



EASTHAM OPEN SPACE AND RECREATION PLAN

FEBRUARY 2014



Aerial View of Eastham looking East from Cape Cod Bay to the Atlantic Ocean

Prepared by the Eastham Open Space Committee
For submission to the
Department of Environmental Management
Division of Conservation Services



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Forestry Advisory Committee	Historical Commission
Long Range Planning Advisory Board	Planning Board
Public Access Committee of Eastham	Recreation Commission
Recycling Committee	Water Management Committee

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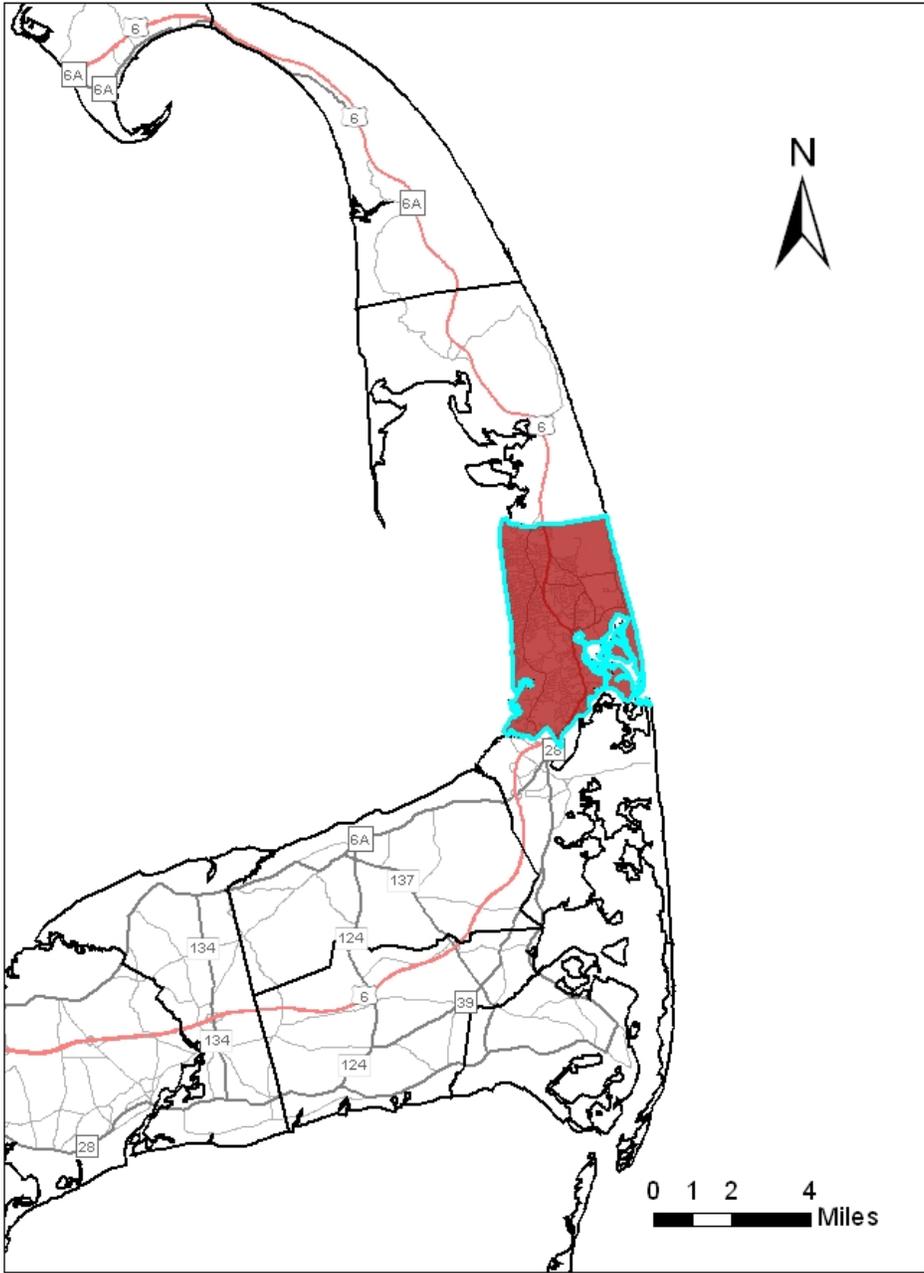
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Regional Context : Eastham



Map 1 - Data from MassGIS



SECTION 1: PLAN SUMMARY

“The overall aspirations of Eastham are to maintain as much of the remaining open space as possible for recreation (both passive and active) and to protect our fragile sole source aquifer.”

Town of Eastham 1998 Open Space and Recreation Plan

The 2014 Eastham Open Space and Recreation Plan (OSRP) is a management document used by town departments, committees, as well as local organizations, to guide open space and recreational decisions and activities in Eastham over the next five years. Additionally, the 2014 OSRP represents an update to the 2007 Open Space and Recreation Plan and is consistent with the 2012 Eastham Local Comprehensive Plan.

This plan describes Eastham’s open space and recreation management strategy and includes an assessment of current open space and recreation needs, a statement of goals and objectives to fill the Town’s needs, and an action plan with which to meet these goals.

The Town of Eastham’s Open Space Committee, an advisory committee under the overview of the Conservation Commission, developed this plan. Established and appointed by the Board of Selectmen, the Open Space Committee is charged with the responsibility to prepare and maintain this open space and recreation plan for the Town in accordance with 301 CMR 5.00 (Code of Massachusetts Regulations); to identify and prioritize a program of continuous land acquisition and protection; to develop plans for use and maintenance of current open space holdings; and to develop plans for use and maintenance of potential open space acquisitions.

The revised 2014 Open Space and Recreational Plan takes into consideration the goals and objectives of the 1998 and 2007 Open Space and Recreation Plans, and is based on the newly adopted 2012 Eastham

Local Comprehensive Plan. It is consistent with many of the goals, objectives, and findings within the Cape Cod Regional Planning Policy, the Outer Cape Capacity Study, the Lower Cape Water Management Task Force, the Cape Cod Coastal Embayment Project, and the Statewide Comprehensive Outdoor Recreation Plan.

The 2007 Open Space and Recreation Plan (OSRP) established the following primary goals that are still relevant and just as important today:

1. To protect and maintain 50% of Eastham's remaining developable land as open space
2. To protect the sole source aquifer and groundwater
3. To maintain the unique character of Eastham
4. To enhance recreational opportunities appropriate and accessible to all age groups
5. To protect and manage critical natural resources
6. To maintain and improve upland and coastal recreation and conservation resources

This 2014 OSRP has been revised to meet the 2007 goals as well as to update the goals to make them applicable to the Town's current conditions:

1. Establish a municipal town-wide water supply and water distribution system
2. Maintain the overall quality and quantity of groundwater
3. Protect, preserve, and acquire open space
4. Protect and enhance habitat
5. Maintain and enhance the Town's recreational facilities
6. Maintain and improve upland and coastal recreation and conservation resources

The Town of Eastham's staff and elected officials work in close cooperation with citizen committees to research, analyze, and make reports accessible for public comment when making land use planning decisions. The following reports are posted on the town website [www. Eastham-Ma.gov](http://www.Eastham-Ma.gov):

1. Freshwater Ponds Water Quality Report (2013)
2. Landfill Study (2013)
3. Town of Eastham Conservation Land Inventory and Analysis (2012)
4. Organic Land Management Policy (2012)
5. Fertilizer and Pesticides Policy (2012)
6. Eastham Local Comprehensive Plan (2012)
7. Water Supply Environmental Report (2010)
8. Eastham Wastewater Management Planning Project (2009)
9. Wildland Fire Protection and Preparedness Plan (2009)
10. Eastham Bikeways Committee Long Range Plan (2008)
11. Open Space Managed Land Plan (2003 – in the process of being updated)
12. Land Acquisition Program (1999-present)

The Open Space Committee believes that this document accurately reflects resident's current thinking about Eastham's natural resources, ecosystem, wildlife habitats, open spaces, recreational facilities, and town character. Over the next five years, we look forward to working closely with town boards, departments, and committees, local organizations, and citizens to continue Eastham's commitment to open space protection and community preservation.



SECTION II – INTRODUCTION

STATEMENT OF PURPOSE

“It seems that whenever people are given a free choice, they move to open tree-studded land on prominences overlooking water.”

E.O. Wilson describing the phenomenon he calls “the right place”.

Even before the first Earth Day was celebrated to demonstrate support for environmental protection on April 22, 1970, the Town of Eastham recognized the special nature of the 44-acre Wiley Park area, and acquired the parcel in 1968, as one of the first conservation purchases made by a local community on the Outer Cape. In 1981, the abutting 25.3 acre Nickerson property was acquired, and together the two areas protect a substantial portion of the shorelines of Great and Widow Harding Ponds and virtually all of Bridge Pond, creating one of Cape Cod’s first Green Belts.

By 1985 the need for protection of the natural resources at the local government level was supported by Eastham’s residents and the first comprehensive Open Space and Recreation Plan was rolled out.

The 1985 OSRP was rewritten in 1999 to systemically re-examine Eastham’s open space and recreational needs. The plan was again updated in 2007.

Over the decades, Eastham’s rural seaside ‘character’ or ‘sense of place’ is recognized as one of the most important qualities to preserve. This widespread public sentiment in favor of environmental protection and growth control has culminated in open space purchases starting with the Wiley Park (1968) purchase and continues today with the recent purchase of the Garganigo property at the end of Steele Road (2011).

Today, the 2014 OSRP embraces the same mission statement originally written in the 1985 Open Space and Recreation Plan as well as the goal of the more recent Cape Cod Regional Policy Plan, “to preserve

and enhance the availability of open space and provide wildlife habitat, recreational opportunities, and protect the natural resources, groundwater, air quality and character of Eastham.”

Within this revised 2014 Eastham Open Space and Recreation Plan, the Open Space committee has reviewed the progress since the 2007 OSRP update and has identified new issues and changing conditions that need to be addressed. This plan also assesses future needs based on community feedback from Town Meeting voting mandates, public comment and surveys.

After forty years committed to protecting open space, and more recently dedicated to good quality drinking water protection, the 2014 Open Space and Recreation Plan confirms Eastham’s commitment to controlling growth and protecting open space and its natural resources as the Town’s greatest assets. In the future, Eastham’s ongoing commitment to preserving open space and wildlife habitat will assure that there is adequate safe drinking water for generations to follow and that the rural character and coastal identity will be maintained.

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Section III: Community Setting



Regional Context

The Town of Eastham is a coastal resort community straddling the "outer arm" of Cape Cod. Referred to by the Chamber of Commerce as the "gateway to the Cape Cod National Seashore", Eastham is bounded on the north by the Town of Wellfleet, on the south by the Town of Orleans, on the west by Cape Cod Bay and on the east by the Atlantic Ocean. It is approximately four miles wide from east to west and seven miles long from north to south with a total area of 27.26 square miles, an upland area of 13.99 square miles and 37.4 miles of tidal shoreline. The Cape Cod National Seashore occupies most of the eastern portion of the Town, with approximately one-third of the land area within the Seashore boundaries.

As one of the 15 towns in Barnstable County, Eastham lies at the beginning of what is commonly known as the Outer Cape, an area that runs up to Provincetown and that tends to be more rural, quieter, less crowded, less commercial and most like the old Cape Cod. This area is also more seasonal than the Mid- and Upper Cape, with an economy based on the summer tourists and 50% of the households vacant during the winter. Like most of the communities that make up the Outer Cape, Eastham is concerned with encouraging economic development that will provide year-round employment, and at the same time not denigrate the fragile ecosystem, housing for year-round residents in a real estate market that sees a significant annual increase in home prices and the ever increasing traffic on Route 6, the only way in and out of the area for motor vehicles.

Route 6, the main artery on the Cape, literally cuts through the heart of Eastham, dividing the Town into two parts – Cape Cod Bay side (west) and Atlantic Ocean (east). On a typical summer day, at least 30,000 vehicles pass through the Town. The Police Department has made major strides toward reducing the accident rate in recent years. Most commercial development is located along Route 6.

Eastham shares its sole-source aquifer (the only source of drinking water) with the southern section of Wellfleet. Both towns draw from the Nauset lens, one of six lenses (watersheds) on the Cape. This lens also supplies seven great ponds in Eastham and South Wellfleet. Eastham is a partner, with Orleans and Brewster, in the Tri-Town Septage Treatment Facility in Orleans and has reciprocal agreements with

police and fire departments in neighboring towns. Eastham is also the home of Nauset Regional High School, which it operates in partnership with Brewster, Orleans, and Wellfleet.

As one of the smaller towns on the Cape, Eastham benefits from its association with the Cape Cod Commission, a regional planning agency that provides planning and technical assistance to the Town. The Commission was instrumental in the development of a Regional Policy Plan, Outer Cape Capacity Study and Eastham's Local Comprehensive Plan, all adopted in and updated in 2012 and has provided the Town with GIS base maps and specialized planning maps. The Commission provides a valuable regional context for planning and land use issues by involving all 15 towns in decision-making and by providing technology and technical support that the individual towns could not afford.

History of Eastham

Prior to the arrival of the Europeans, the "Kingdom of Nauset" covered the Outer Cape and the Islands with the major villages inhabited by the Nausets, a band of the Wampanoags, along the shores of the present Town Cove and Nauset Marsh. Seven families (about 49 individuals) arrived from the Plymouth Colony in 1644. The directors of the colony, dissatisfied with the poor quality of lands granted them in Plymouth, sent the delegation to scout Eastham for a new site for the center of government. The decision was not to move, but the seven families stayed and established a new town. In 1646, the General Court gave permission for the community of settlers to organize as the "township" of Nauset. The Town of Eastham was established in 1651 by an order of the General Court. Included within the town boundaries at that time were Orleans, Chatham, Wellfleet, and parts of Brewster and Harwich. With the separation of Orleans in 1797, the present boundaries of Eastham were established.

As one of the oldest towns on Cape Cod and in the Commonwealth, virtually all of Eastham is eligible for listing as a historically significant landscape. The history of the Town is closely tied to the history of its land use. Unlike other towns on the Cape with distinctive 19th century village development patterns, Eastham developed as farms with little evidence remaining of an historic village center. Historically designated structures and sites are scattered throughout the Town, because its past is rooted in agriculture. When the first settlers arrived, the area was covered with dense forests, of which little remains today because the trees were cut for building, farming, sheep grazing and fuel. or more recently for residential development. When Henry David Thoreau walked through Eastham in the mid-1800s, there was not a tree to be seen from horizon to horizon. He named the area the "howling plains of Nauset." This barren scene lasted until the 1950s.

Long after most Cape towns had abandoned farming, the well-drained sandy soil of the Eastham Plains supported a thriving truck garden industry. Well into the 20th century, Eastham was famous for its strawberries, asparagus and turnips. Even today, one occasionally comes upon "wild" asparagus still growing in abandoned fields. Because much of Eastham remained in agriculture until recently, the process of forest succession got off to a later start here. The upland forests of Cape Cod display a checkerboard pattern of plant types, which have emerged from a previously barren and impoverished landscape, due to past European land use practices. Native Americans cultivated the land by clearing small plots for mixed crops and by burning. The soil remained enriched. Pilgrim settlers and those that followed were not aware of the impact they would have on the land until it was too late.

The most recent changes to the landscape have come from an increase in residential development in the 1980s and 1990s. While new subdivisions are rare, the development has continued as infill on

already divided parcels and on parcels previously considered undesirable because of their difficult topography or proximity to Route 6. The result is larger houses, and at the same time a number of seasonal cottages, bungalows and garages are being enlarged and improved as owners convert to year-round use. In addition to this development, “mansionization” is occurring on quarter and half-acre lots that are grandfathered under current zoning.

Population Characteristics

Recent Population Characteristics:

The population of the Town of Eastham has grown from 1970 to 2010 from 2043 to 5488. The resident population continues to grow older. The median age remained fairly steady from 1970 to 1990, but increased substantially from 1990 to 2010 from 41.7 years to 56.8 years. Furthermore, there is a seasonal population component that boosts demand for services. In 1990 the summer population was estimated to be 21,800 and by 2000 it was conservatively estimated to be 27,500*. This is a twenty-six percent (26%) increase as compared with the twenty-two percent (22%) increase in the resident population during those years.

These dramatic changes in Eastham’s population are supported by increasing income, increased mobility of people, the draw of the National Seashore and other natural attractions as well as by the general appeal of the character of the community.

Such growth and changes in population impacts the use of the land and existing infrastructures. The management of responses to this development will determine the extent to which the mission and goals of this Plan are achieved.

Projections for various neighboring communities are shown in Table 2. The likely impacts felt in the town by this projected growth in population will include increased local and through traffic, demand for additional services and pressure for additional residential development or conversion from seasonal to year-round homes.

*The summer population is not regularly estimated by a standard method. It consists of several groups of people including year-round residents, summer residents, shorter term guests and more transient weekenders. Of these only the first group is regularly counted. Nonetheless the capacity to house people is limited. Assuming five people per house during a peak summer period plus 1000-1500 in motels the total population is about 25,000. The Eastham Police Department has another estimate of 30,000 from the Town Clerk’s office; thus the adjusted entry of 27,500. The actual summer population on any particular day would likely fluctuate around this number.

Table 1: Population Changes for Barnstable County and Selected Outer Cape Towns

Town	2000 Population	2010 Population	Percentage Change	Population Change
Brewster	10,094	9,820	-3%	(274)
Chatham	6,625	6,125	-8%	(500)
Eastham	5,453	4,956	-9%	(497)
Harwich	12,386	12,243	-1%	(143)
Orleans	6,341	5,890	-7%	(451)
Provincetown	3,431	2,942	-14%	(489)
Truro	2,087	2,003	-4%	(84)
Wellfleet	2,749	2,750	0%	1
Lower Cape	49,166	46,729	-5%	(2,437)
Barnstable County	222,230	215,888	-3%	(6,342)

Source: U.S. Census and Cape Cod Commission

Eastham’s population has remained almost the same for the last 10 years. Over 50% of the houses are occupied only during the summer months and there is no indication that will change in the near future. Many of the summer residences are not constructed for winter use. This has resulted in a larger population during the “shoulder months” surrounding the summer. Predicting long range population trends is difficult, but the population is not likely to increase significantly, since the town is at 95% build-out. Limited occupation opportunities make it very difficult for young families to live in Eastham.

Historic changes in Eastham’s population:

Eastham's largest population prior to World War II was 966 persons in 1830. From that time it declined steadily until there were only 430 citizens in the Town in 1920. The net rate of decrease was close to 3% per year; with a large proportion of those who left being youths seeking employment opportunities elsewhere. After the First World War, population increased slightly and by the end of World War II was about 600.

In the post-war period, three factors had a dramatic impact on Cape Cod and Eastham. Rapid expansion of the nation's road system and automobile ownership put Cape Cod within one day's drive for more than 80 million people in the Boston metropolitan area and up and down the coast. In 1961 the National Seashore was established and quickly attracted many visitors, now averaging over five million per year. Many retirees were attracted to the Cape, and the year-round, retired population contribution to the Cape's and Eastham's economy now exceeds that of tourism. At the 2000 census, Eastham’s population stood at 5,453 and the seasonal population was conservatively estimated at 22,000.

Table 2: Eastham Population Change

Year	Population	Change	% Change
1900	502		
1910	518	+ 16	+ 3.2%
1920	430	- 88	- 16.9%
1930	543	+ 113	+ 26.3%
1940	582	+ 39	+ 7.2%
1950	860	+ 278	+ 47.8%
1960	1,200	+ 340	+ 39.5%
1970	2,043	+ 843	+ 70.3%
1980	3,472	+ 429	+ 20.9%
1985	4,043	+ 571	+ 16.4%
1990	4,462	+ 419	+ 10.3%
2000	5,453	+991	+18.2%
2010	4956	- 497	- 9.1%

Source: U.S. Census Bureau, compiled by the Cape Cod Commission

The summer population consists of four groups: the year-round residents, the second home owners who reside only during the summer, the tourists and visitors in non-dwelling accommodations (motels, campgrounds, and cottages) and the day trippers, visitors that come, but do not stay overnight. The 1980 summer population was estimated at 18,292, raising the off-season density of 244 to 1,284 persons per square mile. The 2000 summer population was estimated at 22,000, raising the off-season density of 383 to 1,983. Of the 1980 summer population of 18,292, 70%, or 12,845 persons, were second homeowners. Of the summer population of 2000, 50%, or 11,000 persons are second homeowners.

Eastham has experienced tremendous residential growth in the past twenty years with 2,085 permits issued for new homes, an average of 104 new houses each year. As stated before, in 1980, Eastham had an off-season density of 244 persons per square mile. That number increased to 319 persons per square mile in 1990 and to 383 persons per square mile in 2000. In 1969, 48.2% of the Town was undeveloped, decreasing to 16.5% in 1991 and to 7.4% in 2002 according to information furnished by the Town Assessor. Between 1980 and 1990, the Town's population grew from 3,472 to 4,462, a 28.5% increase, and to 5,453 in 2000, an 18.2% increase.

Data compiled by the Department of Housing and Community Development provides a closer look at the year-round population and shows an almost equal division between those younger and older than 45, and an almost equal number of males and females. The birth rate is below the state average and the death rate is slightly higher. In general, the population tends to be older, with the many retirees changing from seasonal to year-round residency. Less than 2% of the population is non-Caucasian. Traditional married couple households comprise 58% of the total, with 29.6% being non-family households.

Table 3: Changes in Eastham's Population Median Age

Year	Population	Increase Over Previous Decade	Median Age
1940	582	-	-
1950	860	47.60%	-
1960	1,200	39.50%	37.5+/-
1970	2,043	70.30%	41.1
1980	3,472	69.90%	39.1
1990	4,462	28.50%	41.7
2000	5,453	22.20%	47.6
2010	4,956	-9.00%	39.1

Source: U.S. Census via Cape Cod Commission

The median household income is \$31,339, roughly 84.8% of the state average. Per capita income is \$16,004 or 92.9% of the state average. A total of 8.6% of the residents fall below the poverty line, compared with 8.9% statewide. The year-round unemployment rate is only slightly higher than the state average. This is noteworthy when compared to other Outer Cape towns that have winter rates of nearly 50% unemployed. The largest sector of the workforce is employed in wholesale and retail businesses, followed by the construction trade and then retail services such as finance, insurance and real estate. Businesses tend to be smaller, with the largest employers being the Sheraton Four Points Hotel and the Town of Eastham.

Table 4: Age Composition

Age Groups	1970	1980	1990	2000	2010	% Change: 1980-2000
0-4 years	128	178	255	208		16.9%
5-19 years	499	683	733	846		23.9%
20-59 years	839	1,686	2,074	2,658		57.7%
60-74 years	444	689	1,046	1,112		61.4%
75+ years	133	236	354	629		167.2%

Source: U.S. Census of population, 1970, 1980, 1990, 2000, 2010
U.S. Census Bureau, compiled by Cape Cod Commission

Growth and Development Patterns

Land Use Patterns and Trends

Historic development patterns and trends were closely tied to farming and agriculture. The "First Comers" from Plymouth were attracted to Eastham by the rich topsoil and heavily wooded, level terrain. They removed the trees and put the fields into wheat, corn and other crops, which flourished, in the one- to two-foot layer of humus that had been accumulating since the last glacier receded 10,000 years before. With the tree cover and other indigenous vegetation removed, rain and high winds swept across the plains depleting the rich soil by the 1770's. When he made his walking trip across the Cape in 1850, Thoreau described the land as "white and yellow, like a mixture of salt and Indian meal, a substance which gives soil a poor name."

The impact on the Town's economy was devastating. The recovery of salt from ocean water in wooden salt works provided a revenue source for a few years, but that market faded when salt mines were opened in upstate New York in the early 1800's. After Orleans separated in 1797, Eastham was left with no natural harbors on either coast. Men went to sea from other ports; the remainder of the population was reduced to subsistence farming and/or the harvesting of shellfish. The introduction of cranberry bogs in the late 1800's and later the cultivation of turnips and asparagus helped, but life in Eastham from 1800 until after the First World War was one of marginal economic existence. Settlement patterns tended to be individual houses situated far apart on farms rather than the tight village development pattern in other Outer Cape towns, usually centered around a deep-water harbor. Even today, the Town has no clearly defined center. It consists of at least three different centers: around the historic Windmill green and Town Hall, the Historic District across from the Salt Pond Visitors Center and the commercial center at Brackett Road and Route 6.

Today, Eastham is characterized by residential use, commercial development, limited industrial uses along Route 6 and the Cape Cod National Seashore. The most dramatic change in land use over the last twenty-five years is in the amount of developed land versus undeveloped land. The amount of land devoted to residential development has, from 340 acres or 3.7 percent of the Town in the late 1960s to over 3,000 acres or 33 percent of the Town today. Understandably the amount of undeveloped land has decreased at a comparable rate from 4,400 acres or 48.2 percent of the Town in the late 1960s to around 1,200 acres or 7.4 percent of the Town today.

This intensity of development and the related pressure placed on the Town have been dramatic. In addition, neighboring towns have also experienced similar development, which has affected daily life in Eastham. Added tourism, especially related to the Cape Cod National Seashore, an increase in commercial development in Orleans, and more activities scheduled during the fall and spring shoulder seasons have also contributed to an increase in both through and local traffic, especially along the Route 6 corridor.

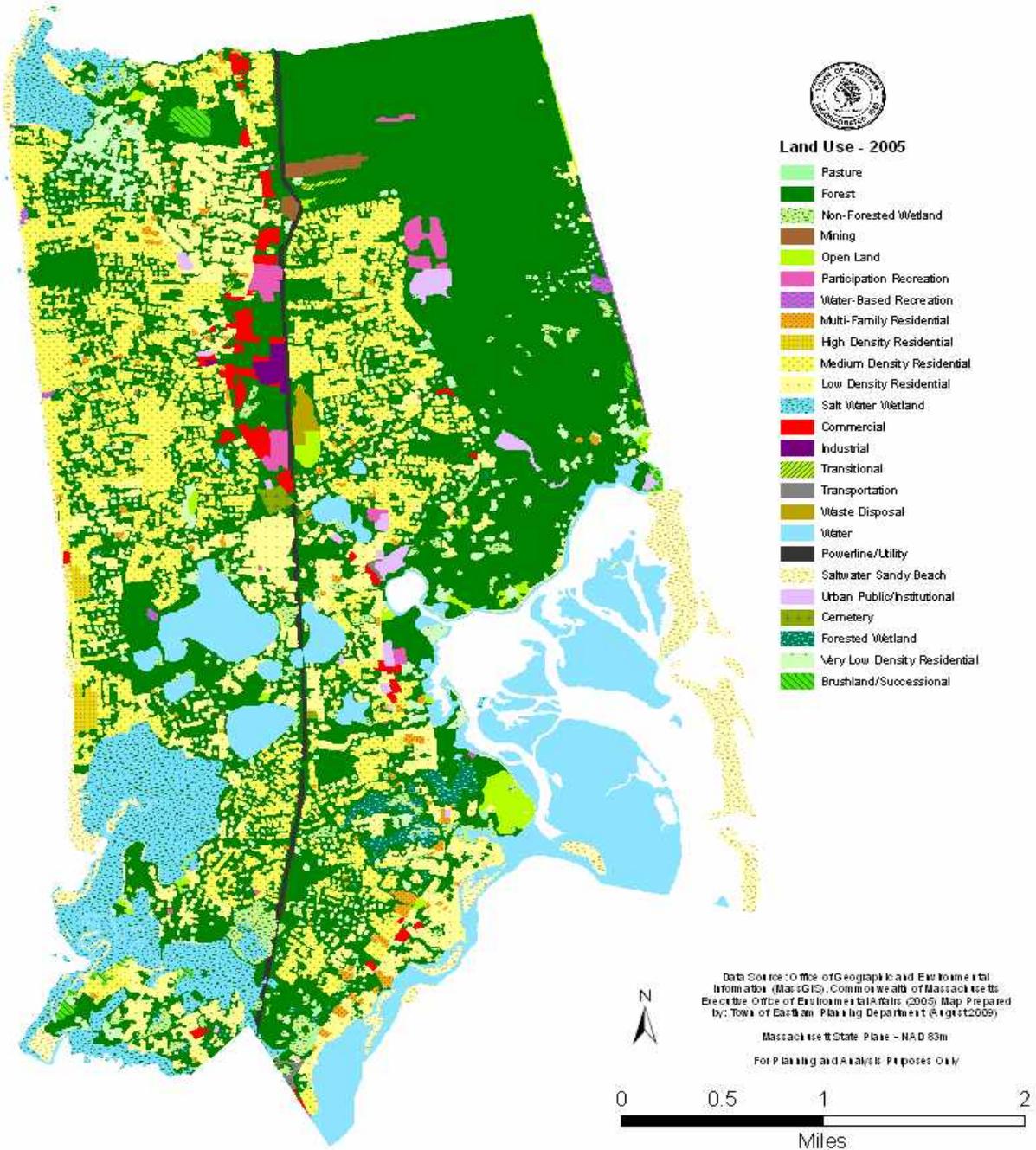
Residential structures in Town are fairly uniform in architectural style. Most single-family homes were built during the last fifty years and can generally be described as either single-story ranches or two-story Capes. Residential areas in Town are no longer only concentrated along the coastline and near commercial centers but have spread inland. The homes were all built without town water or sewer

services, with the newer ones built on lots of one acre or more and the older ones on quarter and half acres.

Non-residential uses are predominantly commercial and situated along Route 6. They are principally restaurants, inns or motels, professional offices, public facilities, nurseries, gas service stations and storage facilities. These uses comprise only one hundred and thirty-five (135) acres, primarily located along Route 6 with corresponding level of service and safety impacts. Many of the commercial developments are designed in the roadside "strip" single story building style with no consistent appearance. Some have purposely retained a residential scale and style appropriate to the Town. There is an industrial district located off Brackett Road and a small district for marina-related uses to accommodate residential boating and fishing needs located in the southern-most point in Eastham along the Bay near Rock Harbor.

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Map 2: Existing Land Use



The Cape Cod National Seashore, authorized by Congress in 1961, comprises one-third of Eastham (4,800 acres), including most of its six and one-half mile Atlantic shoreline, from Orleans to Wellfleet. Town Cove and the outer Nauset Beach are not part of the Seashore. More than one hundred privately owned residential dwellings exist within the Seashore, most of which were constructed prior to the Seashore's creation.

Eastham is fortunate to have its natural setting between Cape Cod Bay and the Atlantic Ocean and a third of its total land area preserved as open space within the Cape Cod National Seashore. In addition, the Town, along with private citizens, has set aside many parcels of land that include municipal, conservation, recreation and historical sites. These include saltwater and freshwater beaches, landings and ponds, trails, marshes, meadows and playing fields.

The series of "vision" workshops held in the spring of 2000 also reaffirmed the general future land use plan of the 1996 LCP. The general distribution of uses in the plan include: residential uses along the western side of town, marine related uses in the southwestern corner, a mix of commercial, institutional and residential along the central axis (Route 6) and the Cape Cod National Seashore to the east.

Major future land use areas include:

Town Hall Area (See #1 on Map 3)

This area, which currently houses most of the Town facilities, including the Town Hall, Police and Fire Departments and the Library, should be maintained as a Town civic area. Nonresidential uses tailored to the needs of local and off-Cape residents including those using the Town facilities should be encouraged. Improvements should include enhanced landscaping, burying of overhead utilities, parking, safe access, pedestrian and bus passenger amenities such as weatherproof shelters, lighting, trash receptacles, etc. to create a "pedestrian friendly" atmosphere. During the winter, sidewalks maintained free of snow and ice would also facilitate pedestrian travel.

Brackett Road/Route 6 Area (See #2 on Map 3)

The Brackett Road/Route 6 area currently contains a retail center, an industrial area and a recently extended bikeway access to the Cape Cod Rail Trail. This area has the potential for mixed use and/or residences of slightly higher density. Improvements in the immediate vicinity of the intersection of Brackett Road and Route 6 should include enhanced landscaping, burying of utilities, pedestrian and bus passenger amenities.

Cape Cod National Seashore (See #3 on Map 3)

The Seashore is a major draw for visitors and seasonal residents to the area, and a major preserved recreation area for year round residents. This large portion of Town will see no change except for the possible expansion to include adjacent parcels to be added by gift or purchase, as they become available.

Tourist Business (See #4 on Map 3)

Located north of the Town Hall area, this sector accommodates commercial uses of high volume, such as: restaurants, motels and tourist retail services. Incentives should be developed to reduce the number of highway access points and improve pedestrian and bicycle connections in this area. Landscaping requirements for parking areas and highway frontage should be increased to improve the visual character of this area and to provide a more pedestrian-oriented scale.

Highway/Residential District (See #5 on Map 3)

Located along the southern and northern sections of Route 6, this sector will allow buildings to be used for residences and businesses, providing the businesses retain Cape Cod architecture, and are adequately landscaped, with all parking in the rear.

Residential Areas (See #6 on Map 2)

Existing residential areas, which are most of the remainder of Town, are essentially one neighborhood, but are described and designated on Map 4, primarily for planning purposes. Cluster development should be encouraged in each of these areas, as appropriate, and where adequate land is available.

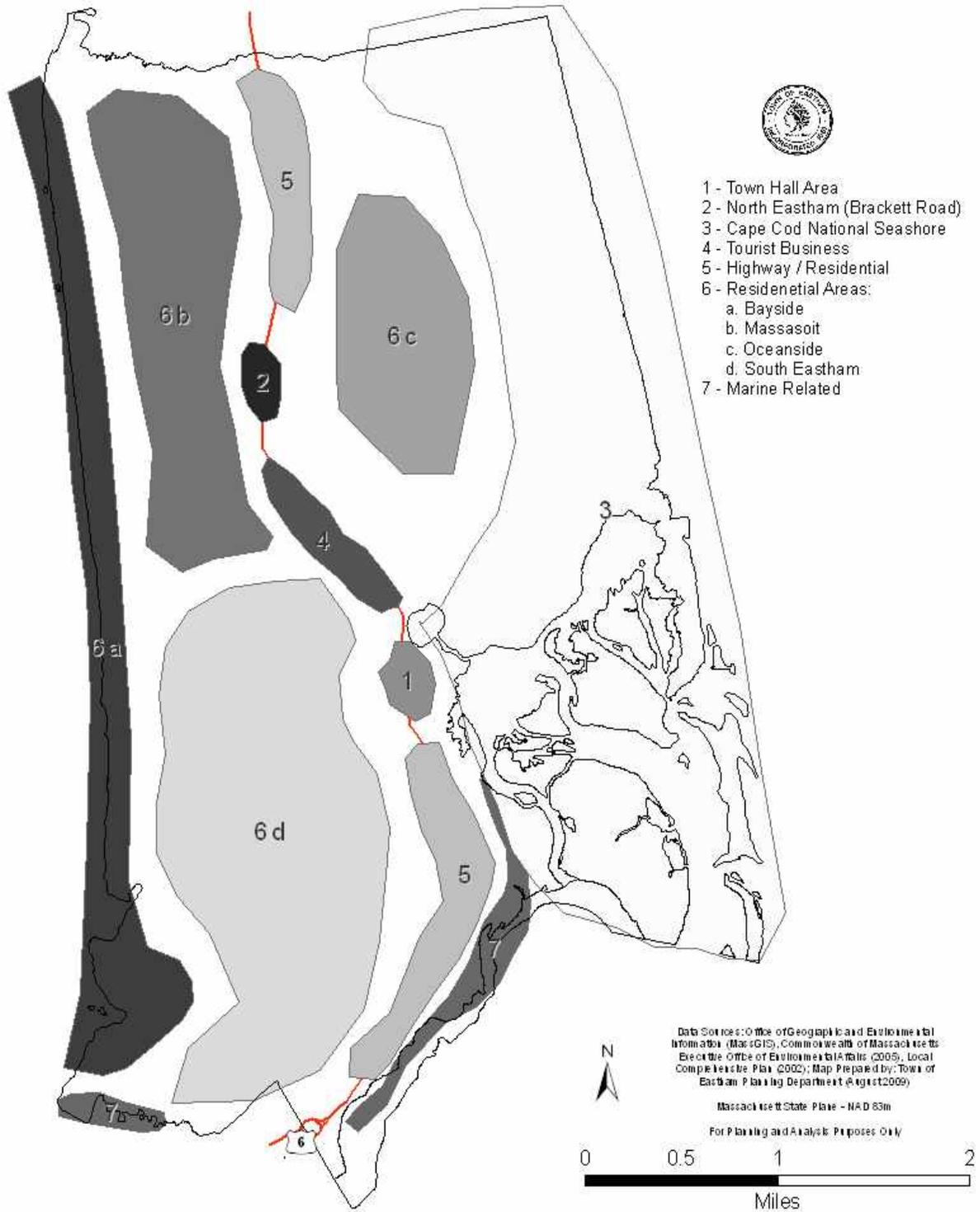
Marine Related (See #7 on Map 2)

Currently there are areas with landing and related service facilities for residents that should be maintained. The area at Town Cove is proposed as a Working Waterfront Overlay Zone. However, development pressures are forcing changes to that character which strong land use controls may be able to thwart. The town investigated creating a DCPC in part of the town to impose a moratorium and thereby stop growth pending a full study.

Map 3: Eastham Chamber of Commerce Map



Map 4: Eastham Area Designation Land Use Map



Rate of Development

Table 5 shows building permits issued by type from 1997-2010.

Table 5: Building Permits per Year

Year	New Residence	Additions/Renovations	Total Residential Permits
1997	97	165	261
1998	111	209	320
1999	138	209	347
2000	93	222	315
2001	52	422	474
2002	39	528	567
2003	40	560	600
2004	37	546	583
2005	52	478	530
2006	33	419	452
2007	57	449	506
2008	11	385	396
2009	12	354	366
2010	15	397	412

Source Town of Eastham, 2011

Although there had been a significant decline in new construction, the last three years have been steady, while additions and renovations remain very strong.

Beginning in the 1960's, land was rapidly developed for residential purposes. By 1991, 33% of the land (3006 acres) was used for residential purposes and by 2000, 39% (3542 acres) of the land was used for residential purposes. The development continued and currently about 42% (4120 acres) of Eastham's land is so used. Overall development from the 1960's to 1991 was at the rate of 105 acres per year. During the 1990's the rate averaged 93 acres per year and thereafter about 83 acres per year.

This intensity of development and the related pressure placed on the Town have been dramatic. In addition, neighboring towns have also experienced similar development that has affected daily life in Eastham. Added tourism, especially related to the Cape Cod National Seashore and an increase in commercial development in Orleans have also contributed to an increase in both through and local traffic, especially along the Route 6 corridor.

Non-residential uses are predominantly commercial and situated along Route 6. They are principally in the form of restaurants, inns or motels, professional offices, public facilities, nurseries, gas service stations and storage facilities. These uses comprise only one hundred and thirty-five (135) acres, primarily located along Route 6 with corresponding level of service and safety impacts. Many of the commercial developments are designed in the roadside "strip" single story building style with no consistent appearance. Some have purposely retained a residential scale and style appropriate to the Town. There is an industrial district located off Brackett Road and a small district for marina-related uses to accommodate residential boating and fishing needs located in the southern-most point in Eastham along the Bay.

Table 6: Land Use by Acreage and Percentages, 1991 and 2008

Category of Use	1991 Acres	% of Town	2008 Acres	% of Town
Developed Land:				
Mixed Use (Residential/Commercial)	114.0	1.2%	353	3.0%
Residential	3,006.0	33.0%	3799	35%
Commercial	105.0	1.2%	320	3%
Industrial and Utilities	30.0	0.3%	112	1%
Exempt Property (Institutional)	644.0	7.1%	2413	22%
Total Developed Land	3,899.0	42.7%	6997	64%
Undeveloped Land:				
Developable				
- Residential	962.0	10.5%	293	2.7%
- Commercial	38.0	0.4%	4.19	.2%
- Industrial	25.0	0.3%	4	.2%
Undevelopable				
- Residential	363.0	4.0%	230	2.1%
- Commercial	0.5	0.0%	4	0.0%
- Industrial	1.0	0.0%	1	0.0%
Open Space-Residential	23.0	0.3%	0	0.0%
Chapter 61 (Forest, Agric., Recreational)	97.0	1.1%	20	0.2%
Total Undeveloped Land	1,509.5	16.6%	255	5.5%
Cape Cod National Seashore	3,000.0+/-	32.9%	3000	27%
Roads and Water Bodies	712.0 +/-	7.8%	712	6.5%
Total Land	9,120.5	100.0%	10,912	100.0%
<i>Source: Town of Eastham Assessor's Files, Although "total acres" as reported changed – that is the Assessor's Office report. There is some question about just how far ownership extends into the "dunes and beach" land.</i>				

Vacant Land/Build-out

Population projections look at trends in births, deaths, and migration. These trends are useful in estimating short-term growth within a community. A build-out projection is a means of checking a community's zoned development potential to see if full development fits within the natural/ manmade environment, capacity constraints and the community's vision of what it wants to become. The build-out projections in 1996 are shown in the table below.



The actual build-up by 2007 is also presented in the last column of Table 7.

Table 7: Build-out Projections

Residential	Low	Medium	High	Actual # of Units (2007)
Additional residential units	733	1,150	1,781	
Total residential units at build-out	5,464	6,000	6,512	5,886
Non-Residential				
Retail (sq. ft.)	500,000	562,121	N/A	130
Industrial (sq. ft.)	327,000	367,343	N/A	24
Commercial (sq. ft.)	827,000	929,270	N/A	
Total				6,040
Sources: <i>Low projection prepared by Thomas Planning Services based on 70% of the total land area (adjusted for wetlands by assessors code, does not include large lots with additional development potential).</i> <i>Medium projection prepared by CCC based on 78% of the total land area (adjusted for wetlands by site inspections, includes large lots with additional development potential).</i> <i>High Projection prepared by Land Use Inc., based on 90% of the total land area (not adjusted for wetlands, includes large lots with additional development potential).- Number of units Eastham data.</i>				

Given the area of the Town and established zoning policies, growth, and development gradually approaches a limit. However, the Cape Cod demographic has never been entirely steady. Housing prices, retirement rates, birth rates, as well as national and worldwide economic conditions play a role. Surely the rate of progress toward build-out is influenced by external factors as well as the unique local circumstances.

The Cape Cod National Seashore, authorized by Congress in 1961, comprises one-third of Eastham (3,000 acres), including nearly all of its six and one-half mile Atlantic shoreline, from Orleans to Wellfleet. More than one hundred privately owned residential dwellings exist within the Seashore, most of which were constructed prior to the Seashore's creation. The Town also owns 25 acres fronting on the Atlantic Ocean.

Zoning Controls

The Town has already taken a number of steps to protect its natural resources, preserve its present land use pattern and prevent the continuation of strip development. Much remains to be done to balance the town's preservation desires against the commercial needs, and the need for affordable housing.

Residential: There are approximately 300 acres of vacant developable land and land with the potential for additional development. The potential build-out for Eastham under the current zoning is approximately 400 additional housing units resulting in a total of 6,236 units at build-out. Over the last 25 years Eastham has averaged 88 new housing units per year. Projecting at that average, Eastham would reach residential build-out by 2015. If the average annual rate for the last five (5) years were used (40 units per year) Eastham would reach residential build-out by 2022. In either case residential build-out is not far in Eastham’s future. The build-out figures do not account for approximately 400 grandfathered lots that are below the current zoning requirements but are protected by their special status. While these lots could be built without regard to current zoning requirements, they are subject to other town bylaws and regulations, which in combination with the lack of sewer or water service reduce that number considerably.

Non-residential: There are approximately 19 acres of commercial land and 24 acres of industrial land available for development. If all the land is used, there could be eleven and one-half (11.5) acres or about five hundred thousand (500,000) square feet of gross floor area of commercial development and seven and one-half (7.5) acres or about three hundred and twenty-seven thousand (327,000) square feet of gross floor area of industrial development. It should be noted that although much of the industrial land has been inaccessible, accessibility is likely to increase in the near future.

Impacts of Anticipated Residential Growth

There are a number of additional impacts Eastham can anticipate with the expected increase in residential development and associated increase in population as shown below in Table 6. Table 6 provides the following information: existing conditions (60% seasonal/40% year-round) in the first column, a full build-out of vacant residential land with an increase in the conversion of seasonal units (40% seasonal/60% year-round) in the second column, and a full build-out of all vacant land with 100% year-round units) in the last column. Anticipated impact on town services for build-out has not changed.

Table 8: Anticipated Growth Impacts on Selected Town Services

Impacts	Existing (60%/40%)	Build-out (40%/60%)	Build-out (100%)
Number of year-round residential units**	2,308	3,600	6,000
Number of households**	1,908	3,200	5,600
Number of year-round persons per household (2.34 persons)**	4,460	7,488	13,104
Number of school children (14.5% of population)**	648	1,085	1900
Number of classrooms (4 per 100 students)	25	43	76
School Personnel (5 per 100 students)	32	54	95
Gallons of water per day (100 per capita)	210,800	360,000	600,000
<i>** Based on 2000 U.S. Census data</i>			

Recommended land use and zoning options incorporated into the OSRP include:

- Decrease development intensity in sensitive areas;
- Develop regulations which address the rate, amount and impact of seasonal to year- round conversions, for example require de-nitrification on lots of less than 2000 square feet;
- Continue to refine the Zoning By-laws, especially for commercial zones;
- Consider the use of a growth cap on the rate of residential construction;

Decreasing intensity in sensitive areas will involve not only prohibiting new development in such areas, but also prohibiting expansion or rebuilding. Sensitive areas may include lands in watershed protection areas, beach property and critical habitat areas identified in upcoming sections of this plan. Conversion rate regulations may be the most difficult to draft as there are not many existing examples in Massachusetts. However the town has a zoning by-law requiring a special permit when redevelopment results in a significant increase in habitable space. This approach may in the long term have a greater impact than decreasing the density on the remaining vacant residential land. Refining the zoning bylaws will also help to improve the appearance of and reduce traffic conflicts within commercial areas.

The Regional Policy Plan defines three types of Growth/Activity Centers, Village, Regional and Industrial. The village model focuses on pedestrian oriented residential and small scale commercial. The regional model focuses on densely developed commercial with some higher density residential. The Industrial model focuses on typical industrial uses, manufacturing and wholesaling. Each of these models requires a specific level of infrastructure development and community support services. Based on that fact the most suitable growth activity centers for the Town are the village and a “modified” industrial center.

TRANSPORTATION

The goal is to foster a transportation system in Eastham which is safe and accessible, and reduces dependence on automobiles.¹

Existing Conditions

Transportation is one of the most difficult issues facing Cape Cod and communities like Eastham. Providing mobility in the face of funding limitations is difficult enough. Combined with the competing issues of community character such as impacts to natural resources, the seasonal nature of the traffic problem and an increasing population dependent upon public transportation the problem becomes especially difficult.

Eastham's existing transportation system still consists mainly of roads, as opposed to other means of transportation. Today, approximately 95% of all trips in Eastham are via the private automobile. Bus ridership, walking and bicycling together total only 5% of trips. In part, this reflects the fact that existing year-round public transportation services are limited and have been neither encouraged nor studied by local government. Similarly, the appeal of bicycle transportation is constrained by the absence of east-west bike paths outside the National Seashore, and the lack of bicycle racks and secure storage bins at commercial centers in both Eastham and Orleans.

The anticipated annual expenditures on maintenance and repair of Eastham's town owned roads as well as the state owned portion of the transportation system (Route 6) is \$160,000 per year. Current capacity throughout the town owned road network meets all but the summer travel demands. Peak travel demand on Route 6 during the summer results in severe congestion in South Eastham leading to the Rotary as well as congestion near the signalized intersections in town. Traffic at intersections at Brackett Road and occasionally at Samoset operates at reduced levels of efficiency.

¹ Cape Cod Regional Policy Plan (2009) pp. 133-147

Although the capacity constraints occur primarily during the summer, safety problems occur on a year-round basis. Based on the latest available accident records, Route 6 in Eastham has a higher accident rate than any other section of Route 6 on Cape Cod. It appears that conflicts between through traffic and local turning traffic along the four-lane highway are largely responsible. Speed and inattentive drivers contribute to extensive property damage and loss of life in these accidents. Enhanced police surveillance has improved the flow of traffic and reduced accidents.

The annual average daily traffic (AADT) total volumes for Route 6 in 2001 ranged between 19,459 at the Eastham/Wellfleet town line to 26,864 just south of the Cape Cod National Seashore Visitor's Center. Further traffic count data for locations sampled along Route 6 and significant local roads is reported in the Cape Cod Commission's annual traffic counting reports. There are no clear trends in traffic volumes in recent years.

Eastham's LCP strives to create a vision for an integrated transportation system. It recognizes the importance of Route 6 to the town and regional road system; the need to make Route 6 safe and efficient; and that maintaining/preserving character and environmental resources are important priorities when considering widening roads and intersections. It identifies the preference for adjusting current development potential through open space acquisition, land use changes, and the provision for public transportation stops at appropriate residential and commercial locations. It also recognizes that coordination with our neighboring communities; the region and the State are necessary to address our transportation issues. This could be accomplished by active participation on the Cape Cod Regional Transit Authority, involvement and input with the Cape Cod Transit Task Force, and working closely with the National Park Service.

There were two specific conditions that were identified in the LCP that should be addressed. The first being the multitude of existing curb cuts along the Route 6 corridor. Curb cuts tend to add confusion and movement conflicts on a heavily travelled roadway. This is particularly problematic when there is no service road present. In recent years, a private endeavor between two businesses was implemented that allowed a small driveway service connection between the Fairways Restaurant and the Seatoller Shopping Center so traffic could flow without having to access Route 6.

Despite its less than desirable geometrics (steep grade, gravel surface, & limited sight), it has proven to be quite successful.

The second is the lack of service roads along the Route 6 corridor. Service roads tend to enhance the town shopping experience with the creation of an easy way to get from one business to another. This would be of particular benefit to the businesses themselves by creating opportunity for customers to stop in.

Eastham is primarily a residential community with 33% of the current developed land devoted to residential uses. The largest landowner in the Town is the National Seashore, which comprises 33% of the Town. Furthermore, nearly 60% of the homes are used seasonally. Eastham's existing transportation system consists of roads, limited bus service and bicycle/pedestrian travel. Eastham residents, like those in most other Cape communities, rely primarily on the automobile for transportation. The Cape Cod Rail Trail, a regional bicycle path, traverses the length of Eastham. A sidewalk runs along the West side of Route 6 in Eastham. In addition, there are recreational bicycle paths and walking trails within the Cape Cod National Seashore.

Roadways

A total of approximately 6 miles of State road (U.S. Route 6) and 61 miles of accepted Town roads exist in Eastham. Route 6 is classified as a Principal Arterial by the Cape Cod Commission, and begins on Cape Cod at the Bourne/Wareham town line and ends in Provincetown, the northern most point on the Cape. This State Highway is a 4 lane undivided roadway in Eastham. It bisects the Town (east/west) running for 6 miles from the rotary at the Orleans border to the south, to the Wellfleet town line in the North. The speed limit along Route 6 is 40 miles per hour. The Eastham/Orleans Rotary is posted at 25 miles per hour.

Public transportation



Public Transportation to and from Eastham is limited. The Plymouth & Brockton Street Railway Company (P&B) makes a regular stop at and across from the Town Hall on Route 6, and provides service from Boston to Provincetown and points in between. Additional stops are provided, as needed, requiring the passenger to hail the bus or request a drop-off along Route 6. During the winter, P&B operates two buses between Provincetown and Hyannis, and during the summer operates five buses.

Cape Cod Regional Transit Authority provides daily bus service, Monday through Saturday, beginning 6:30 a.m. to 7:45 p.m. from Harwich to Provincetown, passing through the towns of Orleans, Eastham, Wellfleet, and Truro to Provincetown. Passengers may board the Flex at any of the scheduled bus stops or they may flag the bus down anywhere along the bus route except along Route 6.

The Cape Cod Transit Authority also runs an on-call transportation service called the B-Bus (called the DART). Reservations must be made at least a day in advance for this service which provides passengers a ride from their home for medical appointments, shopping trips and other errands.

The Eastham Council on Aging provides van service for residents over sixty to medical appointments and shopping areas. The Council also provides transportation to special programs, events and field trips for seniors.

Summer bus shuttles are operated by the National Seashore between the Little Creek Parking area and Coast Guard Beach, though you have to pay for parking. If you arrive by bike or walk, the shuttle is free.

Water Supply Systems

The Outer Cape is underlain by sandy sediments saturated with fresh water derived entirely from precipitation. Of the 40 to 47 inches of annual precipitation on the Outer Cape, about half is lost to evaporation, transpiration and direct runoff. The remainder percolates through the ground and collects in lens-shaped bodies of freshwater which float over sediments saturated with denser saltwater.

Eastham's water is withdrawn from the Nauset Lens of the Cape Cod Aquifer. A 1993 study by the USGS determined that the northern edge of the Nauset Lens discharges at Blackfish Creek and Drummer Cove in South Wellfleet, and the southern edge of the lens discharges at Rock Harbor Creek and Town Cove at the Orleans-Eastham town line. The ground water table roughly following the land elevation rising in a dome of up to 17 feet above mean sea level (= 17 feet NGVD; National Geologic Vertical Datum) beneath the portion of the Eastham outwash plain in North Eastham to the east and west of Route 6 and North Sunken Meadow Road.

There is only one type of water delivery system in Eastham -- private wells. Most are on-site domestic water supply wells drawing about 200 GPD. Some are small volume wells, serving various businesses and office buildings for which the withdrawal volume has not been estimated. In a Cape Cod Commission study, "Small Volume Well Inventory and Prioritization Project", 67 registered and unregistered small volume wells are listed: three (3) are nontransient-noncommunity public water supply (NTNCPWS) systems, 38 are transient-noncommunity public water supply systems (TNCPWS), and 26 are unregistered water supplies. There are no areas of Eastham served by a municipal water supply system with the exception of nineteen services near the Orleans town line, which are connected to the Orleans public water supply.

The Outer Cape Capacity Study (1996) recommends that the Route 6 corridor and landfill areas in Eastham be considered for the development of public water supply systems. As many as one in every five wells along the

corridor exceeded nitrate levels of 5 mg/L between 1985 and 1994. The study predicts that as buildout approaches, that number will increase to one in every four wells. A 1990 USGS survey identified two potential sites for development of municipal water supply wells should such service become a necessity in the future. These sites are identified as site of hypothetical public-supply well "A", located in Eastham Water Resource Protection Zoning District "G", and as site of hypothetical public-supply well "B", located in Eastham Wellfield Protection Zoning District "H". The cost of providing public water to the Route 6 corridor and landfill areas is estimated at \$6 to \$9 million dollars in capital expenses and around \$500,000 in operational expenses.

Sewer Service

There are no areas of Eastham that are served by public sewers. Only on-site sewage disposal systems are used throughout the Town. These systems include cesspools, Title 5 septic systems and "innovative technology" disposal systems such as those using a peat bed to reduce nitrate nitrogen concentration in effluent discharge and bioclear systems that is a member of the Tri-Town Septage Treatment facility located in the town of Orleans. This facility serves the communities of Eastham, Orleans, and Brewster. The facility management is responsible for operation and maintenance of the plant. The Eastham Board of Health prepared a Town inspection and maintenance program that was implemented during 1997. This has been discontinued. System upgrades are required when property is conveyed or improved, and when an existing system fails or exceeds four pumpings per year.



Section IV: Environmental Inventory and Analysis

Geology, Soils and Topography

Geology

Cape Cod owes its existence to glacial deposits derived from the last ice sheet, which moved over southeastern New England. Glauconite, fossil material, and the sparsity of feldspar in the glacial sand suggest that the ice sheet overrode coastal plain and shelf sediments of the Pleistocene and pre-Pleistocene ages before reaching Cape Cod. During deglaciation of southern New England, the topography of the continental shelf played a major role in determining the pattern of ice retreat. Major lobes formed in the relatively shallow basins on the shelf.

When the Cape Cod Bay lobe had retreated to approximately the present south shore of Cape Cod Bay, the Harwich outwash plain deposits were laid down. The great extent of the outwash plain and the Sandwich moraine indicate a major standstill during the deposition of these features (Mather, et al, 1942). The glacial deposits on outer Cape Cod, including the Nauset Heights outwash and Eastham plain outwash were deposited after the Harwich outwash deposits. During this time, the Cape Cod Bay lobe was either depositing ice-contact lacustrine sediments north of the ice-contact head of the Harwich outwash plain or it was retreating across Cape Cod Bay. West and southwest surface gradients on the Eastham plain and the outwash plains further to the north indicate they were deposited by meltwater draining the South Channel lobe (Oldale, 1968; Koteff et al, 1967).

Till interbedded with and overlying the Nauset Heights outwash deposits may have been deposited during re-advances of the Cape Cod Bay or South Channel lobes, or as flowtills. Retreat of the ice away from the ice-contact head of the Harwich outwash plain caused the development of a preglacial lake between the retreating ice front and the glacial deposits to the south. The lake eventually occupied most of Cape Cod Bay.

During the deposition of the sediments on outer Cape Cod, which include the Wellfleet plain, Truro plain, and Highland plain deposits (Koteff, et al, 1967; Oldale, 1968), the Cape Cod Bay lobe retreated northward in Cape Cod bay to drain eastward through Town Cove which resulted in a lake stage lower than present sea level. Meltwater streams draining the ice near Nauset Beach Lighthouse deposited the Eastham plain deposits. Older sediments of the Eastham plain were deltaic and graded to the low stage of the lake. All the deposits above sea level are fluvial; they were deposited by streams that flowed westward and eventually eastward between the ice-contact head of the Nauset Heights deposits and ice that occupied the marsh filled embayment south of Nauset Bay. Continued northward retreat of both lobes terminated glacial deposition and, when the ice lobes had retreated north of High Head (Truro), the lake in Cape Cod Bay drained completely.

Direct effects of glaciation on Cape Cod ceased about 18,000 years ago when the ice had retreated some distance north of Boston (Kaye and Barghoorn, 1964). Eustatic sea level was about 400 feet below its present level (Edmary and Garrison, 1967), and the ocean was ten or more miles from the present shoreline. With the waning of glaciation, water previously trapped in the ice melted, resulting in a rapid rise in eustatic sea level. Approximately 6,000 years ago, marine waters reached the vicinity of Cape Cod (Ziegler et al, 1965), and extensive erosion of glacial deposits occurred. The shoreline reached its present position in relation to the glacial deposits about 3,500 years ago (Redfield, 1965).

Sea cliff erosion of glacial deposits provided sediment for the growth of spits. North of Nauset Bay and First Encounter Beach where spits had not developed, the glacial deposits in the sea cliffs are being eroded by waves. The average rate of erosion along the Atlantic shore is about 3.1 feet per year (Ziegler et al, 1964); along the Cape Cod Bay shore it is somewhat less.

When erosion threatens structures which are not easily relocated, such as the numerous cottages along the Cape Cod Bay cliffs, property owners have sought to stabilize the bank with engineered structures such as bulkheads

or revetments. The net effect of these structures is to reduce the amount of sand available to the beach and consequently the barrier beaches at Sunken Meadow and First Encounter. Various alternatives have been utilized, such as nourishment using sand from inland sources, "soft" solutions using sand bags, vegetative cover and sand drift fencing.

The alignment of the seaward shore of Nauset Beach and the cliffs cut in the glacial deposits to the north suggest that the shoreline is retreating westward at a constant rate. Material eroded from the glacial deposits is transported by waves and currents and eventually deposited at the distal end of the spits as shoals or beach deposits. During storms the seaward shore of the spits is eroded and beach deposits are deposited several feet above normal high tide. Locally, storm waves cut channels (storm sluices) through the spits and dunes, carrying material into the lagoon where it is deposited as overwash fans, which re-vegetate in succeeding seasons.

Rates of erosion are sporadic and can change significantly based on changes in offshore sand bars, or the severity and timing of storms. Throughout the 1990s the Nauset Light Beach area had accelerated erosion rates, and, as a result, the lighthouse structure was in danger of collapsing into the sea. A coordinated effort of private citizens, the Cape Cod National Seashore and the U.S. Coast Guard provided for the safe removal of the structure to a more landward location to a location 150' to the west in the fall of 1997. A sequence of storms beginning in fall 1990 obliterated some of the dunes at Coast Guard Beach and revealed evidence of Native American habitation. A team of National Park

Service archaeologists completed a detailed examination of the site over the two subsequent winters and documented valuable information about the site and its uses by its inhabitants between 1,200 and 2,500 years ago.

Freshwater peat deposits probably began to develop in kettle holes and stream valleys shortly after deglaciation. Poor drainage in the sandy deposits was caused by permafrost, and altered by the rise in the water table resulting from postglacial rise in sea level. Salt water peat deposits probably began to develop about 6,000 years ago in kettle holes submerged by the rise in sea level. Evidence from Nauset Harbor in Nauset Marsh indicates that at least as long as 1,200 years ago, salt marsh was present. Other salt marshes may have formed extensively as much as 3,000 years ago, which would have followed the growth of spits that provided sheltered lagoons.

Soils

The climatically associated soils on Cape Cod are podzols. Their existence in this less than normal hostile climate is due to the porosity of the glacial material and the rapid leaching associated with it. The remaining sediments that are characteristic of the Eastham area are interior and coastal sands deposited by wind actions either along the present coast and associated with wave action or those sands associated with direct glacial deposition. Wet sediments found in and near salt marshes and freshwater swamps are also quite prevalent, particularly in southern and coastal Eastham areas.

Topography

Like most of Cape Cod, Eastham's terrain is level to gently rolling with land mass elevations generally from sea level to sixty feet above sea level. Perhaps the most significant feature of the topography is the nearly one half of the Town covered by water. Eastham might be considered the "low country" of the Cape, with many points of saltwater infiltration occurring at elevations below sea level. The most dramatic topographical features occur along the Atlantic Ocean coast where steep cliffs or bluffs are formed by the erosion of outwash plains.

USGS Topographic Quadrangle

Eastham, Massachusetts



Legend
[Dashed Line] Eastham



0 0.25 0.5 1 1.5 2 Miles

Data From MassGIS

Landscape Character

Eastham's natural beauty is one of its greatest assets. Scenic vistas on the bay and ocean front along with the variety of landforms give the landscape a character that attracts many visitors and enriches the life for "locals" year-round. Within the Town are marshes, bogs, woodlands, ponds and miles of shoreline. Looking out over the Nauset Marsh, past the barrier beach to the breaking waves or surveying the tidal flats at First Encounter Beach that stretch further than the eye can see are unique experiences even on the Outer Cape. Local residents have listed proximity to water as one of the best things about living in Eastham, including the oceanfront and the beautiful fresh and salt water ponds that dot the area.

With its reliance on tourism for economic survival, it is certainly in the Town's best interest to preserve and protect these unique vistas and areas. It is worth noting that even those visitors staying in the Mid or the Upper Cape will schedule a visit to the Outer Cape because of its unrivaled beauty and many recreational opportunities. If the area should begin to look "just like everywhere else", there will be no reason for tourists to visit and those who live here will no longer feel a special connection to nature, the out of doors and the water that brought them in the first place.

Water Resources

Surface Waters and Wetlands

Wetlands habitat comprises more than twenty-five percent (25%) of the land area of Eastham, both within and outside of the boundary of the National Seashore. The vast majority of these areas are salt marsh (1,300 acres) fresh water ponds and vegetated wetlands (475 acres). Some seventeen (17) vernal pool habitats have been described or certified through the State's Natural Heritage and Endangered Species Program and many others are known to exist.

The salt marsh systems bordering Cape Cod Bay have all been included in one of two Areas of Critical Environmental Concern: the Inner Cape Cod Bay area and the Wellfleet Harbor area. Included in these areas are critical habitat areas for Diamondback Terrapin, salt marsh sparrow and Piping Plover. Nauset Marsh has not been so designated, although the majority of this system within the Town's boundary lies within the National Seashore thus preventing significant changes. The barrier beach known as Nauset Spit is habitat for various threatened and endangered species such as plovers and terns, which depend on the aquatic food sources nearby. The entire estuary and Town Cove represent an important spawning and nursery area for finfish, shellfish and lobsters. Both white cedar and red maple swamps border the coastal resources areas. Other bordering vegetated wetlands extend from the many fresh water ponds and transition areas along salt marsh systems.

Two anadromous and catadromous fish runs are maintained by the Town at Herring Pond and the Great Pond (Cole Road) system. The kettle pond area of the mid-section of the Town is connected by a variety of trenches, ditches and culverts to allow the migration of these fish through several hundred acres. Two ponds, Great Pond and Herring Pond, have been the subject of scientific evaluation through the Massachusetts Clean Lakes program to determine the well being of the pond and to recommend preventative and restorative measures with regard to water quality, fisheries habitat and recreational uses. The results of the diagnostic phases of these works suggest that the ponds are in relatively good health with good species diversity, and minimal eutrophication. The feasibility study of Great Pond included various methods of adapting swimming areas to coexist with macroalgal species and watershed sampling.

Starting in 2001, a joint effort by the Cape Cod Commission, Cape Cod National Seashore and the Eastham Ponds Stewards began monitoring ten (10) of Eastham's ponds for water quality. The results indicate that all but

Minister Pond are in relatively good condition. Minister Pond merits closer scrutiny.

It is estimated that some two hundred (200) acres of wetlands area have been altered as a result of development since 1970. This acreage includes projects completed before the Wetlands Protection Act, a series of small development projects, which were initially permitted under the Act, and the cumulative degradation of the West Shore beaches as a result of effects of revetments and other coastal engineered structures. Two salt marsh remediation projects have recently been undertaken which will lead to improved conditions, including the reduction in the quantity of invasive populations of phragmites. Tidal flow was improved in the upper reaches of Boat Meadow Creek due to the installation of a large culvert as part of the bike trail extension. Tidal flow was also improved in Abelino's Creek due to the removal of the upper layers of an old dike. Phase Two of the Abelino's Creek restoration is proposed for the near future.

The need to assess and identify those critical environmentally sensitive areas in Town which deserve particular attention and review through various regulatory agencies has been established. Joint meetings with the Conservation Commission, Board of Health and Water Resources Advisory Committee have been initiated in an effort to systematically review development projects in those areas recognized as sensitive with regard to development or renewal of development such as seasonal conversions. It is essential that the review process be conducted in an integrated fashion among the various appointed boards and committees. This process has been started.

The Board of Assessors and Conservation Commission have identified the concept of Conservation Restrictions as a valuable tool to providing tax relief in exchange for restrictions on development of properties, which are identified as significant habitat areas. To date, eight (8) such parcels of land are protected including several areas identified as containing critical habitats.

The Glacial Ponds Trail concept was developed to link several areas in the vicinity of the various kettle ponds in the central part of Town together with their respective habitats of woodlands and wetlands. This linkage provides a significant corridor for migration of various species. Off-road vehicle use is not permitted anywhere in the Town by regulation and by-law. This policy should be maintained to protect these sensitive areas.

The identification of additional vernal pools for certification should be a priority and can be accomplished with assistance from Town departments and staff. Such designation permits greater statutory regulation under the Wetlands Protection Act and Cape Cod Commission Regional Policy Plan as well as local by-laws.

Currently, projects in Areas of Critical Environmental Concern (ACEC) are regulated by local by-laws more rigidly than under State regulation. The areas within the ACEC have been included in the definition of "resource area" and regulations prohibit any dredging or filling within the boundary of the ACEC. Additionally, local regulations prohibit the replication of inland wetlands entirely.

A careful analysis of the ponds, vernal pools and mapped critical wildlife habitat areas should be implemented. Comparison with the previously collected data under the Clean Lakes program will provide insight as to the adequacy of current regulations in protecting these areas, and will identify those areas, which need remediation under the current Wetland Protection By-law or the Board of Health regulations.

Coastal Resources

The coastal resources of Eastham are divided between Cape Cod Bay (the west shore) and the Atlantic Ocean (east shore) including Nauset Marsh and Town Cove. The Bay shoreline extends approximately 5.5 miles and is a mixture of coastal bank deposited by glacial activity, barrier beaches which form and protect extensive salt marsh systems and coastal dunes. The Town owns and maintains seven (7) public beach areas along this shoreline with a total parking lot capacity of some five hundred (500) vehicles.

The parking facilities serve an area which totals approximately 1,500 linear feet of public beach front (0.3 miles). No lifeguards are provided at these beaches due to the nature of the tidal action. Average depth of water is eight (8) feet along the beaches at high tide, and at low water sand bars extend up to one mile offshore. Numerous private access points to the shore are maintained by local associations of homeowners.

Sunken Meadow and First Encounter are two barrier beaches, created by sand transported by tidal action and the wind. Landward of these barrier systems are extensive salt marsh systems, which have tidal creeks. Other salt marsh systems include Boat Meadow and Rock Harbor. All of these systems have been designated as Areas of Critical Environmental Concern (ACEC). In total, they contain approximately four hundred (400) acres.

A listing of those Town-owned beaches and parking areas follows.

Table 9: Eastham Beach Parking

Number (Estimated) of Beach Parking Spaces		
Beach	Handicapped	Other Spaces
South Sunken Meadow	1	16
Cooks Brook	4	102
Campground	4	105
Thumpertown	1	22
Cole Road	1	14
First Encounter	4	106
Boat Meadow		13
Great Pond	2	40
Wiley Park	3	49
Bees River	3	88
Herring Pond	1	13
Dyer Prince		6
Hemenway	3	26
Nauset Light	2	60

Rock Harbor is located at the southern extremity of the Town and is shared with the town of Orleans as a (tidal) port for recreational and commercial fishing vessels. Eastham maintains some forty-five (45) slips for dockage of boats and a parking area with a boat launching ramp is maintained by the Public Access Board of the Commonwealth. Periodic dredging of this harbor continues on an erratic schedule. The most recent activity was completed in 2004, with the dredge spoil being deposited in several nearby shoreline locations. Dredging is scheduled to begin in the spring of 2015 and the material will be used on site. (See Rock Harbor dredging below)

Billingsgate Island, scarcely visible except at low tide, is presently a mere fraction of its former self. Once an upland area, which supported a community of residents, tidal action reduced the volume of land to a shoal area. This foreshadowing of the future of the rest of the Cape forced the removal of the dwellings and people some time ago, but the resource as a productive shellfish ground still exists. The corporate boundary of the Town extends three (3) miles further into Cape Cod Bay and within that area are productive grounds for the harvest of quahogs, sea clams, and bay scallops. Recreational fishing for both finfish and shellfish is common along the entire shoreline.

On the opposite side of the Town, Eastham's "back shore" faces the Atlantic Ocean, which consists for the most part of high bluffs of glacial till exposed to coastal processes. Much of this sand has been transported southerly to form the Nauset Spit, a barrier beach which created and protects the Nauset Marsh system and adjacent Town Cove. The salt marsh system covers approximately eight hundred (800) acres and is an extremely productive

nursery area for both fin and shellfish species. The harvesting of Shellfish is an ongoing activity in the marsh with both recreational and commercial activity being sustained and encouraged. The Town has developed numerous programs to supplement the natural production of shellfish species including relays, aquaculture methods to raise seed for the "wild" fishery, predator control programs and water quality monitoring.

Private shellfish aquaculture sites continue to operate in various areas of the Nauset Marsh and Town Cove as they have historically done. The Town is currently addressing the recent interest in aquaculture by developing and permitting larger scale "Aquaculture Development Areas". These large sites, which abut Town property in Cape Cod Bay, will be leased to individuals. By streamlining the permitting process and providing areas not subject to upland property owners' objections, it is anticipated that aquaculture activities will grow.

Aquaculture Development Areas

The Nauset Marsh / Town Cove Aquaculture Development Area is limited to sites identified and in existence since January, 1997. The town designated Aquaculture Development Areas (ADA) in the intertidal area of Nauset Marsh / Town Cove for the purpose of facilitating the process of certification and approval. By designating an area as an ADA, this provides for surveying, Conservation Commission approval, determination of productivity from Department of Marine Fisheries, Division of Waterways permits, Indian Affairs review, and Corps of Engineers permits for the installation of devices for the cultivation of shellfish.

The Boat Meadow Aquaculture Development Area (BM-ADA) was subsequently designed in 1996 to support the needs of aquaculture in the Town of Eastham. Currently there are 28 aquaculture sites that make up 28 acres at Boat Meadow.

All activities of an aquaculture lease site are in compliance with the Town of Eastham management plan filed by the applicant or as amended in consultation with the Natural Resources Department. Annual reports of the activity, seed permits are required for the purchase or transport of seed shellfish from these sites and delivered to the Department of Natural Resources.

The licensed (granted) aquaculture grower is able to start with a 1 /2 acre site for the first two years. After an initial two years a licensee may expand to 2 full acres which is the maximum acreage permitted by one licensee/ grant.

Supervised by the Natural Resources Officers best practices on the ADA are conducted in three stages: (1) Production of See – very small clams are obtained from hatcheries. (2) Field planting – the seed are "planted" in plastic mess bags and are slightly elevated. (3) Grow Out – the seed are allowed to remain the bags until they are harvested.

The corporate boundary of the Town divides Town Cove from sections of Nauset Marsh. Historically, residents of each town have "enjoyed the rights to the shellfishery" as if they were residents of the other Town since the political separation of Orleans from Eastham in 1797. Since division of resources based on political rather than biological or other scientific strategies does not make sense, the two towns have cooperated closely on all aspects of management of the water bodies in question.

The majority of Eastham's shoreline along the back shore remains undeveloped beyond the establishment of the Cape Cod National Seashore. Two beaches are maintained on the Ocean at Nauset Light and Coast Guard sites. Both facilities are operated by the Seashore and include restroom facilities as well as



lifeguards. Three Town landings are maintained along the marsh and Cove and serve as boat launching areas. Swimming is limited at these sites.



Dredging Rock Harbor

The proposed 2015 dredging of Rock Harbor should carry the towns of Eastham and Orleans through the next 10-12 years. Although the cost for dredging Rock Harbor has increased about eight-fold in a decade, both Eastham and Orleans officials agree it needs to be done. When the two towns began discussing dredging the shared harbor the cost was pegged at \$600,000 – or approximately \$300,000 for each community, or about double what taxpayers had paid about 10 years ago. Now, a year after that original cost was given, the price has jumped to \$1.7 million.

The price ballooned as it became clear that the materials can't be placed on beaches – it is too grey and gritty – and the cost of trucking it to a disposal site is now very high. The plan now is to ship the dredged materials by scow to a disposal site offshore.

In 2004, the dichotomy of excess sand in Rock Harbor, which was removed, was placed on the Eastham side of the harbor to stabilize the dune upland.

Due to the lack of any other harbor facilities, there appears to be a limitless demand for services at Rock Harbor despite the fact that it is subject to tidal action. The limited number of slips cannot meet the need, but the expansion of dock facilities must be weighed together with loss of marsh and increased traffic along access roads. A Harbor Management Plan for the Town should be investigated in light of the framework provided and guidelines for dredge activities. However, a great deal of effort is required to complete such a plan and the constraints of Rock Harbor itself may be self-limiting.

Docks and piers constructed along the shore of Town Cove present an ongoing concern with regard to the access along the shoreline as well as effects on shellfish habitat. Issues such as increased turbidity, loss of areas, and conflict of use are concentrated along this section of Eastham's shoreline. In 1999, by-laws were amended to encourage community access docks and piers.

There has been a dramatic increase in recent years of both boat moorings and on-shore small boat storage. A permitting program is in place, which regulates both the quantity and locations. Extensive mooring fields are to be found at Hemenway Landing, Great Pond, and along the entire Cape Cod Bay shoreline with banned winter storage

All of the salt marsh systems along the west shore are currently closed to shellfish activity due to an administrative closure order issued by the Environmental Protection Agency (EPA). Sanitary surveys of these areas have not been completed at the present time, but high coliform bacteria counts in samples suggests that these areas would not meet water quality standards. In Nauset Marsh and Town Cove, several areas are subject to "seasonal closure" or "rainfall closure" due to road runoff, which is channeled directly in shellfish growing areas. These areas are in critical need of attention and protection.

With the understanding that changes periodically take place to the inlet of the Nauset Marsh system which increase flood potential for low lying lands, some effort should take place to identify potential High Hazard areas on FEMA maps. During a few years in the early 1990s when two inlets established, more tidewaters are able to enter the system, but not necessarily exit on the low tide; thus, with a series of easterly gales, which drove

tidewaters into the marsh, numerous instances of flooding have occurred. In fact, the one hundred (100) year flood elevation has been achieved several times in a few years. The FEMA maps need to be reviewed in light of different barrier beach configurations. At a minimum, development in boundary areas or within hazard areas should be scrutinized.

Shorefront Development

The overwhelming majority of the shorefront in Eastham along Cape Cod Bay is eroding at various rates ranging from more than two (2) feet per year to less than one-half (1/2) foot per year. The response by property owners has been to construct structures to prevent the loss of their property with the resulting loss of active beach, "end effects" which encourage neighbors to imitate the activity, and finally a loss of sand to adequately nourish the barrier beach systems at the extremities of the Town. If a landowner chooses to take erosion control measures, the Town now requires that they be "soft" rather than "hard" solutions, but significant damage has already occurred. Mitigation is also required in the form of annual renourishment of sand, in an effort to preserve the dynamic beach system. Even so, nourishment of Town-owned beach areas is a significant problem increasing in scope.



As the densely developed areas along the shore are converted to year-round use, or expanded to include more housing on substandard lots, septic issues and the subsequent low level impact of foot traffic and other incidental pressure increases. Access to and use of the beachfront property is an issue of increasing concern as certain property owners are attempting to exercise their property rights to mean low water (a considerable distance) and prevent such activities as bathing, boat moorings and the harvest of shellfish in front of their property. While not excessive at the present time, these owners represent a trend increasing at a regular rate. This may be a result of the recent relocation of residents from more urban areas that arrive with an attitude of needing complete privacy from their neighbors and an unwillingness to share what they have with visitors and year-round residents.

Vegetation

As described in Section III, Eastham's original forest was stripped in the early years of the area's settlement. With soil depletion from agricultural activities, wind action in exposed areas and frequent forest fires and repeated cutting, regrowth of most species has been inhibited. A large percentage of Eastham is covered with open pine barrens, particularly its northern and western sections.

Far from being a "natural" landscape, these woods are a direct result of Eastham's agricultural history. Pitch pines and locusts, which are the common species that seed in abandoned fields, are unusually numerous in Eastham. Red cedars usually mark the site of a former pasture rather than a plowed field. Young cedar seedlings, unlike pines and locusts, can survive the repeated grazing by cattle and sheep. In fact, in the few open field habitats still maintained on the Outer Cape, one can find among the mown grass tiny prickly red cedar plants, no more than a few inches high, which may be decades old. These hardy survivors bide their time, and, once these fields are abandoned, quickly rise up and colonize them.

Much of the second growth forest on Cape Cod has been described as ordinary and not of any particular importance. Yet it is these forests that make up much of the undeveloped woodlands on the Cape. The most

prevalent pine variety is the pitch pine. The oak species most common include scrub oak, white oak, red oak and pin oak. These “ordinary” forests will over time increase in significance as they grow increasingly scarce. As the title implies, second growth pine/oak forest has sprung up on formerly cultivated lands that once were forested with a diversity of hardwood species. The pines and oaks are often 30 to 50 years old. In the natural process of forest succession, pitch pine forests are reaching their maximum age and are gradually being replaced by oak and a few other hardwood species. As the pines age, they become susceptible to invasions by beetles, as is evidenced by the abundant dead or dying pitch pines throughout Eastham. These areas are considered the Cape’s prime developable land and provide important upland wildlife and plant habitat. It is important to note that between 1971 and 1990, 1,311 acres of forest were lost to development in Eastham (Outer Cape Capacity Study, 1996).

Pitch pine/scrub oak barrens flourish on the relatively level sandy soils found on the Outer Cape. The pitch pine (*Pinus rigida*) occurs in an open pattern and has a dense understory of scrub oak (*Quercus ilicifolia*). Pitch pine is a relatively hardy tree that has a natural resistance to fire, due to its thick bark. The scrub oak understory shares the open spaces with plant species such as Bearberry (*Arctostaphylos uva-ursi*) sedges (*Carex* spp.) and lichens (*Caladonia* spp.) Heathlands, or communities of low growing shrubs, are also numerous. They include species such as Bearberry and Black Huckleberry (*Gaylussacia baccata*).

In addition to the forested areas, Eastham is also characterized by freshwater wetland and salt marsh vegetation. Freshwater wetlands include wet meadows, marshes, swamps, bogs, vernal pools, streams and ponds. Atlantic white cedar swamps are found in low areas of the coastal plain that are covered by standing water where the sandy soil is topped by a saturated peat layer. It is not unusual for standing water to be present at least half of the growing season. Atlantic white cedar (*Chamaecyparis thyoides*), an evergreen of the cypress family, is the characteristic tree found in the swamp. It is common to find a shrub layer of hollies in association with cedar swamps such as Common winterberry (*Ilex verticillata*) and Inkberry (*I. Glabra*) as well as ericaceous, or heath like shrubs, such as Sweet Pepperbush (*Clehra alnifolia*), swamp azalea (*Rhododendron vicosum*) and poison sumac (*Rhus vernix*). The remaining cedar swamps on the Cape are thought to be remnants of as much as 6,000 acres that existed when the Pilgrims arrived. The bogs were mined for their peat and the trees provided a source of fence posts and cedar shingles. The swamps were also converted to cranberry bogs and cleared for agriculture.

Vernal pools are important wildlife habitat for a variety of amphibian and invertebrate \ species, some of which are completely dependent on the pools for their survival. The temporal nature of the pools precludes the establishment of fish populations. Without predation by fish, amphibian eggs and larvae are able to mature, making these pools ideal habitat for certain species of frogs and salamanders, as well as other invertebrate species. These pools are particularly susceptible to changes in surface topography and hydrology and the introduction of pollutants through stormwater.

Salt marshes are one of the most biologically rich ecosystems in the world, as they nourish and shelter an abundant array of shellfish, fish, birds and even people. The salt marsh exhibits definite zones in the arrangement of its plant species. The limits of the marsh zones are determined by plants' responses to varying salinity and the frequency of tidal flooding. This separation is most easily seen in the occurrences of the marshes' two most dominant plant species: the coarse, broad-leafed salt marsh cord grass (*Spartina alterniflora*) along the edge of the water, and the smaller salt meadow cord grass (*Spartina patens*) common to the largest and intermediate sections. Bordering the upper zone between high marsh and land vegetation is seaside goldenrod, blackrush and panic grass. Higher marsh ground that receives influxes of fresh water is colonized by cattails and phragmites.

An important but isolated habitat in Eastham is the Sand Plain Grassland, which is a state listed endangered habitat. The primary characteristics of the habitat are grasslands of droughty, low nutrient soils dominated by little blue stem grass (*Schizachyrium scoparium*), Pennsylvania sedge (*Cares pensylvanica*) and poverty grass (*Danthonia spicata*). Other common inhabitants are bearberry (*Arctostophylos uva-ursi*), scrub oak (*Quercus ilicifolia*) and stiff aster (*Ionactis linariifolius*). Some animals that benefit from open habitats like Sand Plain Grasslands are bobolinks, grasshopper sparrows (*Ammodramus savannarum*), a number of small animals and

birds of prey such as owls, northern harriers (*Circus cyaneus*), and other hawks. Sand Plain Grasslands are an early successional stage of plant community development, and are maintained by factors such as fire, salt spray, or mowing. Threats to this habitat are invasive plants, development and forest succession.

In 2001, to honor the 350th anniversary of the incorporation of the Town of Eastham, and due to a strong interest in creating a lasting legacy, the 1651 Forest project came about. The overall goal is to utilize a section of Wiley Park, where groves of compatible trees and underbrush will be planted to provide a forest that typifies those that existed approximately 350 years ago. There is a Friends group responsible for carrying out the planting plan and other tasks associated with the maintenance of the forest. Several species have been planted to date.

Threats to Natural Resources

All of Eastham's critical natural resources are sensitive to development pressures as well as increases in population and the accompanying recreational pressures. The primary threats to each of these resources are described in Table 10.

Each specific type of critical natural resource listed above has a threshold for tolerance to impacts from development or recreational use. Development results in a variety of impacts on natural resources including clearing of land, creation of impervious surfaces that prohibit groundwater infiltration, drainage changes, erosion and sedimentation, elimination of habitat, introduction of nutrients from septic systems, changes in groundwater flow due to large numbers of private wells, noise pollution and disturbance of habitat and visual impacts.

One of the greatest threats to the critical natural resources of Eastham is reduction, fragmentation and elimination of woodland habitat. For residential development, the amount of cleared vegetation for roadway and structures typically ranges between 40% and 80%. It is not unusual for a residential or commercial site to be completely stripped of vegetation prior to its development. Removal of vegetation reduces or eliminates the ability of wildlife to breed, feed, take shelter and survive. It is important to maintain unfragmented tracts of forest of sufficient size to support the Cape's overall diversity of wildlife species. Too often, developments contain inadequate wildlife corridors that provide little functional wildlife habitat, and are of little value to wildlife that require interior forest habitat.

As climate changes occurs, local ecology across Cape Cod will be threatened by different temperature regimes, weather patterns, and other conditions. A recent report of The Northeast Climate Impacts Assessment (NECIA) predicts that open space communities will change along with climate trends. As the temperatures rise and growing conditions transform, plant and animal communities, fish and bird migrations are expected to move northward in search of suitable habitat, and more southern species will move in to take their places.

As a result of climate change, change in Cape Cod Bay and the Atlantic Ocean will have an effect on the Town of Eastham's herring runs. This isn't merely an academic matter; already, fish migration in response to warming bay and ocean waters is having real-world effects. The Town of Eastham's herring runs have been very productive the past few years, but will that continue. The herring is just a harbinger of things to come. As fish populations migrate in response to changes in ocean temperatures. As global warming alters the world's oceans, fish diplomacy is sailing into uncharted waters.



The storm of 1978 pounded Coast Guard Beach

Table 10: Threats to Natural Resources

Resource	Threat
Salt marsh	Dredging and filling (esp. docks/marinas) Adjacent development Ditching for mosquito control Excessive nutrient loading Stormwater runoff
Quaking/Sphagnum Bogs Cedar swamps	Stormwater runoff Nutrient loading Adjacent development Changes in hydrology
Vernal pools	Changes in hydrology and surface topography Stormwater runoff Adjacent development Direct loss to development Lack of protection (unidentified and uncertified) Drawdown of the water table
Herring runs	Reduced stream flow Obstructions that block fish passage Over fishing

Coastal Plain Pond Shore	Groundwater withdrawal and drawdown Trampling of vegetation Off road vehicle use Nutrient loading Stormwater runoff Adjacent development
Barrier beaches	Alteration by development Shoreline protection structures Sediment starvation Off road vehicle use
Hardwood tree stands/ Unfragmented forest	Direct loss to development

Source: Outer Cape Capacity Study, Cape Cod Commission, 1996

Special Concern, Threatened and Endangered Species

In the section for plant species, and for the wildlife listed, the following definitions, as identified by the Massachusetts Natural Heritage and Endangered Species Program, will be applied:

Special Concern--This category includes any species of plant or animal, which has been documented by biological research and inventory to have suffered a decline that could threaten the species if allowed to continue. Also, any species that occurs in such small number or with such restricted distribution or specialized habitat requirements that it could easily become threatened in Massachusetts.

Threatened--This term applies to any species of plant or animal likely to become endangered species in the foreseeable future through all or a significant portion of its range. It also defines any species declining or rare as determined by biological research and inventory and likely to become endangered in the foreseeable future.

Endangered--This classification refers to any species of plant or animal in danger of extinction throughout all or a significant portion of its range, and species in danger of extirpation as documented by biological research and inventory.

Plants

PLYMOUTH GENTIAN (*Sabatia kennedyana*) --Endangered-- the tall, branched flowering stalk rises out of a basal rosette of oblanceolate leaves. The terminal pink flowers have one to ten petals and a yellow center fringed with red. It blooms in August and September. Found only on sandy to peaty beach margins of some kettlehole ponds of the coastal plain, it occurs predominately on gently sloping north and west shores. The water level of the ponds must fluctuate periodically to inundate the margins and stop invading shrubs.

This species is rare throughout its limited, disjunct range and the New England Botanical Club considers it rare in New England (Rhodora, 1981). It is known only from small areas of southern Nova Scotia, Massachusetts, Rhode Island, North and South Carolina. Plymouth Gentian is on the rare and endangered species lists of all of these places. It does not occur in intervening areas. The cause of rarity is development and the limited range of the species. Recreational use of ponds on the coastal plain leads to trampling and destruction of this habitat. Pond contamination from run-off and faulty septic systems is also a problem.

BUTTERFLY-WEED (*Asclepias tuberosa*) --Special Concern-- is a tall (3-9cm) pubescent plant with large linear-to-oblong leaves growing singularly on the stem. Unlike most milkweeds, it does not have milky juice. Butterfly-weed has bright orange flowers arranged in terminal umbels, which, in August, are conspicuous in their moorlike habitats, and most often found in small, localized populations.

COMMONS' PANIC GRASS (*Panicum commonsianum* Ashe) --Special Concern-- is a short (20-50mm), tufted perennial grass that is found in small clumps with several spikelets. This grass flowers and fruits twice each year in the spring and fall. Growing in dry sandy soil of the coastal plain, it is found in dry oak woods, spottily distributed in openings in the ericaceous ground layer, colonizing disturbed soil within the forest where there is little or no litter. At the northern edge of its range in Massachusetts, the destruction of habitat by residential and commercial development has caused its rarity.

PRICKLY PEAR (*Opuntia humifusa*) --Threatened-- is the only cactus widespread in the East. It grows in clumps and has flat fleshy green pads covered with clusters of short reddish-brown barbed bristles. The flowers bloom from the tops of the pads and are large and showy. The large red fruits are juicy, sweet and edible.

In Massachusetts, Prickly Pear grows usually in dry sandy fields and stabilized dunes, often in association with poison ivy and red cedar. Considered rare by the New England Botanical Club, it is listed as rare in Massachusetts where it is at the northern limit of its natural range. People transplant this unusual plant to their gardens, adding to the cause of its rarity.

BUSHY ROCKROSE (*Helianthemum dumosum*) --Endangered-- is a very low shrub-like plant that produces flowers in May and June that are borne in small clusters at the end of elongated branches. Small pinkish asexual flowers appear later on in the season. Bushy Rockrose prefers dry sandy plains with sparse herb layers and is often found in bearberry-huckleberry bayberry-shortgrass moors.

Considered for federal listing as threatened and endangered, it is considered rare in New England by the New England Botanical Club and is listed as rare throughout its range, which includes Eastham. Ninety percent of the known occurrences for this plant are in Massachusetts. A decrease in grazing and fire disturbance followed by forest succession has limited the available habitats for this plant. Bushy Rockrose has a very limited total range and many older stations have been destroyed through development.

BROOM CROWBERRY (*Corema conradii*) --Special Concern-- is a low evergreen shrub with dense tufts consisting of diffusely branched stems covered with small linear leaves. Broom Crowberry blooms in April and May with purple flowers. Broom Crowberry is found in open moors and heath lands on the coastal plain. It prefers dry sandy soil and is often found in areas that have been grazed. The species has been crowded out and shaded, as shrubs, scrub oak and pitch pine become established in moorlike habitats due to fire suppression and the cessation of grazing.

Wildlife and Fisheries

A diverse array of habitats within the Town provides for a correspondingly high diversity of plants and organisms. Outer Cape Cod, although somewhat isolated from the mainland, nevertheless attracts many "mainland" birds and mammals, and is especially important because of its "outermost" location to migratory birds. In addition, its unique geographical position and ocean-moderated climate are in part responsible for the presence of many plants and animals at the limits of their northern and southern geographical range.

Mammals living in Eastham include red squirrel, gray squirrel, white-tailed deer, raccoon, red fox, rabbit, skunk, opossum, shrew, muskrat, bat, weasel, mouse, vole, and coyote. In addition to the more common species, birdlife includes songbirds such as the prairie warbler, pine warbler, northern parula warbler, red-eyed vireo, cedar waxwing, red-breasted nuthatch, horned lark, black-billed cuckoo and eastern phoebe. Other notable bird species include northern harrier (marsh hawk), osprey, bald eagle, red-tailed hawk, black duck and wood duck. Numerous frog, turtle, salamander, snake and other amphibian and reptile species also make Eastham their home. In addition, numerous pelagic (or open sea) birds are supported by Stellwagen Bank and the waters off Eastham, including fulmars, gannets and shearwaters, and the diversity of fresh and salt water wetland provide habitat for a variety of waterfowl and wading birds.

Wetlands and wetland-dependent flora and fauna predominate. Most important game animals, as well as "passively" enjoyed songbirds, raptors, colonial waterbirds, reptiles, amphibians and of course fish, depend on wetland habitats for food and cover. Coastal swamps, marshes and wet meadows are habitat for deer, muskrat, raccoon, red fox, cottontail rabbits, woodcock, and migratory waterfowl. The shrubby borders of coastal marshlands and kettlehole swamps provide outstanding feeding and nesting cover for songbirds and small mammals. In addition, the beneficial contribution of organic detritus from these coastal marshes to estuaries and near-shore marine systems is well appreciated (Dr. John Portnoy, Cape Cod National Seashore, NPS).

Several agencies are compiling and updating information on special concern, threatened, or endangered species, and many local people provide information to these agencies based on extensive local observation. Scientific staff of the Cape Cod National Seashore monitor rare species within the Park. The U.S. Fish and Wildlife Service conducts field investigations on nationally significant species. The Massachusetts Natural Heritage Program (Department of Fisheries and Wildlife) maintains an ongoing inventory of rare, threatened and endangered plants and animal species, as well as the geographic locations of critical ecosystems.

Reptiles and Amphibians

EASTERN BOX TURTLE (*Terrapene c. carolina*) --Threatened-- is 4½-6 inches long with a high, domelike shell and extremely variable coloration and pattern. Both upper and lower shells may be yellow, orange or olive on black or brown; either dark or light colors may predominate.

Found in woodlands, field edges, thickets, marshes, pastures, bogs and stream banks, the Eastern Box Turtle ranges from southeastern Maine, west to the Mississippi River, central Illinois and south to northern Florida. Most typically found in well-drained forest bottomland, they have been observed swimming in slow-moving streams and ponds. The young are semi-aquatic. This animal is considered rare in Massachusetts due to loss of habitat and mortality while crossing highways.

NORTHERN DIAMONDBACK TERRAPIN (*Malaclemys terrapin*) --Threatened-- is a medium-sized salt marsh turtle with a wedge-shaped back shell that is colored in ash grays, light browns and blacks, and patterned with concentric rings, grooves and stripes. They inhabit marshes, which border salt or brackish tidal waters and can also be found in mud flats, shallow bays and coves. This animal is believed to be declining in Massachusetts.

EASTERN SPADEFOOT TOAD (*Scaphiopus holbrookii holbrookii*) --Threatened-- is characterized by an elongated sickle-shaped "spade" found under each hind foot. Its body is grayish brown, blackish-brown, or sepia with smooth skin. Two yellow lines originate from each eye and run down its back to form a lyre-shaped pattern. Another light line runs along each side of its body. It is found in forested areas with sandy or loose soils and pine and oak woodlands interspersed with temporary ponds, which are used for breeding. It is listed as a rare species in Massachusetts where it is also considered endangered.

SPOTTED TURTLE (*Clemmys guttata*) --Special Concern-- is a small turtle, usually less than five inches in shell length, which is characterized by distinct yellow polka dots on its head, neck and legs. Spotted turtles are pond dwellers, which prefer the colder water temperatures of spring; they disappear in the heat of summer. They lay eggs in nearby open fields and the young hatch in about 12 weeks. Their average life span is 26 years, but many probably achieve 50 years.

Birds

ROSEATE TERN (*Sterna Dougallii*) --Threatened-- nests in colonies on islands, beaches and sand dunes. Endangered in Massachusetts and throughout their range, the Roseate Tern is under consideration for federal listing under the Endangered Species Act (ESA).

ARCTIC TERN (*Paradisaea*) --Special Concern--is endangered in Massachusetts. The Arctic Tern nests colonially in similar habitat to the Roseate Tern.

LAUGHING GULL (*Larus atricilla*) --Special Concern-- nests colonially on islands, beaches, and sand dunes or in similar habitat to the Arctic and Roseate Terns. The Laughing Gull is increasingly rare in Massachusetts.

RED KNOT (*Calidris canutus*) --Special Concern-- uses sandy beaches with extensive tidal flats and nearby salt marshes during migration stopovers. The Red Knot does not breed in Massachusetts, but the stopover habitat is important in its life cycle.

PIPING PLOVER (*Charadrius melodus*) --Threatened-- nests on sandy beaches and dunes. Numerous programs have been implemented to enhance the populations. Oversand vehicle traffic is a major factor in the destruction of juvenile plovers. Closure of beaches to motor vehicle traffic during times when chicks are scampering along the beach has significantly increased the success rate of fledged young. Other predators such as mammals and other bird species remain a part of the survival formula.

WILLET (*Catotrophus semipalmatus*) --Special Concern-- nests and feeds on beaches and salt marshes. The Willet is a Species of Special Concern and is rare in Massachusetts.

LEAST TERN (*Sterna antillarum*) --Special Concern-- inhabits broad, flat, open, sandy, pebbly beaches, with sparse vegetation. Nests are usually shallow depressions in the sand, and they occur in colonies. The Least Tern is considered a Species of Special Concern in Massachusetts.

OSPREY (*Pandion haliaetus*) --Special Concern-- requires clear water of ocean, lakes and streams that have close proximity to high perching opportunities. Osprey has enjoyed some success with several nesting sites established around Eastham's marshes. This cooperative effort between Massachusetts Audubon, Massachusetts Division of Fish & Wildlife, the Town and various property owners has resulted in the installation of pole-mounted platforms. Typically, a nesting pair will occupy the site and return yearly to raise two or three young.

Scenic Resources and Unique Environments

Scenic Landscapes

The Massachusetts Landscape Inventory, established by the Department of Environmental Management (DEM) to "identify and locate the Commonwealth's important natural features" includes the salt marshes of Eastham in the Cape Cod National Seashore. These marshes, primarily the Nauset Marsh, are visible from the Fort Hill area, Seashore trails, and the Old Coast Guard Station at Coast Guard Beach. Although they have not been officially listed as scenic landscapes, the salt marsh systems and tidal flats along Cape Cod Bay provide vistas that are unique on Cape Cod, and perhaps in the Commonwealth. One can almost imagine the Native American dwellings that stood on the ridge above the marshes when Champlain sailed into Cape Cod Bay and had his "first encounter" with the local residents. At low tide, the tidal flats at First Encounter Beach and Kingsbury Beach stretch as far as the eye can see, providing a rare glimpse of the ocean floor and sea-life. The salt marsh systems have all been included in two Areas of Critical Environmental Concern: The Inner Cape Cod Bay area the Wellfleet Harbor area on the northern border of Town.

There are several distinctive scenic areas, which can be viewed from Town-owned lands. These include the Lamont Smith and Louise Horton (Cottontail) areas, the Fort Hill area looking out to Town Cove, Coast Guard Beach and Nauset Beach in Orleans as well as to the salt marshes. The Cape Cod Rail Trail provides views of several marsh and pond areas. Other areas are Town Cove at Collins Landing seen from Route 6, Boat Meadow as seen traveling north on Bridge Road, all Town landings and beaches and the Atlantic Ocean and Coast Guard Beach seen traveling south on Ocean View Drive.

The 4,800 acres of Eastham contained within the Cape Cod National Seashore would certainly be considered a unique environment. Residents have consistently rated the Seashore as one of the visually most appealing areas of the Town, and residents use the Park for walking, hiking and bicycling throughout the year. In addition to its visual qualities, the presence of the Seashore guarantees that fully one third of the Town will be preserved as open space and as a habitat for wildlife.

Culturally Significant Landscapes and Scenic Roads

Eastham's cemeteries are significant contributors to the historical character of its cultural landscape. The Cove Burying Ground (1660-1770), also the site of the Town's first church, contains the graves of three Mayflower passengers and many of the first settlers. The Bridge Road Cemetery (1754-1886), also the site of the Town's second church, buried succeeding generations of the original residents. Both cemeteries are listed on the National Register of Historic Places. The Congregational and Soldiers Cemetery was established in 1829 when a new church was built on the King's Highway (now Route 6). The complete name derives from a Civil War Memorial erected on the grounds. A Methodist burial ground and church were established in the early 1800's on the King's Highway and is now the Evergreen Cemetery.

The most popular culturally significant landscape in Eastham is the "Windmill Green" located on Route 6 and Samoset Road. The wind-driven gristmill is the oldest on Cape Cod and a favorite tourist attraction. At its present site since 1808, it is listed on the National Register of Historic Places as a contributing structure to the Eastham Center Historic District.

Eastham is fortunate to have many scenic roads featuring combinations of tree-lined vistas, historic houses, ocean, pond and marsh views. The Eastham Historical Commission has compiled a list of scenic roads that includes: Bridge, Cable, Dyer Prince, Fort Hill, Governor Prence (east of Route 6), Great Pond, Hemenway, Herring Brook, Lawton, Locust, Massasoit, Mill, Nauset and Salt Pond Roads, Ocean View Drive, and Smith Lane.



Historic Sites and Districts

Several sites and structures in Eastham are listed in the National Register of Historic Places including those within the boundaries of the Cape Cod National Seashore. They include the Nauset Archaeological District, which has been designated a National Landmark by the Secretary of the Interior. This designation automatically confers National Register status on these sites which include three (3) in the Salt Pond area, two (2) at Fort Hill and one (1) at Coast Guard Beach; Nauset Light, Nauset Light Keeper's House and oil house; Beacon and Twin Sisters of Nauset Lighthouses; and the French Cable Hut.

The Old Town Centre Historic District is a local regulatory district approved by Town Meeting in 1986. The District Commission reviews all exterior buildings alterations, demolitions and new construction. The District consists of twenty-five (25) properties and encompasses the west side of Route 6 in the vicinity of Salt Pond Road, Locust Road to Mill Road, and the east of Route 6 along Nauset Road to Schoolhouse Road. It includes the 1869 Schoolhouse Museum owned by the Eastham Historical Society.

Since approval of the Town's first local comprehensive plan, several Eastham historic sites and districts have been added to the National Register of Historic Places as a result of grants obtained by the Eastham Historical Commission. The Old Town Centre Historic District is now listed in the National Register as well as its previous listing in the State Register.

The Eastham Center Historic District consists of fifty-nine (59) properties along the west side of Route 6, Samoset Road to Bridge Road, and Depot Road to Samoset Road. Notable inclusions are the Windmill, Windmill Green, Public Library, Chapel-in-the Pines (Unitarian-Universalist), 1741 Swift-Daley House owned by the Eastham Historical Society, and the Eastham Town Hall, the only property on the east side of Route 6.

Collins Cottages Historic District, consisting of thirteen (13) properties), is sited on Town Cove at the entrance to Eastham. Cove Burying Ground, Eastham's first cemetery, is on the east side of Route 6 opposite Hay Road. Bridge Road Cemetery, the town's second oldest, is west of Route 6 and south of Samoset Road. Both cemeteries are listed individually in the National Register.

The Fort Hill Rural Historic District encompasses 100 acres of field, forest and salt marsh within the boundaries of the Cape Cod National Seashore. Located east of Route 6, the district includes the Captain Edward Penniman House and Barn, the Sylvanus Knowles House and the Seth Knowles House.

The Massachusetts Historical Commission, in conformance with Federal guidelines, considers any structure at least 50 years old to have potential historic significance. Research conducted by the Eastham Historic Society and the Eastham Historical Commission has identified 221 structures in the Town meeting this definition.

A formal inventory of 100 properties was completed in 1995 and is on file at the Massachusetts Historical Commission. Twenty-eight (28) properties were recommended for nomination to the National Register of Historic Places. The Massachusetts Historical Commission determined sixteen (16) to be eligible for listing. Six have since been listed.

The oldest church building in Eastham is the Chapel-in-the-Pines (Unitarian-Universalist) dating from 1889. It is individually eligible for listing in the National Register and is now listed there as a contributing building in the Eastham Center Historic District. A major financial sponsor of the Chapel's construction was Captain Edward Penniman, whose house and barn at Fort Hill are a National Register property.

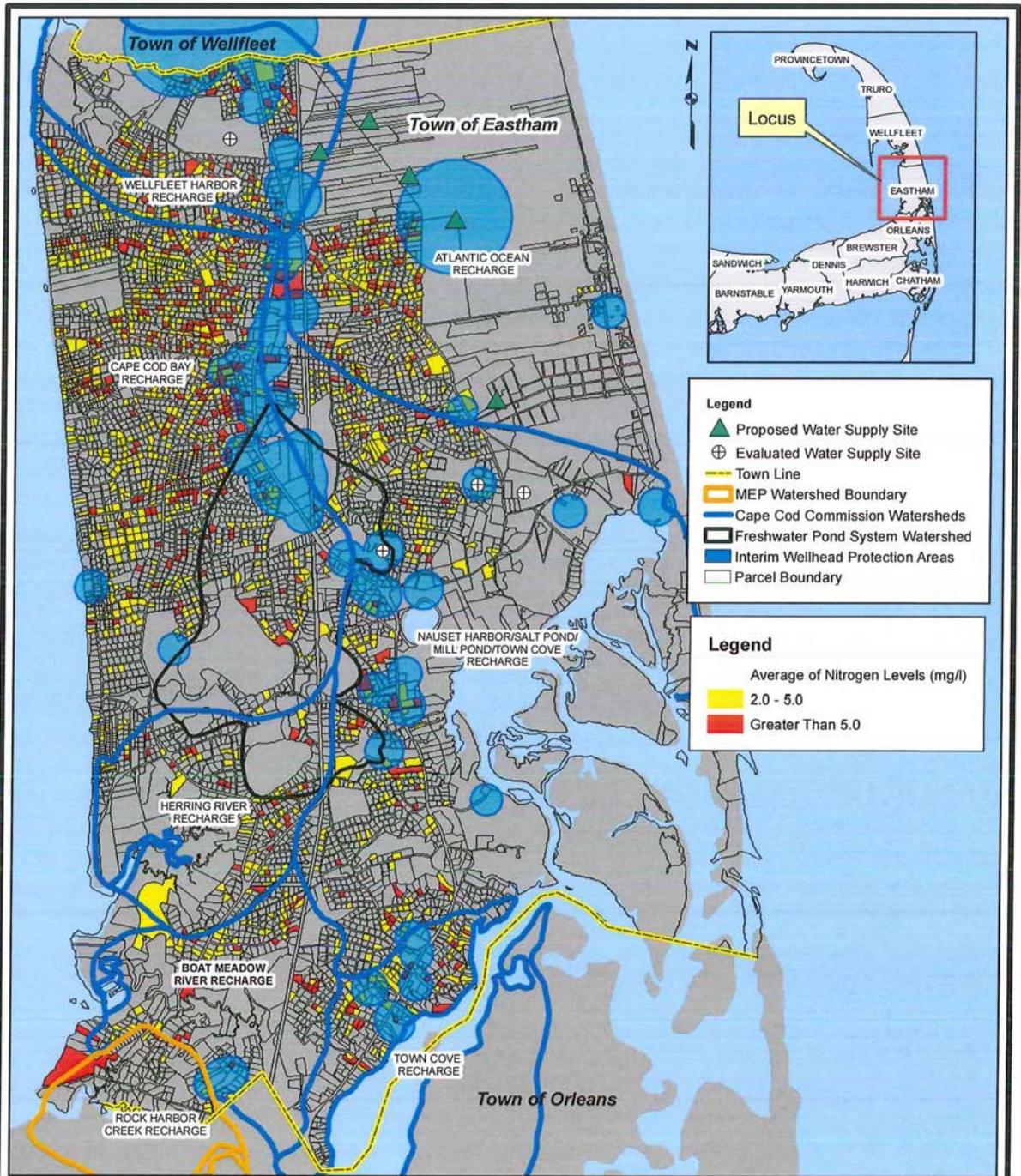
Environmental Problems

Groundwater, Surface Water and Coastal Water Contamination

The Cape Cod Aquifer, and thus, the Nauset Aquifer, is replenished entirely from precipitation. On the Cape, there is little surface water runoff. Up to ninety percent (90%) of the annual rainfall and snowfall percolates into the ground. Additional recharge to the aquifer is provided by wastewater discharge from on-site septic systems. This wastewater may still harbor contaminants and nutrients that endanger drinking water, freshwater ponds and estuaries. For this reason, wastewater disposal needs to be carefully managed to control negative impacts. Ponds, streams, and groundwater all flow to larger rivers and marine waters. This interconnection means that all water uses -- drinking, swimming, boating, shell fishing, cranberry farming or wetlands habitat -- depend on the quality of groundwater.

The most common potential contamination source for the on-site domestic water supply wells in Eastham are on-site sewage disposal systems. Furthermore, the small size of the Town, which is long and narrow, magnifies the conflict between the water recharge areas for private wells and potential municipal water supply wells and potential contamination sources. Other significant existing and potential contamination sources are commercial underground fuel storage tanks, most of which are located along Route 6, and on-site domestic underground. An additional significant contamination source is storm water runoff from Route 6.

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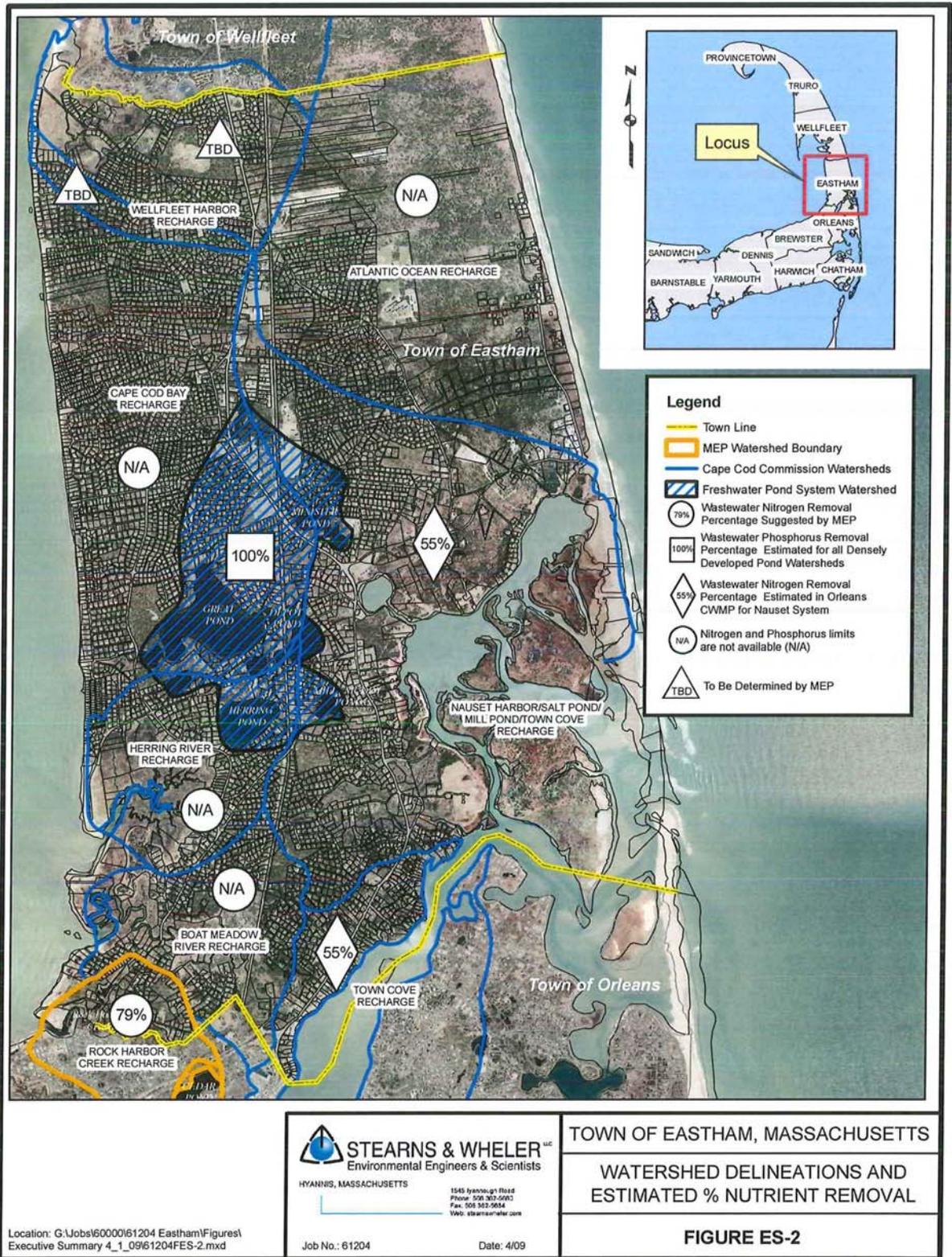
Job No.: 61204

Date: 4/09

TOWN OF EASTHAM, MASSACHUSETTS

AVERAGE OF NITRATE READINGS
(BETWEEN 1999 - 2006)

FIGURE ES-1



Groundwater Impact Strategies

It continues to be the policy of the Town that the best strategy to maintain good water quality is to prevent contaminants from reaching critical water supplies rather than to attempt a cleanup of previously degraded areas. The Great Pond watershed zone study has identified the former Town landfill (now a transfer station) and former septage lagoon as potentially significant contributors to degradation of the water quality in that zone. The Town, however, has an extensive monitoring program in place and the site is capped and closed. Water quality on and adjacent to the site has steadily improved. In the report entitled "Groundwater and Gas Monitoring Results for September 2003, Town of Eastham Old Orchard Road Site" prepared by ATP Environmental and submitted to the Department of Environmental Protection, it was concluded that there were no Lower Explosive Limit exceedances at any of the landfill's gas monitoring wells and the data suggests that concentrations of landfill gas in soils off site pose no imminent threat. Also, off site detection of volatile organic compounds (VOCs) was minimal and the data appears to support that concentrations of VOCs pose no imminent threat. While there were VOCs present in several of the wells, all of the concentrations were below Massachusetts Maximum Contaminant Levels. The report also concludes that there is continued evidence of a localized groundwater movement to the northeast.

The entire section of Route 6 through the Town disposes of storm water runoff as point source discharges into either water bodies or artificially created basins. According to the 1996 report, Water Resources of Outer Cape Cod, private wells along the same road have levels of sodium significantly higher than those private wells along both Town and private roads, indicative of more intensive State road salting programs for snow and ice control. In addition to these easily identifiable sites, the effects of other low level activities such as lawn chemicals, fertilizers, the intensification of use of private property through conversion of seasonal use residences to year-round use, and the creation of additional living space on existing dwellings on substandard lot sizes continue to adversely impact water quality.

The Water Resource Advisory Board, in collaboration with the Board of Health, formulated an annual water monitoring program which was approved at the May 2002 Town Meeting and has since begun implementation. Each year one-third of the Town's wells are sampled for nitrate content on a three-year cycle.

The Board of Health has established regulations to limit and sometimes prohibit an increase in the number of bedrooms for a dwelling, which requires a Title 5 variance of any sort. Further protection could be provided through by-laws or regulations requiring identification of local zones of contribution for new development and nitrate loading overlay districts in densely populated or vulnerable sensitive areas. Zoning measures could include development impact statements as part of site plan review and establishing a District of Critical Planning Concern through Cape Cod Commission regulations. Additionally, the Board of Health encourages sewage disposal systems that utilize alternative and innovative technology to provide more effective treatment of effluent than that provided by existing Title 5 regulations and technology. The Board of Health has required use of alternative systems on several applications for variances.

Waste Water Management Committee

In 2002, the Board of Selectmen appointed a Wastewater Management Planning Committee and charged the committee with the ultimate goal of developing a comprehensive wastewater management plan to protect the water resources of the Town. The purpose of this Committee is to exercise review and advice on issues related to groundwater, wastewater, and fresh water systems. These functions include guidance for the development of comprehensive water supply and waste water management plans that will:

1. Provide public water in critical areas;
2. Protect the water resources with appropriate remediation measures;
3. Protect the water quality of ponds; and
4. Comply with MA DEP Total Maximum Daily Load (TMDL) regulations

The specific responsibilities of the Committee include:

1. Investigation of experiences in other communities with regard to water supply and wastewater management practices, and the protection of ponds.
2. Compilation of a working library of information about water supply, wastewater management pond quality-protection practices.
3. Research current and evolving innovative methods of treatment and/or disposal of wastewater.
4. Identification of specific tasks and expertise necessary to complete water and wastewater management Plans, and recommendations regarding which tasks can be completed by the Board, Town staff, Cape Cod Commission and/or external consultants.

The Waste Water Management Committee recently propose a plan "*The Town Of Eastham Comprehensive Plan to Protect Pond Water Quality*" to recommend actions that will be taken to restore water quality in the freshwater ponds in the Town of Eastham and reduce further pollution.

The fresh water ponds serve as a window on our drinking water supply and are at the same time a major focus of recreational activity. Careful monitoring of these resources is imperative to protect against accelerated eutrophication and disruption of the normal processes. Phosphates are regarded as the limiting nutrient factor in fresh water systems, however, diagnostic studies on the Great Pond system (Wagner et al, 1986, and 1991) indicate that while "...primary productivity is largely dependent on phosphorous dynamics, groundwater inputs are not as influential as might be expected. In general, the quality of water in Great Pond is entirely appropriate to its varied uses; alteration through management appears unnecessary at this time."

As impacts on groundwater from resident population growth increases, it can be expected that there will be increased impacts on Eastham's ponds. In the case of Great Pond, several residences have been added since 1986 within the pond watershed. The community cannot afford to become complacent about maintaining high water quality. Therefore, attention should be focused on mitigation of non-point contribution of the groundwater to Eastham's fresh water ponds. Periodic monitoring for nutrients, elimination of the use of phosphate cleaning products, and upgrading of sewage disposal systems within 300 feet of ponds should be considered.

Beginning in 2001, a group of volunteers trained by the Cape Cod Commission through the PALS program (Pond and Lake Stewards) began monitoring ten ponds in town for several parameters including clarity, dissolved oxygen, temperature, and some chemical testing including total nitrogen, total phosphorus and chlorophyll. The goal of the monitoring is to provide a long-term record of pond water quality to be able to assess groundwater quality and the pond eutrophication process. Preliminary results of the monitoring system seem to indicate that all the ponds suffer from at least moderate eutrophication, which although a natural process, is influenced by human activity.

The protection of coastal embayments is a key environmental issue that is directly related to the economic vitality of Eastham. Embayments are where shellfish live and where much of the finfish in the surrounding ocean begin their lives. The land areas surrounding these embayments are some of the most desirable lands for development because of their proximity to the coastal waters. On Cape Cod Bay, the desirability of these lands has caused these areas to be divided into very small lots, each with its own septic system. Each of these septic systems adds contaminants to the groundwater, which is then discharged into the coastal embayments. Non-point source contaminants from septic systems can include metals from plumbing, phosphate from detergents, and nitrogen from toilet wastes, plus other chemicals and contaminants added to toilets by persons unfamiliar or unconcerned with the immediate impact of untreated septage on the surrounding environment.

Among these contaminants, nitrogen is the primary concern for coastal waters. It is usually the nutrient, which limits coastal productivity. Too much nitrogen leads to ecosystem-wide changes as the underlying plant

communities are altered. Excessive nitrogen in coastal waters has been implicated as a cause of declining shellfish and finfish productivity, loss of eelgrass beds, and increased algal growth. Coastal ecosystems around Cape Cod are particularly sensitive to excessive nitrogen because the ecosystems have evolved to accommodate small amounts of nitrogen, reflective of the Cape’s generally nutrient-poor sandy soils. As human populations have increased on Cape Cod, so have the nitrogen loads from wastewater discharges, fertilized lawns, and road runoff containing animal wastes and volatile organisms from gasoline and associated automotive exhaust products.

In order to ensure that coastal water quality is protected from excessive nutrients, adequate documentation of the sensitivity of each individual embayment to non-point source pollution must be developed and a management plan must be established and implemented. The Towns of Eastham and Orleans participated in a flushing study of Nauset Marsh and Town Cove beginning in 1993, funded through the Cape Cod Commission’s Coastal Embayment Project and the National Seashore, to determine their critical nitrogen load. A final report was issued in 1998 with the critical nitrogen loading rate for the two embayments and recommendations for appropriate non-point source strategies. Chief among these recommendations was adopting Board of Health regulations requiring denitrifying septic systems for all new and replacements septic systems within the delineated watershed.

Underground storage of heating oil and gasoline is currently subject to periodic testing and review. This is critical since a failure in any underground storage tank will probably affect downstream domestic water supply wells and a facility, which is located in a sensitive area, will have disastrous consequences. The Town should continue to encourage the removal of underground storage tanks to diminish the potential for groundwater contamination.

Solid and Hazardous Waste

Eastham operates a solid waste transfer station and recycling center at the site of the closed landfill on Old Orchard Road. This facility is used to collect and transfer materials to private processing, recycling and disposal facilities. In October of 2002, the Town approved a new design and reconstruction of the Eastham Recycle Center and Transfer Station. The result of the new design is to reduce trash generation by increasing recycling over the near and long term future. Through the use of compactors, the cost of transporting recyclables to market has also be reduced.

According to the Eastham Department of Public Works, during calendar year 2003, the Eastham Transfer Station handled 7,204.5 tons of municipal solid waste. The Town recycled 9.3% of the 7,204.5 tons. The most recent figures from the Cape Cod Commission follow:

Table 11: Cape & Island Tonnage Information, CY 2001 and 2002

Eastham	Tons
Recycled	210.29
Landfilled	1,120.14
Total	1,330.43

Source: Cape Cod Commission

A private company hauls most of Eastham’s solid waste in town-owned trailers to a waste-to-energy facility in Rochester, MA. The contract between the town and SEMASS will be in force January 1, 2015.

The transfer station and recycling center include a scale, gate house, two compactors, a "stock exchange" for reusables, a composting area, and drop-off areas for glass, all types of paper, cardboard, magazines, most plastics, tin and aluminum cans, refundable containers, yard waste, ashes, wood, scrap metal, car batteries, tires, and white goods. Eastham’s voluntary recycling program became mandatory in May of 2000. Eastham holds

annual household hazardous waste (HHW) collections. In 2003, 1,585 gallons of waste were collected from 198 households at a cost of \$6,785. Data collected by the Cape Cod Commission indicates that the average cost per household of such events Cape-wide in 2003 was \$27, while in Eastham the average cost per household was \$29.

Future waste quantities at the transfer station will depend on the increasing trend toward recycling and home composting, the increase in user fees to encourage waste reduction and the possible adoption of a unit-based pricing strategy (pay-by-bag). The Eastham Board of Health has adopted regulations, which address the management of solid waste and recyclable materials, and transfer station operational standards. The regulations require the separation of compostable and recyclable materials from refuse which goes to SEMASS. The transfer station is financed by the Town's operating budget. Current operating costs are covered by a combination of tax revenues, sticker fees and other user fees.

Eastham is a member of the Tri-Town Septage Treatment Facility, which treats septage waste and is located in the Town of Orleans. The facility generates sludge, grit and screenings, which are hauled to an off-Cape facility. The sludge was composted at the Yarmouth-Dennis Regional Septage Facility until summer 1995 when the composting operation was closed due to equipment problems. If this composting facility is re-opened, the sludge may return to this facility.

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Wiley Park Conservation Area

Section V: Inventory of Lands of Conservation & Recreation Interest

Protected Parcels

In addition to having one third of its land area under the jurisdiction of the National Seashore, Eastham was a “pioneer” among Cape towns in purchasing open space. As far back as the early 1970's, and well before the establishment of the Cape Cod Land Bank, Eastham residents saw the benefit in acquiring open space to provide wildlife habitat, control development and provide recreational opportunities. Currently, the Town sets aside \$75,000 annually in its capital expenditures budget for the purchase of open space. According to the Outer Cape Capacity Study (1996), Eastham's per capita acres of open space at 0.69 is the fourth highest on the Cape, exceeded only by its three Outer Cape neighbors (Wellfleet, Truro and Provincetown). The higher number for the other three towns is largely due to larger land holdings by the Cape Cod National Seashore. By comparison, the average for the remainder of the Cape outside the four Outer Cape towns is 0.20 acres per person.

Cape Cod National Seashore

The Cape Cod National Seashore along Eastham's eastern boundary provides a passive and active recreational facility of more than 4,800 acres or close to one-third of the Town. The Seashore is a favorite regional and national destination spot and provides miles of beaches, offering excellent fishing, swimming, boating and kayaking. The upland portion supports nature trails, bicycling, horseback riding and hunting. The park is operated by the National Park Service (U.S. Department of the Interior) and was established by an Act of the U.S. Congress on August 7, 1961. The legislation protects the land by specifying preservation as the primary goal:

"In order that the Seashore shall be permanently preserved in its present state, no development or plan for the convenience of visitors shall be undertaken which would be incompatible with the preservation of the unique flora and fauna or the physiographic conditions now prevailing or with the preservation of such historic sites and structures."

The Seashore receives approximately five million visitors yearly and virtually all of these visitors pass through the town of Eastham. The Salt Pond Visitor Center in Eastham is one of the main entrances to the Seashore and other attractions within the Town include Fort Hill, Nauset Lighthouse, Coast Guard Beach, and Doane Rock.

The Seashore has two beautiful sandy beaches in Eastham. The beaches extend from the spit south of Coast Guard Beach to Wellfleet. A total of 825,000 people visit the beaches annually. The Coast Guard maintained a sea rescue station at one location, hence the name of the beach. The Park maintains 55 parking spaces with comfort

facilities provided including outside showers for bathers. Additional parking is provided off Doane Road at the Doane Rock and Little Creek areas. Shuttle service is provided to Coast Guard Beach from these parking areas.

Nauset Light Beach is approximately two miles north of Coast Guard Beach. This beach provides 150 parking spaces and receives 700,000 visitors each year. A comfort station and showers are provided. Park rangers patrol the Seashore throughout the year. They also provide guided tours to many of the Seashore’s attractions and historic sites. There is also the Salt Pond Visitors Center with many on-going activities scheduled year-round.

Town-owned Open Space

Eastham has over four hundred and eighty five acres of Town owned open space holdings, some of which are also historic areas. These areas provide a variety of outdoor experiences to both residents and visitors. In addition, the Town owns 64 acres of land known as the Roach property located on North Sunken Meadow Road.

Table 12: Town-owned Open Space

Name	Location	Acreage
South Eastham Conservation area	Peach Orchard Way	24
Cottontail Acres (Horton)	Samoset Road	18
Boat Meadow	off Bridge Road	168.5
Deacon Paine Road	Deacon Paine Road	0.7
Minister’s Pond	Schoolhouse Road	5
Herring River	off Herring Brook Road	13.5
North Sunken Meadow	North Sunken Meadow Road	12.4
Nickerson Parcel	Cole Road West	26.6
Outer Beach	Map #30 D 5	2
Rock Harbor	Dyer Prince Road	10
Salt Marsh	Map #67 E 2	2.5
Sunken Meadow	Map #65 B 2	2
Sunset Avenue	Map #28 G 2	5.5
Town Forest	Map #33 C 4 & C 5	128
Eastham Windmill	Samoset Road	1.6
Wiley Park	Herring Brook Road	40
Upper Boat Meadow	Smith Lane	19.2
Gutzler Property	John Thomas	5.6
Walters Property	State Highway	7.7
Roach Property	Sandy Meadow Way	43.35
Total Town-owned Open Space:		536.15 acres

Source: Town of Eastham, Assessor’s Office

Eastham Conservation Foundation

The table below lists the land holdings of the Eastham Conservation Foundation, which include forty-five (45) parcels ranging in size from under one acre to more than thirty acres. The Eastham Conservation Foundation is a private nonprofit group unaffiliated in any official way with the Town. To date, the Eastham Conservation Foundation has acquired over two hundred and fourteen (214) acres, of which almost seventy-five percent is designated wetlands.



Table 13: Landholdings of the Eastham Conservation Foundation

ID	Date	Grantor	Total	Up	Wet	Habitat - Type	Map	Parcel
1	Dec-80	William F. Kenney	21.2	0	21.2	Salt Marsh	13	115
2	Nov – 82	Richard & Kate Wallace	1.15	1	0.14	Salt Marsh /Upland	20	9
3	Dec – 83	Arthur & Josephine King	0.8	0	0.6	Salt Marsh	1	42
4	Nov – 84	David & Audrey Greenwald	0.67	1	0	Eroding Bluff	23	17
05	Feb – 85	Robert Thayer	15.2	0	15.2	Salt Marsh	14	10
05	Feb – 85	Robert Thayer	0.73	1	0.21	Salt Marsh & Coastal	14	11
6	Jun – 86	Salt Meadow Corp.	9.49	2	7.98	Vegetated Wet	17	31
7	Sep – 86	Daniel & Hazel Pease	0.77	0	0.77	Shrub Swamp	12	042A
8	Jan – 89	Nature Conservancy	1.03	1	0.35	Coastal Dune, Beach	13	59
9	Dec – 90	Laura Kelly	26	1	24.5	Marsh - Old Bog	17	687
10	Dec – 90	Nancy H. Heller	1.24	1	0	Upland Locust Grove	15	120
11	Aug – 91	J. A. Stoehr & P. Nicholson	3.09	3	0	Pine & Hardwood	2	2
14	Dec – 91	Margaret Weiler	3.49	4	0	Pine & Hardwood	5	27
15	Dec – 91	V. Van Keuren & C.	0.7	1	0.21	Salt Marsh & Upland	19	106
18	May – 92	Capowack Trust	19.9	1	19.3	White Cedar, Maple Swamp	18	225
01	Dec – 92	V. Van Keuren & C.	0.28	0	0	Pine Woods	12	262
01	Dec – 92	V. Van Keuren & C.	0.32	0	0	Pine Oak Woods	12	267
20	Aug – 93	Laura Kelly	5.4	4	1.71	Pine Woods / Marshbog	17	772
22	Nov – 93	Collis D. & Joanne D. Peters	34.3	0	34.3	Salt Marsh	17	491
23	Dec – 93	Robert & Dorothy Mather	0.51	0	0.51	Shrub Swamp	19	64
24	Jun – 94	Abner & Elizabeth Pratt	0.46	0	0.03	Pine/Oak Woods	15	19
25	Jun – 94	Nancy Heller (Hoffman)	1.24	1	0.55	Locust Grove	18	314
26	Oct – 94	Torey Montessi & Camilla	3.79	4	0	Pine/Oak Woods	5	21
02	Nov – 94	Daniel & Hazel Pease	1.24	1	0.72	Shrub Swamp	12	037A
02	Nov – 94	Daniel & Hazel Pease	0.87	1	0.2	Pine Woods	12	038B
28	Dec – 94	Phillip D. Chase, Sr.	7.43	7	0	Pine/Oak Woods	5	023B
02	Dec – 94	Beatrice Burke (Coddington)	1.34	1	0	Dune, Beach	19	38
02	Dec – 94	Beatrice Burke (Coddington)	1.08	1	0	Dune	19	039A
30	Jan – 95	Chase Higgins Realty Trust	2.54	0	2.54	Salt Marsh	13	124
31	Aug – 95	Mildred H. Cummings	0.35	0	0	Cedar Field	12	203
32	Nov – 95	John J. Coleman	1.91	2	0	Pine/Oak Woods	6	143
33	Nov – 95	Albert J. Avellar, Jr.	1.79	0	1.79	Salt Marsh	20	91
35	Dec – 95	John R. Sibley	26.7	2	25.2	Salt Marsh/ Old Bog	1	15
36	Oct – 96	Mary Sue Dunsford	0.62	0	0.5	Vernal Pool	18	155
38	Aug – 97	Bernadette L. Ryder	2.7	0	2.7	Salt Marsh	16	7
39	Oct – 97	Richard A. Martin	1.01	1	0.26	Mixed Transition	19	115D
40	Oct – 97	Richard A. Martin	0.42	0	0	Shrub Thicket	19	115C
43	Mar – 98	James N. Carter	1.3	0	0.97	Salt Marsh; Bank	14	6
41	Jun – 98	Barbara E. (Mair) Little	0.67	0	0.31	Pondshore, Wetland	11	348
42	Nov – 98	Phillip H. & Maybritt L.	0.71	0	0.29	Pondshore	11	366
44	Jun – 99	Laura R. Kelly	6.85	6	0.6	Coastal Heath	17	687
45	Jun – 00	Wyman Richardson	0.75	1	0.25	Vernal Pool & Upland	12	212
47	Dec – 00	Jacqueline Duffek	2.83	3	0	Upland Bordering	20	58
		Total	215	51	164	<i>Source: Eastham Conservation Foundation, Inc</i>		

Land Protected by Conservation Restrictions

Eastham has adopted guidelines, which set forth conservation restriction procedures for the Town. Conservation restrictions place limits on the future development use of a parcel of land requiring maintenance of the parcel in a natural or open condition for a specific period of time. The title remains with the owner and public access is not necessarily provided. An organization, such as the Eastham Conservation Foundation or Massachusetts Audubon Society, generally holds the restriction, but the Conservation Commission may also hold the restriction. The Town's guidelines note "studies have indicated that restricted land generates a substantial net savings to the Town when compared with costs associated with development." It adds, "for this reason, every effort should be made to promote conservation restrictions in the town." Land of any size may be placed under conservation restriction and such restrictions generally carry an 85% tax abatement (95% if public access is permitted). The following parcels are subject to a conservation restriction in the town.

Table 14: Land Protected by Conservation Restrictions

ID	Date	Grantor	Total	Upland	Wetland	Habitat Type	Map	Parcel
12	Sep – 91	Ernest & Willa Hollis	2.74	1.58	1.16	Pond & Field	8	295A
13	Oct – 91	Marian Thomas	1.01	1.01	0	Pond Frontage & Pine Woods	13	79
16	Dec – 91	Laura Kelly	10.8	10.5	0.33	Mixed Pine & Hardwood	17	687G
17	May – 92	Estate of Coddington	7.55	3.02	1.15	Dune Field Beach Marsh	19	41
21	Oct – 92	Opel / Emerson	3.32	2.78	0.54	Mixed Pine Woods /	11	61
34	Nov – 95	Marian P. Thomas	5.45	5.45	0	Coastal Heath / Dune	13	74B
37	Dec – 96	Mildred Cummings	6.5	4.49	2.01	Pond; Pine Woods	12	300
46	Dec – 00	Cook & Hake	1.41	0.6	0.21	Vernal Pool & Upland	12	234
48	Nov – 01	Sibley	5.6	5.6	0	Pine Oak	1	74
49	Nov – 01	Kosarick	7.7	7.7	0	Pine Woods	4	456
		Total	52.1	44.45	7.66			

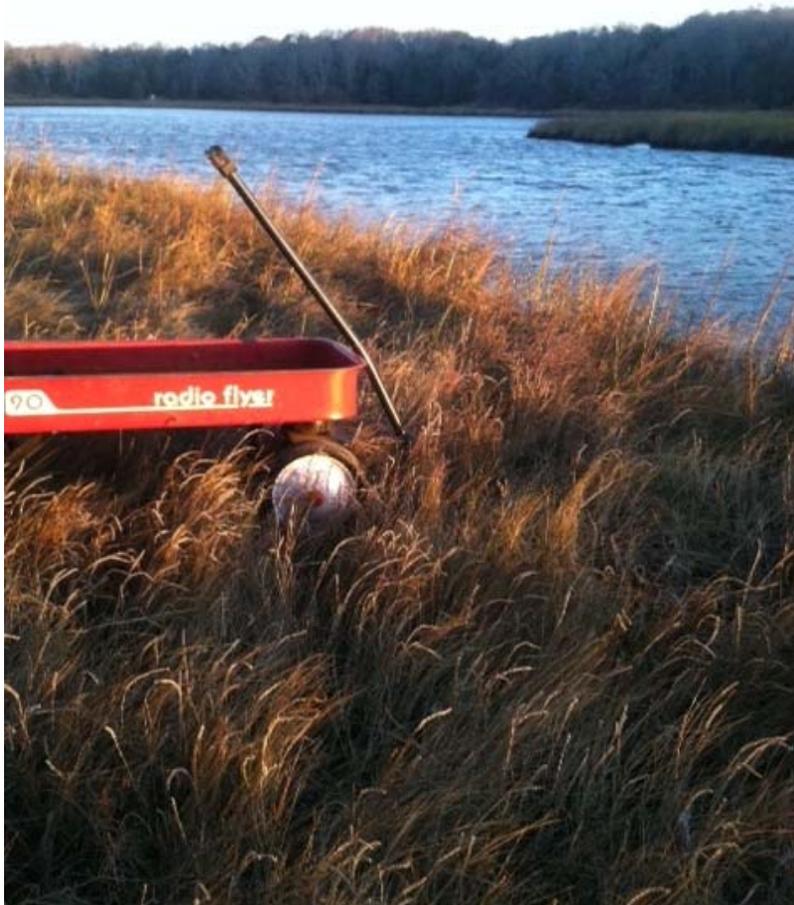
Source: Eastham Conservation Foundation, Inc.



Table 15: Town Owned Property over 5 Acres (Exclusive of landings, beaches and open space)

Property	Acreage
Old County Road (Blk.28 Lot 5)	5.00
Highway Department (555 Old Orchard Road)	18.93
Herring Brook Road (31 Wiley Park)	44.10
725 Samoset Road	17.06
1620 Samoset Road (26A Comfort Station)	29.52
End of Samoset Road	6.10
Lamont Smith	23.69
200 Schoolhouse Road (Eastham Elementary School)	11.40
Municipal Facilities (Town Hall, Fire, Police, Little League)	8.21
Candlewood and Forrest Avenue	16.70
Roach Property	63.30
Merrill - Samoset Road	0.50
Walters Property	7.7
Purcell Property	11.00

Source: Town of Eastham



“Clam Basket Wagon”

Table 16: Town of Eastham Asset Inventory and Location

Title	Address
<i>General Government:</i>	
*Town Hall and Recreation Building	2500 State Highway (Rt. 6)
<i>Public Safety:</i>	
*Police Station	2600 State Highway (Rt. 6)
*Fire Station	2550 State Highway (Rt. 6)
<i>Education:</i>	
Elementary School	Schoolhouse Road
<i>Public Services:</i>	
Department of Public Works (DPW)	555 Old Orchard Road
(Garage, Tractor Shed, Shed)	555 Old Orchard Road
Roadway System (46.4 miles)	Throughout Town
Septic Waste System	
(Tri-Town Septage Plant, 1/3 owner)	Orleans
Solid Waste Disposal System	
(Transfer Station)	Old Orchard Road
<i>Common Facility and Service Assets:</i>	
Public Library	Samoset Road
*Senior Citizens Center	Nauset Road
<i>Recreation System:</i>	
Little League Field	2500 State Hwy. (Rt. 6)
Information Booth	Route 6
Comfort Stations (3)	First Encounter
(Cont)	Cooks Brook Beach
	Wiley Park
Historic Site – Old Windmill	Route 6
<i>Cemeteries:</i>	

Congregational and Soldier's **	Route 6
Old Cove Burial Ground	Route 6
<i>Public Beaches with Parking Lots:</i>	
South Sunken Meadow	Off Sunken Meadow Rd
Cooks Brook	Off Steele Road
Campground	Off Shurtleff Road
Thumpertown	Off Thumpertown Road
Wiley Park	Off Herring Brook Road
Cole Road	Off Cole Road
First Encounter	Samoset Road
Cook Harbor (marina)	Off Dyer Prince Road
Rolling landing (boat launch)	Off Herring Brook Road

Hemenway Landing (ramp & parking)	Off Route 6
Salt Pond (parking)	Off Route 6
Vehicles and Rolling Stock (40 units)	Throughout Town

Source: Town of Eastham *Emergency Facilities/Shelters plus Nauset Regional High School

NOTE: Nauset Regional, Eastham Elementary and Nauset Middle Schools are classified Emergency shelters. The Nauset Kennels is designated as emergency animal shelter/hospital. ** Privately owned but integral.

Other Critical Open Lands:

PREFERENTIALLY-TAXED LANDS

There are three state programs, known as “preferential assessments”, that provide for reduced property taxes for landowners. These are Chapter 61, the Forestland Act; Chapter 61A, the Farmland Assessment Act; and Chapter 61B, the Open Space Act. A landowner participating in one of these programs commits a property to agriculture, forest or recreation for a specific period of time. In exchange, the Town reduces taxes and is granted the right to purchase the property if and when it is removed from the Chapter 61 classification for conversion to residential, commercial or industrial use. Under these programs, the reduction in taxes is generally 75-95%. A landowner must pay penalties if the land is removed from the program.

Lands in this program should not be considered protected open space. The Town has 120 days to purchase property in one of these programs under the right of first refusal provision and must match a bona fide purchase price. The town's option can also be assigned to a nonprofit organization such as the Trust for Public Land. However, in many cases towns do not have the financial ability to purchase these lands within that time frame unless they have planned ahead for such acquisitions. Land Bank funds and the Town’s land acquisition program should be a great asset for this purpose.

Table 17: Land Subject to Preferential Taxation

Program	Owner/Location	Acreage
Chapter 61	Fellers/255 Higgins Rd.	35.40
Chapter 61A	G. Handel/1765 Massasoit Rd.	11.69
Chapter 61B	Atlantic Oaks (Campground) Rt. 6	17.10
	Total Acreage Subject to Preferential Taxation	64.19

Source: Eastham Assessors Records (2009)

PONDS

There are twelve (12) ponds in Eastham: Molls, Minister, Great, Long, Jemima, Muddy, Herring, Depot, Widow Harding, Bridge, Baker’s, and Deborah’s. These ponds, which are surface expressions of groundwater, have good water quality, and provide swimming and boating opportunities. Many of these ponds are privately owned. In addition to these ponds, four additional surface water bodies exist. These include Salt Pond Bay, Nauset Bay, Herring River, and Boat Meadow River.

Table 18: Eastham’s Largest Ponds (Acres)

Great Pond	109
Herring Pond (Coles Pond)	43
Long Pond (Depot Road)	25
Minister’s Pond (Meetinghouse Pond, Eastham Center Pond)	21
Little Muddy Pond (Muddy Pond, Mill Pond)	11
Bridge Pond	10
Widow Harding Pond	9
Jemima Pond	6
Total	234 Acres

LANDINGS AND BEACHES

Public access to water in Eastham is provided via eight (8) Town landings and eleven (11) Town beaches. The beach and landing area total over one hundred and seven (107) acres, as shown on table on the table below. These beaches provide recreational opportunities including swimming, fishing, boating, surfing and walking.

Table 19: Town Owned Landings and Beaches

Name	Location	Acreage
Boat Meadow Landing	Bay View Drive	8.3
Collins Landing	Route 6	0.1
Great Pond Landing and Beach	Great Pond Road	1.0
Minister’s Pond Landing and Beach (Fisherman’s Landing)	Schoolhouse Road	1.0
Salt Pond Landing	Route 6	6.4
Hemenway Landing	Hemenway Road	1.3
Jemima Pond Landing	Samoset Road	0.7
Herring Pond Landing & Beach	Herring Brook Road	0.9
Campground Beach	Campground Road	2.2
Cooks Brook Beach	Steele Road	4.3
Sunken Meadow Beach	South Sunken Meadow Road	1.0
Thumpertown Beach	Thumpertown Beach Road	1.0
Cole Road Beach	Cole Road	1.0
First Encounter Beach	Samoset Road	34.0
Wiley Park	Herring Brook Road	44.0
Kingsbury Beach	Kingsbury Beach Road	0.3
Rock Harbor Landing	Dyer Prince Road	9.9
Total Town-Owned Landings and Beaches		107.5 Acres

Source: Eastham Open Space Committee

Unprotected Land

In accordance with the mandate from its citizens, and the resulting land use policy, it is anticipated that most Town-owned parcels will remain undeveloped. Worth mentioning is the 5.3-acre parcel that is currently leased to the Nauset Rod and Gun Club. Located within the Seashore, this parcel is unlikely to be developed because it lacks appropriate access, and current zoning regulations require three acres to construct a single-family home within the Park. Any new construction would also be subject to CCNS regulations and design guidelines.

The Nauset Regional High School is located on a 15-acre Town-owned campus within the Seashore. The school's student population has increased steadily, and the need for the facility extends far into the future. It is unlikely, therefore, that the parcel would ever be used for residential development.

Of greater concern are large privately owned parcels. A survey of the Town assessor's records in 1999 produced a list of 136 privately owned parcels of one acre and larger. As a result of that survey, twelve properties were identified as desirable for purchase and as being consistent with the seven criteria developed by the Open Space Committee to guide the Town's land acquisition program. Owners of some other parcels meeting the general criteria referenced above have indicated a willingness to consider sale of the parcels to the Town at some future date, and the town continues to maintain contact with these owners.

Recreational Facilities

Town Facilities

There are three public indoor facilities primarily used for recreational activities. These include: the Nauset Regional High School gymnasium, the Eastham Elementary School gymnasium, and the Eastham Council on Aging facilities. Willy's Gym, a private facility, provides equipment and spaces for a variety of recreational activities.

Outdoor active recreational facilities include the Nauset Regional High School soccer field, track and tennis courts; the Eastham Elementary School ball field and playground; the baseball, softball and soccer field and basketball court behind the Town Hall and the Wiley Park playground, bridle path and swimming area. The following is a list of recreation facilities including National Seashore Beaches:

Table 20: Recreational Facilities

Location	Docks/Piers/ Floats	Launch	Beach	Picnic	Showers	Restroom
Boatmeadow			X			
Campground Beach			X			
Coast Guard Beach			X		X	X
Cole Road			X			
Collins Landing			X			
Cooks Brook Beach			X		X	X
Doane Rock				X		X
First Encounter Beach			X			X

Great Pond Beach		X	X			
Hemenway		X				
Herring Pond		X	X			
Jemima Pond		X				
Kingsbury Beach			X			
Minister's Pond			X			
Nauset Light Beach			X		X	X
Rock Harbor	X	X				
Salt Pond		X				
Sunken Meadow Beach			X			
Thumpertown Beach			X			
Wiley Park	X		X	X		X

Source: Local Comprehensive Planning Committee

Cape Cod Rail Trail

Cape Cod is home to some of the best cycling available in New England today. It is the home of the famous Cape Cod Rail Trail; a twenty-three-mile paved trail. The Rail Trail extends from Route 134 in South Dennis to Lecounts Hollow Road in South Wellfleet. The Rail Trail occupies a former Rail Road right of way, which was used to bring passengers and freight to Cape Cod in the early 1800's to approximately 1960. The Department of Environmental Management of Massachusetts manages the trail. The trail passes by many points of interest and several pristine ponds and lakes suitable for swimming and picnics.

In Eastham the Cape Cod Rail Trail runs north to south for approximately six miles. The trail is eight feet in width and provides a walking and biking route connecting the towns of Orleans to the south and Wellfleet to the north. Limited parking for vehicles and restrooms are provided in Eastham along this trail. The National Seashore Bike Trail runs from National Seashore Visitor Center (Nauset Road at Route 6) to Coast Guard Beach (approximately 1-1/2 miles). Parking is provided in the Visitor Center. Several biking/hiking trails, which would link the existing Cape Cod Rail Trail and the National Seashore Bike Trail, and allow for additional non-motorized access to the Bay and Ocean sides, have been proposed; one of which would take advantage of the Cape Cod Regional High School parking facilities.

Proposed Bike Routes in Eastham:

1. A route from Nauset Regional High School to Nauset Light Beach and Coast Guard Beach.
2. A route from the National Seashore Visitor Center to the bay beaches.
3. A route from where the existing trail intersects with Brackett Road to the North Eastham Post Office shopping area to eliminate bike traffic on Brackett Road.

Camping Opportunities

There are no publicly managed campgrounds in Eastham. There is one private campground on Route 6 that permits tent camping.

SECTION VI: COMMUNITY VISION



Eastham's town hall was built in 1913

Description of Process

The vision and goals recommended in this plan were derived from meetings, workshops, and the results of surveys accumulated since the Open Space and Recreation Plan of 1998. The outcomes reflect the interests and issues expressed by residents of Eastham, town boards and committees, and town departments.

Based on opinions gathered from public workshops, meetings with various Town Boards and civic organizations, the following vision statement was created:

"A diversified community which honors its past as a fishing and agricultural settlement, and current character as a modest, residential community which accommodates workers, vacationers, and retirees."

Eastham Local Comprehensive Plan 2012

The consensus, however, acknowledges that the preservation of open land facilitates the attainment of community qualities which reflect the high value of active and passive use recreational opportunities, variety of wildlife habitat, and protection of the Town's historic and natural character.

Within the context of an overall community vision, preservation of open space needs to also be approached with due consideration of other significant community needs, such as affordable housing, and other public uses.

The primary goal of the Open Space and Recreation Plan is to ensure the enrichment of the Town through the preservation of open space and recreation land. The OSRP is also a chronicle of the successes of the previous efforts and in Section VI-B maps a strategy for the future.

Chronicle of Progress:

1. 1968 – With the purchase of Wiley Park, the citizens of Eastham set a course to protect and maintain open space for the enjoyment of all and to provide special habitats for the native species of plants and animals.
2. 1985 – The original Eastham Open Space and Recreational Plan
3. 1999 – The town completed a rewrite of the Open Space and Recreation Plan
4. 2000 – The Eastham Vision Workshop and Survey.
5. 2001 – The Open Space Committee conducted a survey of the users of our Open Space area which provided valuable insight as to how our parklands are used. It also formed the basis for many of the criteria contained in our new Managed Lands Plan.
6. 2007 – Update of the Eastham Open Space and Recreation Plan.
7. 2013-2014 – Open Space Committee updates and rewrites the Open Space and Recreation Plan.

Statement of Open Space and Recreation Goals

“Eastham, planning for the future, is identified by the phrase, “maintenance of community character.” This is expressed as a desire to produce, in effect, high quality drinking water, a continuance of our small town semi-rural atmosphere, maintaining our beaches, protecting and preserving our historic cultural resources and open space, and natural resources. Little expression of the need for growth in our town has been heard. If and when growth occurs, it should be consistent with the carrying capacity of the Town’s natural resources and community facilities and should reflect the desire of the Town.”

Eastham Local Comprehensive Plan 2012

The vision and goals of the 2014 Open Space and Recreation Plan have been incorporated from the 2012 Town of Eastham Local Comprehensive Plan.

From the outset of the process, Eastham’s Open Space and Recreation vision was directed towards two basic concerns:

1. The identification of land to be acquired or otherwise preserved as open space; and,
2. The identification of the best potential use of such land (whether it is most suitable for conservation, for active or passive recreation or for integrated use).

Based on the input, the following is a statement of broad, long-term goals regarding open space and recreation:

1. Protect improve water quality and supply
2. Provide open space and recreation opportunities to maintain Eastham’s rural character and small coastal community identity
3. Provide adequate recreational opportunities for all Eastham residents
4. Protect and enhance public and traditional maritime interests
5. Protect natural features and open space
6. Protect wetlands and plant habitat/wildlife areas
7. Encourage recreational and commercial marine activities
8. Protect coastal areas from manmade degradation

Goal 1 – Protection of Eastham’s Groundwater

To maintain overall quality and quantity of Eastham’s groundwater to ensure a sustainable supply of untreated high-quality drinking water and to preserve and restore the ecological integrity of marine and fresh surface waters.

Minimum Performance Standards:

- A. Enforcement by the Board of Health and other responsible Town bodies, of bylaws and regulations designed to minimize the potential for water contamination. Given the demonstrated relationship between water quality and development density particular caution must be exercised in the evaluation of requests for variances where increased use of a property is a factor.
- B. Mandatory periodic septic inspections.
- C. Reduction of the use of chemicals such as fertilizers and pesticides that inevitably contaminate groundwater.
- D. Active encouragement of water conservation
- E. Education and the dissemination of information about water protection will enlighten the public of the importance of water quality and what can be done to preserve it.
- F. The continuation of systematic and regular monitoring of the quality of Eastham’s well water.
- G. Maintain and improve coastal water quality to allow the harvest of shellfish and/or swimming in all coastal waters as appropriate, and to protect coastal ecosystems which support shellfish and finfish habitat.

Goal 2 – Eastham shall protect 50% of its remaining developable land, as of 1996, as open space to preserve and enhance the availability of open space, natural resources, provide recreational opportunities, and community character in order to manage population growth and congestion.

Minimum Performance Standards:

- A. Protection and enhancement of the Town’s character through preservation of key elements of the Town’s natural and historic properties, including restoration of damaged or degraded resources.
- B. Optimal protection of the Town’s natural resources that make Eastham a pleasant and desirable place to live, including an aggressive and strategic land protection program
- C. To develop and implement an ongoing land acquisition program.
- D. Work with the Eastham Conservation Foundation and with landowners participating in the Chapter 61 programs to acquire conservation restrictions on those lands or set aside funds for their purchase, if they are proposed to be sold for development.
- E. Continue to maintain and protect public access to both freshwater and saltwater bodies for recreational purposes.
- F. Investigate possible loops and connectors with the existing biking and walking paths and identify parcels for acquisition.
- G. Maintain Town-owned land within the Cape Cod National Seashore as open space.
- H. Encourage landowners to restore blighted or abandoned areas to open space.

- I. Aggressively seek to acquire tax title lands and hold them for community purposes such as open space and recreation where such use would be consistent with the Open Space and Recreation Plan.
- J. Strategic acquisition of environmentally sensitive properties with a focus on acquisition of properties that are contiguous with existing conservation land.

Goal 3 - Eastham shall meet the needs of residents and visitors by making access to facilities and resources universal in order to preserve and enhance opportunities for passive and active recreation in the natural environment.

Minimum Performance Standards:

- A. Coordinate with PACE committee (Public Access Committee of Eastham) to ensure recreational opportunities, trails and open spaces are ADA (Americans With Disabilities Act) compliant.

Goal 4 - To protect the public interests in the coast and rights for fishing, fowling, and navigation; to preserve and manage coastal areas so as to safeguard and perpetuate the biological economic and aesthetic values, and to preserve and where appropriate expand public access to the shoreline.

Minimum Performance Standards:

- A. Designate a “working waterfront” overlay zone in the area of Collins Landing in Town Cove to ensure the preservation and expansion of traditional maritime use.
- B. Confirm designated traditional rights-of-way to the shore through appropriate legal means.
- C. Restrict development or increased use in environmentally sensitive nearshore areas and limit septic impact of development.
- D. Continue the harbor planning study, targeting Rock Harbor, to develop a framework and guidelines for use and dredging activities.
- E. Encourage ‘soft’ solutions to coastal erosion.
- F. Develop a comprehensive plan to support the present program required for annual beach nourishment/replenishment as a condition for permission to install, maintain, or rebuild.
- G. Continue and expand shellfish propagation.

Goal 5 - To preserve and restore the quality and quantity of inland and coastal wetlands in Eastham.

Minimum Performance Standards:

- A. Wetlands and vernal pools should be identified, mapped and protected so as to maintain their ability to provide natural functions.
- B. Develop and implement plans to address existing storm water management problems where runoff and drainage systems are adversely affecting water quality in wetlands and water bodies.
- C. Continue to seek ways to remediate tidal restrictions.
- D. No soil absorption system shall be located within one hundred (100) feet of any water body, water course, either permanent or intermittent, any vegetated wetland, fresh or salt, as determined by predominance or vegetational species; the top of any coastal bank; the landward toe of any primary dune or the spring high water mark on any salt water body or estuary; or the annual flood level of any fresh water body.
- E. No septic tank shall be located within fifty (50) feet of any water body, water course, either permanent or intermittent, any vegetated wetland, fresh or salt, as determined by predominance or vegetational species; the top of any coastal bank; the landward toe of any primary dune or the spring high water mark on any salt water body or estuary; or the annual flood level of any fresh water body.

Goal 6 - To prevent loss or degradation of critical wildlife and plant habitat, to minimize the impact of new development on wildlife and plant habitat, and to maintain existing populations and species diversity.

Minimum Performance Standards:

- A. Develop a review process for activities in critical plant and wildlife habitat areas that could adversely impact such habitat and/or seek designation as significant habitat areas under the Massachusetts Endangered Species Act.
- B. Adopt by-laws/ordinance limiting land clearing and alteration of natural topography prior development review.
- C. Inventory critical lands in town for critical wildlife and habit areas.
- D. Conduct an analysis to assess potential growth impacts in wildlife and plant habitat areas, identifying those that are protected as well as those threatened by development.
- E. Inventory of invasive species
- F. Prevent, control and minimize invasive species and their impacts accomplished through a management plan.

Progress since 2007, the Town of Eastham has passed 10 Town Meeting Articles that favorably reinforce the community vision and acceptance of this Open Space and Recreation Plan.

Recreation - Playground

2007 Article 20: To see if the Town will vote to transfer and appropriate the sum of Sixty Thousand (\$60,000.00) Dollars from the Community Preservation Fund balance for recreation, for the purpose of the Eastham Elementary School Playground Project as proposed by the Eastham Elementary School Parents Group to be administered by the Town in accordance with applicable laws; or take any other action relative thereto. Article Passed.

Open Space - Land Acquisition Fund

2007 Article 31: A motion was made and seconded by the Board of Selectmen to authorize the Board of Selectmen to petition the legislature to authorize the establishment of a Land Acquisition and Maintenance Fund, as was done in 1998, to fund the acquisition and/or maintenance of open space or recreational land under the care and custody of the Board of Selectmen, into which the town, may appropriate funds from time to time from any source, and into which gifts for said purpose may be and further expenditures from this fund shall be made by majority vote of the Board of Selectmen unless for the purchase of land which requires a 2/3rds vote of town meeting.

Article Passed.

Open Space - Land Analysis

2011 Article 29: A motion was made and seconded by the Board of Selectmen to appropriate from the Community Preservation Open Space Reserve Fund Balance to the Eastham Open Space Committee, \$5,000, for an analysis of parcels held for conservation purposes and/or under the custody of the Town of Eastham Conservation Commission, and all other protected open space in Eastham (not including land owned by the federal government within the Cape Cod National Seashore). Article Passed.

Open Space - Land Purchase

2011 Article 30: A motion was made and seconded by the Board of Selectmen to appropriate from the Community Preservation Reserve Fund to the Town of Eastham Board of Selectmen, the sum of \$560,000 for the purchase of the purchase a parcel of land located at 590 Steele Road more fully described in a deed recorded at the Barnstable county Registry of Deeds in Book 11418 Page 56, and

shown in Plan book 203 Page 11, as lots 4, 5, and C, and further shown on Assessors Map 4 Parcel 108 and containing 15,340 square feet for recreational use in connection with the use of Cook's Brook Beach. Article Passed.

Open Space – Sandy Meadow Land Use

2011 Article 34: To see if the town will limit the use of the remaining portions of the town owned land known as the Roach Property for open space and passive recreation. Petition Article passed.

Recreation - Parking

2012 Article 25: A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Fund Balance \$5,100 for the purpose of constructing a parking lot at Sandy Meadow Way to serve passive recreation users of the parcel.

Article Passed.

Open Space - Conservation Land Inventory and Analysis

2012 Article 26: A motion was made and seconded by the Board of Selectmen to rescind \$5,000 previously transferred and to transfer \$20,000 from the Community Preservation Open Space Reserve Account to the Eastham Open Space Committee for an analysis of parcels perceived to be held for conservation purposes and/or under the custody of the Eastham Conservation Commission, and all other protected open space in Eastham (not including land owned by the federal government within the Cape Cod National Seashore). Article Passed.

Recreation - Water Quality Treatment

2012 Article 22: A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Open Space Account \$140,000 for the purpose of treating Herring Pond to preserve the open space quality of the pond by reducing the effects of phosphorus. Article Passed.

Recreation – Water Quality Treatment

2013 Article 20: A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Open Space Reserve Fund Balance to the Eastham Water Management Committee, \$220,000 for alum treatment to be expended for the purpose of protection of an open space resource by funding the necessary permits and hiring consultants for remediation, by alum treatment, of unhealthy phosphorus levels in Great Pond with said funds to spent under the direction of the Health Agent. A motion was made and seconded to indefinitely postpone Article 20 Motion failed majority voice vote as declared by the Moderator. Article passed.

Recreation – Accessibility

2013 Article 22: A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Open Space Reserve Fund Balance to the PACE Committee, the sum of \$25,000 for enhancing handicapped accessibility at Bee's River under the direction of the Beach and Recreation Administrator for the purpose of providing additional Handicapped Access via the use of Mobi-Mat or similar material in the area of Bee's River (aka Hatch's Beach). Article Passed.

Open Space – Trail Construction

2013 Article 25: A motion was made and seconded by the Board of Selectmen to transfer \$20,000 from the Community Preservation Open Space Reserve Fund Balance to the Open Space Committee, for construction of pathways, benches and other amenities, on land located off Sandy Meadow Way to serve passive recreation users of the parcel. Article Passed.

Open Space - Additional Open Space Holdings

2010 - Working collaboratively with the Eastham Conservation Foundation Inc.

(ECF), a private, non-profit organization established to promote the interests of the Town and its inhabitants, and to assist in the preservation and maintenance of various natural resources, ECF acquired 175.27 acres in perpetuity for conservation and recreation.

Furthermore, the articles of organization of the Eastham Conservation Foundation ensure the continued stewardship of their landholdings:

“...upon any liquidation or winding up of the affairs of the corporation, its entire assets remaining, after providing for the payments of its debts and obligations, shall be conveyed, transferred, and set over to the Town of Eastham,....”

Eastham will continue to work to preserve and enhance the management of open space and protect natural resources (such as groundwater and surface water, coastal water and adjacent shoreline areas, inland and coastal wetlands and wildlife and plant habitats) and community character) through growth management strategies while increasing the opportunities for passive and active recreation in the natural environment.

DRAFT



Sandy Meadow Trail

Section VII: Analysis of Open Space and Recreation Needs

SUMMARY OF RESOURCES PROTECTION NEEDS

The Eastham Local Comprehensive Planning Committee conducted a series of public workshops on each of the Plan elements and distributed a Community Survey. Many of the issues identified by the opinion survey (2002) appear on the agendas of town committees and considerable work continues on these issues to develop strategies to address them.

The following table indicates the order of priority needs assessed by the respondents by age group:

Table 21: Priority Needs

Issue	0 - 40 years	41 - 50 years	51 - 65 years	65 + years
Population growth	1	2		
Water quality	2	3	1	2

Cost of service	3			
Education funding		1		
Over development			2	3
Transportation/traffic			3	1

Source: Local Comprehensive Planning Committee Survey, 2002

Several of the key issues as identified in the community survey (water quality, population growth, transportation/traffic, education funding and the cost of municipal services) are addressed by goals, policies and recommendations provided in both the 2012 Local Comprehensive Plan.

Additionally, other issues identified at a series of public workshops collected from the environmental inventory are included in the 2014 Open Space and Recreation Plan:

- Improve groundwater and surface water quality,
- Preserve and enhance open space and wildlife corridors,
- Plan for the overall growth and needs of the community,
- Development of an efficient public transportation system for residents and visitors,
- Promote economic development while protecting environmental resources and preserving historic character,
- Establishing limitations on additional commercial development on Route 6,
- Creation of affordable housing,
- Education and employment opportunities.

Based on opinions gathered from public workshops, meetings with various Town Boards and civic organizations, the Long Range Planning Advisory Board enunciated the following overall vision statement:

The townspeople want Eastham to be “a diversified community which honors its past as a fishing and agricultural settlement, and current character as a modest, residential community which accommodates workers, vacationers and retirees.”

Eastham has an approved Open Space and Recreation Plan on file with the Massachusetts Department of Environmental Management. This plan is water driven, that is to say that protection of water resources is the goal on which all other goals hinge. The overall strategy of protecting half of the remaining undeveloped land in Eastham looks to protect groundwater, surface water and coastal resources. Bounded on two sides by water and with many interior ponds, wetlands and coastal embayments, the relationship between land and water is critical.

Eastham’s Overall Goals and Related Needs’ therefore include:

- Protecting/improving water quality and supply
- Improving sewage disposal systems
- Preserving the historic and rural character of the Town
- Protect natural features and open space
- Protect wetlands and plant habitat/wildlife areas
- Protect coastal areas from natural and manmade degradation
- Encourage recreational and commercial marine activities
- Provide more affordable year-round housing
- Provide quality service for all residents including schools, recreation facilities, police and fire services
- Support sustainable economic development, year-round job creation

- Controlling the impact of Route 6 on rural Town character
- Reducing commercial sprawl and improve the appearance of commercial areas (Route 6)
- Encourage conservation and reduce electric energy consumption
- Encourage the development and coordination of regional public transportation
- Promote and extend, if necessary, postsecondary education opportunities to enhance the Town's human resources

Groundwater Protection Plan – Effective Targeting Restoration Strategies

Eastham is fortunate to be essentially the sole user and major beneficiary of the Lower Cape aquifer's Nauset Lens. The northern-most reaches of the Lens are shared with Wellfleet and are used by the National Park Service to provide water for their headquarters area. Route 6 traverses the crest of this lens, which has a maximum water table elevation of 17 feet above mean sea level. With groundwater flows that are generally perpendicular to the lens' contour lines, this location makes the Route 6 corridor particularly hazardous with respect to the wide dissemination of contamination. That a large number of small volume wells are located within this corridor may have significant implications for economic sustainability whenever contamination leads to their failure.

Eastham ponds are part of the regional aquifer system and, as such, are linked to drinking water and coastal estuaries, as well as any pollutants added to the aquifer. The Town of Eastham has 23 inland freshwater ponds, with a total surface area of 258 acres. Of these 23 ponds, seven are extremely small, surface area less than one acre, and five have a surface area larger than 10 acres.

In Eastham, water quality in the ponds is generally a reflection of the amount of development around the ponds, including impacts from wastewater, fertilizers, and stormwater runoff, as well as the individual characteristics of each pond.

It is commonly accepted that the relationship between groundwater and freshwater ponds is the thread that links together all of Eastham's natural resources. In 2009, Cape Cod Pond and Lake Stewardship (PALS) program focused on our local pond concerns and collected water quality data from 10 ponds between 2001 and 2006. That final report was delivered to the Town in April 2009. This review also included a detailed review of six ponds selected by the Town of Eastham Water Resources Advisory Board. These detailed, pond-specific reviews included delineation of pond watersheds, development of water and phosphorous budgets, characterized the ponds ecological status and made recommendations for next steps.

The need to take steps to restore the water quality of Eastham's ponds has been demonstrated by studies of our pond water over the past 12 years, and has been supported through Annual Town Meeting articles. In 2012, \$140,000 was appropriated for the purpose of treating Herring Pond to preserve the open space quality of the bond by reducing the effects of phosphorus, and in 2103, \$220,000 was expended for the remediation of unhealthy phosphorus levels in Great Pond.

Development of appropriate and cost-effective water quality restoration strategies for all the ponds will require collection of some additional information to develop adequate understanding of phosphorus sources. All ponds require sampling of their sediments to directly measure current and future potential sediment phosphorus loading. Review of the phosphorus budgets also indicates that development of pond-specific information about stormwater inputs and aquatic bird populations is important for effectively targeting restoration strategies. Collection of this information, along with other recommended pond-specific data, will refine the phosphorus budgets and ensure that management and restoration strategies accurately target the sources of impairments in these ponds.

In December 2013, the Eastham Water Management Committee drafted a Comprehensive Plan to Protect Pond Water Quality. The purpose to the plan is to recommend actions that will be taken to restore water quality in the freshwater ponds and reduce further pollution.

“While long range efforts to deal with excess nutrient flow from phosphorus and nitrogen into estuaries and ponds through the replacement or upgrading of septic systems and other steps offer the possibility of a cure for the problems of our ponds and coastal waters, down the road it is imperative to take steps now to protect our waters with tools that are readily available with a reasonable amount of effort.”

Eastham Water Management Committee (2013)

In summary, we believe we can take the reasonable efforts to identify and recommend actions that will restore the water quality of our ponds and reduce conditions that would contribute to a recurrence of the problem through a policy or regulation for residents on the use of fertilizers, removal of animal wastes, prohibition of phosphate based detergents, and control of storm run-off to ponds if the tools are presented to the Board of Health and Conservation Commission and Department of Natural Resources.

Water Delivery System and Water Wastewater Management Plan

The goal is to maintain overall quality and quantity of Eastham’s groundwater to ensure a sustainable supply of untreated high-quality drinking water and to preserve and restore the ecological integrity of marine and fresh surface waters.²

Water Delivery System

Eastham’s water delivery system consists entirely of private wells. Most of these are on-site domestic water supply wells drawing about 200 gallons per day (gpd). Some are Small Volume Wells, serving various businesses, condominiums, and office buildings for which the withdrawal volumes can be substantially larger.³ Currently, there are known to be 50 such wells of which seven (7) are non-transient/non-community public water supply systems, and 43 are transient/non-community public water supply systems. Eastham has 19 accounts near the Orleans town line are connected to the Orleans public water supply and special arrangements are used to provide water near the Transfer Station. Annual Town Meeting, in 2009, voted the sum of \$3.15 million (also by debt-exclusion ballot) to:

1. Conduct pumping tests to establish the quantity and quality of water available from water supply wells in Eastham Water Protection Districts G, H, and Nauset Regional High School and work to include completing all required permitting and environmental reviews necessary to provide up to 1 million gallons per day (gpd) from each supply site.
2. Conduct an evaluation to determine all costs and the feasibility of obtaining 500,000 gallons per day or more of water from the Town of Orleans.

With knowledge of the quality and quantity of resources available both from Eastham and Orleans in this initial phase of determining availability of water supply, a comparative cost benefit analysis can be applied to determine the best option or options to supply a town-wide water system. The town-wide system would be designed to provide 1.8 million gallons per day peak capacity with extra design

² See Cape Cod Regional Policy Plan (2002) pp. 31-38 for performance standards.

³ “Small Volume Wells” are defined and classified by the Code of Massachusetts Regulations, 310 CMR 22.00 under the Department of Environmental Protection (DEP) regulations as small community wells, non-transient/non-community wells, and transient non-community wells. These water systems are defined as “Public Water Systems” [310 CMR 22.02 (8)] if the system is used for the provision to the public of piped water for human consumption, if such a system has at least 15 service connections or regularly serves of at least 25 individuals for at least 60 days of the year.

capacity to reach 2.5 million gallons per day. This article also provided for the Board of Selectmen to act as Water Commissioners and once the system is operational, to assess charges and collect fees.

Septic Disposal

Public sewers currently serve no areas of Eastham. Only on-site sewage disposal systems are used throughout the town, varying from cesspools to Title 5 septic systems to Title 5 systems with advance treatment. In recent years, a number of Alternative Septic Treatment installations have been installed to reduce nitrate nitrogen concentrations in effluent discharges. Eastham is a member of the Tri-Town Septic Treatment facility located in Orleans serving Eastham, Orleans, and Brewster. Much of Eastham's pumped sewage is processed there. In 2009, discussions regarding the partnership and the future of the Tri-Town facility began.

Potential Well Sites

Three potential sites have been identified for development of municipal water supply wells should such service become necessary.⁴ These sites are located in Water Resource Protection Zoning District "G", and located in Well-field Protection Zoning District "H". District G lies in an area containing several town-owned "woodlot" parcels, and is relatively unthreatened by other land uses. District H lies in 120 acres of town-owned land, which was tested in 1970 as a possible municipal well-field site with a potential yield of 1 million gallons per day.⁵ The third site is located at Nauset Regional High School. The existing well will be permitted to increase production capacity up to 1 million gallons per day.

Analysis of Need: The Town's main concern continues to be to maintain an adequate supply of drinking water and preserve its good quality for the foreseeable future. Steps that will help to ensure this outcome are:

1. Enforcement by the Board of Health and other responsible Town bodies, of bylaws and regulations designed to minimize the potential for water contamination. Given the demonstrated relationship between water quality and development density, particular caution must be exercised in the evaluation of requests for variances where increased use of a property is a factor.
2. Reduction of the use of chemicals such as fertilizers and pesticides that inevitably contaminate groundwater.
3. Active encouragement of water conservation.
4. Education and the dissemination of information about water protection will sensitize the public to the importance of water quality and what can be done to preserve it.
5. The continuation of systematic and regular monitoring of the quality of Eastham's well water. Knowledge of contaminant levels and their evolution over time can identify areas of concern and guide remedial interventions.
6. Requirement of double-walled above-ground heating oil tanks in conjunction with the Eastham Fire Department as a result of transfer of replacement.

⁴ Zoto, G.A. and T. Gallagher, eds. 1988. Cape Cod Aquifer Management Project Final Report. Boston, MA.

⁵ Whitman & Howard, Inc. 1970. Report on Proposed Water System: Eastham, Massachusetts. HUD Project no. P-Mass-3423P. Boston, MA.

Current and Future Demand for Open Space and Recreational Opportunities

Eastham has a great diversity of open space and recreation opportunities as demonstrated in the inventory above. At the same time, the Town has a very active retired population. The survey conducted by Eastham's Local Comprehensive Planning Committee shows that the amount and frequency of use of open space and recreation facilities by Eastham residents does not really decrease until after age 80.

In the 1995 Capewide Residents Survey conducted by the Cape Cod Commission 87% of residents said that "amount of open space" was important to them in making the decision to live or vacation on Cape Cod and 77% cited "recreational opportunities." In addition, residents supported increasing taxes to pay for acquisition of open space for water supply protection (81%) and passive recreational use (64%). A total of 67% supported a town land acquisition program to limit the potential population growth in their town. A requirement that developers of all large projects donate land to the community for use as public open space was supported by 66% of those responding. Although the 1995 survey did not have a large enough sample size to compare results among towns, a similar survey conducted in 1990 permitted such comparisons. It is notable that Eastham residents' responses were consistent with those of the rest of Cape Codders in most cases with regard to open space issues. Despite the presence of Cape Cod National Seashore, 43% of Eastham residents stated in 1990 that loss of open space was a serious problem facing their town, compared with 49% for the Cape as a whole. In addition, in 1990 51% of Eastham residents supported legislation to create a land bank through a real estate transfer tax, the second highest margin of support in any town on Cape Cod (Wellfleet was the highest). Support for this proposal was even greater in the 1995 survey.

Based on the 485.1 acres of open space and the current population, the protected open space per capita is .09 acres. Any additional growth in population will create increased pressure on existing open space and recreation facilities and will also reduce the amount of perceived open space within the Town of Eastham. "Perceived" open space is a total of protected open space combined with undeveloped land. As these undeveloped lands are converted to residential use, the amount of "elbow room" within the Town will be reduced.

Analysis of Need: It is clear that unless additional open space is acquired, the amount of protected open space per person will be dramatically reduced by projected levels of residential growth over the next 5 years. In the process the character of the community and of individual neighborhoods will be changed.

The town has several options for changing this future scenario slowing growth through changes in zoning, undertaking an ambitious land protection program or some combination of the two. Data from the Outer Cape Capacity Analysis indicates that most existing vacant residential lots in the Town are less than one acre. Only 17 lots are greater than 5 acres and these would support approximately 96 dwellings. It appears, therefore, that changes in zoning are unlikely to significantly alter future build out projections, making land protection the stricter method for reducing overall population pressure at build out.

Opportunities to Meet Town Open Space Needs

Eastham also maintains an Open Space Lands Management Plan which designates the tasks to be done annually in order to maintain town owned open space properties in keeping with the following three goals: 1. Keep it natural, 2. Make it accessible and 3. Render it educational. These plans are maintained by the Open Space Committee.

Funding for Land Protection

There are a variety of potential funding sources for open space acquisition. CPA funds allot a minimum of the annual 3% property surcharge tax for open space and recreation projects that meet the requirements of acquisition, creation and preservation. Since its inception, CPA funds have provided a Glacial Trail linkage, a connecting bridge over different parts of Wiley Park, and partially funded the new playground and equipment for the renovated elementary school. Additional funds may come from DEM trail grants, land trust purchases, negotiation of easements or other sources.

Subdivision Control Law/Special Permits

Chapter 41, Section 81U provides that *"before approval of a plan by a planning board, said board shall also in proper cases require the plan to show a park or parks suitably located for playground or recreation purposes or for providing light and air are not unreasonable in area in relation to the area of the land being subdivided and the prospective uses of such land, and if so determined said board shall by appropriate endorsement on the plan require that no building may be erected on such park or parks for a period of not more than three years without its approval."*

Analysis of Need: During this three-year period the town could seek funds to compensate the developer for such open space/park dedication. This provision offered an opportunity to provide for the open space and recreational needs of residents within the larger subdivisions in the town.

In addition, the Town could make greater use of cluster zoning to provide open space within residential subdivisions. Assessors' data indicates that there are only 5 parcels greater than 10 acres within the Town. There are approximately 12 parcels between 5 and 10 acres. Expanding the use of the cluster bylaw to parcels that are a minimum of 5 acres in size would allow for greater use of this bylaw provision, and at the same time allow for design that accomplishes open space protection objectives.

Opportunities to Meet Town Recreational Needs

Eastham will play an important role in the Cape Cod Pathways project. Cape Cod Pathways is a regional effort to create a Cape-wide interconnected network of walking trails. The Barnstable County Commissioners and Cape Cod Commission are coordinating this project with assistance from several other agencies and organizations. The Eastham Board of Selectmen has endorsed this project. The County and the Town are working together to identify trail routes, identify acquisition needs and dedicate trail segments.

Analysis of Need: The first priority within the Town of Eastham is to identify a north-south spine for the trail. Lateral trail segments will also be planned. Biking/hiking connectors from the existing Cape Cod Rail Trail to the bay and ocean sides would provide for increased recreational opportunities.

Safety issues are a major concern along the existing bike paths. Painted crossings on major roads, signage for motorists and cyclists, lighting where appropriate, emergency telephones and courses on bicycle safety should be provided. In 2012, the town's Planning Department prepared a "Town of Eastham Bike Route Signage Location map" that identifies the proposed location and orientation of bicycle direction signs as part of a regional trail project sponsored by the Cape Cod Regional Transit Authority and the Cape Cod Commission. Signs were installed in 2013 and directed riders from various primary and secondary roadways to the Rail Trail.

Analysis of Need: The Bikeways Committee could recommend mitigating measures for potential problems and additional bicycle routes. In addition to connectors, parking facilities and comfort stations must be provided for these routes.

Need for an Open Space and Recreation Plan

Eastham has various opportunities for outdoor recreation including town-owned fields and courts behind the Town Hall building, at Nauset Regional High School and at Eastham Elementary School. Additional outdoor recreational facilities would be beneficial and would prevent the need to travel out of town for some activities that more than the available space. Except for the high school, there are no indoor public recreational facilities available to Eastham residents. The town should explore the possibility of constructing an indoor recreational facility providing various types of activities for all segments of the population.

The following recommendations are suggested to maintain and improve the existing level of open space protection and recreation facilities and programs.

Summary of the Analysis of Eastham's Resource Protection Needs

- A. Develop a comprehensive open space protection program in order to meet future open space and recreation needs, protect community character, reduce growth pressures and maintain community fiscal health.
- B. This program should include expanded use of town acquisitions, conservation restrictions, subdivision set-asides, protection of tax title lands and other methods of open space protection. Priority shall be given to the following areas:
 - 1. Zones of contribution to public water supply wells
 - 2. Future water supply areas
 - 3. Construction of a multi-use building on town owned property for sport activities
 - 4. Rare species habitat and other critical habitats
 - 5. Unfragmented forest habitat
 - 6. Missing links between open space areas identified within the Greenbelt or Cape Cod Pathways/Bikeways networks.
- C. Update its Open Space and Recreation Plan every five (5) years and submit it to the State to maintain eligibility for Open Space funding under federal and state grant programs.
- D. Continue to work with the Eastham Conservation Foundation to identify, acquire and manage open space and conservation restrictions. Priority should be given to the protection of significant natural and fragile areas described in 6.1.5 of this section.
- E. Continue to work with the Eastham Conservation Foundation and with landowners participating in the Chapter 61 programs to acquire conservation restrictions on those lands or should set aside funds for their purchase if they are proposed to be sold for development.
- F. Develop a cluster by-law and actively promote its use where this alternative would allow protection of open space and recreation lands, environmentally sensitive areas and/or provide for needed trail corridors.
- G. Amend its subdivision regulations to take advantage of Section 81U of the Subdivision Control Law which permits towns to require open space set-asides within subdivisions for future acquisition.

- H. Continue to maintain and protect public access to both freshwater and saltwater bodies for recreational purposes.
- I. Investigate possible loops or connectors with the existing biking and walking paths, identify parcels for acquisition, establish a bike safety course, recommend measures to mitigate safety concerns, and identify opportunities for additional parking in proximity to the Cape Cod Rail Trail. In particular the Town should work with the National Park Service to develop open space and trail linkages to the Cape Cod National Seashore.
- J. Maintain Town-owned land within the Cape Cod National Seashore as open space.
- K. Continue to expand the current programs to include all age groups and consider additional sites for ball field and basketball facilities. In addition, the Recreation Commission should consider entering into an agreement with private resources in Town for an indoor swimming program for all age groups.
- L. Encourage landowners to restore blighted or abandoned areas to open space.
- M. Aggressively seek to acquire tax title lands and hold them for community purposes such as open space and recreation where such use would be consistent with the Open Space and Recreation Plan.
- N. Consider recreation needs in the development of plans for the Town Hall area and for the Route 6 and Brackett Road area.
- O. Revise Open Space Map to include key differences between types of ownership/control (e.g., town-owned open space, recreation areas, national seashore, land trusts, etc.)

Natural Resources

The Natural Resources Department provides management of the various environmental services of the Town including shellfisheries protection and propagation, herring runs, harbors and landings facilities and activities, Conservation Commission administration and open space land management. Recently, shellfish propagation activity was enlarged with the location of a shellfish hatchery at Salt Pond. The department is staffed year-round with three full-time personnel and one long term seasonal assistant deputy Natural Resources Officer. A clerk provides administrative support for this department and the DPW at 60% full time equivalent.

The department is supported by appropriations from the General Fund. The fees collected for shellfish permits, dockage and moorings are returned to the General Fund. Shellfish permit fees are variable from year to year due to the variability of shellfish stocking. Fees collected by the Conservation Commission associated with wetlands projects are reserved and used for the administration of the wetlands statutes.

The staff of this department addresses a variety of ongoing activity and interaction with the public. Whether the question is about public shellfish programs, aquaculture, beach erosion, boating safety, marine mammal strandings, or other natural resource matters, the goal is to protect the resources by helping humans who live or visit here appreciate the gifts of nature that Eastham has to offer without destroying the very beauty that they provide.

Analysis of Need: Capital improvements related to maintenance and replacement of vessels and equipment exposed to salt water environments are made on a regular basis. New methods of shellfish propagation are utilized as they develop.

Historic Sites and Districts

Several sites and structures in Eastham are listed in the National Register of Historic Places including those within the boundaries of the Cape Cod National Seashore. These are: Nauset Archaeological District, which has been designated a National Landmark by the Secretary of the Interior. This designation automatically confers National Register status on these six sites which include three in the Salt Pond area, two at Fort Hill and one at Coast Guard Beach; Nauset Light; Nauset Light Keeper's House; and oil house; Beacon and Twin Sisters of Nauset Lighthouses; French Cable Hut.

The Old Town Centre Historic District is a local regulatory district approved by Town Meeting in 1986. The District Commission reviews all exterior buildings alterations, demolitions and new construction. The District consists of 57 properties and encompasses the west side of Route 6 in the vicinity of Salt Pond Road, Locust Road to Mill Road, and the east side of Route 6 along Nauset Road to Schoolhouse Road. It includes the 1869 Schoolhouse Museum owned by the Eastham Historical Society.

Since approval of the Town's first Local Comprehensive Plan, several Eastham historic sites and districts have been added to the National Register of Historic Places as a result of grants obtained by the Eastham Historical Commission. The Old Town Centre Historic District is now listed in the National Register as well as its listing in the State Register.

The Eastham Center Historic District consists of 59 properties along the west side of Route 6, Samoset Road to Bridge Road, Depot Road to Samoset Road. Notable inclusions are the Windmill, Windmill-Green, Public Library, Chapel-in-the-Pines (Unitarian-Universalist), 1741 Swift-Daley House, owned by the Eastham Historical Society, and the Eastham Town Hall, the only property on the east side of Rte 6.

Collins Cottages Historic District, 13 properties, is sited on town Cove at the entrance to Eastham. Cove Burying Ground, Eastham's first cemetery, is on the East Side of Route 6 near Pine Woods Road. Bridge Road Cemetery, second oldest, is west of Route 6 and south of Samoset Road. Both cemeteries are listed individually in the National Register.

The Fort Hill Rural Historic District consists of 33 properties and encompasses 100 acres of field, forest, and salt marsh within the boundaries of the Cape Cod National Seashore. Located east of Route 6 the district includes the Captain Edward Penniman House and Barn, Sylvanus Knowles House, and Seth Knowles House.

The Massachusetts Historical Commission, in conformance with Federal guidelines, considers any structure at least 50 years old to have potential historic significance. Research conducted by the Eastham Historic Society and the Eastham Historic Commission has identified 221 structures in the Town meeting this definition.

Analysis of Need: The Historical Commission is preparing to use a grant from the MHC and local CPC to do a thorough inventory of the Route Six corridor targeting those properties skipped in previous surveys.

Scenic Landscapes

The Massachusetts Landscape Inventory, established by the Department of Environmental Management (DEM), "identifies and locates the Commonwealth's important natural features" including the salt

marshes of Eastham in the Cape Cod Natural Seashore Unit. These marshes, primarily the Nauset marsh, are visible from the Fort Hill area, Seashore trails, and the old Coast Guard Station area at Coast Guard Beach.

There are several distinctive scenic areas, which can be viewed from Town-owned lands. These include the Lamont Smith and Louise Horton areas, the Fort Hill area looking out to Town Cove, Coast Guard Beach and Nauset Beach in Orleans, as well as to the salt marshes, the Cape Cod Rail Trail with views of several marsh and pond areas; Town Cove at Collins Landing as seen from Route 6; Boat Meadow landscape as seen traveling north on Bridge Road, all of the Town landings and beaches, and the Atlantic Ocean and Coast Guard Beach as seen traveling south on Ocean View Drive from Cable Road.

Culturally Significant Landscapes and Scenic Roads

Eastham's cemeteries are significant contributors to the historical character of its cultural landscape. The Cove Burying Ground (1660 - 1770), also the site of the Town's first church, contains the graves of three Mayflower passengers and many of the first settlers. The Bridge Road Cemetery (1754 - 1886), also the site of the Town's second church, buried succeeding generations of the original residents. Both cemeteries are listed in the National Register of Historic Places. The Congregational and Soldiers Cemetery was established in 1829 when a new church was built on the King's Highway (now Route 6). The complete name derives from a Civil War Memorial erected on the grounds. A Methodist burial ground and church were established in the early 1800's on the King's Highway and is now the Evergreen Cemetery.

The most popular culturally significant landscape in Eastham is the "Windmill Green" located on Route 6 and Samoset Road. The wind-driven gristmill is the oldest on Cape Cod and a favorite tourist attraction. It has been at its present site since 1808 and is listed in the National Register of Historic Places as a contributing structure to the Eastham Center Historic District.

Eastham is fortunate to have many scenic roads featuring combinations of tree-lined vistas, historic houses, and ocean, pond and marsh views. The Eastham Historic Commission has compiled a list of scenic roads that include: Bridge, Cable, Dyer Prince, Fort Hill, Governor Prence (east of Route 6), Great Pond, Hemenway, Herring Brook, Lawton, Locust, Massasoit, Nauset and Salt Pond Roads, Ocean View Drive, and Smith Lane. Although these roads have not been designated as Scenic Roads (pursuant to MGL Chapter 40 Section 15C) they are recognized as special features in the community and should be so treated.

Areas in Need of Improvement

Most of the areas identified as "in need of improvement" due to unattractive signage, inadequate landscaping and screening, and in need of pedestrian amenities are located on Route 6 from Old Orchard Road north to the Wellfleet Town line. Some areas are also located south of Nauset Road in the Town Hall area. National Seashore properties suffer from lack of funding for cultural resources and will continue to be in need of some renovation. While general conditions of the private structure inventory is considered to be satisfactory, there are some properties in need of general maintenance and repair.

Existing Protections for Historic, Scenic and Cultural Resources

Properties within the Old Town Historic District are protected from inappropriate alteration and demolition. The Historic District Commission reviews new construction, reconstruction, alterations, movement and demolitions of all exterior architectural features of buildings and structures within the district visible from a public street, way or park.

Historic properties within the National Seashore are provided some protection through the use limitations of the Seashore District and through Park Service review of alterations to improved properties. Historic Properties listed on the State or National Register of Historic Places and outside municipal historic districts are provided protection through the Cape Cod Commission Act. These properties and sites can be protected from “substantial alteration” or demolition by the Local Historical Commission or another agency referral to the Cape Cod Commission for review.

Current and Projected Threats to Community Character

Route 6 has long been Eastham’s “main street.” The community character of Eastham, however, has been threatened by commercial sprawl in the form of strip development along this route. Signage, building design, overhead utilities, and landscaping (or lack thereof) have contributed to a sense of suburban sprawl along this major thoroughfare. This “sprawl” detracts from the inherent nature of Eastham. Several measures were undertaken in the late 1980s, which have helped curb the further deterioration of this route through re-zoning and use limitations. However, traffic associated with the Seashore as well as with those traveling to and from Provincetown continues to pose a threat to the small-town character of Eastham.

Analysis of Need: The formation of a plan addressing improvements to existing businesses, signage, landscaping, parking requirements, pedestrian flow and traffic safety along this vital route is necessary to mitigate current and projected community character concerns. See Transportation section.

The growing development of communications towers and windmill generators is also of concern as companies compete to expand service to Cape Cod. Regulations governing the location of cellular towers and other transmission facilities are necessary to limit impacts to environmental resources, important vistas and other areas with distinctive community character. Eastham has adopted a by-law limiting the location of cellular towers to town owned land.

In recent years serious concern has been expressed by Eastham residents over the construction of large-scale single-family homes and their impact on community character. Additionally, current owners of cottages on small lots close to Cape Cod Bay are applying for permits to make substantial square footage upgrades that will impact community character. Responding to concerns from residents and other Town regulatory boards the Planning Board prepared a new zoning article for residential site plan review, which was approved by a special town meeting in 2001. The planning board reviews and modifies about 10 requests per year for structures that exceed the allowed footprint or square footage. This helps keep new construction in character with the neighborhood.

Strategies to Protect Identified Historic Resources

Outside of the Town’s Historic Districts, there is little protection afforded historic properties in Eastham. Current and projected threats to the historic inventory include property owner disinterest or financial inability to maintain a historic property, remodeling projects that destroy historic features, properties which fall into disrepair due to extended litigation, and new development in close proximity to a historic property and not in architectural congruence with it.

Analysis of Need: Historic Districts afford the highest level of protection for historic properties. While the expansion of a current district is a future possibility, the creation of any new district is unlikely. Emphasis should be placed on the nomination of individual properties to the National Register of Historic Places in order to provide greater recognition of their significance and protection from substantial alteration or demolition under town by-law and the Cape Cod Commission Act.

A demolition delay by-law is in place that provides a procedure to forestall the immediate demolition of any structure of potential historic significance until a public hearing can be held to make a final determination, and, if appropriate, initiate action to preserve the structure. The bylaw has been invoked twice although applying it to several properties has been discussed most recently in the Old Town Centre Historic District.

Signage, building design, landscaping, lighting, pedestrian circulation and parking requirements, accompanied by selective burying of overhead utilities, are needed to facilitate protection of the Town's inherent character. Boards and Committees are addressing these issues along the Route 6 corridor and in other areas of Eastham. All commercial building permits trigger site plan reviews that may recommend landscaping, lighting arrangements and general layouts for lots and structures. Residential building permits for structures that might impact community character or historic resources are referred to the Planning Committee for a site plan review. Although relatively few permits are denied, changes that would improve community character and preserve historic resources are frequently proposed. Recently about 25 such reviews are done annually.

This comprehensive plan recognizes the complex interrelationship between growth, land use, provision of infrastructure and services, access to jobs and educational opportunities, tourism, the maintenance of community character local demographics and the environment. Growth influences land use, which in turn influences the transportation system and ultimately the environment. The Town expects to continue to attract new development that includes growth in tourist summer population, and visitors to continue. More recent studies by the Cape Cod Commission, The Cape Cod Joint Transportation Committee and the RTA broaden this study to provide a vision of all transportation factors. The Outer Cape Capacity Study (OCCS) provides a glimpse of new development, how much would occur, and when build-out would occur.

The OCCS plan recognizes that a future for Eastham which achieves a desired future growth, land use, transportation system and environment must resolve potential conflicts with the transportation system and the costs for additional infrastructure and services. Future growth will increase the demand for accommodative travel facilities in order to increase highway capacity and improve safety. Controlling the number and location of curb cuts to accommodate small groups of residences and businesses could reduce interference with highway traffic.



Kids have fun on the Beach and Recreation Department July 4th Parade Float

SECTION VIII: GOALS AND OBJECTIVES

After reviewing the open space and recreational community vision (Section VI), and analyzing the needs of the Town (Section VII), the following Town goals and objectives for Open Space and Recreation have been compiled to establish criteria for decision making and strategy implementation which will assure the achievement of the Town's open space and recreational goals.

In developing the 2013 goals and objectives, the Open Space committee has reviewed and incorporated the following:

1. Previous 2007 Town of Eastham Open Space and Recreation Plan;
2. The 2012 Town of Eastham Local Comprehensive Plan;
3. The Cape Cod Commissions Regional Policy Plan;
4. The survey results and the public forum comments
5. Eastham Annual Town Meeting Warrants and Minutes
6. Other related town board committee plans; and
7. OSRP's from other communities.

As described in preceding sections, the Town's goals and objectives have been identified based upon the needs of the community and can be characterized into three (3) categories:

1. Protection of the Town's water resources.
2. Protection, preservation, and acquisition of open space.
3. Maintenance and improvement of upland and coastal recreation and conservation resources.

The following goals, objectives, and action plans were developed for open space and recreation activities in the Town of Eastham. These goals can be described as our strategic action plan based upon our community vision statement that defines what the Town will accomplish over the next five years.

1. Establish a town-wide water supply and water distribution system
2. Protect and preserve open space parcels
3. Protect and enhance habitat
4. Maintain and enhance the Town's recreational facilities.
5. Protect coastal water resources

Goal 1: Provide Open Space and Recreation Opportunities to Maintain Eastham's Rural Character

The objective is to preserve and enhance the availability of open space and provide wildlife habitat, recreational opportunities, and protect the natural resources, groundwater quality, air quality, and character of Eastham, consistent with the Regional Policy Plan.

Land Analysis Action Plan:

The identification of land to be preserved, maintained as open space, or acquired

1. Complete a comprehensive review and inventory of existing town-owned properties. ECLAP II
2. The identification of the best potential use of town owned land for conservation, for active, or passive recreation, and / or general use
3. Develop land management plans for existing conservation.
4. Investigate possible loops or connectors with existing biking and walking paths.

Land Acquisition Plan: To develop and implement an ongoing land acquisition program.

1. Identify future open space purchases.
2. Continue to work cooperatively with the Eastham Conservation Foundation, local non-profit land trusts, state and federal programs to identify, acquire, and manage open space and conservation restrictions.
3. Update a database of landowners with key open space parcels who should be contracted by the town on a regular basis to discuss options for preserving their land as open space.

Protect and enhance the Town's character through the preservation of key elements of the Town's natural and historic properties, including restoration of damaged or degraded resources.

Continue to maintain and protect public access to both freshwater and saltwater bodies for recreation purposes.

Develop a cluster zoning by-laws, also called conservation-oriented development, which allows a tract of land to be considered in its entirety and development is concentrated on a portion of the tract, leaving the rest undeveloped as protected open space and recreation lands.

1. Amend the subdivision regulations to take advantage to Section 81U of the Subdivision Control Law which permits the town to require open space set-asides within subdivision for future acquisition.

Goal 2: Maintain adequate supply of drinking water and preserve its quality

The objective is to maintain an adequate supply of drinking water and preserve its good quality for the foreseeable future.

Continue the Town's strong commitment to acquiring open space for the purpose of protecting future wellhead sites.

Maintain communication and coordination with neighboring town(s), which share the same aquifer lens.

Promote an educational Municipal Water Action Plan:

1. Enforcement by the Board of Health and other responsible Town department, of bylaws and regulations designed to minimize the potential for water contamination.
- 2.Reduction of the use of chemicals such as fertilizers and pesticides.
- 3.Active encouragement of water conservation
- 4.Education and the dissemination of information about water protection will sensitive the public to the importance of water quality and what can be done to preserve it.
- 5.The continuation of systematic and regular monitoring of the quality of Eastham's well water. Knowledge of contaminant levels and their evolution over time can identify areas of concern and guide remedial interventions.

Eastham will maintain the overall quality and quantity of Eastham's groundwater, to ensure a sustainable supply of high quality untreated drinking water and to preserve and improve the ecological integrity of marine and fresh surface waters.

1. Eastham's Freshwater Ponds are monitored annually since 2002
2. Continue to maintain and improve coastal water quality to allow the harvesting of shellfish and/or swimming in all coastal waters as appropriate, and to protect coastal ecosystems which support shellfish and finfish habitat.
3. Continue pond sampling to monitor water quality.

Goal 3: Enhance Recreational Opportunities Appropriate and Accessible to all Ages.

The objective is to meet the needs of residents and visitors by making access to facilities and resources universal in order to preserve and enhance opportunities for passive and active recreation in the natural environment.

Improve accessibility and protect habitat at Sandy Meadows, including trail improvements, including hardening material on portions of a trail for improved handicapped accessibility.

Continue to expand recreation programs to include all age groups and consider additional sites for ball fields and basketball facilities.

Evaluate the need for a youth center community facility or multi-use sports building.

Continue to upgrade and expand beach services.

Protect areas containing cultural and historic features which is of outstanding or unique value because of its inherent rarity and significance.

Goal 4: Protect and Manage Critical Natural Resources

The objective is to protect and enhance public and traditional maritime interests and the public trust rights of fishing, fowling, and navigation; to preserve and manage coastal areas so as to safeguard and

perpetuate their biological, economic, historic, maritime, and aesthetic values, and to preserve, enhance, and, where appropriate, expand public access to the shoreline.

Track daily usage(s) and collect data from Hemenway Landing, Salt Pond Landing, and Collins Landing to ascertain carrying capacity, the baseline and threshold of usage(s).

1. Designate Collins Landing a working waterfront overlay zone.

Continue to protect areas of land, both upland and coastal, where the interaction of people and nature has produced an area of distinct character.

Implement the Rock Harbor Marina Improvement Management Plan:

1. Dredge Rock Harbor and maintain the channel.
2. Use dredged materials for beach nourishment where possible.
3. Increase the capacity for additional boat slips, improvements to infrastructure and increase revenue generation.
4. Ensure No Discharge Zones for boats meet Federal and State Guidelines.
5. Eliminate marine head waste

Update List of Public Access points to ocean, bay, marsh and pond shorelines.

1. Secure easements for public ownership of tidal flats between mean high and low water.
2. Pursue establishment of community docks on Town Cove.

Encourage 'soft' solutions to coastal erosion revetment.

1. Continue to require annual beach nourishment as a condition of revetment maintenance.

Expand the shellfish propagation program for both recreational and commercial areas.

1. Evaluate the aquatic predatory control plan.

Identify and cleanup point source discharges of storm water runoff.

1. Target salt marshes along Cape Cod Bay for sanitary survey and remediation programs.

Goal 5: Protect and Manage Wetlands Wildlife and Plant Habitat

The objective is to prevent loss or degradation of critical wildlife and plant habitat, to minimize the impact of new development on wetlands wildlife and plant habitat, and to maintain existing populations and species diversity.

Document growth impacts upon wetland areas.

1. Restrict development or increases in use in environmentally sensitive near shore areas and limit septic impact development.

Document potential growth impacts upon wildlife and plant habitat areas

Wetlands Action Plan:

1. Identify, map and protect wetlands and vernal pools
2. Adopt a wetlands bylaw that coincides with the Natural Heritage and Endangered Species Program (NHES) for protection of vernal pools and isolated wetlands.
3. Work with relevant town departments and boards to develop mutually acceptable policies for boundary delineation and the siting of new subsurface disposal systems as well as improving and retrofitting areas with failing systems.
4. Develop and implement plans to address storm water management problems.

5. Continue to seek ways to remediate tidal restrictions
6. Conduct an analysis to assess potential growth impacts to wetland areas, identifying those that are protected as well as those threatened by development.



Alum Treatment – Herring River and Great Pond

Section IX – REVIEW- 2008-2013 Action Plan

The following is a summary of accomplishments over the past five years based on the goals set in the 2007 Open Space and Recreation Report.

Since submitting our first draft of the 2007 Open Space and Recreational Plan, the Board of Selectmen, town boards & committees, volunteers, and town staff have been busy enacting measures to protect the quality of life in Eastham and achieve the visions of the Town's 2012 Local Comprehensive Plan and the 2014 Open Space and Recreation Plan.

As the Open Space Committee reviewed the actions taken by the Town of Eastham over the past five years, 2008-2013, the words cooperation and collaboration range clear.

Water Quality

Over the years, exploration of a municipal water system has impacted the staff and town people the most. In collaboration with town departments and commissions, the Town in cooperation with town committees, presented to town meeting the municipal water system for vote twice over the last few years. The issue was best approached as a town wide system to be installed over fifteen years. This program would ensure that every property owner would pay for their water and have municipal water. This infrastructure would have enhanced fire protection, improved insurance ratios. Repeatedly, it lost narrowly, the last article presented losing by 11 votes in 2013. The Town's commitment to educate residents to the benefit of municipal water will continue.

Pond Treatment and Monitoring – Directed by the Health Agent, the Town continues to receive positive results from two pond treatment projects implemented by the town in order to slow the effects of excess nutrient loading upon the ponds. The treatments consist of an alum treatment to Herring Pond (2012) and Great Pond (2013) and the proposal of the installation of a water circulating device at Schoolhouse-Ministers Pond.

Groundwater Protection

With town meeting approval of \$3,050,000 budget, the Town had three test wells drilled on town-owned property to determine whether or not there is an adequate ground water supply to support a municipal water system. Initial results indicated that all three test wells were promising enough to justify the completion of testing and permitting. As part of the same project, a feasibility study continues to me ongoing in order to determine whether Town water requirements can be supplemented through the purchase of water from the neighboring Town of Orleans.

Preserve Town's Character

Produce the 2012 Local Comprehensive Plan - The Long Range Planning Advisory Board worked for several years on the development of the updated Local Comprehensive Plan including an extensive public participation process and public comment. The Final Plan was submitted to the town at the May 2013 Town Meeting and approval.

A District C & D Vision study was initiated to plot the current and potential future uses of the business district of the Town of Eastham to address community needs, goals and recommended actions, as identified in the 2007 Open Space and Recreation Plan, with the following specific goals:

1. Improve Traffic Flow on Route 6;
2. Create connected pathways around open spaces;
3. Explore use considerations for the newly acquired Purcell Property; and,
4. Promote Water Supply and Wastewater Treatment for the Business Districts.

North Eastham Overlay Zoning District study - explored the possible development of an Overlay District as a way to provide incentives for certain types of land use that would foster the highest and best interests of the town.

Sign Code Revisions - the Planning Board has been working diligently for approximately two years on revisions to the Sign Code and these efforts will continue. Amendments to Zoning By-Law and planning Rules and Regulations – The Planning Board worked on several proposed amendments to the Town of Eastham Zoning By-laws pursuant to MGL 40A §5 for the May 2013 Annual Town Meeting (ATM). Topics include outside display and an Affordable Accessory Dwelling Units bylaw.

Protect Open Space

Woods Hole Group completes an inventory and analysis of conservation land in Eastham for the Town's Open Space Committee and Conservation Commission.

Town Of Eastham Conservation Land Inventory and Analysis is completed. An analysis of open space parcels to document their ownership and use.

The Conservation Commission and the Town's Environmental Planner continue to work in cooperation with the building inspector, Planning Board, Zoning Board of Appeals, Conservation, Old Town Center Historic District Commission, Open Space Committee, Board of Selectmen, and various other groups and individuals on reviewing project applications.

Staff members participated in a municipal property management and land planning session - with the primary goals of enhancing the public's safe use and enjoyment, protecting and sustaining social and environmental values and quality, and providing a variety of land use opportunities for both humans and wildlife.

Sandy Meadow / Roach Property is newly designated Open Space under the control of the Board of Selectmen. A Land Management Plan is developed to outline trails and improve accessibility, while protecting the natural habitat. An ADA accessible trail in accepted by the Board of Selectmen

Promote Recreational Opportunities

In the past five years the Recreation Department has grown in participation, activities, travel activities, and use of facilities. Many new programs have been initiated in the past five years, including:

The winter of 2009 brought the introduction of adult indoor soccer and youth tennis at the Mid-Cape Racquet & Health Club and Willy's Gym, Eastham. The Eastham Recreation collaborated with the Brewster Recreation and Parent's Group to sponsor a very successful middle school winter dance. Summer of 2009 was also the inaugural year for pick-up softball, golf, and a clamming class!

February Vacation 2010 was jam-packed with ice-skating, bowling, swimming, a pizza party, a trip into Boston for Disney on Ice, an obstacle course, and open gym. new programs including family fitness, Adult Boot Camp, Teen & College Sports Conditioning and adult basketball clinics, family paddle board lessons, flag football, mini-golf, climbing rock walls and a special visit from Santa to end the year.

By 2012 the Recreation Department added a fishing program, February and April School Vacation activities packed with bowling, movies, laser tag, lunches & ice cream, indoor waffle ball, softball clinics and ice skating! 2012 also the was full of new programs including machine ball, chess & checkers on the beach, cheerleading and beach art! The introduction of a bike and hike program. Fridays after school children biked to Coast Guard Beach and Marconi Beach. Field trips to Bunker Hill Monument, continual recreational programs and special events include:

Boys and Girls K-6th, Middle School, High School Basketball, and summer basketball
Softball, Baseball, T-Ball, and Pick-up Baseball
Swim lessons, a swim team & meets
Summer and Fall Soccer
Summer Tennis
Field Hockey
Jump Rope
Annual Pumpkin Party
Egg Hunt
Skate Night
Annual Disney on Ice trip
Thanksgiving Duck Race

The Recreation and Beach Department manages bayside beaches, ponds in Eastham and is also responsible for a section of the parking lot at Nauset Light Beach. The department also oversees the seasonal operation at the Sticker Office where both Taxpayer and Visitor Beach Stickers are sold.

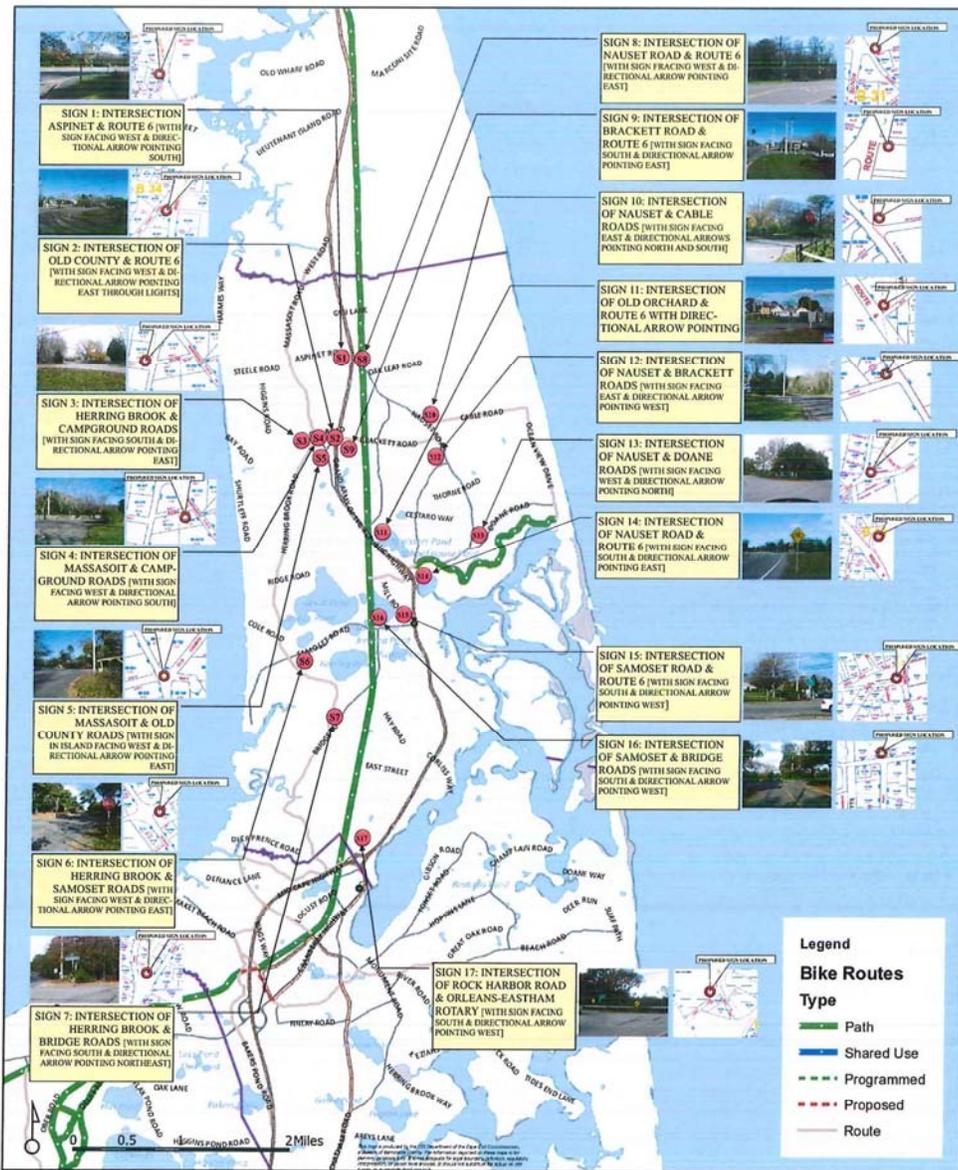
The Town completed the Cape Cod Regional transit Authority Bike Route signage project – worked with the CCRTA, Cape Cod Commission, the Town Administrator’s office, the Police and Fire Chiefs, the DPW Director and others to identify and map the best locations for signage that would help to direct bicyclists to existing bike trails in town.

Prevent loss of Critical Habitat

Conservation Regulations - Conservation Commission is exploring the development of regulations regarding wood materials, pesticide/herbicide use, plastic materials, and wetland buffer zone land use.

Town-sponsored Conservation permit Applications - As part of its effort to maintain compliance with wetland protection laws and regulations, the Departments of Natural Resources and Public Works have been working cooperatively with input from the Conservation Department to develop permit applications for presentation to the Commission for the following town-sponsored land management and maintenance activities: commercial aquaculture, natural resources protection, management and maintenance, vessel storage, and road and parking lot maintenance.

The town is obliged to conduct activities within these categories on a regular basis to maintain public services and safety and is also required to operate with the proper permits. Many of these activities occur within the buffer zone to wetlands, and therefore are within the jurisdiction of the Conservation Commission. The Commission welcomes and supports these efforts and recognizes that Eastham’s work in this regard is at the forefront of municipal wetlands permitting.



TOWN OF EASTHAM BIKE ROUTE SIGN LOCATION MAP

PREPARED FOR REGIONAL BICYCLE WAYFINDING PROJECT
 SPONSORED BY THE CAPE COD REGIONAL TRANSIT AUTHORITY AND THE CAPE COD COMMISSION
 PREPARED BY EASTHAM PLANNING DEPARTMENT
 NOVEMBER 15, 2012

BASE MAP AND SIGN GRAPHICS PROVIDED BY CAPE COD COMMISSION

Historical and Cultural Accomplishments

2012 The Eastham Historical Society received a grant from the Massachusetts Historical Commission with additional matching funds by the Eastham Community Preservation Committee to expand the town survey of historic properties. The survey is scheduled to be completed by the end of 2013.

2012 Plans for the Rock Harbor Marina Dredging are presented to the Town's of Orleans and Eastham officials

2012 Saw the introduction of new rec programs including Fishing Program, Bike & Hike Program and more field trips.

2011 The Forest Advisory Committee, working together with the Friends of the 1651 Eastham Arboretum and the DNR, coordinated the initial removal of an area of invasive species and updated the 1651 Forest Planting Summary and Planting Map. In the spring, the Friends successfully planted fifteen American Holly along the north side of the Wiley Park entrance road.

The Forest Advisory Committee is continuing to update the 1651 Forest Planting Summary and Planting Map. Generally, two planting projects are planned for each year along with maintenance sessions as required.

Articles Passed at Town Meeting: Open Space and Recreation

During Town Meetings held each year, the townspeople make their opinions heard. Following is a time line of recent Town Meeting Articles that highlight Eastham's commitment to overall planning goals and performance standards for open space and recreation.

2007 Article 31 – "A motion was made and seconded by the Board of Selectmen to authorize the Board of Selectmen to petition the legislature to authorize the **establishment of a Land Acquisition and Maintenance Fund**, as was done in 1998, to fund the acquisition and/or maintenance of open space or recreational land under the care and custody of the Board of Selectmen, into which the town, may appropriate funds from time to time from any source, and into which gifts for said purpose may be and further expenditures from this fund shall be made by majority vote of the Board of Selectmen unless for the purchase of land which requires a two-thirds vote of town meeting." Article Passed.

2011 Article 29 – "A motion was made and seconded by the Board of Selectmen to appropriate from the Community Preservation Open Space Reserve Fund Balance to the Eastham Open Space Committee, **\$5,000, for an analysis of parcels held for conservation purposes** and/or under the custody of the Town of Eastham Conservation Commission, and all other protected open space in Eastham (not including land owned by the federal government within the Cape Cod National Seashore)." Article Passed

2011 Article 30 – "A motion was made and seconded by the Board of Selectmen to appropriate from the Community Preservation Reserve Fund to the Town of Eastham Board of Selectmen, the sum of **\$560,000 for the purpose of purchasing a parcel of land located at 590 Steele Road** more fully described in a deed recorded at the Barnstable county Registry of Deeds in Book 11418 Page 56, and shown in Plan book 203 Page 11, as lots 4, 5, and C, and further shown on Assessors Map 4 Parcel 108 and containing 15,340 square feet for recreational use in connection with the use of Cook's Brook Beach." Article Passed

2011 Article 34 – "To see if the town will limit the use of the remaining portions of the town owned land known as the Roach Property for open space and passive recreation."

2012 Article 22 – “A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Open Space Reserve Account **\$140,000 for the purpose of treating Herring Pond** to preserve the open space quality of the pond by reducing the effects of phosphorus.” Article Passed

2012 Article 25 – “A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Fund Balance **\$5,100 for the purpose of constructing a parking lot at Sandy Meadow Way to serve passive recreation users of the parcel.**” Article Passed

2012 Article 26 – “A motion was made and seconded by the Board of Selectmen to rescind \$5,000 previously transferred and to transfer \$20,000 from the Community Preservation Open Space Reserve Account to the Eastham Open Space Committee for **an analysis of parcels perceived to be held for conservation purposes and/or under the custody of the Eastham Conservation Commission, and all other protected open space in Eastham** (not including land owned by the federal government within the Cape Cod National Seashore). Article Passed

2013 Article 20 – “A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Open Space Reserve Fund Balance to the Eastham Water Management Committee, **\$220,000 for alum treatment to be expended for the purpose of protection of an open space resource by funding the necessary permits and hiring consultants for remediation, by alum treatment, of unhealthy phosphorus levels in Great Pond** with said funds to be spent under the direction of the Health Agent.” Article passed

2013 Article 22 – “A motion was made and seconded by the Board of Selectmen to transfer from the Community Preservation Open Space Reserve Fund Balance to the PACE Committee, the sum of **\$25,000 for enhancing handicapped accessibility at Bee’s River under the direction of the Beach and Recreation Administrator** for the purpose of providing additional Handicapped Access via the use of Mobi-Mat or similar material in the area of Bee's River (aka Hatch's Beach).” Article Passed

2013 Article 25 – “A motion was made and seconded by the Board of Selectmen to transfer \$20,000 from the Community Preservation Open Space Reserve Fund Balance to the Open Space Committee for **construction of pathways, benches and other amenities, on land located off Sandy Meadow Way to serve passive recreation users of the parcel.**” Article Passed

The following reports were issued and are posted on the town website [www. Eastham-Ma.gov](http://www.Eastham-Ma.gov):

- Eastham Wastewater Management Planning Project (2009)
- Town of Eastham Conservation Land Inventory and Analysis (2012)
- Organic Land Management Policy (2012)
- Landfill Study (2013)
- Water Supply Environmental Report (2010)
- Freshwater Ponds Water Quality Report (2009-2013)
- Fertilizer and Pesticides Policy (2012)
- Open Space Managed Land Plan (2003 – in the process of being updated)
- Eastham Bikeways Committee Long Range Plan (2008)
- Wildland Fire Protection and Preparedness Plan (2009)

Following is a review of actions since the 2007 OSRP goals stated in the Town’s Annual Report:

Supporting Goal 1: In order to preserve and enhance the availability of open space in Eastham and provide wildlife habitat, recreation opportunities, and protect the natural resources, scenery,

groundwater quality, air quality and community character of Eastham and in order to manage population growth and congestion, Eastham shall strive to protect 50% of its remaining undeveloped land as open space.

2007 The Open Space Committee focused on two parts of the management plan – accessibility and education. With the efforts of the Department of Natural Resources, accessibility was improved for all users and a Fire Management Plan prepared for Wiley Park, the Nickerson Property, and Cottontails Acres Conservation Areas. The Fire Management Plan was submitted and approved and implemented in 2008.

2008 The Town of Eastham places a representative to the Cape Cod Commission, The commission was created after significant pressure from rapid development in the 1980s focused attention on the need to manage growth, guide land use, and address environmental problems in a comprehensive way throughout all of Cape Cod.

2010 Land Acquisition Program criteria is developed and implemented.

Properties include potential land acquisitions that:

1. Protect water quality; contribute to well-field protection; provide accessory equipment sites for a potential water supply distribution system.
2. Access the Chapter 61 tax abatement program: agricultural, forest, open space and recreation.
3. Provide links to the Cape Cod Pathways and Bikeways network; Cape-wide Greenbelt program where criteria are met for wildlife habitat.
4. Abut town conservation lands.
5. Abut a body of water/marsh.
6. Provide a potential town park, recreation or beach site

2011 Department of Public Works continues to monitor the erosion problem at our beaches. Maintaining, cleaning, and replenishing sand on all beaches along Cape Cod Bay; maintaining all Town Landings and replacement of pavements washed away by storm is an ongoing project.

2011 the Community Preservation Committee recommended grants for the purchase of a multi-unit affordable housing property a survey of the open space parcels with the town and the purchase of land for expansion of the Cook's Brook Beach parking lot.

2012 The newly formed Environmental Planning Department's (EPD) work is divided into two functions: Regulatory Review and Environmental Planning/Conservation Projects and Initiatives.

In 2012, the Eastham Conservation Lands Inventory and Assessment Project, sponsored by the Open Space Committee, was prepared by the Woods Hole Group. The plan provided a detailed inventory of all lands held for Conservation in the town and a map illustrating conservation lands owned by the town and non-profit conservation organizations.

2012 Renovations to the Swift-Daley House Museum, including structural repairs, window replacement and electrical upgrades (\$202,000)

2012 Preservation of historical town records (\$53,754)

Supporting Goal 2: To preserve and enhance opportunities for passive and active recreation in the natural environment to meet the needs of all Eastham residents and visitors by making access to facilities and resources universal.

2008 The town, in conjunction with the Open Space Committee, completed the construction of a footbridge (which was constructed to be Americans with Disabilities compliant) in Wiley Park that joined Wiley Park Conservation area with the newly purchased (2005) Nickerson Conservation area.

2009 The open space committee assessed the existing walking paths in Eastham and plans are underway to adjust the paths to blend public accessibility with conservation of natural environments.

2009 The preservation of our town historic cemeteries has been an ongoing effort, with support from CPA funding, there has been a continual maintenance by mending cleaning and landscaping these important historic resources of the Town.

Cycling continues to be a popular recreational activity in Eastham. Promoting bicycle safety along the Cape Cod Rail Trail and on the streets remains the primary focus of the Bikeways committee. The committee continues to distribute handouts of rules for safe cycling.

The Forest Advisory Committee continued its efforts to guide the management of the 1651 Forest at Wiley Park. These efforts are carried out in order to establish a forest in areas of Wiley Park that is a representative example of the forests in existence when Eastham was first settled by Pilgrim immigrants.

Department of Natural Resources (DNR) following the directive in the 2008 Fire Management Plan “thin the ‘fuel’ bearing brush and either remove, burn, or chip it” from the Town’s Conservation areas

2009 Open Space Committee working with DNR published an Open Space Trails Implementation Schedule.

2010 The Forest Advisory Committee updated the planting inventory log in conjunction with the DNR, using GPS to locate current plantings in Wiley Park and within the Friends of Eastham 1651 Arboretum.

2010 The Open Space Committee replaced signs at the entrance to Town open spaces, and added trail markers in the Glacial Ponds Conservation Area.

2010 With the assistance of a grant for Wildfire prevention, DNR and AmeriCorps complete the Wiley Park trail maintenance program.

2010 The committee also reviewed plans and supported the plantings and maintenance work done by the 1651 Forest Advisory Committee in Wiley Park.

2011 The Bikeways Committee sponsored a bicycle maintenance class, in conjunction with a local bike shop and the Eastham Police Department.

2011 The Public Access Committee of Eastham (P.A.C.E.), a brochure was distributed throughout town that lists all accessible public buildings in Eastham.

2012 The grand opening of the Cook’s Brook Beach Bathhouse Americans with Disabilities Act compliant installation of a new bath house and septic system at Cook’s Brook.

2012 The Recreation Department provide beach wheelchairs and Mobimats to area beaches.

2012 The Bikeways committee was consulted in an ongoing program conducted by the state and influenced by the town to improve and add the necessary signs with the intent to make people aware of where access points are to the bike trail to aid the traveler and hopefully increase bicycle use on the Cape.



Revetments and dune nourishment along Cape Cod Bay

Goal 3: To maintain the overall quality and quantity of Eastham's groundwater, to ensure a sustainable supply of high quality untreated drinking water and to preserve and improve the ecological integrity of marine and fresh surface waters.

2008 Major repairs to the storm water drainage system in Thumpertown Beach parking lot.

2009 Town of Eastham developed a conceptual water and wastewater infrastructure scope of work for the North Eastham Village Center Proposal

2009 Reviewed volunteer-collected water-quality data for selected ponds and prepared a report. Town of Eastham continued to coordinate the Cape-wide Pond and Lake Stewardship Project: as part of the annual water-quality monitoring program, samples were collected and analyzed from 11 ponds in Eastham.

2009 The selectmen received a Draft October 2011 Action Plan for the Town of Eastham Ponds. The report, compiled by consultants Ecologic, LLC, and GHD, summarized pond conditions, field assessments, water and sediment analysis, and watershed sources. It outlined a number of possible remedial and protective measures along with a recommended implementation strategy.

2009 Develop the Massachusetts Estuaries Project (MEP) watershed, land use and nitrogen loading information for the Nauset Marsh estuary system.

2009 The annual water-quality monitoring program increased to 28 samplings at 12 ponds in Eastham.

2009 The topic of degrading water quality both in terms of drinking water and surface pond and estuarine waters is of great concern to the Conservation Commission.

2009 Storm water discharge to Salt Pond with drainage improvements were started under design.

2009 The Groundwater Protection Plan includes plans to:

- Develop of an overlay district of “environmentally sensitive areas” where controls are more stringent than in other areas
- analyze of the effect drawdown of the aquifer is having on natural resources and the Town’s ability to sustain itself
- establish a program for regular Town-wide testing of private wells
- establish Town-wide water restrictions and development and implementation of a conservation program
- recommend areas of Town that need special water restrictions
- recommend areas of Town that need a public water supply
- analyze the best use of existing resources to ensure that there will be enough high quality drinking water for the Town’s future
- provide a framework for promoting cooperation between Federal, State and Town regulatory agencies to achieve the above goals

2012 Treatment of Herring Pond to improve water quality

2013 Treatment of Great Pond to improve water quality

2013 The Eastham Water Management Committee publishes a draft of the Town of Eastham Comprehensive Plan to Protect Pond Water Quality

Goal 4: To encourage the use of public and private sewage treatment facilities in appropriate areas where they will provide environmental or other public benefits and where they can be adequately managed and maintained.

2009 The town completed a preliminary wastewater study.

The Wastewater Management Plan includes plans to:

- Analyze the effect on-site wastewater disposal is having on groundwater, other natural resources and the Town’s ability to sustain itself
- Continue the program for regular Town-wide testing of individual disposal systems
- Recommend areas of Town that require special disposal systems due to high density or proximity to sensitive resource areas
- Recommend areas of Town that would benefit from a Town sewage disposal system or a series of “package treatment plants” with an analysis of the potential cost
- Analyze of the best use of existing resources to ensure that there will be enough high quality drinking water for the Town’s future
- Provide a framework for promoting cooperation between Federal, State and Town regulatory agencies

Goal 5: To protect the public interests in the coast and rights for fishing, fowling, and navigation; to preserve and manage coastal areas so as to safeguard and perpetuate their biological, economic and aesthetic values, and to preserve and where appropriate expand public access to the shoreline.

The ongoing process of protecting our Bay beaches and achieving a balance between the desires of the upland property owners and the health and well being of our beach system and salt marshes continues to be our focus.

Red tide appears each year, as early as February and continues into June, sometimes July.

Each year, April and May, DNR reports a successful run of herring and elvers in both our Cole Road and Herring Pond runs.

Redesign Thumpertown access staircase to Cape Cod Bay beach from parking lot is completed. The access stair redesign is to provide a more environmentally friendly construction on the eroding coastal bank.

2010 Rock Harbor Marina Management Plan to enhance the public enjoyment of the Rock Harbor area is introduced for public comment.

2008-2014 DNR participates in the contaminated quahog relay from the Taunton River in Fall River. The quahogs are planted in the Salt Pond and are of smaller size ranging from littlenecks to cherrystones. The shellfish are harvested by the public on Shellfish Sunday's.

The selectmen will continue to work with the Recreation and Beaches Department, the Conservation Commission, the Department of Natural Resources, and the Department of Public Works to find the best solutions to mitigate damage resulting in future lost parking and shoreline

In 2011, The Department of Natural Resource purchased a new 22' ft Eastern patrol boat with up to date electronics for Rock Harbor to be used by Natural Resources and the Fire Department for patrolling and search and rescue.

In 2011 Eastham DNR receives 300,000 seed quahogs in June from the Barnstable County Cooperative Extension Service.

May 2013, working with the Commonwealth of Massachusetts Division of Marine Fisheries, the Town of Eastham re-constructed a fishway at two locations in support of the largest river herring run in Eastham and an annual run of American eel elvers. Great Pond provides 110 acres of river herring spawning and nursery habitat on the Cape Cod Bay side of Eastham. Water flow exits Great Pond through the 7 acre Bridge Pond and travels via Herring Brook to Cape Cod Bay. The Bridge Pond outlet herring ladder/culvert structure and the Herring Brook ladder/culvert at the entrance to Cape Cod Bay were replaced in the winter of 2012-2013 by the Town of Eastham as part of the WHIP habitat restoration project funded by the Natural Resources Conservation Service.

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

The DPW raised Ellis Road to minimize flooding and eliminated a storm water outfall pipe into Town Cove.

Goal 7: To maintain and improve coastal water quality to allow the harvesting of shellfish and/or swimming in all coastal waters as appropriate, and to protect coastal ecosystems which support shellfish and finfish habitat.

2008-2013 Demonstrating the Town's commitment to aquaculture and shellfish. 25,000 oysters were grown in Salt Pond Bay by the Department of Natural Resources for public harvest.

Goal 8: To preserve and restore the quality and quantity of inland and coastal wetlands in Eastham.

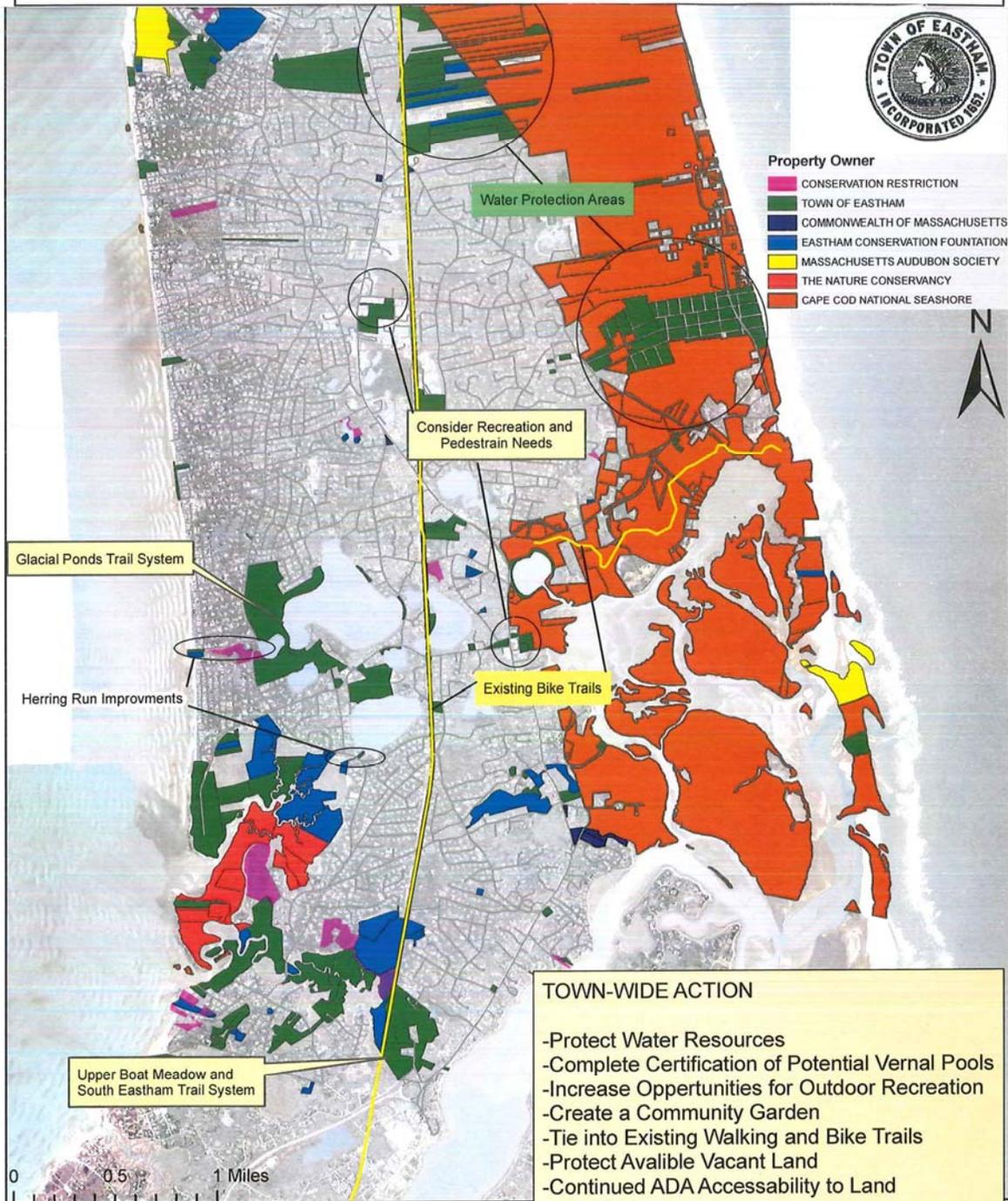
The Conservation Commission continues with the primary responsibility of enforcing the Wetland Protection Act and the local Wetland Protection Bylaw regarding work proposed in and around our wetland areas.

2012 Restoration of Sunken Meadow salt marsh by removing an old cranberry dike.



2013 Cole Road Herring Run Culvert Restoration Project

TOWN OF EASTHAM FIVE YEAR ACTION PLAN MAP



Section X: Five-Year Action Plan

Five-Year Action Plan				
Town of Eastham Open Space and Recreation Plan				
Five-Year Action Plan				
Goal 1 PROVIDE OPEN SPACE AND RECREATION OPPORTUNITIES TO MAINTAIN EASTHAM'S RURAL CHARACTER				
Objective	Action	Department	Funding Source	Time Frame
Open Space	Continue to develop a comprehensive open space and recreation plan to meet future open space and recreation needs	Open Space / Conservation / Natural Resources / Recreation	OB / Grants	Ongoing since 2002
	Protect and enhance the Town's character through the preservation of key elements of the Town's natural and historic, including restoration of damaged or degraded resources	Open Space / Conservation / Planning Board / Natural Resources	OB	Ongoing since 1998
	Review the Open Space Inventory, verify and document protections or lack thereof, on town owned properties	Open Space / Conservation / Natural Resources	OB / Grants	New Review undertaken since 2011
	The Town will continue to work cooperatively with the Eastham Conservation Foundation, local non-profit land trusts, state and federal programs to identify, acquire, and manage open space and conservation restrictions	Open Space / Conservation / Natural Resources	OB	Ongoing
	Update a database of landowners with key open space parcels who should be contracted by the town on a regular basis to discuss options for preserving their land as open space	Open Space / Conservation / Assessors / Natural Resources	OB	Update undertaken 2010
Open Space	Develop a cluster zoning by-law, also called conservation-oriented development, which allows a tract of land to be considered in its entirety and development is concentrated on a portion of the tract, leaving the rest undeveloped as protected open space and recreation lands	Open Space / Conservation / Planning Board	OB / Grants	Conceptual
	Amend subdivision regulations to take advantage of Section 81U of the Subdivision Control Law which permits towns to require open space set-asides within subdivisions for future acquisition	Open Space / Conservation / Planning Board	OB	Ongoing

	Continue to maintain and protect public access to both freshwater and saltwater bodies for recreational purposes	Conservation / Board of Health / Natural Resources / Recreation	OB	Ongoing
	Investigate possible loops or connectors with existing biking and walking paths, identify parcels for acquisition, establish a bike safety course, recommend measures to mitigate safety concerns, and identify opportunities for additional parking in proximity to the Cape Cod Rail Trail	Open Space / Conservation / Natural Resources / Recreation	OB / Grants	Ongoing since 2008
Goal 2 PROTECTION OF THE TOWN'S WATER RESOURCES				
<i>Objective</i>	<i>Action</i>	<i>Department</i>	<i>Funding Source</i>	<i>Time Frame</i>
	Delineate specific actions that will apply and benefit all ponds in Eastham	Conservation / WMC	OB / Grants	Undertaken
	Continue the Town's strong commitment to acquiring open space for the purpose of protecting future wellhead sites	Open Space / Conservation / Natural Resources / Board of Health	OB / Grants	Ongoing
Water Resources: Education	Work to encourage pond abutters to maintain or reestablish a buffer zone of native plantings on the pond side	Conservation / Natural Resources / WMC	OB / Grants	Ongoing
Water Resources: Education	Education: Communication of basic water resource information that provides (a) information for informed decision-making on water management issues presented at Town Meeting; and (b) encouragement of personal involvement in activities to preserve and protect the water supply on their own and on public lands	Open Space / Conservation / Natural Resources / Board of Health	Grants	Ongoing
	Develop strategy for educating the public about best practices to protect pond water quality	Water Management Committee / Conservation / Board of Health	Grants	Undertaken
Water Resources: Outreach	Communication: Improve upon a system of communication and coordination among town committees involved in water resource issues, including the Board of Health, the Conservation Commission, the Planning Board, the Water Resources Advisory Committee, and the Board of Selectmen	Open Space / Conservation / Board of Health / Planning Board / Natural Resources	OB	Undertaken
	Communication / coordination with neighboring town(s), sharing the same aquifer lens	Conservation / Board of Health / Natural Resources	OB	Undertaken

	Enforcement by the Board of Health and responsible Town bodies, of bylaws and regulations designed to minimize the potential for water contamination	Board of Health / Conservation	OB	Ongoing
	Reduction of the use of chemicals such as fertilizers and pesticides that inevitably contaminate groundwater	Board of Health / DPW	OB	Ongoing
	Active encouragement of water conservation	Board of Health / Conservation	OB	Ongoing
	The continuation of systematic and regular monitoring of the quality of Eastham's well water	Board of Health	OB	Ongoing
	Continue to maintain and improve coastal water quality to allow shellfishing and/or swimming in all coastal waters as appropriate, and to protect coastal ecosystems that support shellfish and finfish habitat	Conservation / Natural Resources	OB / Grants	Ongoing
Water Resources	Continue pond sampling to monitor water quality by means of the Barnstable County supported Ponds and Lakes Steward Program	Open Space / Conservation / Board of Health	OB / Grants	Undertaken
	Continue protection of potential sites for municipal water supply wells and their zones of contribution	Open Space / Conservation / Natural Resources	OB / Grants	Ongoing
	Continue to plan and implement a well water sampling program with monitoring	Board of Health	OB	Ongoing
	Ensure protection of fresh water wetlands and ponds and ponds from storm water discharges	Open Space / Conservation / DPW / Natural Resources	OB	Ongoing
	Maintain the 5-ppm nitrate-nitrogen loading standard consistent with the Cape Cod Commission Regional Policy Plan	Conservation / Board of Health / Natural Resources / CPC	OB	Undertaken
	Continue to monitor Environmentally Sensitive Area Zones requiring separate performance standards with regard to septic system upgrades and installations	Conservation / Board of Health	OB	Undertaken
	Continue to reduce the use of road salt for control of ice and snow with due regard for the requirements of road safety	Conservation / DPW	OB / Grants	Ongoing

	Develop by-laws and zoning regulations that protect the ground water resources in Town, such as public water supply zones of contribution, municipal well field zones, marine embayments, and nitrate loading overlay districts in densely populated and/or vulnerable areas	Conservation / Natural Resources	OB / Grants	Ongoing
Goal 3 ENHANCE RECREATIONAL OPPORTUNITIES APPROPRIATE AND ACCESSIBLE TO ALL AGES				
<i>Objective</i>	<i>Action</i>	<i>Department</i>	<i>Funding Source</i>	<i>Time Frame</i>
	Construct a multi-use sports building	Recreation & Beach	OB	Wish List
Recreation	Continue to expand the current programs to include all age groups and consider additional sites for ball field, tennis and basketball facilities	Recreation & Beach	OB / CPA	Yearly Program Additions Ongoing
	Evaluate the need for a youth center / community facility	Recreation & Beach	OB	Ongoing since 2001
	Consider recreation needs in the development of plans for the Town Hall area and for the Route 6 and Brackett Road area	Open Space / Conservation / Natural Resources	OB / Grants	Ongoing since 2008
	Continue to plan and implement a well water sampling program with monitoring	Open Space / Conservation / Natural Resources	OB	Ongoing
	Continue to upgrade and expand beach services	Recreation & Beach	OB	Ongoing
	Improve accessibility and protect habitat at Sandy Meadows, including trail improvements for improved handicapped accessibility	Open Space/ Conservation/ Natural Resources/ DPW	CPA	Completion date: May 2014
Cultural Recreation	Protect areas containing cultural / historic features that have outstanding or unique value because of their inherent rarity and cultural / historical significance	Historical Commission/ Conservation/ Natural Resources / DPW	OB	Ongoing
Goal 4 PROTECT AND MANAGE CRITICAL NATURAL RESOURCES				
<i>Objective</i>	<i>Action</i>	<i>Department</i>	<i>Funding Source</i>	<i>Time Frame</i>
	Manage resource protected area(s) for sustainable use of natural ecosystems	Conservation / Open Space /	OB	Ongoing

		Natural Resources		
	Continue to collaborate/work with the Forest Advisory Committee in its efforts to guide the management of the 1651 Forest in Wiley Park	Forest Advisory Committee / Conservation / Natural Resources	OB / Grants	Yearly ongoing
	Enhance the entrance to Wiley Park with a sustainable, low maintenance, landscape project using hardy native and naturalized plantings to demonstrate that a landscape can be maintained without impacting the Town's sole source aquifer	Forest Advisory Board / Friends of 1651 arboretum / Conservation / Open Space / Natural Resources / DPW	Grants	Grant received from Barnstable County Land Mangmt program / project underway
Managing Coastal Resources	Continue to track daily usage(s) of Hemenway Landing, Salt Pond Landing, and Collins Landing to ascertain carrying capacity, the maximum amount of usage(s) that will indefinitely support the landing without permanently impairing the productivity of the habitat and the character of the environment	Natural Resources	OB	Seasonally Ongoing
	Continue to protect areas of land, both upland and coastal, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value	Conservation / Open Space / Natural Resources	OB	Ongoing
	Designate a 'working waterfront' overlay zone in the area of Collins Landing in Town Cove to ensure the preservation and expansion of traditional maritime uses	Open Space / Conservation / Natural Resources / Board of Health	OB / Grants	Feasibility study underway / date of completion 2016
	Proceed with the Rock Harbor Marina Improvement Feasibility Study / Management Plan intended to increase the marina's capacity for additional boat slips, improvements to infrastructure and increase potential revenue generation	Conservation / DPW / Board of Health / Natural Resources / Town Of Orleans	OB	Feasibility study undertaken 2010 / Management Plan underway
	Dredge Rock Harbor and maintain the channel	DPW / Natural Resources / Town of Orleans	OB / Grants	Awaiting Date

	Explore the feasibility of using Rock Harbor dredged materials for beach nourishment projects	Conservation / Open Space / DPW / Natural Resources	OB / Grants	Undertaken / Report due 2014
	Restrict development or increase in use in environmentally sensitive near shore areas and limit septic impact of development	Open Space / Conservation / Board of Health / Planning Board / Natural Resources	OB	Undertaken / Ongoing
	Review areas designated as Federal no discharge zones for boats to be certain they meet current Federal and State guidelines	Conservation / Board of Health / Natural Resources	OB	Undertaken 2011 / Ongoing
	Continue to cooperate with the regional disposal options for marine head waste	Board of Health / Harbormaster / Natural Resources	OB	Ongoing
	Monitor by-laws and regulations established to reduce the potential impacts to health and safety and the economy resulting from coastal storms	Open Space / Conservation / Natural Resources / DPW	OB / Grants	Ongoing
	Update the list of projects that provide or enhance coastal access and use of their shoreline	Open Space / Conservation / Natural Resources	OB	Ongoing / Update review 2015
Education	Encourage 'soft' solutions to coastal erosion instead of engineered structures	Open Space / Conservation / Assessors / Natural Resources	OB	Ongoing
	Continue to monitor a comprehensive plan to require annual beach nourishment/replenishment as a condition for permission to install, maintain, or rebuild a revetment	Conservation / Natural Resources / DPW	OB	Ongoing monthly / annually
Coastal Resources	Secure easements for public ownership of tidal flats between mean high and mean low water	Conservation / Natural Resources	OB	Undertaken
	Continue to expand the shellfish propagation program for both recreational and commercial uses	Natural Resources	OB / Grants	Ongoing
	Initiate an aquatic predatory control plan	Natural Resources	OB	Spring 2013

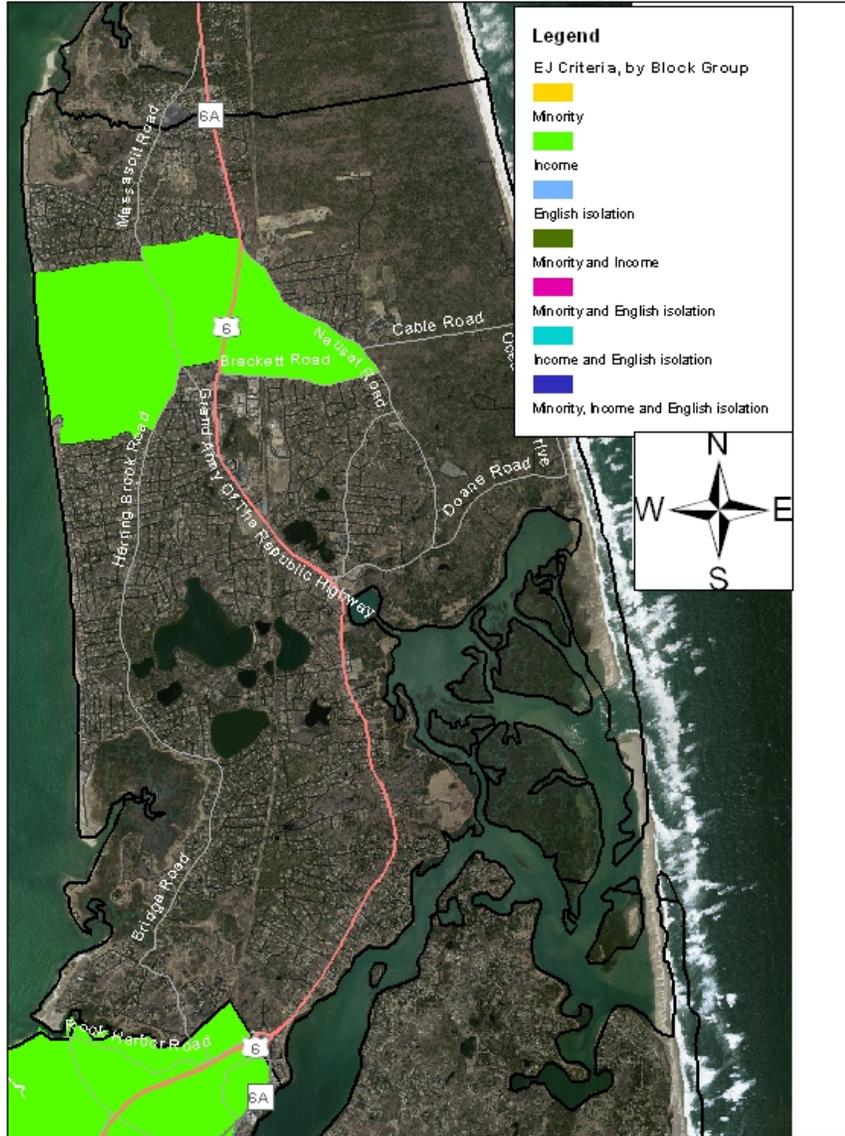
	Pursue the establishment of community docks rather than individual private docks in the area of Town Cove	Natural Resources / Conservation	OB	Start Date 2013
Stormwater Remediation	Identify and cleanup the existing point source discharges of storm water from roadways such as Route 6	DPW / Conservation / Board of Health	OB	Ongoing since 2007
	Target the salt marsh areas along Cape Cod Bay which are subject to administrative closure for sanitary survey and restoration/remediation programs	Board of Health / Open Space / Conservation / Natural Resources	OB / Grants	Ongoing since 1998
Goal 5 PROTECT AND MANAGE WETLANDS WILDLIFE AND PLANT HABITAT				
<i>Objective</i>	<i>Action</i>	<i>Department</i>	<i>Funding Source</i>	<i>Time Frame</i>
	Expand and refine the town's wetland bylaw that provides for the following: protection of vernal pools outside other resource areas as well as isolated wetlands	Open Space/ Conservation/ Natural Resources/ Board of Health	OB / Grants	Ongoing
	Develop mutually acceptable policies for wetland boundary delineation	Conservation/ Board of Health / Natural Resources	OB	Undertaken
	Site new subsurface disposal systems	Board of Health	OB / Grants	Awaiting Date
	Retrofit areas with failing disposal systems	Board of Health	OB	Ongoing
	Seek ways to remediate tidal restrictions	Open Space / Conservation / Board of Health / Planning Board / Natural Resources	OB	Undertaken since 2009
	Develop a review process for activities in critical plant and wildlife habitat areas	Conservation / Open Space / Natural Resources	OB	Review in Process, Report due 2015

	Adopt by-laws / ordinances limiting land clearing and alterations of natural topography prior to development review	Conservation / Board of Health / Natural Resources	OB	Updated 2010
	Continue to analyze potential growth impacts upon wetland areas	Board of Health / Conservation	OB / Grants	Ongoing since 2008
	Continue to analyze potential growth impacts upon wildlife and plant habitat areas	Open Space / Conservation / Natural Resources	OB / Grants	Ongoing since 2008

The harvest of shellfish at Sunrise on Nauset Marsh

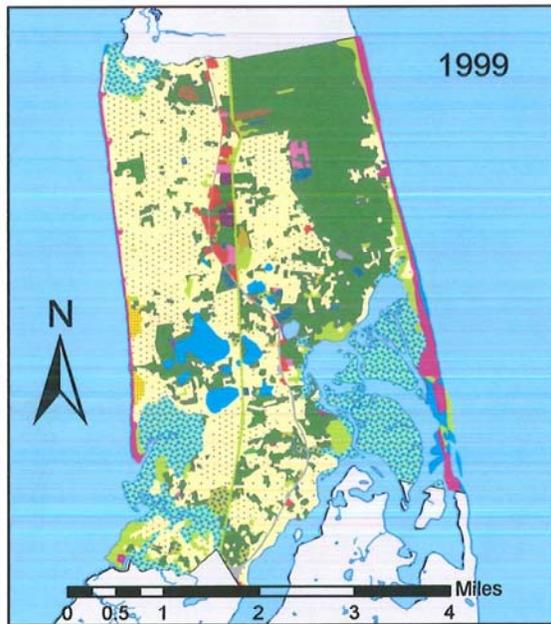
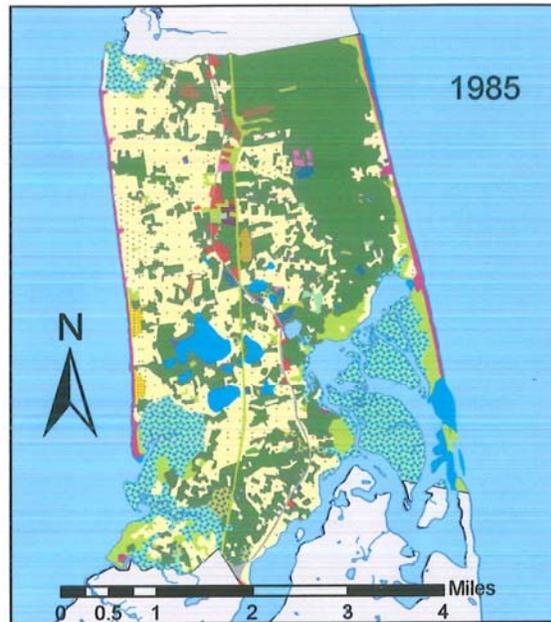
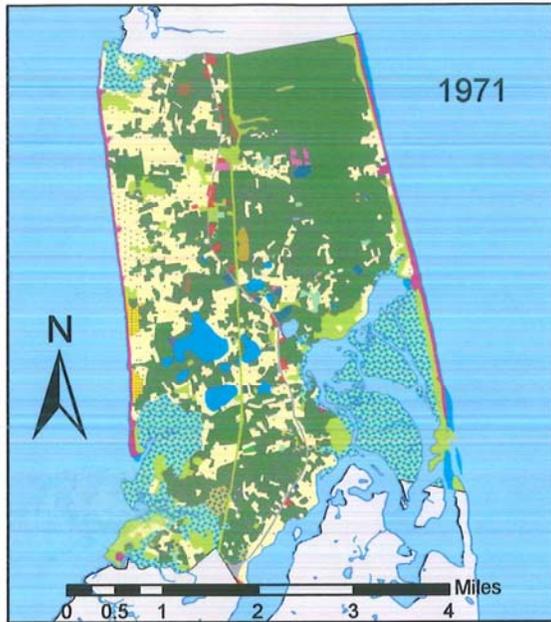


Environmental Justice Populations



Historic Land Use

Eastham, Massachusetts

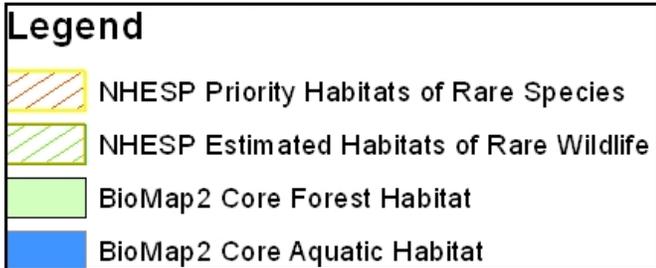
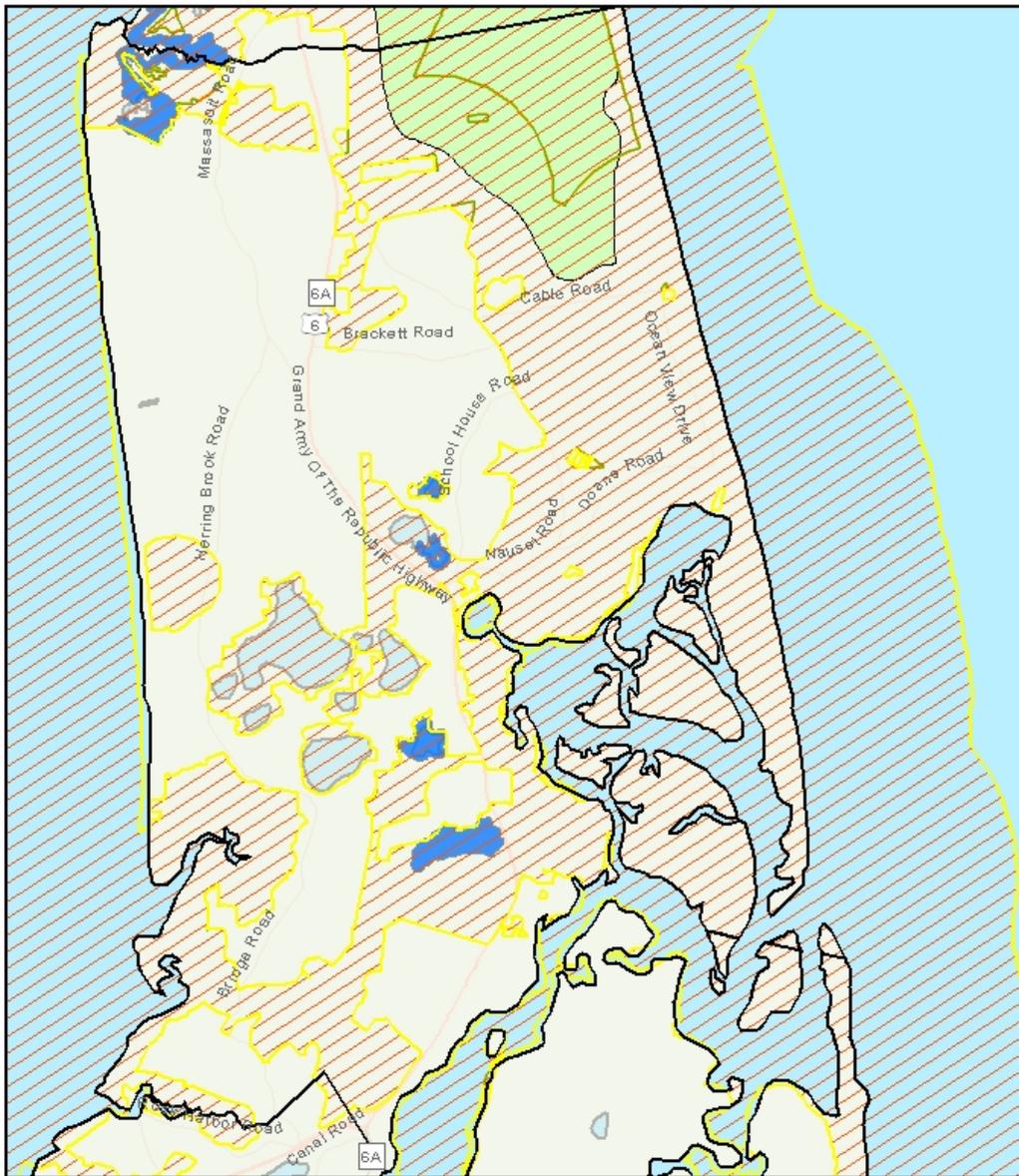


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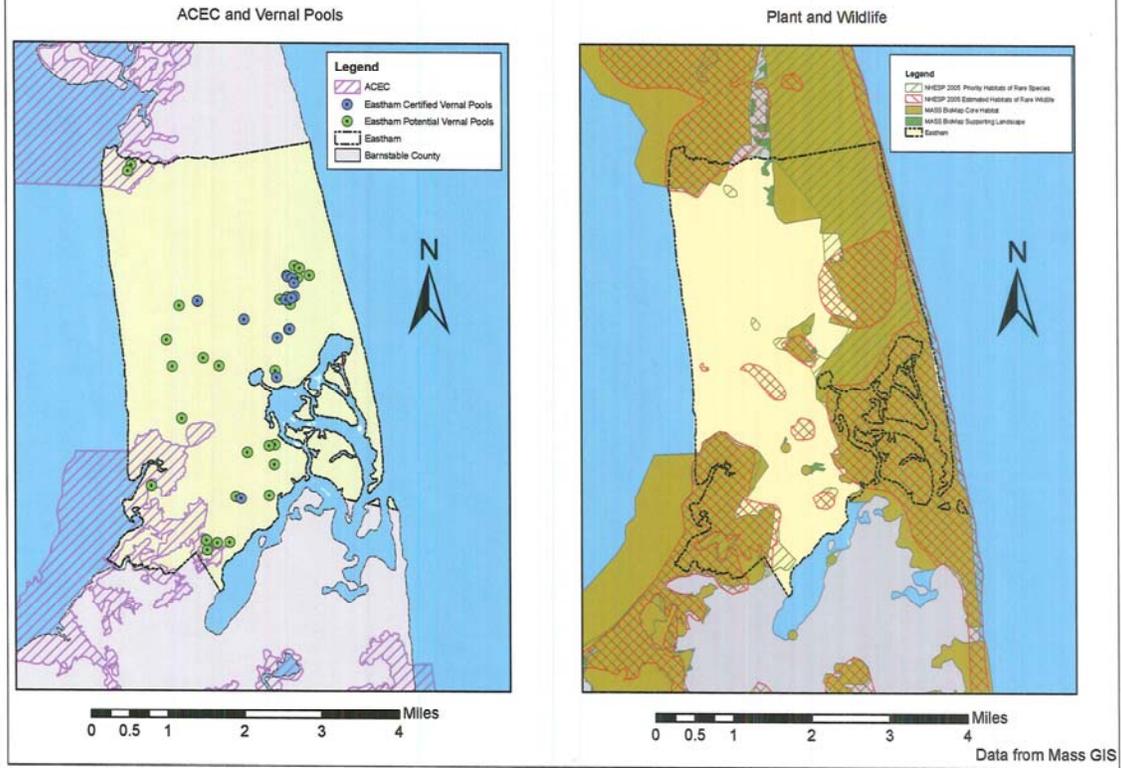
Legend

- Crop Land
- Pasture
- Forest
- Non-Forested Wetland
- Mining
- Open Land
- Participation Recreation
- Spectator Recreation
- Water-Based Recreation
- Multi-Family Residential
- High Density Residential
- Medium Density Residential
- Low Density Residential
- Salt Water Wetland
- Commercial
- Industrial
- Urban Open
- Transportation
- Waste Disposal
- Water
- Woody Perennial
- Massachusetts Towns

Eastham Endangered Species Habitat



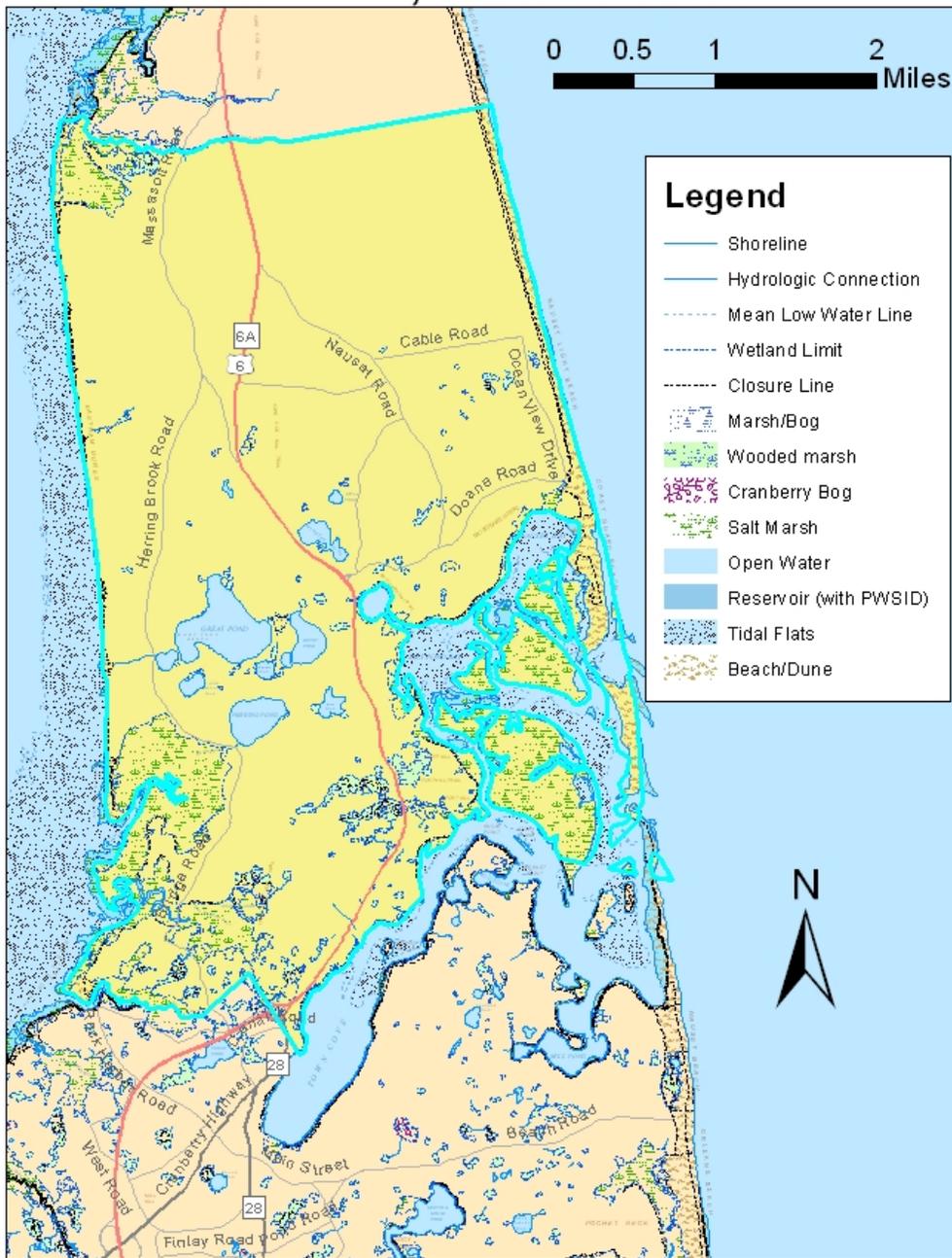
Unique Features Eastham, Massachusetts



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Water Resources Surface Water and Wetlands Eastham, Massachusetts



Data from MassGIS