has also begun documenting flood zone areas and any areas subject to excessive erosion.

The Town has also begun working on a Multi-Hazard Mitigation Plan which identifies policies and action plans that can be implemented over a period of time to help reduce a hazardous risk and minimize future losses in Town. The plan is being coordinated by the Cape Cod Commission.

### 7.1.3 Wildlife Corridors and Strategies for Their Protection

Although it appears that these Yarmouth's wildlife corridors may be preserved due to the land takings completed in the 1980s and present open space availability, future considerations that involve land acquisitions should examine the significance of wildlife routes. Fragmentation of wildlife and plant habitat should be minimized by the establishment of greenways and wildlife corridors of sufficient width to protect species that inhabit the interior areas, as well as by the protection of large unfragmented areas, and the use of open space or cluster development.

### 7.1.4 Managing Information for Future Acquisition

~~The overwhelming r~~Responses at public forums and to surveys distributed throughout the community demonstrates that open space acquisition is a ~~high~~ priority for the community. With the use of the municipal GIS, Town Departments can identify parcels and gather detailed Assessor's information with a much higher degree of detail and efficiency.

### 7.1.5 Proper Use and Policing

The Town would like to ensure that appropriate uses occur in conservation areas to ensure the protection of wildlife habitat, wildlife, open spaces and natural areas. Where use restrictions are already in place, these restrictions should be clearly posted and enforced through police action.

### 7.1.6 Property Integration

There are opportunities to augment the value of existing conserved lands by increasing the size of the conservation area. Undeveloped properties adjacent to these properties should be evaluated for acquisition or other means of protection from full development.

### 7.1.7 Capital Costs and Funding

Major expenses associated with management of open space areas include:

- Town dredging and shoreline nourishment
- Shoreline infrastructure inventory & repairs
- Aging infrastructure and structures
- Overall land maintenance (trail heads, trails, parking lots, boardwalks, etc)
- Invasive species management
- Dam maintenance and repairs
- Improving tidal flushing by modifying restrictions
- Improving fish ways

Sometimes these improvements can be performed using existing manpower and equipment from various Town Departments. However, work from various Town Departments is contingent upon operating budgets, available staff, season, and scheduling. The Town's Capital Budget Committee should consider funding for improving town lands and facilities, particularly in areas of conservation interest. Outside sources of funding for these types of improvements should be explored, through applicable county, state or federal funding sources, such as Urban Self Help, Community Preservation Act or private fundraising.

## 7.2 Summary of Community's Needs

The following community-based needs are related to open space planning due to their potential impacts on open space land or availability.

### 7.2.1 Recreational Needs

According to the Massachusetts *Statewide Comprehensive Outdoor Recreation Plan (SCORP)*, Massachusetts communities are in need of recreation areas for swimming, and trail-based activities such as walking and biking. They are also in need of additional playground areas. On the Cape and Islands specifically, the SCORP indicated that new playground areas were the most highly sought after recreation need, with tennis and golfing facilities as a close secondary need. Yarmouth is in need of some of these facilities as well.

As discussed in Section 3 of this Plan, Yarmouth has a significant number of older residents and fewer young families. Therefore, it is in the Town's interest to focus attention on increasing and/or enhancing recreational opportunities for its aging population, as well as for children under age 17 to encourage young families to live in Yarmouth. Planning for the outdoor needs of elders need not be complicated or expensive. Items as simple as incorporating benches to stop and rest along a hiking trail would be useful. Benches, firm footing, safe parking access are simple, yet important, design considerations. Parks and playgrounds for elementary-aged school children are a necessity in addition to walking and biking areas for slightly older children of this age group. The Town has recently completed the Route 6A playground at the corner of Route 6A and Playground Lane to provide for a neighborhood park in this area. The Town is also continuing planning on the extension of the Cape Cod Rail Trail which will provide a valuable shared-use pathway that can be used by all ages.

An important consideration when assessing Yarmouth's recreational opportunities is to determine whether these opportunities are meeting the demands of Yarmouth's disabled population. The Americans with Disabilities Act (ADA) is a wide-ranging piece of legislation intended to make American society more accessible to people with disabilities. For facilities to become ADA-compliant, certain specifications must be met, such as the inclusion of hand rails, ramps and handicapped accessible bathrooms. In the State of Massachusetts, these requirements are spelled out in 521 CMR - Architectural Access Board (AAB).

Town-owned recreational properties within Yarmouth were inventoried to determine whether they are ADA-compliant. It was found that none of these facilities are fully ADA-compliant with regard to parking and ramps, and most lacked site access, stairs, and door requirements as well. Many specifications, such as restroom requirements, did not apply to these outdoor recreation facilities. Table 7.1 summarizes specific improvements that the Town of Yarmouth hopes to make in order for the Town-owned recreational properties listed above to become ADA-compliant.

**Table 7.1. ADA Transition Plan**

<b>Recreational Facility</b>	<b>Responsible Party</b> (In cooperation w/ the Disabilities Commission)
Callery-Darling Conservation Area	Conservation/DPW
<ul style="list-style-type: none"> <li>• Handrails needed along trail header, wherever applicable.</li> </ul>	
<ul style="list-style-type: none"> <li>• Visually impaired signage at trail header.</li> <li>• Improvements to access area where possible (e.g., packed surface, parking).</li> </ul>	
Parkers River Beach	Conservation/Recreation/DPW
<ul style="list-style-type: none"> <li>• Stair tread widening possible when maintenance occurs.</li> </ul>	
Bass Hole/Greys Beach	Conservation/Recreation/DPW
<ul style="list-style-type: none"> <li>• Handrails, wherever applicable.</li> <li>• Visually impaired signage at needed.</li> </ul>	
	Conservation/Recreation/DPW
<ul style="list-style-type: none"> <li>• Improvements to picnic area necessary (e.g., table knee space and clearing).</li> <li>• Addition of fastened mats at facility entrances.</li> </ul>	
Sandy Pond Recreation Area	Recreation/DPW
<ul style="list-style-type: none"> <li>• Visually impaired signage needed.</li> </ul>	
<ul style="list-style-type: none"> <li>• Parking improvements necessary (e.g., handicapped-accessible space closest to facilities or drop-off area, signage, and van space).</li> </ul>	
<ul style="list-style-type: none"> <li>• Improvements to site path of travel needed (e.g., leveling of pathway).</li> </ul>	
<ul style="list-style-type: none"> <li>• Restroom turning space and clear floor space needed, and pipe insulation cover.</li> </ul>	
<ul style="list-style-type: none"> <li>• Improvements to picnic area necessary (e.g., table knee space and clearing).</li> </ul>	

Recreational Facility	Responsible Party (In cooperation w/ the Disabilities Commission)
Flax Pond Recreation Area	Recreation/DPW
<ul style="list-style-type: none"> <li>• Visually impaired signage needed.</li> </ul>	
<ul style="list-style-type: none"> <li>• <del>Addition of handrail, ramps, and door improvements at facility entrances (see inventory sheet for details), when possible.</del></li> </ul>	
<ul style="list-style-type: none"> <li>• If possible, widening of play area equipment <u>access</u> for wheelchairs.</li> </ul>	
<ul style="list-style-type: none"> <li>• <del>Addition of handicapped-accessible signage in parking area.</del></li> </ul>	
<ul style="list-style-type: none"> <li>• <del>Improvements to site path of travel needed (e.g., leveling of pathway).</del></li> </ul>	
<ul style="list-style-type: none"> <li>• <del>Improvements to picnic area necessary (e.g., table knee space and clearing).</del></li> </ul>	

Some of the ADA deficiencies identified in the 2007 OSRP for Flax Pond Recreation Area have been addressed. These include handicap accessibility to the lodge and the new restrooms, additional handicapped parking signage, improvements to the site pathways and a wheelchair accessible picnic table.

### 7.2.2 Future Land Use Needs

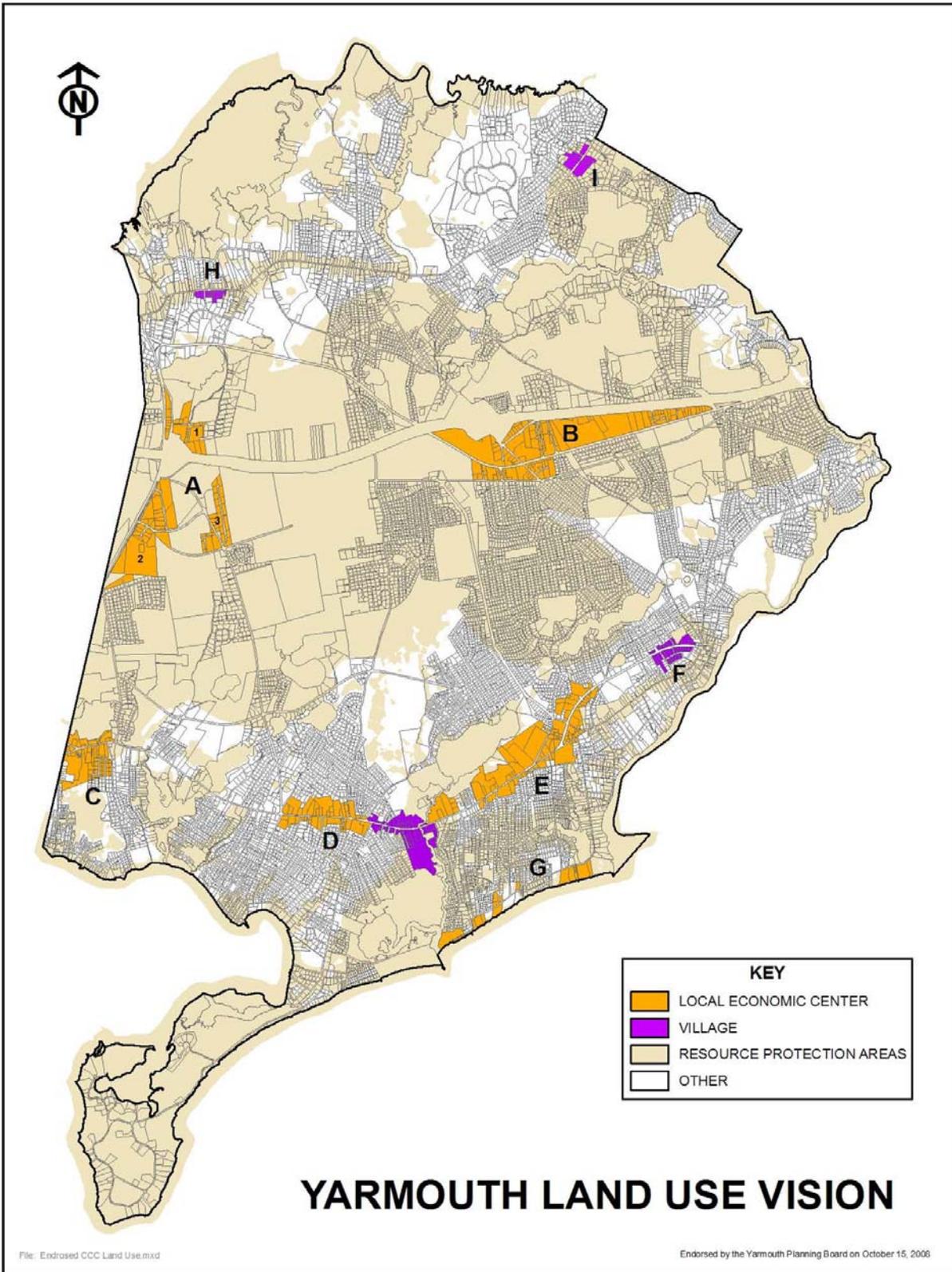
As discussed in Section 3.4, residential housing, including senior housing and affordable housing, are future land use needs, whereas substantial growth of the retail and office industries are not anticipated at this time. Yarmouth has approximately 700 acres of privately owned, undeveloped, potentially buildable land. These factors will increase competition between development and land conservation interests, unless the existing housing stock is refurbished, and infill and redevelopment possibilities are explored. The Town should continue to use zoning initiatives and affordable housing subsidies to minimize development impacts, while increasing residential and commercial capacity.

### 7.2.3 Managing Growth/Areas in Need of Revitalization or Redevelopment

The Yarmouth Land Use Vision plan shown in Map 6 identifies areas as Local Economic Centers and Villages, which areas identified as suitable locations for growth and redevelopment. The intent is to channel development into these centers to create conveniently located, easily accessible centers and reduce further development in outlying areas. As most of these areas area already fully developed, growth would be directed to vacant spaces in existing centers (in-fill projects), or would be a redevelopment project which would replace or revitalize existing buildings and site designs.

Since the 2007 OSRP was developed, the Town adopted in 2012 the Village Centers Overlay District (VCOD) (see Map 1). This Zoning Bylaw created four distinct Villages along Route 28:

Map 6 – Yarmouth Land Use Vision Map



- **Village Center 1:** Enhances the character of Parker’s River, promotes public recreational activities and creates a mix of uses in a village setting.
- **Village Center 2:** Residential uses with a mix of compatible, smaller commercial uses that encourage people to live, work and shop in the area.
- **Village Center 3:** Creates opportunities for year-round family-oriented activities that are appealing to residents and visitors, and which will create jobs for local residents.
- **Village Center 4:** Primarily commercial, with uses that support year-round residents.

The VCOD Bylaw provides for various incentives for land owners and developers to invest in and beautify this segment of Route 28 to promote year round tourism and improve Yarmouth’s economy. In exchange for these incentives, mandatory building and site design standards must be met.

Development via the use of the Town’s Revitalization Overlay Architectural District (ROAD) Bylaw has increased in recent years. This bylaw allows for zoning flexibility in the design of commercially zoned parcels south of Route 6 that have economic benefits and adhere to specific design requirements. Zoning Bylaw Section 404 – Motel Bylaw has also been utilized to redevelop motel properties into residential housing, promoting redevelopment of existing parcels for residential housing rather than green field development.

The Town should ~~continue to investigate other village centers, expand~~ consider easing regulatory requirements to encourage the use of cluster developments and promote redevelopment over green field development through zoning initiatives.

### 7.2.5 Access to and Awareness of Conservation Lands

The previous Open Space and Recreation Plan identified several conservation areas that had not reached their full use potential because of inadequate access. Poor access can refer to physical barriers such as locked gates, inadequate parking or where a conservation area would otherwise offer recreational opportunities for people with disabilities. Poor access, however, may also refer to barriers in public awareness. For example, if residents or visitors are not aware of the location of parking and access points to conservation lands or ways to water, these areas will not realize their full value to the community. Similarly, if trails are not marked or mapped, residents will not be aware of where they expect to take walks through forested areas. Where appropriate, awareness of conservation areas should be fostered through the use of signs and trail markers. To foster use of conservation lands, the Town should:

- Continue to use the Town website to disseminate information on trails and trailhead parking areas.
- Update and post on-line a map of all ways-to-water, including legal parking locations.
- Investigate the potential for expanding trailhead and ways-to-water parking areas, and
- Explore funding opportunities for additional trail and kiosk signage.

### **7.3 Management Needs, Potential Changes of Use**

#### **7.3.1 Use of Conservation Lands**

Daily maintenance of conservation areas falls to the Town Natural Resources Department, with policy guidance from the Conservation Commission. The lack of available staff to act as stewards for the large number of town-owned properties has become an issue. Restoration of funding for conservation land management will allow for the necessary increase in staffing to better maintain conservation lands.

#### **7.3.2 Coordination of Town Staff**

Town Staff should continue to coordinate efforts related to maintenance and preservation of open space and recreation areas to maximize available resources. Conservation, Natural Resources, Department of Public Works and Parks and Recreation are all vital contributors to the maintenance of our conservation and recreational areas. During the recent winter damage to the Bass Hole Boardwalk, the Natural Resources Division was able to provide valuable manpower to quickly repair and reopen this boardwalk which is used year round by residents.

## **SECTION 8: GOALS and OBJECTIVES**

The following list provides concrete objectives to meet the general goals identified in Section 6 and address the needs identified in Section 7 of this Plan.

1. Maintain and manage open space and conservation properties.
  - a) Pursue mechanisms of funding or otherwise providing for maintenance of Open Space and Conservation properties.
  - b) Develop an invasive species management plan to prevent, monitor and remove invasive species.
  - c) Continue on-going Land Management activities.
  - d) Continue to enforce appropriate and legal use of conservation areas for passive recreation to prevent degradation and abuse of open space areas.
  
2. Expand the amount of open space and conservation land.
  - a) Identify and preserve land for natural resource protection, drinking water protection, passive recreation, quality of life and aesthetics.
  
3. Protect and improve environmental resources, water quality and open space.
  - a) ~~Enforce~~ Investigate development of higher standards for stormwater treatment, recharge and flood control throughout the community.
  - b) ~~Explore ways to~~ reduce nitrogen levels.
  - c) Promote tidal restoration projects to improve tidal flushing and foster healthy ecosystems.
  - d) Pursue wetland restoration projects.
  - e) Develop educational tools on best management practices.
  - f) Continue coordination of GIS database with the on-line permitting system.
  - g) Further protection of wetland resources through identification and regulation.
  - g)h) Pursue dredging projects.
  
4. Preserve and protect open space and natural environments through land use management, while balancing the need for economic development.
  - a) Concentrate development in suitable areas, promote cluster development that preserves meaningful open space, and promote infill and redevelopment of blighted properties over green field development.
  - b) Promote Zoning Bylaws amendments that protect natural resources and preserves vegetation.
  
5. Provide year-round active recreational opportunities and increase public awareness of Town-owned land, facilities, and programs.
  - a) Expand active recreational opportunities.
  - b) Expand use of existing facilities and programs.
  - c) Maintain and upgrade existing facilities.
  - d) Maintain and enhance Yarmouth's recreational shellfish resources

**SECTION 9: FIVE YEAR ACTION PLAN:**

The action items outlined in the following Open Space and Recreation Implementation Table are intended to continue existing practices and initiate new strategies to achieve the objectives developed in Section 8 of this plan. Each action item is accompanied by a timeframe and identification of responsible parties. Any special funding sources have also been noted. Refer to the end of this section for a summary of abbreviations.

**Open Space and Recreation Implementation Table**

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
<b>GOAL 1</b>	<b>MAINTAIN AND MANAGE OPEN SPACE AND CONSERVATION PROPERTIES:</b>						
Action 1a	<b>Pursue mechanisms of funding or otherwise providing for maintenance of Open Space and Conservation properties:</b>						
	Update/Maintain a list of all open space parcels and identify which Town Departments, Committees, civic organizations or other entity is currently responsible for maintenance.	X					DNR, DCD & PR
	Explore additional, long-term funding mechanisms for open space maintenance, including the tax levy, donations, Land Bank, impact fees, and corporate naming opportunities.		X				DNR, CC & DCD
	Explore use of civic organizations or associations, Ameri-corp, Senior Environmental Corp. boy/girl scouts or volunteers for specific maintenance projects within open space areas.	X					DNR, CC & CA
Action 1b	<b>Develop an invasive species management plan to prevent, monitor, and remove invasive species:</b>						
	Develop a public education program to raise awareness of the invasive species problem and reduce the unintentional introduction of invasive species.				X		DNR, CC & CA
	As staffing limits allow, investigate and monitor areas of known invasive species activity, including areas identified by the general public. Consider training and utilizing volunteer groups, students and property abutters to monitor for invasive species.		X				DNR, CC & CA
	Continue to pursue grant funding, and start to utilize town employees with pesticide licenses, to remove identified invasive species in town-owned lands or waterbodies.	X				CCC Extension, CPA	DNR, CC & CA

**Open Space and Recreation Implementation Table (continued)**

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
<b>Action 1c</b>	<b>Continue on-going Land Management activities:</b>						
	Apply for grants to continue with the prescribed burn and mechanical removal of vegetation program on Town lands to improve wildlife habitat and enhance native plant communities.	X				Barn. County Coop. Ext. Wildlife Preparedness Management Program	DNR & FD
<b>Action 1d</b>	<b>Continue to enforce appropriate and legal use of conservation areas for passive recreation to prevent degradation and abuse of open space areas:</b>						
	Investigate and address encroachment issues onto conservation lands and into wetland resources.	X					DNR & CA
	Investigate and address illegal dumping on Conservation and Recreation properties and prosecute the offenders as deemed appropriate, such as through fines.	X					PD & DNR
	Continue to provide notification of simultaneous activities of user groups at conservation areas with trail signage.	X					DNR, CA & PR
<b>GOAL 2</b>	<b>EXPAND THE AMOUNT OF OPEN SPACE AND CONSERVATION LAND:</b>						
<b>Action 2a</b>	<b>Identify and preserve land for natural resource protection, <u>drinking water protection</u>, passive recreation, quality of life and aesthetics:</b>						
	Develop a list of properties that contain <u>or would protect</u> : <ul style="list-style-type: none"> <li>• critical plant and wildlife habitats</li> <li>• rare and endangered species</li> <li>• wetland resources and their buffers</li> <li>• wildlife migration corridors</li> <li>• large tracks of undeveloped land</li> <li>• passive recreation opportunities</li> <li>• vista opportunities</li> <li>• adjoining conservation lands</li> <li>• <u>drinking water</u></li> </ul>		X				DNR, CC, &CA
	Pursue acquisition of identified parcels through donations, deeded gifts, Conservation Restrictions, designation of town-owned land, or outright purchases.			X		CPA & CCC Open Space Mitigation Funds	DNR, CC, &CA
	Review annual list of tax delinquent properties and tax title lands to determine if any parcels are appropriate for acquisition for conservation, open space, or recreation and pursue acquisition through tax title.	X					DCD

## Open Space and Recreation Implementation Table (continued)

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
<b>GOAL 3</b>	<b>PROTECT AND IMPROVE ENVIRONMENTAL RESOURCES, WATER QUALITY AND OPEN SPACE:</b>						
Action 3a	<b><del>Enforce</del> Investigate development of higher standards for stormwater treatment, recharge and flood control throughout the community:</b>						
	Explore adoption of Stormwater Management Regulations and Subdivision Rules and Regulations applicable throughout the community that require stormwater treatment, recharge, peak flow attenuation and include options for Low Impact Development (LID) stormwater measures. Include requirements for long-term stormwater operation and maintenance and erosion control measures during construction.				X		DPW, PB, DCD & CC
	Continue to fund stormwater management projects associated with Town roadways or lands, and pursue outside funding whenever possible.	X					DPW
Action 3b	<b><del>RE</del>Explore ways to reduce nitrogen levels:</b>						
	Participate in regional Section 208 water quality planning through the Cape Cod Commission.	X					BOS & TA
	Pursue planning and design efforts to address nitrogen loads in waste water.				X		BOS, TA, Consultant
	Investigate the development of lawn fertilizer regulations taking into consideration the Cape Cod Commission (CCC) model fertilizer regulations.				X		CC & BOH
Action 3c	<b>Promote tidal restoration projects to improve tidal flushing and foster healthy ecosystems:</b>						
	<u>Parkers River Tidal Restoration Project:</u> Continue efforts to finalize the design, permitting and construction of the enlarged Parkers River Bridge at Route 28 to improve the Parkers River/Swan Pond estuary.	X				Hurricane Sandy Funds & CPA	DPW, DNR & DCD
	<u>Penn Central Railroad Tidal Restoration Project:</u> Continue efforts to finalize the design, permitting and construction of the replacement of the former railroad bridge over the Bass River funded as part of the extension of the Cape Cod Rail Trail (CCRT) to enlarge this tidal restriction.	X				MassDOT	DPW, DNR & DCD

**Open Space and Recreation Implementation Table (continued)**

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
	Run Pond Tidal Restoration Project: Work toward advancing this tidal restoration project through acquisition of funding sources to pursue completion of needed impact and design studies and ultimately construction.	X				CPA, Capital Budget & Grants	DPW, DNR & DCD
	As staffing constraints allow, investigate and apply for grants for other tidal restoration projects identified in the Local Comprehensive Plan Chapter 11 – Wetlands, revised December 2014.	X					DPW, DNR & DCD
<b>Action 3d</b>	<b>Pursue wetlands restoration projects:</b>						
	Develop a list of wetlands in need of restoration and, as staffing constraints allow, seek out grants and other funding sources for restoration of these wetlands. (Refer to Action 1b for action item regarding removal of invasive species.)		X				DNR, CC & CA
<b>Action 3e</b>	<b>Develop educational tools on best management practices:</b>						
	Update informational pamphlet outlining best management practices for sensible land management near wetlands and their buffers, including basic lawn care management and practices for reducing nitrogen and phosphorous levels, and promoting use of native vegetation. This pamphlet shall be distributed to the public via the Town website and printed pamphlets located in public places.		X				DNR, CC & CA
<b>Action 3f</b>	<b>Continue coordination of GIS database with the on-line permitting system:</b>						
	Continue to tie on-line permit applications to Town GIS database to identify project parcels that may contain sensitive environmental resources to ensure protection of these resources and identify additional permitting requirements.	X					IT
<b>Action 3g</b>	<b>Further protection of wetland resources through identification and regulation:</b>						
	As staffing allows, map vernal pools on Town owned land and submit to the Natural Heritage Endangered Species Program (NHESP) for Certification.	X					CC & CA
	Evaluate amending the existing Yarmouth Wetland Regulations to extend jurisdiction to certified vernal pools.			X			CC & CA
<b>Action 3f</b>	<b>Pursue dredging projects:</b>						
	Identify and prioritize critical areas in	X					DNR

	<u>need of dredging for water quality and recreation on Town land. Investigate and pursue funding for permitting and dredging, and complete permitted dredging projects.</u>						
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**Open Space and Recreation Implementation Table (continued)**

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
<b>GOAL 4</b>	<b>PRESERVE AND PROTECT OPEN SPACE AND NATURAL ENVIRONMENTS THROUGH LAND USE MANAGEMENT, <u>WHILE BALANCING THE NEED FOR ECONOMIC DEVELOPMENT:</u></b>						
<b>Action 4a</b>	<b>Concentrate development in suitable areas, promote cluster development that preserves meaningful open space, and promote infill and redevelopment of blighted properties over green field development:</b>						
	<del>The creation of the Village Centers Overlay District (VCOD) on Route 28 provided for four distinct village centers that allow for higher residential density in a traditional pedestrian-oriented, mixed-use village center. Explore the creation of additional Village Centers along Route 28 to promote redevelopment of blighted properties.</del>					X	PB, CEDC, CHC & TP
	Review the existing Cluster Development Bylaw and consider changes to the minimum lot size requirements and bonus density for affordable housing units to promote use of cluster style developments that preserve open space.					X	PB, CHC & TP
	Explore the adoption of Chapter 40R to establish Smart Growth overlay zoning districts to promote housing production, mixed land uses, compact design, walkable communities, use of a variety of transportation choices, and preservation of open space.					X	PB, CHC & TP
	To help meet housing needs, explore ways to allow for a wider range of housing types which could include more flexibility for top-of-shop housing and seasonal employee housing within existing developed areas.			X			PB, CHC & TP
	<del>Continue to review and comment on development projects, including affordable housing projects, through Design Review and Site Plan Review processes, to promote open space and adequate buffer and parking lot trees and landscaping.</del>	X					CHC, DCD, DRC & SPR

**Open Space and Recreation Implementation Table (continued)**

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
<b>Action 4b</b>	<b>Promote Zoning Bylaws amendments that protect natural resources and preserves vegetation:</b>						
	Consider amending the existing Zoning Bylaw requirements for land clearing and alteration of natural topography to expand the criteria for permit approval, consider applying to residential lots of a certain size and include language to limit lots from being cleared and left vacant for extended periods which encourages invasive species and illegal dumping.		X				PB, TP, BD & CC
	<del>Investigate the adoption of tree canopy preservation regulations to encourage the retention of existing trees 6" in diameter and greater for new development or redevelopment projects.</del>			X			<del>PR, PB, TP, BD &amp; CC</del>
	<del>Develop a planting list of suitable native species for various site conditions and locations (i.e. wetland buffers, street trees, foundation plantings, or near power lines).</del>		X				<del>CC, DRC, DNR, PB, SPR, TP</del>
<b>GOAL 5</b>	<b>PROVIDE YEAR-ROUND ACTIVE RECREATIONAL OPPORTUNITIES AND INCREASE PUBLIC AWARENESS AND ACCESS TO TOWN-OWNED LAND AND FACILITIES:</b>						
<b>Action 5a</b>	<b>Expand active recreational opportunities:</b>						
	Update the Flax Pond and Sandy Pond Master Plan including Peter Homer Park.			X		CPA	PR & Consultant
	Investigate the need for and ways of creating additional year-round indoor recreational facilities using public/private partnerships.				X		PR
	Continue active efforts to extend the Cape Cod Rail Trail (CCRT) through Yarmouth.	X				State & Fed. Funds, CPA & Ch 90	DPW & TP
	Complete the expansion and improvements at the Sailing Center and Phase 2 improvements at Flax Pond	X					PR
	Complete the Dog Park at Sandy Pond Recreation Area.	X					DNR & PR
	Continue with improvements to the Flax Pond Recreation Area per the Master Plan.				X		PR
	Continue phased improvements at the Sandy Pond Recreation Area per the Master Plan.				X		PR
	<del>Incorporate Complete Street concepts (sidewalks/bike lanes) in road projects wherever feasible within the road layout.</del>	X					<del>DPW, TP</del>

**Open Space and Recreation Implementation Table (continued)**

Goal/ Actions	Description	Timeframe (Years)				Funding	Responsible Parties
		On-going	1-2	2-4	3-5		
<b>Action 5b</b>	<b>Expand Use of existing facilities and programs:</b>						
	Address multi-generational needs through cooperation and coordination between various Town Departments, such as Parks & Recreation, Libraries and the Senior Center.		X				PR, TL & SC
	Update the comprehensive inventory and maps of all town ways-to-water, including available parking locations, and post on the Town website.	X					DNR & GIS
	Conduct a needs assessment at the various public access to water locations and identify any access, parking, boat ramp upgrades, or other infrastructure improvements.			X			DNR
	Promote awareness of recreational facilities and programs through a multi-media approach.		X				PR & Consultant
<b>Action 5c</b>	<b>Maintain and upgrade existing facilities:</b>						
	Explore an Adopt-a-Field program with private and non-profit entities.		X				PR
	Pursue CPA funding to upgrade existing facilities to address safety and design deficiencies.			X			PR
	Pursue use of Tourism Revenue funds for physical improvements, such as new booths at the beaches.		X				PR
	Explore the addition of amenities to existing recreational facilities, such as lending library at the beaches/parks, and Wi-Fi at the beaches.		X				PR
	Address deficiencies in hardscape courts and amenities (i.e. basketball courts, tennis courts, or retrofits for pickle ball courts)			X			PR
<b>Action 5d</b>	<b>Maintain and enhance Yarmouth’s recreational shellfish resources:</b>						
	Continue and/or increase purchase of seed stock for shellfish replenishment.	X					DNR
	Explore the need for and possible locations for additional town shellfish up-wellers.			X			DNR
	Continue to investigate funding for stormwater improvements to promote shellfish restoration.	X					DNR & CA

<b>Responsible Parties</b>	<b>Abbreviation</b>
Affordable Housing Trust	AHT
Board of Appeals	BOA
Board of Health	BOH
Board of Selectmen	BOS
Building Commissioner	BC
Building Department	BD
Cape Cod Commission	CCC
Capital Budget Committee	CBC
Chamber of Commerce	COC
Community and Economic Development Committee	CEDC
Community Housing Committee	CHC
Community Preservation Committee	CPC
Conservation Agent or Administrator	CA
Conservation Commission	CC
Council on Aging	COA
Department of Community Development	DCD
Department of Public Works	DPW
Design Review Committee	DRC
Division of Natural Resources	DNR
Finance Committee	FinCom
Fire Department	FD
Historic Commission	HC
Information Technology Division	IT
Massachusetts Department of Transportation	MassDOT
Old Kings Highway	OKH
Parks and Recreation Division	PR
Planning Board	PB
Police Department	PD
Senior Center	SC
Site Plan Review Team	SPR
Town Administrator	TA
Town Libraries	TL
Town Planner	TP
Water Department	WD
Yarmouth Housing Authority	YHA

**SECTION 10            PUBLIC COMMENTS**

The following pages include written comments on this Plan from key Town officials: Conservation Commission; Planning Board; and the Cape Cod Commission.



# TOWN OF YARMOUTH

1146 ROUTE 28, SOUTH YARMOUTH, MASSACHUSETTS 02664-4492  
Telephone (508) 398-2231, Ext. 1276, Fax (508) 398-2365

Planning  
Board

June 3, 2015

Kerry Muldoon  
Conservation Administrator  
Town of Yarmouth  
1146 Route 28  
South Yarmouth, MA 02664

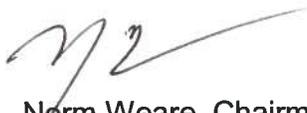
Re: 2015 Open Space and Recreation Plan Update

Dear Ms. Muldoon:

The Planning Board has had the opportunity to review and discuss the draft Open Space and Recreation Plan update and finds that the document provides a complete analysis and summary of existing conditions, and defines Yarmouth's future needs, goals and objections.

After the June 3, 2015 public meeting, Board members voted unanimously to support the plan's approval. We look forward to using the document as a basis for future planning efforts and improvements to Yarmouth's open space and recreational resources.

Sincerely,



Norm Weare, Chairman  
Yarmouth Planning Board

cc: Kathleen Williams, Town Planner



# TOWN OF YARMOUTH

1146 ROUTE 28

SOUTH YARMOUTH

MASSACHUSETTS 02664

Tel (508) 398-2231 — Fax (508) 398-0836

CONSERVATION  
COMMISSION

June 4, 2015

Kerry Muldoon  
Conservation Administrator  
1146 Route 28  
South Yarmouth, MA 02664

Re: 2015 Open Space and Recreation Plan Update

Dear Ms. Muldoon,

The Yarmouth Conservation Commission has reviewed the draft 2015 Open Space and Recreation Plan update. The plan is comprised of well written and detailed narratives of Yarmouth's natural resource areas, open space, recreation areas as well as the Conservation Areas. The plan has clearly defined Yarmouth's continued interest and commitment towards Open Space and Recreation longevity.

The Commission supports the 2015 Open Space and Recreation Plan. The Commission is specifically interested in goals that incorporate improving water quality, encouraging environmentally sensitive planning, improving stormwater capabilities, promoting ecologically sound landscaping, restoring wetland resource areas and managing conservation and open space areas. The Commission looks forward to utilizing this plan with future projects.

Sincerely,

Ed Hoopes,  
Conservation Commission Chairman



**SECTION 11 REFERENCES/RESOURCES**

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