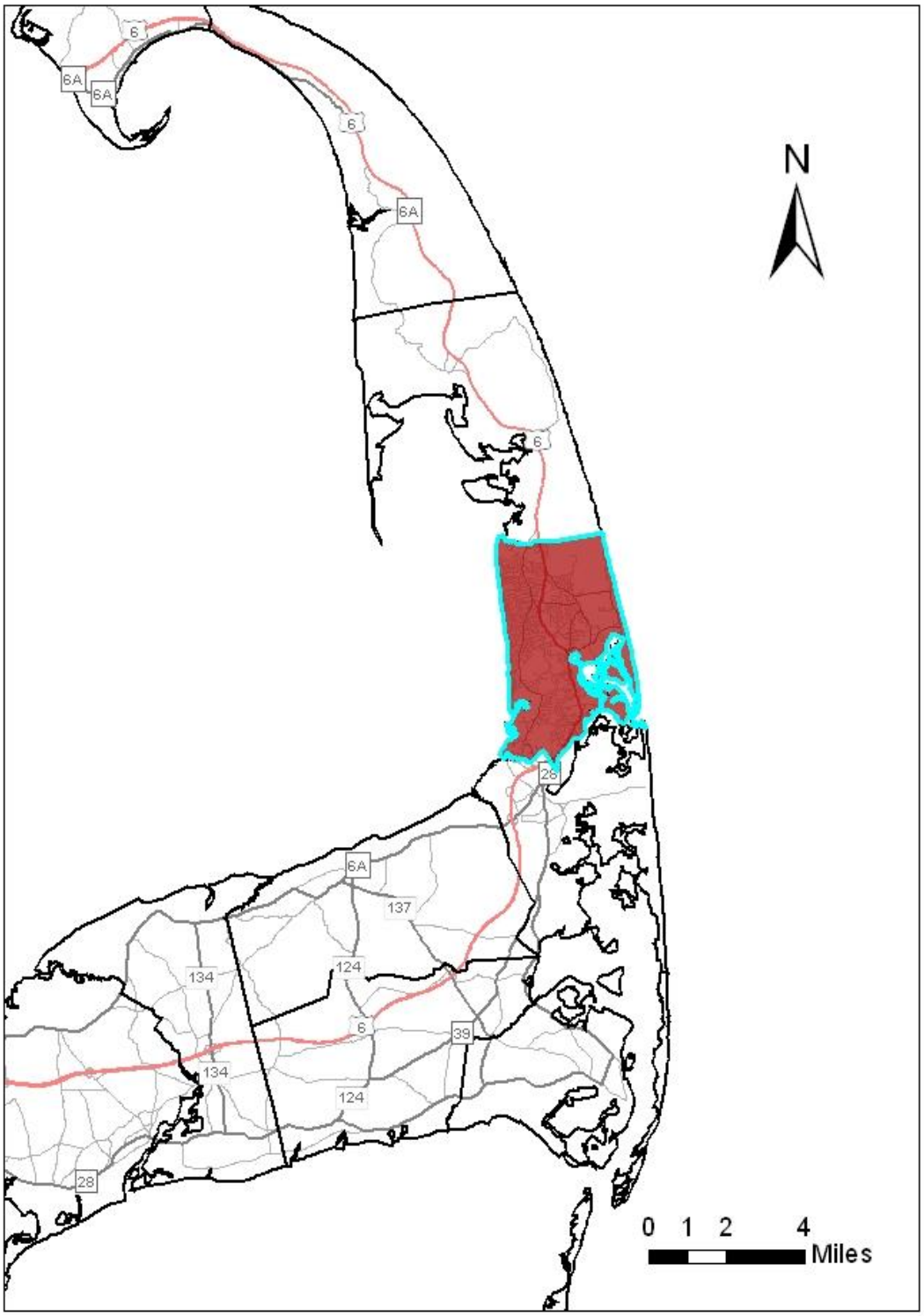
OPEN SPACE AND RECREATION PLAN

2015

Regional Context : Eastham



Map 1 - Data from MassGIS

TOWN OF EASTHAM, MA

The following individuals and organizations have contributed to this Open Space and Recreation Plan for the Town of Eastham.

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Town Committees

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

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SECTION 1. PLAN SUMMARY

"The overall aspirations of Eastham is 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 2016 Eastham Open Space and Recreation Plan (OSRP) is a management document used by town departments and committees as well as local organizations to guide open space decisions and recreation activities in Eastham over the next seven years. Through surveys, weekly public town committee meetings and public hearings, and the annual Town Meeting, the 2016 OSRP is a blending of community expression that forms a vision with goals and objectives for the future planning of Eastham.

The plan not only addresses the requirements of the OSRP, but sets the foundation for future open space protection, land acquisition, incorporates fresh water quality recommendations and allows for open space and recreation planning in Eastham.

The Eastham Open Space Committee, an advisory committee under the oversight of the Conservation Commission, submitted this plan. Established and appointed by the Board of Selectmen, the Open Space Committee is charged with the responsibility to prepare and maintain 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 Eastham 2012 Comprehensive Plan, the Community Preservation Plan FY2015-2019, the Cape Cod Regional Policy Plan, the Massachusetts Statewide Comprehensive Outdoor Recreation Plan 2012, the Water System Plan, the Freshwater Ponds Water Quality Reports and the Cape Cod Commissions Heritage Landscape Report; have all been assimilated into the 2016 OSRP. The goal of the Open Space Committee is to create an updated OSRP that will be a time capsule of town-wide environmental issues, recreation activities, and recommended action plans between the last OSRP (2007) and today (2015).

This plan describes Eastham's open space and recreation management strategies and includes an assessment of current open space and recreation needs, a statement of goals and objectives and an action plan for meeting these goals.

The revised 2016 Open Space and Recreational Plan (OSRP) takes into consideration the goals and objectives of the 1998 and 2007 Open Space and Recreation Plans, and is based on the 2012 Town of Eastham Local Comprehensive Plan. This revised OSRP is consistent with many of the goals, objectives, and findings within the Cape Cod Regional Planning Policy Plan, the Outer Cape Capacity Study, the Lower Cape Water Management Task Force Study, the Cape Cod Coastal Embayment Project, and the Statewide Comprehensive Outdoor Recreation Plan.

The Eastham Open Space Committee conducted a comprehensive review of the 2007 plan. To gain public comment during the review process, during 2014, an update of the OSRP progress was aired on local television once a month during Open Space Committee meetings, and openly discussed to keep the community informed and involved with the process.

The OSRP draft plan was placed on the Town of Eastham (eastham-ma.gov) website home page for public comment. Contributions were made by the public and the draft plan was updated as necessary. The Open Space Committee engaged other local area towns, regional non-profit partners, as well as the Cape Cod Commission to review the draft document to ensure that the plan is consistent with the Cape Cod Regional Planning Policy.

For the first time, the 2016 OSRP includes an updated comprehensive inventory of lands of conservation and recreation interest, which describes ownership, management agency, current use, condition, and degree of protection for each of these parcels.

New goals for the 2016 Plan were approved in order to make future goals applicable to current conditions and trends in Eastham:

1. Establish a municipal town-wide water supply and water distribution system*
2. Protect, preserve, and acquire open space
3. Maintain the overall quality and quantity of groundwater
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

*Underway 11/2014

Town of Eastham staff and elected officials have worked in close cooperation with citizen committees to research, analyze, and make reports accessible for public comment. The following list is an example of reports posted on the town website www.eastham-ma.gov:

1. Municipal Water Project (2014)
2. Freshwater Ponds Water Quality Report (2013)
3. Landfill Study (2013)
4. Town of Eastham Conservation Land Inventory and Analysis (2012)
5. Organic Land Management Policy (2012)
6. Fertilizer and Pesticides Policy (2012)
7. Eastham Local Comprehensive Plan (2012)
8. Water Supply Environmental Report (2010)
9. Eastham Wastewater Management Planning Project (2009)
10. Wildland Fire Protection and Preparedness Plan (2009)
11. Eastham Bikeways Committee Long Range Plan (2008)
12. Open Space Managed Land Plan (2003 – in the process of being updated)

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

Respectfully submitted,

Robert Gurney, Chairman
Eastham Open Space Committee

SECTION 2. 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" featured in "Special Places on Cape Cod and the Islands" by Naturalist Robert Finch featured story "Wiley Park" in Eastham

Even before the first Earth Day was celebrated to demonstrate support for environmental protection, the Town of Eastham recognized the special nature of the 44-acre Wiley Park Conservation Area, and proceeded to acquire the parcel in 1968 as one of the first conservation purchases made by a local community on the Outer Cape.

Years later in 1981, the abutting 25.3-acre Nickerson Property was acquired. Together the two areas (Wiley Park and the Nickerson parcel) protect a substantial portion of the shoreline and forested area surrounding Great Pond, Widow Harding Pond and nearly all of Bridge Pond, creating one of Cape Cod's first green belt and wildlife corridors.

By 1985 the need for protecting natural resources at the local government level was supported by Eastham residents and the first comprehensive Open Space and Recreation Plan was completed. In 1999, the 1985 Plan was rewritten to systematically re-examine Eastham's open space and recreational needs. The plan was again updated in 2007.

The purpose of the 2016 OSRP is to update the 2007 OSRP and maintain the Eastham's eligibility for future state funding assistance for open space and recreation purchases and improvements. This document also identifies changes since the 2007 Plan, incorporates existing and new goals for water quality protection, open space conservation and acquisition and the Town's goal to provide more active recreation programs to meet the needs of Eastham's current and future residents. The purpose of the 2016 Plan also assesses what progress the Town has made since 2007 on its goals and analyzes future needs based on opinions gathered from public workshops, meetings with various Town Boards and civic organizations.

A. Planning Progress Since the 2007 Plan

"The plan is 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."

(Eastham OSRP 1985)

The above statement was originally written in the 1985 Open Space and Recreation Plan. It addresses the challenges Eastham continues to face in order to preserve open space and provide recreational opportunities today.

Over the past nine years, the town has been making progress on each of the primary goals included in the 2007 Plan to:

1. Protect and maintain 50% of Eastham's remaining developable land as open space.
2. Protect the sole source aquifer and groundwater.
3. Maintain the unique character of Eastham.
4. Enhance recreational opportunities appropriate and accessible for all people.
5. Protect and manage critical natural resources.
6. Maintain and improve upland and coastal recreation and conservation resources.

Progress in Protection of Remaining Open Space

Each year at Town Meeting, the residents voice their thoughts regarding town-wide issues. The following timeline is of recent Town Meeting Articles that were voted on, passed, and subsequently acquired since the 2007 Plan that highlight Eastham's commitment and progress to overall protection of open space.

> 2011 –The Board of Selectmen appropriated 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).
>
> 2011 – The Board of Selectmen appropriated 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.
>
> 2011 – The Town voted to limit the use of the remaining portions of the Town-owned land known as the Roach Property for **open space and passive and active recreation**."
>
> 2012 – The Board of Selectmen transferred 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**.
>
> 2012 – The Board of Selectmen appropriated $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).

2013 – The Board of Selectmen transferred $20,000 from the Community Preservation Open Space Reserve Fund to the Open Space Committee for **construction of an American With Disabilities (ADA compliant) pathway, benches and other amenities**, on land located off Sandy Meadow Way to serve passive recreation users of the parcel.

2014 - The Board of Selectmen **appropriated $1,462,500 to pay costs of acquiring, for open space and passive recreation purposes,** by gift, purchase or eminent domain, a parcel of land containing 3.41 acres, more or less, located at 700 Dyer Prince Road, Map Parcel and shown as Lot 15, on Land Court Plan 28883-D (pending) on File at the Barnstable County Land Registry District and described in Certificate of Title No. 201280.

2015 – The Board of Selectmen appropriated from the Community Preservation Open Space Reserve Fund Balance to the Town of Eastham, the sum of $550,000 (of which close to $200,000 was recovered through donations made for this purchase through the Eastham Conservation Foundation and Mass Audubon) for the purchase of two parcels of land located at 225 Widgeon Drive and 5 Blue Bill Land, containing 1.6 acres, Map and Parcel IDs 17-525, and 17-522. The parcels, known as "Turtle Cove" are to be protected for nesting habitat for threatened diamond-backed terrapins.

Since the 2007 Plan, in addition to land acquired by the Town of Eastham for open space protection and improvements, the Eastham Conservation Foundation acquired 5 parcels of land totaling 9.4 acres, as well as a conservation restrictions on an additional 2.7 acre parcel from 2009 to 2015.

Progress in Water Protection

New Water System Underway

After many years of study and debate, Eastham voted to establish a partial municipal water system at the May 2014 Annual Town Meeting with 86% of voters in support of the Warrant Article.

As the Cape Codder Newspaper reported - "A standing ovation, cheers and maybe a few tears followed the town moderator's announcement that town meeting passed a municipal water system with no debate. The vote, 858-140, was remarkable for its brevity."

"But (this year 2014), as soon as the selectmen introduced the question, which would raise and appropriate $45.8 million to provide municipal water to one-third of the town, the article was called, 'in deference to the 1,100 people here'. It took about 35 minutes to count all the voting cards in the packed Nauset Regional High School gymnasium. But when the count was revealed, the room erupted in applause like a cork popping after years of built-up pressure."

At the May 2015 Annual Town Meeting, voters approved a Warrant Article to complete the town-wide water system
The backbone of the water system (Phase I) is to be almost entirely constructed on previously disturbed land and existing roadway areas and rights of way. The overall land area where construction activities will occur for the system's backbone is estimated to be 22.8 acres. 96% of the project area is associated with water main installations, which will occur predominately within existing roadway areas. The storage tank and well fields are to be constructed in previously disturbed areas, of which approximately 0.46 acres

will occur in undisturbed area.

Progress in Water Quality Status of Freshwater Ponds

Through funding provided by Barnstable County, the Cape Cod Commission contracted the School of Marine Science and Technology (SMAST) to review the available laboratory and field water quality data collected by the Town of Eastham volunteers from ten ponds between 2001 and 2006. The final report: *Eastham Freshwater Ponds: Water Quality Status and Recommendations for Future Activities* was received in April 2009. This report included detailed review of six ponds selected by the Town of Eastham Water Management Committee: Great Pond, Herring Pond, Muddy Pond, Depot Pond, Minister Pond, and Schoolhouse Pond. These detailed, pond-specific reviews include delineation of pond watersheds, development of water and phosphorus budgets, characterization of ecological status and recommendations for next steps.

The Eastham Ponds Action Plan, submitted to the Town of Eastham in December of 2011, recommended an alum treatment program to help mitigate the internal (sediment) phosphorus loading in Herring Pond. This 40 acre pond exhibited elevated phosphorus concentrations and algal density and residents reported declining water quality conditions. An alum treatment program for Herring Pond was rated as the top priority recommendation of the Action Plan. Funding for an alum treatment program of Herring Pond was approved in the Town budget for the 2012 fiscal year.

The Eastham Conservation Commission issued an Order of Conditions to ensure that the alum treatment program would minimize the risk of adverse impacts the environment. GHD contracted with Aquatic Control Technology (ACT), a licensed applicator, to apply a calibrated mixture of aluminum sulfate (alum) and sodium to Herring Pond, based on the site specific dose calculation. The alum treatment program and the associated water quality monitoring were completed over several weeks, beginning on October 24, 2012 and ending November 13, 2012. All required samples were collected and analyzed. The effectiveness of the alum treatment program in reducing phosphorus flux from the pond sediments into the overlying waters, and stimulating algal growth, were evident beginning in the summer of 2013. Continued monitoring and assessment will help determine the effectiveness of this remedial measure.

An Alum treatment was also applied to Great Pond on October 2-9, 2013. The combination of aluminum sulfate and sodium aluminate was applied to address high phosphorus levels in the water, which stimulate growth of algae. Great Pond has experienced anoxia (low or no dissolved oxygen), high chlorophyll levels and high phosphorus levels, resulting in "eutrophic" (nutrient-enriched) conditions. Similar to the Herring Pond application, Great Pond showed signs of improved water quality the following year.

Focusing on Unique Rural Character, Progress Since 2007

Focusing on Eastham's rural character is a priority for town residents. For decades it has been a goal to preserve and enhance important historic and cultural resources that are significant to the community. Two public workshops, the *Heritage Landscapes Inventory* meeting and a highly interactive group exercise sponsored by the Community Preservation Committee call "CPA Tetris" identified priority resources and heritage landscapes that showcase Eastham's rural character.

Heritage Landscape Inventory – 2010

In partnership with the Cape Cod Commission, the Boston University Preservation Studies Program compiled a Heritage Landscape Inventory Report for the Town of Eastham in December 2010. The project followed guidelines established by the Department of Conservation and Recreation and summarized in the organization's publication, Reading the Land – Massachusetts Heritage Landscapes:

Guide to Identification and Protection.

One of the primary goals of the Heritage Landscape Inventory was to foster community involvement in preservation and conservation. The Cape Cod Commission selected Eastham for the heritage landscape survey based on need and interest. Once selected, Eastham designated a 'local project coordinator" to serve as a liaison between individual community members, local preservation and conservation groups, and the project team. A community meeting was arranged in which residents were invited to learn about the program, voice their opinions on the community's valued heritage landscape, and choose priority landscapes that will be the subject of future study.

The primary goal of the Heritage Landscapes Inventory Survey program is to help Eastham identify a wide range of cultural landscapes, particularly those that are significant and unprotected.

Priority heritage landscapes identified in the survey:

Boat Meadow	Rock Harbor
Dyer Prince Road	Bridge Road
Town Cove	First Encounter Beach
Freshwater Ponds	Fort Hill
Turnip Farms	Route 6 (State Highway)

Community Preservation Tetris – 2012

The Eastham Community Preservation Committee (CPC), through the Town of Eastham, contracted with community preservation planning consultants JM Goldson, in January 2014, to create a strategic action plan that would assist with the preparation of an updated Community Preservation Plan to guide allocations of Community Preservation Act (CPA) funds for the next five years. The process included working with the CPC members and studied existing plans including the draft of the 2014 Open Space and Recreation Plan (OSRP), Housing Production Plan, the Local Comprehensive Plan, and other planning documents to identify Eastham's community preservation resources and created resource profiles summarizing the resources in each of the CPA categories.

The consultants interviewed ten community members to help generate a list of project ideas to include in a community workshop exercise, which was structured to develop CPA goals and priorities, including open space, recreation, and historic priorities. The workshop was highly interactive and included digital group polling and a small discussion group exercise called: "CPA" Tetris. Based on the study of Eastham's community preservation needs, resources, and possibilities, as well as community group discussion sponsored by the CPC, which included a community Tetris exercise at an April 2014 Workshop, the CPC identified goals for Historic preservation, Open Space & Passive Recreation, and a new funding category priority, Active Recreation.

Participants were asked to identify Eastham's "special places" and highlighted over 75 places in Eastham.

These included all of the Town beaches, the National Seashore, many open space areas including Wiley Park and Sandy Meadow open space area, as well as scenic views, historic sites, municipal properties, recreation facilities including the recreation departments Field of Dreams, and the public school properties, and many ponds.

Top ten special places identified by participants in the survey:

First Encounter Beach	Fort Hill
Windmill/Town Green	Great Pond
Library	Herring Pond
Coast Guard Beach	Nauset Beach
Wiley Park	Cape Cod National Seashore

Progress in Protecting Significant Buildings

Eastham has a bylaw for the Demolition of Historically or Architecturally Significant Buildings. This bylaw, enacted in 2008, for the purpose of preserving and protecting significant buildings within the Eastham which reflect distinctive features of the architectural, historical, and cultural heritage of the Town and encourages owners to seek out persons who might be will to purchase, preserve, rehabilitate or restore such buildings rather than demolish them. To achieve these purposes the Eastham Historical Commission is empowered to advise the Building Inspector regarding the issuance of permits for the demolition of significant buildings.

Progress in Protecting Critical Natural Resources

Since the 2007 Plan, the Town of Eastham contracted with the Woods Hole Group to inventory and analyze all conservation lands in Eastham for the Open Space Committee and Conservation Commission. The 2011 report is titled The Eastham Conservation Land Inventory and Analysis (ECLAP).

"Conservation Land isn't free. It is land that has been set free. If it is to have meaning at all as protected open space, than it has to be protected from ourselves searching for real estate-based solutions to social problems."

(This excerpt from Perpetuity: The Creed of Land Conservation, Mark Robinson, Executive Director, The Compact of Cape Cod Conservation Trusts, Inc).

ECLAP was designed to:

1. Investigate and document the custodial authority for each parcel;
2. Researched the legal protections documented for each parcel;
3. Identify opportunities to increase the level of protection for conservation land;
4. Identify data gaps and or records inconsistencies; and
5. Assist the Town in the development of a land protection and acquisition plan that ensures the long-term protection of individual parcels exhibiting high conservation value (evidenced by the presence of important wildlife habitat, wetlands, rare species etc.)

The residents of Eastham have repeatedly been strong supporters of the need to buy and protect open space. ECLAP provides the Town of Eastham with a list of real properties, the degree of protection they hold, lot size of the property, current owner, method of land acquisition, primary purpose of acquisition, and so much more including alias name for each parcel. (This list is found later in this document)

Progress in Protecting Wetlands

Eastham has a Wetlands Protection Bylaw administered by the Conservation Commission. The purpose of this bylaw is to protect coastal areas and inland wetlands of the Town of Eastham by carefully reviewing activities deemed to potentially affect wetland values including, but not limited to: public or private water supply, ground water, flood control, erosion control, storm damage, water pollution, fisheries, shellfish, wildlife and recreation and protection of open space.

The Eastham Conservation Commission provides the Town with ecological and environmental protection through the consistent administration and enforcement of applicable environmental laws, bylaws, and regulations. The Natural Resources Department provides resource management and enforcement of applicable laws and regulations.

The Eastham Conservation Commission continues to recognize the need to affirm and strengthen the intent of state legislation establishing Areas of Critical Environmental Concern, MGL Ch. 21A, Sec. 2(7), namely to protect environmental values significant to flood control, the prevention of storm damage, the protection of waters containing shellfish and fisheries, and other public interests protected by the Wetlands Protection Act (MGL Ch. 131, sec. 40 and sec. 40A) as well as the Wetlands Protection bylaws.

Progress in Improving Recreation Opportunities

Since the 2007 Plan, with support from Community Preservation Act funds, the 2014 Town Meeting approved transferring $35,000 to conduct a comprehensive assessment of the Town's current recreation resources and needs and to identify priority strategies for improving and protecting outdoor recreation facilities, with an emphasis on developing a plan to renovate, repair, and or expand the Field of Dreams. The comprehensive assessment of recreational resources in Eastham commenced in 2015.

As part of Town plans to rehabilitate existing active recreation facilities, new tennis courts at Nauset High School were constructed in 2015, at a cost of $366,240.

The Recreation and Beach Department continues to provide year-round programs and activities. They manage recreational activities at nine beaches on Cape Cod Bay, three fresh water ponds, and the parking area at Hemenway Town Landing. To meet the ever-growing needs of the community, they continually strive to develop and advance active and passive recreation.

After forty years committed to protecting open space, and more recently dedicated to good quality drinking water protection, the 2016 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.

Progress in Providing Recreation Opportunities for All

The Public Access Committee of Eastham (P.A.C.E.) has continued to make progress monitoring access for the disabled in the following areas: handicapped parking spaces at beaches, recreation and conservation areas, beach wheelchair availability, orientation of beach attendants and checking on town beaches throughout the summer.

To build public awareness of the recreational opportunities and businesses in Eastham that are in compliance with laws protecting the disabled, P.A.C.E. issued an annual brochure that can be obtained at a number of sites throughout town. Information was also made available during Windmill Weekend at a booth staffed by members, Friends of P.A.C.E., and a representative from the Cape Organization for the Rights of the Disabled (C.O.R.D.).

At two town beaches, Mobi mats for handicapped access to the beach have been installed, along with Mobi-Chairs. A Mobi-Mat is a portable and removable rollout ADA Beach Access Mat for pedestrians (as seen in the photos above). A Mobi-Chair is an amphibious rolling beach chair that provides a transition from Mobi-Mat to beach to water.

The Sandy Meadow (ADA compliant) Trail continues to be a work in progress. Trail preparation has been completed and the first Request for Proposals (RFP) went out during the Spring 2014. Bids were returned, but not accepted based upon budget and scope of work. A new modified RFP was announced in 2015.

Preservation of trails and new signs at Wiley Park Conservation Area and at the South Eastham Conservation Area, and construction of a handicapped-accessible pedestrian bridge at Wiley Park highlight improvements to conservation/recreation areas in Eastham since the 2007 Plan.

B. Planning Process and Public Participation

The traditional form of democratic governing is practiced at Town Meeting. In practice for over 300 years and continuing today, it is a valuable means for Massachusetts residents to voice their opinion and directly effect change in their communities. A Town Meeting is both an event and an entity. As an event, it is a gathering of a town's eligible voters, and is referred to as "the Town Meeting." As an entity, it is the legislative body for towns in Massachusetts, and is referred to simply as "Town Meeting." It is where residents voice their opinions and offer their vision for the future.

The planning process for future land acquisitions and funding of recreation opportunities begin with the citizens, who volunteer for boards, commissions, and committees. It is the citizens who prepare their

goals and objectives; bring their vision to Town Meeting for discussion and vote, and depending upon the outcome of the warrant article vote, appropriate money to support the town and purchase land and improve recreation facilities.

The Eastham Open Space Committee is charged with keeping the Open Space and Recreation Plan updated and current. The Open Space Committee is also responsible for making open space acquisition recommendations to the Board of Selectmen. This was done most recently in 2012, with the completion of the Town of Eastham Conservation Land Inventory and Analysis Plan (ECLAP). Prepared by the Woods Hole Group, ECLAP provides Eastham with a comprehensive inventory and analysis of conservation lands for the Town's Open Space Committee and Conservation Commission to:

1. Document the custodial authority for each parcel;
2. Document the legal protections for each parcel;
3. Identify opportunities to increase the level of protection for conservation lands;
4. Focus future research efforts by identifying data gaps and or records inconsistencies; and
5. Assist the Town of Eastham in the development of land protection and acquisition that ensure the long-term protection of individual parcels exhibiting high conservation value (evidenced by the presence of important wildlife habitat, wetlands, rare species, etc.).

The ECLAP analysis was presented to the residents and part-time residents during aired community television programming of the Open Space Committee and the Conservation Commission during regular monthly meetings in 2013-14. The ECLAP analysis was also made available for viewing on the Town of Eastham website (online) for public comment between December, 2012 and May, 2014. A hard copy of the ECLAP analysis was made available for review and comment at the Department of Natural Resources in December 2012, and is still available for public comment at the Department of Natural Resources.

The Eastham Open Space Committee posted a Draft 2014 Open Space and Recreation Plan (OSRP) on the Town's website in early February 2014 for public comment. The committee also presented this draft OSRP in front of the Eastham Board of Selectmen, Planning Board, Conservation Commission, the Recreation Commission, and the Public Access Committee during televised scheduled meetings. The document was also circulated to the Water Management Committee and the Community Preservation Committee.

Hard copies of the 2014 OSRP draft were provided at the following town facilities: Town Hall, Council on Aging, Eastham Library and at the Natural Resources Department. This draft was then updated to its current version through 2015 and into 2016.

Community Preservation Plan – 2015-2019

The Eastham Community Preservation Committee, through the Town of Eastham, contracted with community preservation planning consultant Jennifer M. Goldson, AICP of JM Goldson and her sub-consultant Elizabeth Rust of ECR Enterprises to assist with the preparation of an updated Community Preservation Plan in January 2014. JM Goldson worked with the CPC members and studies existing plans including the Open Space and Recreation Plan, Housing Production Plan, the Comprehensive Plan, and other planning documents to identify Eastham's community preservation resources and created resource profiles summarizing the resources in each of the CPA categories.

Consultants interviewed ten community members to help generate a list of project ideas to include in a community workshop exercise. On April 1, 2014, the Community Preservation Committee sponsored a community workshop facilitated by the consultants. The workshop was highly interactive and included digital group polling and a small discussion group polling exercise. The goal was to solicit citizen input to

determine community priorities for FY 15-FY19 where the OSRP was highlighted.

The overall principles and goals laid out in the Plan were derived from the April workshop results. In addition to interviews with residents, the CPC posted the draft plan on its website and distributed copies for review and comment in May 2014 and held a public meeting to gather more public comments.

Heritage Landscapes Inventory Survey – 2010

Eastham's heritage landscape identification meeting was held on October 13, 2010, and was attended by approximately fifteen residents, including representatives of town boards and local non-profit organizations. The participants compiled an extensive list of Eastham's heritage landscapes for each of the nine heritage landscape categories: agriculture, industrial and commercial, residential, civic, institutional, natural features, cemeteries, transportation routes, and recreation and open space.

Following the Department of Conservation and Recreation methodology, each person voted for their top three priority heritage landscapes – valued landscapes that both contribute to the character of the community and are not permanently protected or preserved. The ten landscapes receiving the most votes were designated priority heritage landscapes and are the focus of the 115-page report that was prepared from the meeting and interviews.

Enhanced Outreach and Public Participation for Environmental Justice Populations

Eastham's Environmental Population

"Environmental Justice (EJ) is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. EJ is the equal protection and involvement of all people with respect to the development, implementation and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits."

The Massachusetts Office of Geographic Information (MassGIS) has mapped Environmental Justice (EJ) populations for all communities in Massachusetts. According to the mapping provided by MassGIS, Eastham presently has one EJ population according to the State criteria summarized as "the median annual household income is at or below 65% of the statewide median income for Massachusetts".

Focusing on the location of the EJ population in Eastham, as represented on the latest MassGIS Southeast Region Environmental Justice Populations map, the group is within the 02651 Zip Code for North Eastham, located in the northwestern part of town of Eastham, the oldest section of town, and is bordered to the west by Cape Cod Bay, to the east by US Route 6, to the north by the town of Wellfleet, and to the south by Great Pond Road, Herring Brook Road, and Samoset. According to the United States Census, the Census-Designated Place (CDP) has a total area of 11.9 square miles. 3.4 miles of it is land, and 8.5 square miles of it is water.

The US Census states that over 92% of the population within the CDP speaks only English. The racial makeup of the CDP is 98.12% White, .26% African American, .16% Native American, .42% Asian, .05% Pacific Islander, .05% from other races, .94% from two or more races. Hispanic or Latino of any race are .84% of the population.

In the CDP, the population was spread out with 17.1% under the age of 18; 4.2% from 18 to 24; 22.6% from 25 to 44; 26.9% from 45 to 64, and 29.2% who are 65 years of age or older. The median age is 49 years. The median income for a household in the EJ population CDP is $34,390, and the median income

for a family is $42,794. The median income of overall homeowners in Eastham is higher at $46,076 versus $31,406 for renters.

The Massachusetts Environmental Justice Policy defines EJ populations as "those segments of the population that EOEA has determined to be most at risk of being unaware of or unable to participate in environmental decision-making or gain access to state environmental resources."

Comparing Eastham's median household income to Massachusetts overall, and the median household income for Massachusetts is $14,518 higher than Eastham's. Massachusetts median family income in was $83,813 in 2013, $19,783 higher than the median US family income.

In assessing Eastham's EJ Population's socioeconomic status, and more specifically the economic status, "measuring variables other than household income may be useful, for example assets such as inherited wealth, savings, employment benefits, or ownership of homes" (Berkman & Macintrye, 1997). While income represents a flow of resources over some period of time, consider that 30% of the population in the area represented on the MassGIS EJ Population locator is 65 years or older and on fixed incomes. It is difficult to capture the stock of assets and thus the economic reserves for this EJ population that exists within our community, this block group of 65 years or older are the mainstay of our community stakeholders (boards, committees, volunteers).

Enhanced Outreach

Eastham makes every effort to include all residents in the public participation component through the distribution of both e-copy and hard copy, community television, and online postings that attract all socioeconomic sectors. The Annual Town Meeting is held after work hours. The Board of Selectmen's meetings are held at convenient times for the working community and before darkness of night approaches for senior citizens, as are Commission meetings and other town committee meetings.

The Town of Eastham refers to the term "participation" as meaning some aspect of local community involvement in decision-making implementation and evaluation of a project or plan. The Town of Eastham encourages public participation that encompasses a range of procedures and methods designed to consult, involve, and inform everyone in town to allow those that would be potentially affected by a decision or policy to have input into the process.

Eastham Access Cable Television

The Eastham Government Access Cable Television Channel (Channel 18) is intended to provide information to Eastham residents about issues, services, programs, activities and events involving local government. Using technology, whether computer, laptop, smart phone or television, every resident of Eastham has the opportunity to follow, participate, and comment at all public meetings of Town Policy-making and regulatory boards and commissions, including Town Meeting, Conservation Commission, Open Space, and the Recreation Commission, are authorized for live and delayed cablecast and webcast. Public meetings of other Town committees may be cablecast and / or webcast if time and resource permit without editing and without commentary.

At Town Hall, Bulletin Board items which may be submitted by any town agency or department, must be consistent with the intentions of this policy and shall be cablecast at the discretion of the Town Administrator and a member of the Board of Selectmen.

Further, the Town tries its best to provide public outreach in an way that broadly refers to a framework of policies, principles, and techniques which ensure that all residents and socioeconomic populations

(individuals, families, and households) have the opportunity to be engaged in a meaningful way in the process of decision-making that will affect them, or in which they have an interest.
The town will continue to work to improve Public Outreach and Public Participation as a means of achieving:

1. Participatory democracy (e.g. community empowerment and providing the opportunity to develop knowledge for making informed choices)
2. Transparency in decision-making process
3. Community empowerment and support
4. Reduced conflict over decisions between decision-makers and public groups, and between the groups.

Section 3. COMMUNITY SETTING

A. Regional Context

The Town of Eastham is a coastal resort community located on the "outer arm" of Cape Cod. Referred to by the Chamber of Commerce as the “gateway to the Cape Cod National Seashore”, Eastham is bordered 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. The town 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 National Seashore boundaries.

As one of the fifteen towns in Barnstable County, Eastham lies at the beginning of what is commonly known as the Outer Cape, an area that ends at Provincetown and tends to be more rural, quiet, less crowded and less commercialized and most like what is referred to as the old Cape Cod. The Outer Cape is also more seasonal than the Mid Cape and Upper Cape, with an economy based on the summer tourism and 50% of the households vacant during the winter. Similar to many of the communities on the Outer Cape, Eastham is concerned with encouraging economic development that will provide year-round employment, and yet not impact 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 main way in and out of the area for motor vehicles, are added challenges.

Route 6, the main highway on Cape Cod, passes through the center of Eastham, dividing the Town into two parts – Cape Cod Bay side (west) and Atlantic Ocean (east). Most commercial development is located along this route. On a typical summer day, about 30,000 vehicles pass through the Town. The Police Department has made significant progress towards reducing the vehicle accidents in recent years.

Eastham shares its sole-source aquifer (the only source of drinking water) with the southern portion of Wellfleet. Both towns draw from the Nauset lens, one of six lenses 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 the towns of the Outer Cape.

As one of the less populated towns on Cape Cod, 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.

Table 1. Eastham's Shared Resources

Town of Eastham Shared Resources	Communities / Regions / State / Federal
Cape Cod Bay	Bourne, Sandwich, Barnstable, Yarmouth, Dennis, Brewster, Orleans, Wellfleet, Truro, Provincetown, Commonwealth of Massachusetts, Department of the Interior – National Park Service
Cape Cod National Seashore	National Park Service
Nauset Marsh Estuary	National Park Service, Orleans
Town Cove	Orleans
Fort Hill	National Park Service
Rock Harbor	Orleans
Inner Cape Cod Bay Area of Critical Environmental Concern (ACEC)	Brewster, Orleans
Wellfleet Harbor Area of Critical Environmental Concern (ACEC)	Wellfleet
Cape Cod Rail Trial	Dennis, Harwich, Orleans, Wellfleet

B. 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 remained until the 1950s.

Long after most towns on Cape Cod 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, "wild" asparagus are sometimes found in abandoned fields. Because much of Eastham remained in agriculture until recently, the process of forest succession got off to a later start. 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 uncommon, 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 results are 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 whereby small seasonal cottages from the 1950s and 1960s are demolished and larger homes are constructed.

C. Population Characteristics

Eastham has an aging population with a decrease in age groups under 44. There is a low availability of affordable rental and home ownership housing as is the case for other Cape Cod Towns despite the recent recession and affordability gaps for low and moderate income households that are creating barriers to ownership.

Population and Households

- Eastham's population is 4,956 residents, a decline of 9% between 2000-2010 (compared to a 3% decline in Barnstable County). In the summer, the population grows to above 30,000.
- In 2010, the largest age segment of Eastham's population was 45-64 year olds (35% of total population).
- Between 2000-2010, population change by age groups was as follows:
  - Under 20 years old decreased by 33%
  - 20-34 years old decreased by 31%
  - 35-44 years old decreased by 31%
  - 45-64 increased by 14%
  - 65+ increased by 13%.
- Of the 2,388 households, 17% have children under 18 years old and 46% have persons over 64 years old.
- The median age increased from 48 years old in 2000 to 57 years old in 2010.
- Racial make-up is predominantly white, with 95.6% of the population; Hispanic make up 1.5% of the population, and the remaining persons are non-whites, African American, American Indian/Alaska Native, or Asian.

Household Income and Cost of Housing

- Eastham's median household income per 2008-2012 estimates was $57,703; a 35% increase from 2000, which is less than Barnstable County ($60,424) or the state as a whole ($66,658). (ACS)
- An estimated 45% of Eastham households have low incomes – incomes at or below 80% of

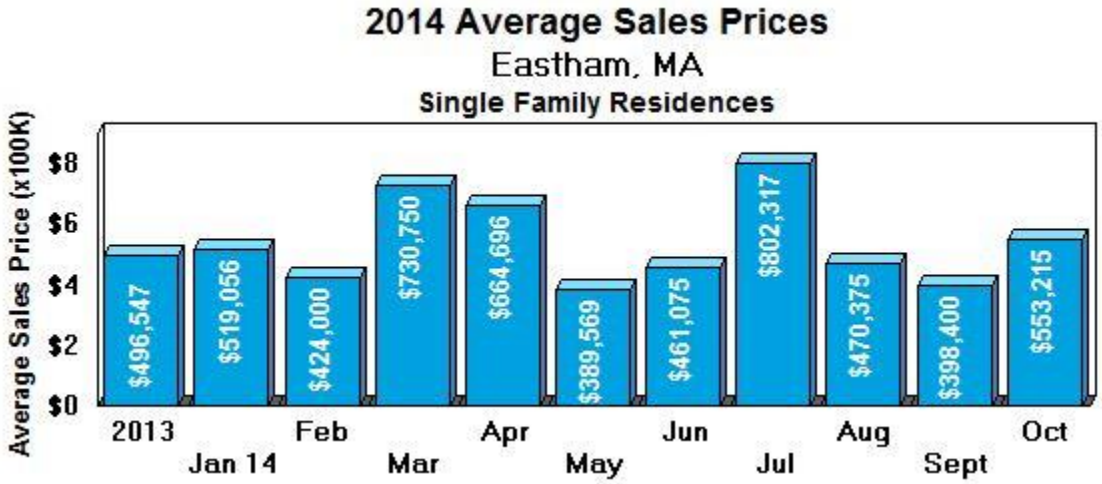
AMI for a household of 2, most likely due to the large number of persons over 64 years of age, retirees living on a fixed income. (ACS)

- The number of individuals below poverty has slightly decreased from 7% to 6% in the period between 2000 and 2010. (Census)
- The median sale price of homes in 2013 was $375,800 even with the decline in the market this is an increase of 95% over the 2000 median of $192,300. (TWG)
- In 2010, most households (91%) own their homes, and 32% of which are housing –burdened (spending over 35% of their income on housing), while 71% of Eastham's renters (of which there were 200) are similarly housing-burdened. (Census)
- The median gross rent in 2010 was $1,056 – an increase of 55% from $682 in 2000. (Census)

Housing Supply

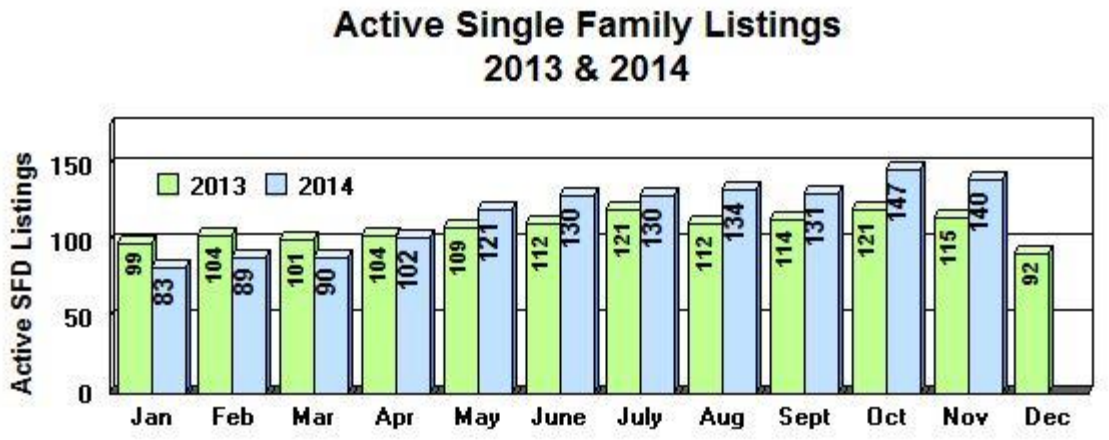
- Eastham has 2,497 occupied housing units, 86% are owner occupied and 14% renter occupied. There are 2,632 year round housing units. (ACS)
- The number of owner-occupied units increased by 178 while the number of rental units decreased by 78 since 2000. (Census)
- More than half of all the housing units in Eastham are seasonal and second homes. (HPP)
- The Town's housing stock remains primarily single-family at just under 95% of total housing units, the balance being condominiums, duplexes, and multi-family units. (HPP)

Figure 1.



Inventory has started its seasonal descent from the fall annual high of 147. The current inventory of 140 homes is increased to 22% from November 2013.

Figure 2.



With 108 sales through October and 18 pending, we can be fairly sure of a final number of about 125 for the year. This will be up somewhat from last year's total of 119.

Population Characteristics

The population of the Town of Eastham has grown from 1970 to 2010 from 2043 to 4956. 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 increases the 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 changes in Eastham's population are supported by increasing income, increased mobility, 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.

Table 2: 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				

*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.

The population of Eastham has remained fairly steady for the past ten years. Over 50% of residences are occupied only during the summer months and there is no indication that will change in the near future. A number of summer residences are not constructed for winter use. This has resulted in a larger population during the "shoulder season" the months surrounding the summer. Predicting long range population trends is difficult, however the population is not likely to increase significantly, as the town is at 95% build-out. Limited occupation opportunities can make it difficult for young families to live in Eastham. On the other hand, from public comments, recent estimates predict an increased population in Eastham based on increased year-round occupancy with in homes already winterized or converted from seasonal to year-round.

Historic Changes in Population

Eastham's largest population prior to World War II was 966 residents in 1830. From that time it declined steadily until there were 430 residents 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 it 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 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 was 5,453 and the seasonal population was conservatively estimated at 22,000.

Table 3: 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 that 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. *Culled from public comments*, there is also a significant population of renters in second homes and some, whose numbers cannot be estimated, in year round homes vacated by residents for some or all of the summer to obtain rental income from their property.

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, showing an average of 56.8 years. 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 4: 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%	56.8

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.

Environmental Justice Populations are determined by identifying all Census 2010 block groups that meet any of the following criteria.

1. "Income: 25% or more of households earn 65% or less than the median MA household income.
2. Minority Population: 25% or more of residents identify as a race other than white
3. English Language Isolation: 25% or more of households are lacking English proficiency."

- 1.82% (48 units) of Eastham's total housing stock is counted as affordable on the State's Subsidized Housing Inventory (SHI) (DHCD, Feb 2014), which is below the Massachusetts minimum affordability goal of 10%.

- Moderate income: A household earning 80%-100% of the Area Median Income (AMI); e.g. 4-person household earnings between $63,900 and $74,900. A moderate-income four-person household could roughly afford a home that costs less than $303,600 or $1,875 in rent. There are 1,365 households in Eastham earning under $75,000 and 14 units for sale under $303,600 (eight 2BR condos, two 3BR condos, four 2BR house). (Zillow).

- Low income: A household earning at or below 80% AMI; e.g. 4-person household earning at or below $63,900. A low-income four-person household could roughly afford a home that costs less than $225,700. Per 2010 figures, only about 1% of units (or 27 houses) are valued at a price affordable to households with low-incomes. There are no houses for sale under $245,000, and there are three 2BR condos under $200,000 (Zillow).

- The median sale price of $375,800 (TWG) requires an annual of $92,500, almost $35,000 higher than the median household income in Eastham. (DHCD affordability calculator).

- Affordability Gap: Based on the median sale price, Eastham's affordability gap is $72,2000 for

moderate income households and a $150,000 gab for low income households.

Affordable Housing Stock

The Town of Eastham encourages projects that include eligible activities, including the high priority areas of affordable housing and recreation. Housing is a complex field, and the Eastham Affordable Housing Trust is dedicated and knowledgeable staff supports the creation of housing units, administer the programs, and manage property. While the goal of Eastham Affordable Housing Trust does not directly produce affordable units, it provides the necessary local capacity to implement and support a proactive housing agenda and build local support for new affordable housing initiatives.

Table 5: Age Composition

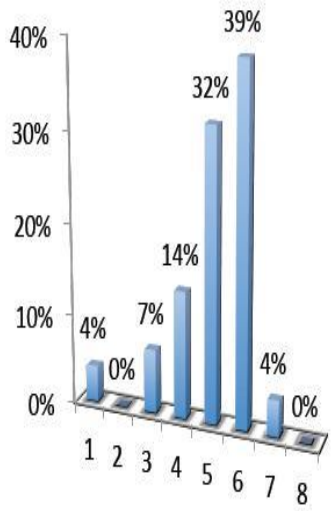
Age Groups	1970	1980	1990	2000	2010	% Change: 1980-2000
0-4 years	128	178	255	208	n/a	16.9%
5-19 years	499	683	733	846	n/a	23.9%
20-59 years	839	1,686	2,074	2,658	n/a	57.7%
60-74 years	444	689	1,046	1,112	n/a	61.4%
75+ years	133	236	354	629	n/a	167.2%

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

Figure 3: What is your Age?

4.) What is your age? (Multiple Choice)

	Responses	
	Percent	Count
24 or under	4%	1
25-34	0%	0
35-44	7%	2
45-54	14%	4
55-64	32%	9
65-74	39%	11
75-85	4%	1
85+	0%	0
Totals	100%	28



Responses gained from CPC April 2014 workshop

D. Growth and Development Patterns

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 was formed as a new town in 1797, 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. Today, the Town has no clearly defined center. It consists of three separate 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 grown from 340 acres or 3.7 percent of the Town in the late 1960s to over acres or 42 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 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.

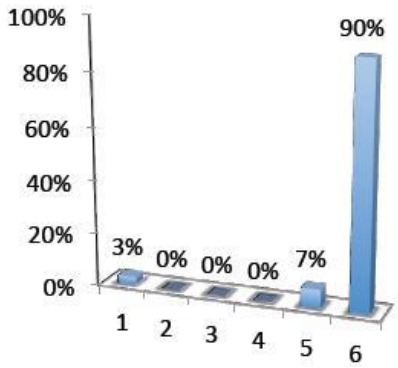
Residential structures in Town are fairly uniform in architectural style. Most single-family homes were constructed during the last fifty years and can generally be described as either single-story ranches or two-story Cape style homes. Residential areas in Town are no longer only concentrated along the coastline and near commercial centers but have spread inland. The homes were all constructed without a municipal water or sewer service, with the newer homes built on lots of one acre or more and the older ones one quarter and a half.

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.

Figure 4: Trends in Eastham

15.) Which of the following statement is true? Eastham has. . . (Multiple Choice)

	Responses	
	Percent	Count
Significantly large and growing senior population	3%	1
High housing costs (95% increase in median sales price between 2000-2013	0%	0
Lower incomes (less than County or state medians)	0%	0
Over 70% of renters that are housing cost burdened	0%	0
Less than 2% of year-round housing that is affordable	7%	2
(correct) All of the above	90%	26
Totals	**100%**	**29**

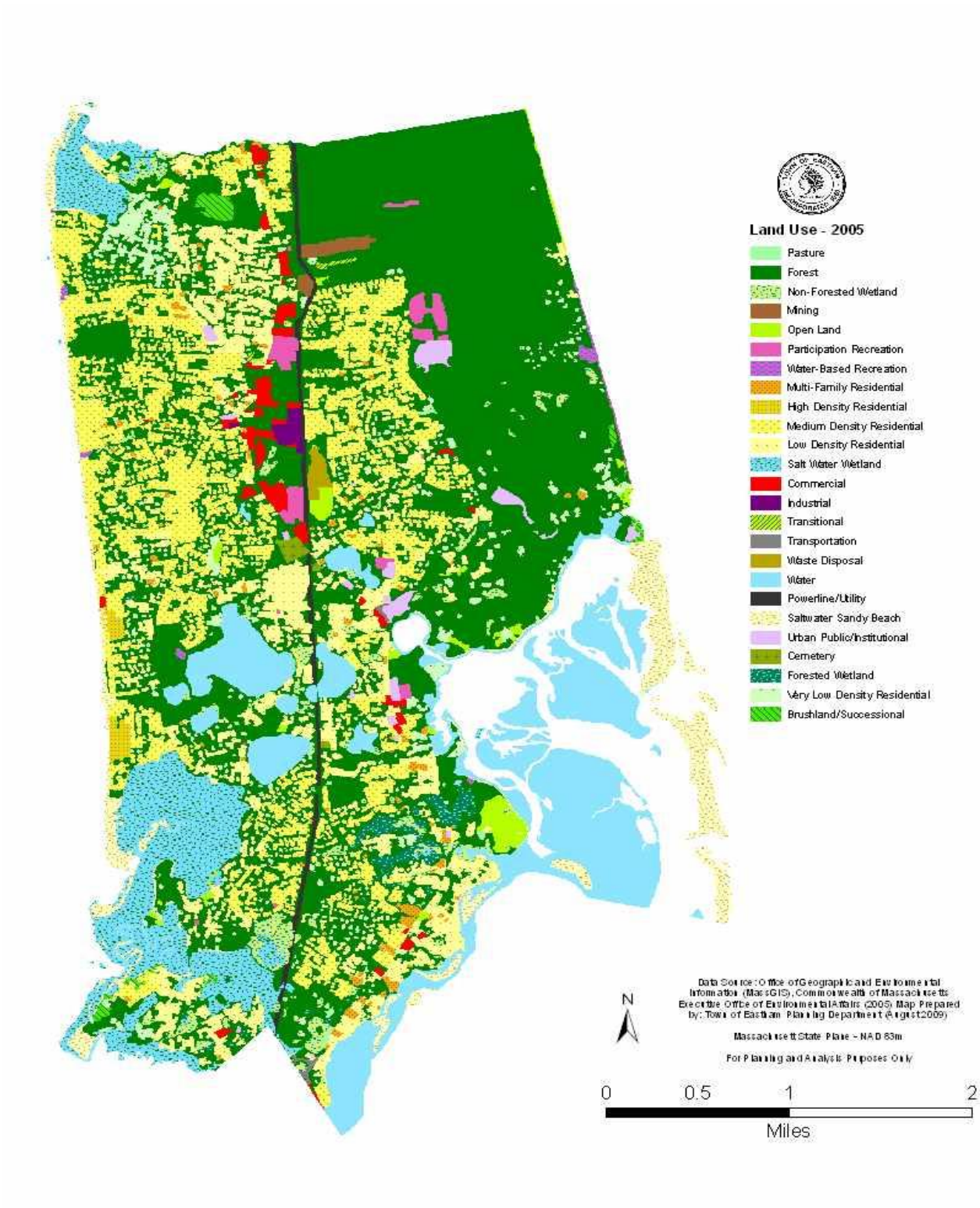


The Cape Cod National Seashore, authorized by Congress in 1961, consists of 4,800 acres of Eastham, including most of its six and one-half mile Atlantic shoreline, from Orleans to Wellfleet. Town Cove and the outer Nauset Beach are not part of the Seashore. More than one hundred privately owned residential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

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 preserved 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 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.

Map 2: Existing Land Use



Major Future Land Use Areas

Town Hall Area

This area currently contains most of the Town facilities including the Town Hall, Police and Fire Departments and Library and should be maintained as a Town civic area. Non-residential uses tailored to the needs of local and off-Cape residents including those using the Town facilities should be encouraged. Improvements can include enhanced landscaping, burying of overhead utilities, parking, safe access, pedestrian and bus passenger amenities such as weatherproof shelters, lighting, trash receptacles and the like 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

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

The National 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

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

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.

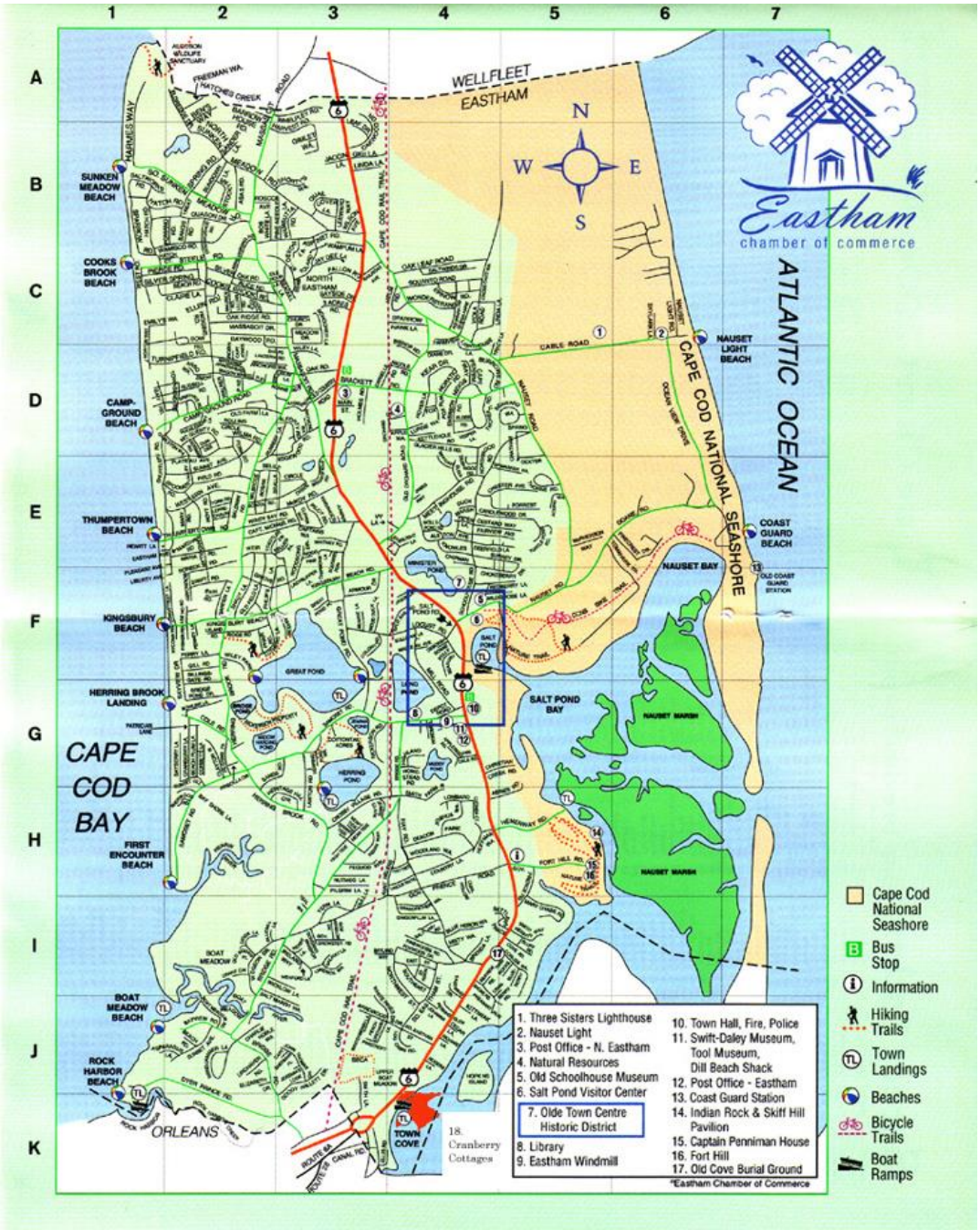
Residential Areas

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.

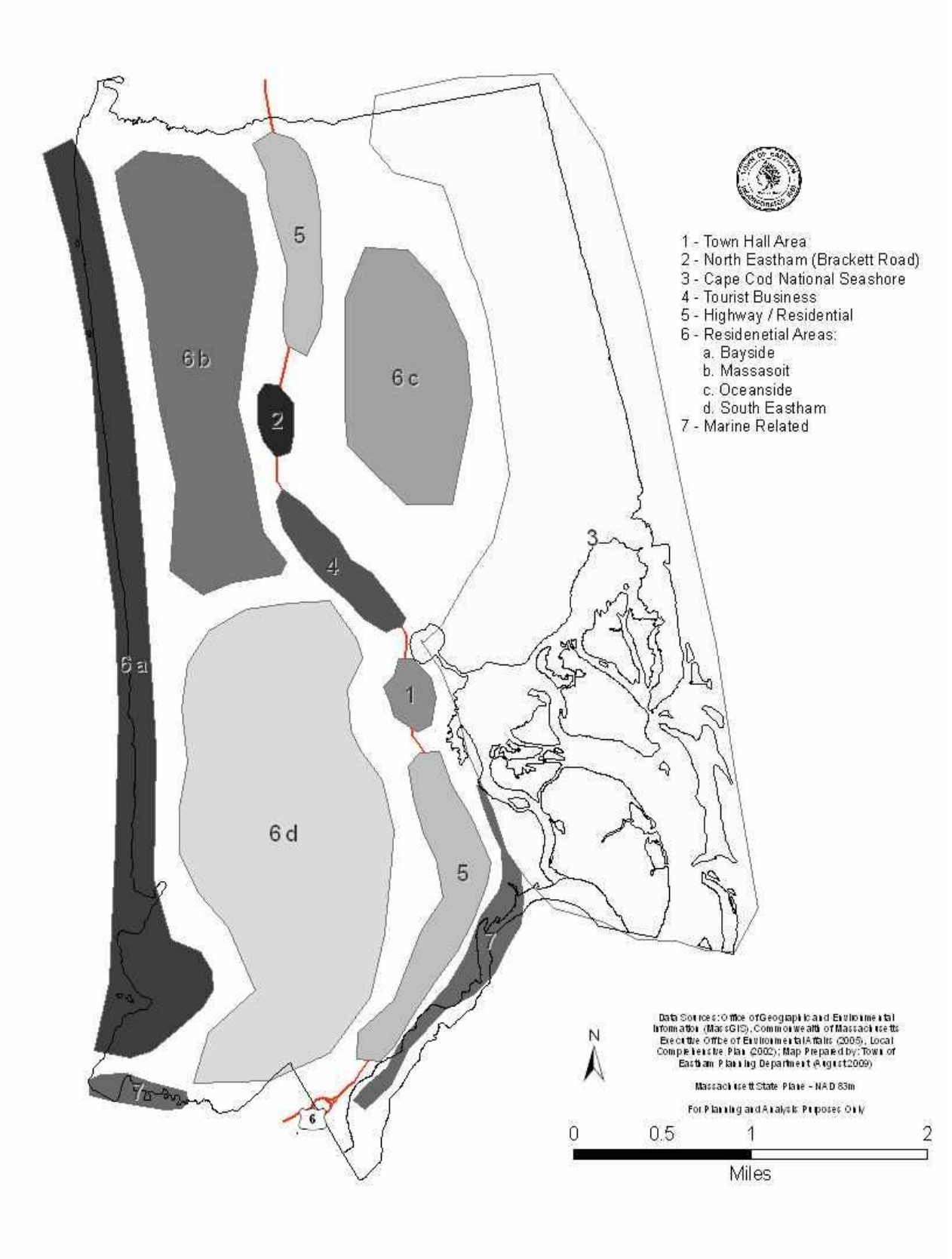
Marine Related

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 District of Critical Planning Concern (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 6 shows building permits issued by type from 1997-2010.

Table 6: 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 continue to increase.

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 Cape Cod Bay.

Table 7: Land Use by Acreage and Percentages, 1991 and 2008

Category of Use	1991 Acres	Percent of Eastham	2008 Acres	Percent of Eastham
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.%
- 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%
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.				

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.

Table 8: Build-out Projections (Projected in 1996)

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

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: *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).* *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).* *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.*				

Given the area of the Town and established zoning policies, growth, and development gradually approach 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.

As previously noted, The Cape Cod National Seashore manages 4,120 acres, or a little more than one-third of Eastham. More than one hundred privately owned residential dwellings exist within the Seashore, most of which were constructed prior to the National Seashore's creation. The Town also owns 25 acres along

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 100 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 2016. 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 3-13. This table 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 9: Anticipated Growth Impacts on Selected Town Services Based on 2000 U.S. Census data

Impacts	**Existing**	**Build-out**	**Build-out**
	(60%/40%)	(40%/60%)	(100%)
Number of year-round residential units**	2,308	3,600	6,436
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
*** Based on 2000 U.S. Census data*			

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 20,000 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 a difficult issue facing Cape Cod and communities like Eastham. Providing mobility with funding limitations can be difficult. Combined with 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 roadways, 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 5% of trips. In part, this reflects the fact that existing year-round public transportation services are limited should be encouraged and 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 need for 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 high 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.

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 *(from public comments: 'which is a*

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

priority of the Planning Board). Curb cuts tend to add confusion and movement conflicts on a heavily traveled 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 six 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 four 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

When discussing the Town of Eastham's Community Setting, one has to also focus on Eastham's water supply. It is as much a part of the identity as is the population, home sales and transportation.

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.

Annual Town Meeting – Residents cheer for approval vote to establish a municipal water system.

The remainder of precipitation percolates through the ground and collects in lens-shaped bodies of freshwater which float over sediments saturated with dense saltwater.

Eastham's water is drawn 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.

Although a town-wide municipal water system has been approved through Town Meeting, and construction of the backbone of the system begun, there is currently 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. Until the town water system is available, only nineteen services near the Orleans town line, which are connected to the Orleans public water supply, have access to municipal water.

The Outer Cape Capacity Study (1996) recommended that the Route 6 corridor and landfill areas in Eastham be considered for the development of public water supply systems, and the Town municipal Phase I water system which began to be constructed in 2015 includes these areas. As many as one in every five wells along the corridor exceeded nitrate levels of 5 mg/L between 1985 and 1994. A 1990 USGS survey ihad dentified two potential sites for development of municipal water supply. These sites are identified as site of public-supply well "A", located in Eastham Water Resource Protection Zoning District "G", and as site of public-supply well "B", located in Eastham well field Protection Zoning District "H". The cost of providing public water to the Route 6 corridor and landfill areas (or Phase I) is estimated at $48 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. 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. Currently, the Tri-Town Septage Treatment facility located in the Town of Orleans, serves the communities of Eastham, Orleans, and Brewster and handles 9.5 million gallons of septage yearly, which is pumped by commercial haulers from homes in the three towns that own the plant, as well as from other towns, mostly on the Outer Cape. 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 and has since 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 4. ENVIRONMENTAL INVENTORY AND ANALYSIS

A. Geology, Soils and Topography

Geological History

Cape Cod was formed by glacial deposits derived from the last ice sheet that moved over southeastern New England. Glauconite, fossil material, and the scarcity 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 and lobes formed in the relatively shallow basins on the shelf.

When the Cape Cod Bay lobe had retreated to around the present south shore of Cape Cod Bay, the Harwich outwash plain deposits were left. 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).

Glacial till inter-bedded with and overlying the Nauset Heights outwash plain left deposits that may have been from a muddy blanket that flowed over the frozen ice forms and down the glacier margin. This top layer of sediment often slides off the ice in the form of mudflows (Oldale, 1968). The resulting deposit is called a flow-till. Sediment deposited during re-advances of the Cape Cod Bay or South Channel lobes and the land form formed what today we call the Town of Eastham. Retreat of the ice away from the ice-contact head of the Harwich outwash plain caused the development of a pre-glacial 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; Oldale, 1968), the Cape Cod Bay lobe retreated northward in Cape Cod Bay and drained 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).

Geology

The glacial sediments of Outer Cape Cod were deposited both by glaciers, glacial lakes and glacial meltwater processes that left a variety of deposits ranging from layers of low permeability clay to course sand and gravel materials. Much of the aquifer deposits in the Outer Cape are stratified outwash deposits, some of which extend to bedrock in many areas or are underlain by glacial lake deposits in other areas. The

outwash deposits of Outer Cape Cod have been divided into genetic units, the oldest being the Wellfleet Plain deposits (to the north of Eastham), followed by the increasingly younger Truro Plain (to the north of Wellfleet) and the Eastham Plain deposits (to the south of Wellfleet Plain). (Environmental Partners 2014)

Eastham consists of interbedded sand, gravel, silt and dry materials of the Eastham Plain glacial outwash deposits which overlie the predominantly silt and clay materials referred to as the Cape Cod Bay lake deposits (Oldale eet al. 1971; Masterson 2004). Interbedded outwash deposits are approximately 110 feet thick and the lake deposits are up to 307 feet thick. Within the Eastham Plain there is a transition from lake deposits to interbedded sand, silt, and clay deposits at depth. As a result, the aquifer sands and gravels extend much deeper from one section/district in town from another section/district in town.

New data is emerging as the public water system project consultants (Environmental Partners) prepare to coordinate installation of the system. Most findings by Environmental Partners are consistent with the conceptual depositional model described by Masterson (2004), in which the remnant of the South Channel lobe occupied the southeast portion of Eastham after the retreat of the Cape Cod lobe which occupied most of Lower Cape Cod in the past. The hummocky topography in the eastern part of town is attributed to buried ice blocks left by the retreating South Channel lobe. A cross section depicts the transition between lake deposits to ice contact deposits occurs where the topography becomes hummocky to the southeast.

Soils

The glacial soils of Outer Cape Cod are associated with the deposits left behind by the lobes of glacial ice, glacial lakes and glacial meltwater processes that dropped a variety of deposits ranging from layers of low permeable clay to coarse sand and gravel materials. This glacial till, the soil, consists of sub-Arctic soils of the cold, humid northern conifer forests, found between the mixed forests of the temperate zone and the Tundras of the Arctic Zone. These soils are podzols. Known also as Spodosol in the seventh approximation Soil Classification System, podzol derives from the Russian term *pod* or “under” and *zol*, “ash”. This soil is very infertile because of the leaching of basic nutrients such as calcium, sodium, potassium and magnesium.

Podzols are composed of layers known as horizons. The A-horizon comprises a shallow needle leaf litter zone, a narrow strongly acidic humus zone, and a broader ash-grey to chalky leached horizon made up of silica, or sand. Beneath this infertile horizon is the zone of illuviation, or B-horizon, in which the leached nutrients of the A-horizon accumulate. Beyond the B-horizon is a totally inorganic C-horizon composed of weathered bedrock. Without substantial fertilization, podzols are suitable only for growing of berries and root crops. Hence, why Eastham is recognized for growing turnips, many berries, stone fruit and asparagus.

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 action either along the present coast and associated with wave action or 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, the terrain in Eastham is a combination of level ground to gently rolling hills and dunes with land mass elevations generally from sea level to sixty feet above sea level. Perhaps the most significant feature of the topography is that a large portion of the Town is covered by water. Eastham may 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 coastal banks or bluffs are formed by the erosion of outwash plains.

Coastal Bank fronting the Atlantic Ocean in the Cape Cod National Seashore

B. Landscape Character

The landscape character of Eastham is difficult to define, however it clearly includes geographic structures of the land, beaches, marshes, fishing areas, patterns of vegetation, spatial experiences and sequences, and the volunteer opportunities for an organization, and the enjoyment of a myriad of active recreational activities. Within the Town are open space marshes, bogs, woodlands, ponds and miles of shoreline both coastal and inland. For the purpose of this Plan, landscape character is used interchangeably with other common (and just as difficult to define) terms, such as “sense of place” and “community character”.

The natural beauty of Eastham is one of its greatest assets. From scenic vistas of Cape Cod Bay and the Atlantic Ocean, to the variety of landforms that gives the landscape a varied character that attracts many visitors and enriches the lives of residents year-round. Easily accessible by car, bike or foot, a resident or visitor can look out over Nauset Marsh from historic Fort Hill parking area, past the spartina grasses of the marsh, over Nauset barrier beach to the breaking waves of the Atlantic Ocean. On the west side of town, there are extensive tidal flats at First Encounter Beach, locating shellfishing activity in the distance as the flats stretch a half mile into Cape Cod Bay at low tide. Many visit Wiley Park Conservation Area to walk their dogs through pitch pine forest, around kettle ponds and to the public beach area where in the summer swimming lessons are given. Landscape character in Eastham is defined and formed by its extraordinary natural history and the cultural history of residents whose way of life has shaped the landscape and influenced its unique character.

Residents have listed proximity to water as one of the important benefits about living in Eastham. In an extensive analysis of information on natural landscapes and the occurrence of native plant and wildlife species of conservation concern known as BioMap2 (MA Division of Fisheries and Wildlife 2012), 44% of Eastham (4027 acres) was identified as Critical Natural Landscape, which are large natural landscapes capable of supporting ecological processes, disturbances, and wide-ranging species.

With tourism being an important part of the economy, it is certainly in the town’s best interest to preserve and protect its varied and unique landscape character. Even visitors staying in the Mid or the Upper Cape area towns will likely visit the Outer Cape because of its unrivaled beauty and many recreational

opportunities. If the area begins to look "just like everywhere else", there will be no reason for tourists to visit and those who live here may lose a special connection to nature, the outdoors and the scenic vistas and water resources that brought them in the first place.

In the 1998 General Management Plan for the Cape Cod National Seashore, the Seashore "recognizes that the variety of Cape Cod's landscape resources, and the many ways in which people experience, use, and care for these resources, are the basis of the appeal and unique character of the Lower and Outer Cape".

C. Water Resources

The purpose of a water resource management plan is to guide and support the decision-making process in Eastham as it relates to the protection, conservation, use and management of water resources. Working with the Open Space Committee, the Conservation Commission provides guidance and enforcement for best management of the Town's water resources in accordance with the laws and regulations of the Department of Environmental Protection (DEP), Natural Heritage and Endangered Species Program, Division of Marine Fisheries and 310 CMR 10.00 Wetlands Protection Act, as well as the Town of Eastham's Wetland By-Law and Conservation Land Regulations. By providing an analysis of existing information, Eastham's Conservation Commission recommends and makes decisions regarding preferred actions that will increase ecosystem knowledge to resolve uncertainties and conflicts.

The water resource plan outlines goals for meeting minimum performance standards, which are modeled primarily after the Cape Cod Regional Policy. Issues concerning land use, growth management, and natural resources are addressed.

Hydrologic Features

Hydrologic features besides groundwater include kettle ponds, vernal pools, freshwater streams and saltwater estuarine wetlands. Some major freshwater features in Eastham include Hatches Creek, Sunken Meadow Marsh and Pond, Silver Spring Brook, Fresh Brook, Herring Pond, Herring River, Great Pond, Bridge Pond, Widow Harding Pond, Depot Pond, Minister Pond, Moll Pond, Muddy Pond, Jemima Pond, Deborah Pond and Schoolhouse Pond.

Surface and Groundwater Hydrology

The groundwater flow system that occurs in the glacial sediments of the Outer Cape consists of (1) freshwater lenses where recharge occurs, (2) surface water bodies such as streams and ponds where recharge and discharge occurs, (3) shoreline and near shore areas where discharge occurs, and (4) underlying saltwater. The source of fresh water in the aquifer and surface water bodies is entirely from precipitation that recharges the sediments. The saltwater beneath is from intrusion of seawater from the Atlantic Ocean (east) and Cape Cod Bay (west) and is denser and heavier than the fresh water.

The system of groundwater flow in Eastham is the result of groundwater mounds that form along the central axis of the Outer Cape, from which groundwater flows toward the coastline (east to west). **Map 6** depicts the freshwater aquifer lenses of the Outer Cape with groundwater contour lines (Masterson 2004). The Outer Cape contains five freshwater lenses; the freshwater lenses from Provincetown (north) to Eastham (south) are the Pilgrim, Pamet, north and south Chequesset and Nauset. The Nauset lens underlies Eastham.

The aquifers are called freshwater lenses because they consist of lens-shaped mounds of freshwater that

overlie denser saltwater. The zone where the freshwater and saltwater meet is gradational such that, at the top of the zone, groundwater is fresh, with salt concentrations increasing with depth through the zone until the salt concentrations is near that of seawater. Therefore, the approximate center of the lens is where the freshwater thickness is greatest. The Nauset Lens has a maximum water table elevation of approximately 17 feet above mean sea level (Environmental Partners Group 2014).

Aquifer Recharge Areas

Recharge from precipitation on the Outer Cape has been estimated to be approximately 45-55% of annual rainfall based on an average annual precipitation rate of 40 to 42 inches per year (Le Blanc et al. 1986; Masterson et al. 1998), which yields a recharge rate between 18 to 23 inches per year.

It is assumed that about 43 percent of the water (18 inches per year) is removed by evaporation and plant transpiration before reaching the water table; the remaining water (24 in per yr) enters the aquifer over the Lower Cape Cod land mass, then freshwater continually flows through and leaves the aquifer at a rate of about 2.5 billion gallons per year, or about 68 gallons per day, according to the report *"Potential Changes in Ground-Water Flow and their Effects on the Ecology and Water Resources of the Cape Cod National Seashore" Masterson (USGS) - Portnoy(CCNS).*

The rate of recharge is low in the summer and fall months and greatest in the winter and spring months. Seasonally viable recharge has an effect on the water levels in Eastham. Annual fluctuations in water levels in Nauset and south Chequesset lenses are up to four feet (Le Blanc et al. 1986).

Streams and ponds occur in low areas or depressions in the ground surface that are low enough to intersect the water table. When the water table is higher than the stream or pond level, the ponds received groundwater discharge. When the water table drops below the depressions, the streams and ponds will go dry. Therefore, surface water runoff does not contribute a sufficient amount of water to maintain stream and pond levels.

Climate change, sea-level rise, and increased withdrawal rates from groundwater all have the potential to impact the fresh water resources critical to the human population and the sensitive coastal ecosystem of the Lower Cape. The continuance of Eastham and the Cape Cod National Seashore's long-term hydrological monitoring program will provide a better understanding of the effects of both natural and human-induced change on groundwater levels of the Cape Cod aquifer.

Flood Hazard Areas

Changes periodically take place to the inlet of the Nauset Marsh system which increases flood potential for low-lying land. 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 tide waters 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.

Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) reports produced by the Federal Emergency Management Agency (FEMA) are the foundation for Eastham's local coastal hazard identification and mapping efforts.

The barometer for all Flood Insurance Maps is land subject to coastal storm flowage (LSCSF). LSCSF means land subject to any inundation caused by coastal storms up to and including that resulting in a 100

year flood as designated by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), surge of record, or flood of record, whichever is greater. One hundred year flood (or base flood as it is also referred to) means the flood having a one percent chance of being equaled or exceeded in any given year.

1. Velocity Zones (including V-, VE-, and Va-30) are those portions of LSCSF which are coastal high hazard areas or areas of special flood hazard extending from the mean low water line to the inland limit within the 100 year floodplain supporting waves greater than three feet height.
2.. AO-Zones are those portions of LSCSF which are subject to inundation by moving water (usually sheet flow on sloping terrain) where average depths are between one and three feet. In Massachusetts, coastal AO-zones are commonly associated with `overwash' and generally border on the landward side of V-zones.
3. A-zones (including A-, AE-, A1-30 & and A99) are those portions of LSCSF which are subject to inundation by types of 100 year flooding where stillwater flooding predominates. AH-zones are those portions of LSCSF which are subject to shallow flooding, usually ponding resulting from overwash, where average water depths are between one and three feet.
4. Overwash – that portion of storm wave uprush that carries over the crest of a berm, dune, or man-made structure, often times depositing sediment or other storm laden material.

Velocity zones (V-zones) and overwash zones (AO-zones) of LSCSF (V-zones especially so) are areas which are subject to hazardous flooding, wave impact, and, in some cases, significant rates of erosion as a result of storm wave impact and scour. V- and AO-zones in coastal areas are generally subject to repeated storm damage which can result in loss of life and property, increasing public expenditures for storm recovery activities, historic taxpayer subsidies for flood insurance and disaster relief, and increased risks for personnel involved in emergency relief programs.

Eastham participates in the Federal Flood Insurance Program, which requires that new shorefront development meet engineering standards to prevent flood damage, but does not prohibit development. Flood velocity zones, or V-zones, are land areas where storm surge or direct wave action occurs. The V-Zones, both along Cape Cod Bay and the Nauset Marsh/Town Cove estuary are all directly subject to wave and wind action. Landward of the velocity zones are other flood-prone zones in which standings waters can be expected during 100-year storm events.

A number of inter-related factors determine wave height and the landward extent of wave run-up in V- and AO-zones, including shoreline orientation, nearshore/offshore bathymetry, onshore topography, wave fetch, storm frequency and magnitude, and the presence of coastal engineering structures. The topography, soil characteristics (e.g., composition, density, and shape of soil material), vegetation, erosion and permeability of the land surface within V- and AO-zones are critical characteristics which determine how effective an area is in dissipating wave energy and in protecting areas within and landward of these zones from storm damage and flooding. The more gentle and permeable a seaward-sloping land surface is, the more effective that land surface is at reducing the height and velocity of incoming storm waves. Wave energy may be expended by eroding and transporting materials comprising the land surface within the V- and AO-zones, as well as by percolation or the downward movement of the stormwater runoff through more permeable land surfaces, thereby lessening the effects of backrush, scour and erosion.

Development within V- and AO-zones poses environmental problems as construction and development activities can impair or destroy those characteristics cited above which are critical to the stated values. Flood hazard zones are a matter of cause and effect. Eastham experiences coastal erosion and flooding regularly due to its location on the fetch side of the counter rotation of a low pressure weather system which causes wind-driven waves.

The Eastham Conservation Commission upholds the Town of Eastham Wetlands Protection Bylaw by

protecting the environmental values significant to flood control and the prevention of storm damage, and other public interests protected by the Wetlands Protection Act (MGL Ch 131, sec. 40). When a project involves removing, filling, dredging or altering Land Subject to Flooding the Conservation Commission shall presume that such an area is significant to, and only to, the respective interests specified in 310 CMR 10.57(1)(a) and (b). "This presumption is rebuttable and may be overcome only upon a clear showing that said land does not play a role in the protection of said interests. In the event that the presumption is deemed to have been overcome, the Commission shall make a written determination to this effect, setting forth its grounds". Notwithstanding the provisions of 310 CMR 10.57(4)(a) or (b), no project may be permitted which will have any adverse effect on specified wildlife habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

The purposes of the Floodplain District are to:

1. Ensure public safety through reducing the threats to life and personal injury.
2. Eliminate new hazards to emergency response officials.
3. Prevent the occurrence of public emergencies resulting from water quality, contamination, and pollution due to flooding.
4. Avoid the loss of utility services which if damaged by flooding would disrupt or shut down the utility network and impact regions of the community beyond the site of flooding.
5. Eliminate costs associated with the response and cleanup of flooding conditions.
6. Reduce damage to public and private property resulting from flooding waters.
7. Facilitate accurate insurance ratings and promote the awareness of flood insurance.

The installation of underground systems for the storage of petroleum products (including but not limited to oil, gasoline, kerosene, and any hazardous materials) shall be prohibited in the 100 year flood plain (Zones A, AO, AH, A1-30, A99, V and V1-30 on the Flood Insurance Rate Maps 250006-0005, prepared by the National Flood Insurance Program for the Town of Eastham). Storage system shall mean storage tank and all supply lines between storage tank and burner. Underground shall mean under the surface of the earth or under pavement, including cement floors of cellars or basements. Storage systems may be located in basements or cellars provided they are on or above the paved floor of the cellar or basement.

Soft Solutions to Flood damage

When an applicant proposes to protect upland and reinforce an eroding coastal bank, the Eastham Conservation Commission strongly recommends and encourages the use of soft solutions such as re-vegetation and snow fencing instead of hard solutions such as rock revetments. This is based on the definitions and presumptions stated in 310 CMR 10.30, and on the Eastham Conservation Commission's understanding that soft solutions minimize adverse impacts to the bank and to adjacent or nearby coastal beaches by breaking up and diffusing wave action and by permitting maximum growth of stabilizing vegetation.

Challenges Faced By Shoreline Erosion

Coastal bank erosion provides sediment to beaches and barrier beaches. 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 less.

When erosion threatens buildings that are not able to be relocated, property owners have sought to stabilize the bank with engineered structures such as rock revetments. These structures reduce the amount of sand available during normal erosion processes to the beach and consequently to down drift beaches and barrier beaches such as South Sunken Meadow and First Encounter. Alternatives have been utilized and

encouraged instead, such as nourishment using sand from inland sources, "soft" solutions using coir rolls, vegetative cover and sand drift fencing.

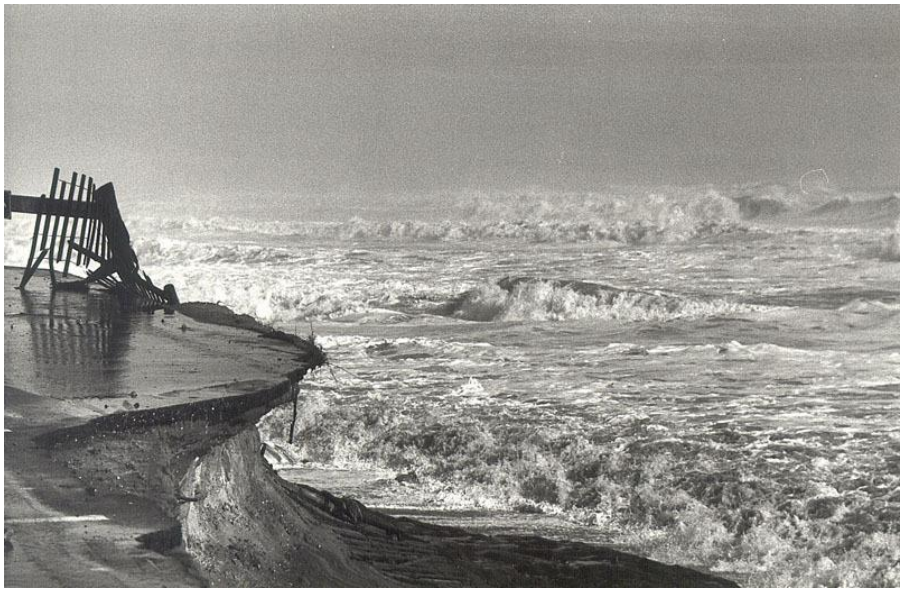
The alignment of the seaward shore of Nauset Beach and the coastal banks cut in the glacial deposits to the north suggest that the shoreline is eroding. Material eroded from the coastal banks are transported by waves and currents and eventually deposited at the end of the spits as shoals or beach deposits. 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 can change significantly based on changes in offshore sand bars, or the severity and timing of storms. Throughout the 1990s, Nauset Light Beach had accelerated erosion rates and as a result, the lighthouse structure was in danger of collapsing into the sea. A coordinated effort of citizens, the Cape Cod National Seashore and the U.S. Coast Guard provided for the safe removal of the structure 150' landward and to the west in the fall of 1997. A sequence of storms beginning in fall 1990 eroded some of the dunes at Coast Guard Beach and revealed evidence of Native American habitation. Service archaeologists completed a detailed examination of the site over the two subsequent winters and documented information about the site and its uses by its inhabitants between 1,200 and 2,500 years ago.

Freshwater peat deposits almost certainly 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.

From the air, Eastham to be a flooded landscape – narrow band of glacial outwash and moraine located in the Lower Cape on the North Atlantic Ocean, fringed by hundreds of acres of tidal marshes; peppered with over 17 freshwater ponds. Hydrologists call it "the sand pile in the ocean' because this image best describes the Cape's permeable soils infiltrated by seawater from both Cape Cod Bay and the Atlantic Ocean.

On this saline groundwater floats a thin lens of freshwater sustained solely by precipitation that falls on the land surface. Fresh surface water resources, kettle ponds, vernal pools and the low-salinity upper reaches of the Nauset Marsh, Rock Harbor, Boat Meadow, Hatches Creek estuaries, depend on fresh ground water.



Wetlands

Wetlands in Eastham consist of both freshwater and salt water. Salt marshes exhibit definite zones in the arrangement of plant species. The limits of the marsh zones are determined by plants' responses to varying salinity and the frequency of tidal flooding. This is most easily seen in the occurrences of the 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. High marsh ground that receives influxes of salt water is colonized by cattails and phragmities. Freshwater swamps and bogs, whose primary species are red maple, black tupelo, gum, alder, arrowwood, high bush blueberry, willows and milkweed, are found further inland. 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. Certain tidal wetlands in Town are impaired due to tidal restrictions. Further details can be found in the Cape Cod Atlas of Tidally Restricted Salt Marshes (Cape Cod Commission, 2001) for the Town of Eastham.

Wetlands habitat comprises more than twenty-five percent (25%) of the land area in Eastham including the Cape Cod National Seashore. The majority of these areas are salt marsh (1,300 acres), seventeen (17) fresh water ponds and vegetated wetlands (475 acres). 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 throughout town. The greatest numbers of vernal pools occur within the boundaries of Cape Cod National Seashore (approximately 30 known), with the vernal pools associated with the area known as "Town Forest" containing such an abundance and diversity of vernal ponds that this area supports the greatest diversity of amphibian species on the outer Cape, as well as numerous species of Odonates, including several state listed species. Vernal ponds also occur in South Eastham/Upper Boat Conservation Area, Nickerson Conservation Area, and numerous other sites in town, and provide important habitat for many amphibian species, including the MA Threatened spadefoot toad, wood frog and spotted salamanders.

The salt marsh systems bordering Cape Cod Bay in Eastham have been included in one of two Areas of Critical Environmental Concern: the Inner Cape Cod Bay area and the Wellfleet Harbor. Included in these areas are critical habitat areas for Diamondback Terrapin, salt marsh sparrow and Piping Plover. Nauset Marsh has not been designated, although the majority of this system within the Town's boundary lies within the National Seashore thus providing added conservation protection. The barrier beach known as Nauset

Spit is habitat for various threatened and endangered species such as plovers and terns that depend on the aquatic food sources.

USGS Topographic Quadrangle

Eastham, Massacchusetts

Miles

0 0.25 0.5 1 1.5 2

Data From MassGIS

Map 6: The Nauset Flow Lens Aquifer

nearby. All of Nauset Marsh 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 (herring) and catadromous (American eel) fish runs are maintained by the Town. One begins at Cape Cod Bay and ends at Herring Pond and the other begins at Cape Cod Bay near Cole Road and ends at Great Pond. The kettle pond area of the Town is connected by a variety of trenches, ditches and culverts to allow the migration of these fish through several hundred acres. 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 for water quality, fisheries habitat and recreational uses. The results suggest that the ponds are in relatively good health with species diversity, and some eutrophication. The feasibility study of Great Pond included various methods of adapting swimming areas to coexist with macro algal species and watershed sampling.

Since 2001, joint efforts by the Cape Cod Commission, Cape Cod National Seashore and the Eastham Ponds Stewards have monitored the water quality in ten of Eastham's ponds. Review of the data from monitoring between 2001 and 2006 indicates that eight of the ponds have average dissolved oxygen concentrations that fail to attain minimum thresholds in state surface water regulations. Review of average nitrogen and phosphorus concentrations finds that all ponds are phosphorus limited, meaning that management of phosphorus will be the key for determining water quality in these ponds and reductions in phosphorus will have to be part of remediation plans. Review of average total phosphorus concentrations also shows that all of the ponds exceed the 10 ppb "healthy" threshold that was developed specifically for Cape Cod Ponds (Eichner and others, 2003). In conclusion, the results indicate that all but Herring and Minister Ponds are in relatively good condition. Herring Pond was treated with alum in 2013 to address phosphorous impacts. Residents around the pond and visitors were pleased with the clarity of the water in Spring of 2014.

It is estimated that approximately two hundred (200) acres of wetlands have been altered as a result of development since 1970. This area 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 Cape Cod Bay side 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 resources, including the reduction in the quantity of invasive populations of phragmiates. Tidal flow was improved in the upper reaches of Boat Meadow salt marsh 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. In a 2011 cooperative project involving the Town of Eastham, the Eastham Conservation Foundation, the Natural Resources Conservation Service and the MA Coastal Zone Management Wetland Restoration Team, a 600-foot old dike was removed to restore tidal flow in the marshes of North Sunken Meadow.

The need to assess, identify and protect 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 Management 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 various appointed boards and committees. This process has been initiated.

The Board of Assessors and Conservation Commission have identified the concept of Conservation Restrictions as a valuable tool for providing tax relief in exchange for restrictions on development of properties, which are identified as significant habitat areas. To date, fourteen (14) private parcels of land are protected, including several areas identified as containing critical habitats.

The Glacial Ponds Trail system links kettle ponds in the central part of Eastham together with their respective habitats of woodlands and wetlands. This connection of areas provides a significant corridor for migration of various species of wildlife. 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 certification of additional vernal pools should also be a priority and can be accomplished with assistance from Town departments and staff. Certification provides 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 afforded more protection under the Eastham Wetlands Protection by-law. Areas within the ACEC have been included in the definition of a "resource area" and regulations prohibit any dredging, filling, or significant construction within the ACEC. A careful analysis of ponds, vernal pools and mapped critical wildlife habitat areas should be implemented. This process should include additional effort to inventory plant and wildlife species occurring in town and compiling the information in a database for ease of access and use. 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.

Increased loading of nutrients, such as nitrogen and phosphorous, to the aquifer is a particular concern because of the potential for increased eutrophication of fresh and coastal surface-water bodies. In accordance with the Wetlands Protection Act, Eastham's approach for development within the 100-foot wetlands buffer seeks to protect and preserve natural resources from development impacts. Conservation site plans are prepared reflecting existing site topography, soils, vegetation, natural drainage patterns, and other landscape features. Development sites should feature common open space and clustered compact lots. Conservation development also integrates storm water Best Management Practices (BMP's) throughout the site to protect and restore naturally hydrology, prevent flooding and protect habitat and water quality.

Sustainability has many definitions but the basic principles and concepts remain constant: balancing a growing economy, protection for the environment, and social responsibility, so they together lead to an improved quality of life for ourselves and future generations. Common use of the term "sustainability," in the context of modern environmentalism, began with the publication of the World Commission on Environment and Development report, Our Common Future, in 1987. This report characterized sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Sustainable Development encompasses the concepts of conservation development and Low Impact Development (LID), and incorporates additional consideration of how sites and buildings affect natural resources and the environment. For example a sustainable development project may feature energy-efficient buildings, and/or the use of recycled and non-toxic materials in construction.

Freshwater Ponds

The water quality of Eastham's ponds in reflects adjacent vegetation, topography and land use. Even before the arrival of people, we know from sediment analyses provided by Mark Adams and John Portnoy of the Cape Cod National Seashore that the ponds responded both chemically and biologically to changes in vegetation and use of the adjacent lands.

As indicated in the sediment record, the ponds are capable of considerable self-regulation, buffering the effects of acid rain and nutrients through in-pond chemical and biological processes. For example, the sediments have the capacity to bind up a large reserve of the nutrient phosphorus, especially if iron is abundant. With increasing human use there is concern that nutrient loading (e.g. from septic systems) may increase beyond the capacity of the pond to assimilate the added nutrients. If this occurs there may be no cure, therefore our goal is to minimize nutrient additions.

From 2008-2014, existing conditions have been continually reviewed and evaluated for current water quality and habitat conditions with respect to the ponds' desired uses, from both a human and ecological perspective. Potential sources of phosphorous were identified. The data sources from the assessment of current conditions include the Cape Cod Commission's detailed review of pond water quality conditions, as measured between 2001 and 2006 (Eichner 2009). Additional sources of data and information included PALS and National Seashore monitoring data from 2008-2010, beach monitoring for bacterial counts and an August 2011 field assessment and sampling program.

The action plan for the Town of Eastham Ponds is one component of a comprehensive nutrient management initiative underway, with alum treatments already administered to Great Pond and Herring Pond. Indeed kettle ponds are a unique resource throughout Cape Cod, and their water quality and habitat conditions are threatened in many ways by the impacts of human activities. Eleven kettle ponds in the Town of Eastham were studied and evaluated for the action plan: these included Great, Herring, Depot, Little Depot, Widow Harding, Ministers, Schoolhouse, Molls, Bridge, Muddy and Jemima Ponds. The action plan included an evaluation of alternatives; a review of potential remedial measures designed to improve the ponds' water quality and habitat conditions. Each alternative evaluation culminated in a series of recommendations for remedial measures.

The Eastham Ponds Action Plan, submitted to the Town of Eastham in December, 2011, recommended an alum treatment program to help mitigate the internal (sediment) phosphorus loading in Herring Pond. This small four acre pond exhibited elevated phosphorus concentrations and algal density. Residents reported declining water quality conditions. The alum treatment program and associated water quality monitoring were completed over a several week period, in the fall of 2012. Water quality conditions of Herring Pond were monitored before, during, and after the alum application.

The effectiveness of the alum treatment program in reducing phosphorus flux from the pond sediments into the overlying waters, and reducing the stimulation of algal growth was evident beginning in the summer of 2013. It was during the summer of 2013 that a similar alum treatment program commenced and the Orders of Conditions were met. Monitoring in Great Pond in 2014 determined the effectiveness of the remedial measure.

Vernal Pools

Eastham has eleven certified vernal pools. Vernal pools are transitory, small freshwater ponds that typically appear in spring in low-lying depressions that are filled by rain and groundwater. In the Eastham watershed they are most commonly found in kettlehole depressions left by past glacial activity. These ponds are crucial to breeding success of several amphibians which spawn in the temporary ponds. Their offspring depend on the pond during their early life history stages. One of these, the yellow spotted salamander, is found in many of the freshwater wetlands and vernal pools, as well as invertebrate fauna, including fairy shrimp which is found only in vernal pools. The green frog (Rana Clamatans), the American toad (Bufo americanus, and red-spotted newt (Notophthalmus v. viridescens) also may breed in vernal pools, although they are not restricted to these pools for reproductive success.

Coastal Resources

Eastham's coastal resources consist of Cape Cod Bay to the west and the Atlantic Ocean to the east. Additionally, Nauset Marsh, Town Cove, Boat Meadow, and South Sunken Meadow are large salt marsh systems along the coast that help to absorb pollutants, storm surges, and harbor a diverse wildlife ecosystem. The Cape Cod Bay shoreline is approximately 5.5 miles in length and is a mixture of coastal bank deposited by glacial activity, barrier beaches which form and protect extensive salt marsh systems and coastal dunes. South Sunken Meadow beach and First Encounter beach are two barrier beaches, created by sand transported from nearby coastal banks and beaches by tidal action and wind. These barrier systems protect extensive salt marsh systems with 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.

Public Beaches

Eastham owns and maintains seven (7) public beach areas along this shoreline with a total parking lot capacity for about five hundred (500) vehicles. The parking facilities serve an area that totals approximately 1,500 linear feet of public beach front (0.3 miles). Lifeguards are not provided at these beaches due to their tidal nature. Average depth of water is eight feet along the beaches at high tide, and at low water sand bars expose tidal flats that extend up to one mile offshore. Numerous private access points to the shore are maintained by local homeowner associations.

Table 10: Eastham Town-Owned Beaches and 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
Coast Guard Beach	4	10

Rock Harbor is located on Cape Cod Bay in the southern portion of Eastham and is shared with the town of Orleans as a tidal harbor for launching and docking recreational and commercial vessels. Eastham maintains about forty-five (45) docking slips and maintains a parking area with a boat launching ramp. The boat launching ramp is maintained by the Public Access Board of the Commonwealth. The harbor is periodically dredged as needed to remove sediment for navigation. The most recent activity was completed in 2004, with the dredge spoils being deposited in several nearby shoreline locations. Dredging also commenced in the fall of 2014.

On the other side of the Town, Eastham's east coast fronts the Atlantic Ocean that consists for the most part of high bluffs of glacial till and ever-moving and drifting coastal sand dunes exposed to dynamic 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 majority of the shoreline in Eastham along the Atlantic Ocean remains undeveloped beyond the establishment of the Cape Cod National Seashore. Nauset Light Beach and Coastal Guard beach are two access points to public beaches. Both beaches are operated by the Seashore and include restroom facilities, parking as well as lifeguards. Three Town landings are maintained along the marsh and Cove and serve as boat launching areas.

Shellfishing in Eastham

The harvest of shellfish is an ongoing activity in the Nauset Marsh system and along the tidal flats of Cape Cod Bay 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 growing to raise shellfish seed for the "wild" fishery, predator control programs and water quality monitoring as recreational and commercial fishing for both finfish and shellfish are common along the entire shoreline.

Billingsgate Island, scarcely visible except at low tide was once an upland area that 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 inhabitants some time ago, but the resource as a productive shellfishing area still exists. The corporate boundary of the Town extends three (3) miles further into Cape Cod Bay and within that area are productive areas for the harvest of quahogs, sea clams and bay scallops.

All of the salt marsh systems along the western shores of Cape Cod Bay are currently closed to shellfishing 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 runoff. These areas are in critical need of attention and protection.

Shellfish aquaculture (also known as shellfish farming) grant sites continue to operate in various areas of the Nauset Marsh and Town Cove as they have historically done. Eastham is currently addressing the recent interest in aquaculture by permitting aquaculture in an “Aquaculture Development Area" off the shores of First Encounter Beach. This large site is and will be leased to individuals for their aquaculture

growing activities. By streamlining the permitting process and providing areas not subject to upland property owners' objections, it is anticipated that interest in aquaculture will increase in the future.

Town of Eastham Shellfish Propagation Program

The Board of Selectmen, through the authority derived from Massachusetts General Laws Chapter 130 and the Eastham Town Code, Chapter 127, adopted a set of guidelines for Shellfish Regulations, fees and catch limits. Eastham has dedicated funds within their budget to enhance shellfish locally. The Department of Natural Resources expends significant efforts growing shellfish to ensure maximum growth and survivability. The Town has a very active shellfish propagation program. It has its own shellfish growing area located on Salt Pond. The department has the ability to grow quahogs and oysters and the capacity to grow over 500,000 per year. Once they have reached a suitable size, the shellfish are broadcast in Nauset Marsh, Town Cove, and Cape Cod Bay for the purpose of recreation and commercial harvest.

Aquaculture Development Areas

The Nauset Marsh and 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 Army Corps of Engineers permitting for the installation of devices for growing 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 Seed – 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 in 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.

Rock Harbor

The 2014-2015 dredging of Rock Harbor will improve boating navigation for Eastham and Orleans through the next ten to twelve years. Although the cost for dredging Rock Harbor has increased, both Eastham and Orleans officials agree it needs to be done. When the two towns began discussing dredging the shared harbor the cost was approximately $600,000 – or approximately $300,000 for each community, or about double what taxpayers had paid about ten years prior. Now, a year after that original cost was given, the price has increased to $1.4 million.

Eastham Town Meeting in May 2014 approved spending $700,000 as its share to dredge Rock Harbor. At Town Meeting on May 6, 2014, Orleans taxpayers approved $900,000 to dredge Rock Harbor. The dredging contract was awarded to Coastline Development, and permits for the project were received from both the Eastham and the Orleans conservation commissions, Army Corps of Engineers, a Chapter 91 permit and a water quality certificate from the Department of Environmental Protection.

The permitting process involved specialized protection measures for the state listed threatened species the Diamondback terrapin turtle that sometimes bury in the mud on the floor of the harbor over the winter. The project also needed to be completed by December 31, 2014 because the federally endangered right whales return to Cape Cod Bay in January in order to not impact them when transporting the dredged material by scow to an offshore disposal site in Cape Cod Bay.

Rock Harbor Services

There is a high demand for services and dockage at Rock Harbor despite the tidal restrictions for navigation. Rock Harbor has 38 dock slips available in Eastham. Rock Harbor can dock vessels in the "Inside Slips" up to a length equal of 22ft. "Outside Slips" can dock a boat up to 33 feet. Prior to obtaining an annual dockage permit from the Natural Resources Department the boat owner also agrees to comply with posted rules and regulations of Rock Harbor as set forth by the Harbormaster and Department of Natural Resources, as adopted by the Board of Selectmen.

Mooring Fields

Eastham mooring regulations have been established in order to provide efficient recreational and commercial boating utilization of the waters of the Town, to improve the safety of moored vessels, and to provide adequate space for the enjoyment and safety of all users of those waters. This is accomplished by controlling the placement of moorings, establishing standards for mooring tackle, and with inspections by the Natural Resources staff of all moorings placed with the Town's waters.

All motorized vessels moored in the waters of the Town of Eastham shall have properly displayed registration numbers and a valid registration certificate as assigned in the state wherein the vessel is registered. A mooring permit must be obtained before any vessel is be moored in the Town. All moorings

are required to be of the mushroom anchor design and must be buried. No concrete or cinder blocks are permitted as mooring material.

There has been an increase in recent years for permits for 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.

Threats to Natural Resources

All of Eastham's natural resources are sensitive to development pressures and impacts, 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 to natural resources including clearing of land, creation of impervious surfaces that prohibit groundwater infiltration, drainage changes, erosion and sedimentation, loss of habitat, introduction of nutrients from septic systems, changes in groundwater flow due from private wells, noise pollution and visual impacts.

One of the greatest threats to the critical natural resources of Eastham is reduction, fragmentation and elimination of upland habitats such as woodlands, grasslands and heathland. It is not unusual for a residential or commercial site to be completely stripped of native vegetation prior to its development. The Eastham conservation commission works with applicants to keep the land disturbance for projects within their jurisdiction and closest to the natural resources, as contained and small as possible to that area needed for development. Removal of vegetation reduces or eliminates various habitat functions for wildlife to reproduce, food availability and shelter. It is important to maintain contiguous tracts of undeveloped land of sufficient size to support Eastham's overall diversity of wildlife species and habitats. 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.

Shorefront Development

The 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 and top stop erosion with the resulting loss of the beaches below and downdrift. "End effects" of these structures encourages 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 applies to install 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 re-nourishment 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 small parcels, septic problems 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.

Table 11: 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 Trampling of vegetation by boats an foot traffic
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
All Upland Habitat Sandplain grassland and heathland	Direct loss to development and Fragmentation Successional processes due to lack of natural disturbance

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

Special Concern: Threatened and Endangered Species and Significant Habitats

In 2012 the Massachusetts Division of Fisheries and Wildlife published BioMap2. BioMap2 used information on the occurrence of rare plant and animal species, rare and sensitive habitat types, and their occurrence in the Commonwealth to identify the most important parcels of land for supporting native plant and animal species diversity and the functioning of natural ecological processes (MA Division of Fisheries and Wildlife 2012).

BioMap2 produced town-specific reports. These reports detail all rare plant and animal species documented in the Natural Heritage database from 1985 to 2010, and those areas of a town that are considered "core habitats" or part of the "critical natural landscape" for Eastham. Thus, BioMap2 is an important document for locating those parts of town important for their natural value. The list and discussion below is based on information contained in BioMap2, supplemented by additional information and observations generated by staff of Cape Cod National Seashore and members of the Eastham Open Space Committee.

BioMap2 identified twenty "Core Habitat" areas in Eastham totaling 4,799 acres determined to be significant habitat for species of conservation concern and/or important as examples of important habitat types. The largest of these was land included inside the boundaries of the Cape Cod National Seashore, including "Town Forest", and many other town conservation and open space areas were also identified. These include: the shoreline and salt marsh systems associated with Rock Harbor, Boat Meadow Beach, and First Encounter Beach; ponds and adjacent uplands associated with the "Glacial Ponds" system extending west to Cape Cod Bay: Sandy Meadow. A total of 37 species of "conservation concern" were listed as known present (as of 2010) at this site.

In the section below for the plant and wildlife species listed, the following definitions, as identified and defined 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.

Species of Conservation Concern—In addition to species listed under the Massachusetts Endangered Species Act (MESA), these are species currently not listed, but in need of conservation action to prevent their further decline.

D. Vegetation

As detailed in Section 3, most of Eastham's original forest was cleared in the early years of settlement. With soil depletion from agricultural activities, wind action in exposed areas, frequent forest fires and repeated cutting, re-growth of most original species had been inhibited. A large percentage of Eastham was covered with open pine barrens, particularly its northern and western sections. Thus the woodlands of

Eastham reflect the town's agricultural history. Pitch pine trees and locust trees, which are the common species that grow in abandoned fields, are numerous in Eastham. Eastern red cedar trees 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 saplings, 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, facilitating a successional process that, unless disturbed by natural disturbances such as wildlife or storms, continues over time towards an oak dominated forest. Forest re-growth began by the mid-19th century and accelerated rapidly in the 20th century. With effective fire suppression and the passage of time, woodland succession is progressing throughout Eastham and on Cape Cod in general and forest dominance is slowly shifting from pitch pine to mixed oak.

These forests make up much of the undeveloped lands on the Cape. The most prevalent pine variety is the pitch pine. The oak tree species most common include scrub oak, white oak, red oak and pin oak. These seemingly "ordinary" forests will, over time, increase in significance as they grow increasingly scarce, elsewhere, and as they consolidate into larger parcels or "habitat patches", attractive to "forest interior" species such as many neo-tropical migrant birds. 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).

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 was initiated. The overall goal of the forest plan is to utilize a section of Wiley Park Conservation Area, 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.

Pitch pine/scrub oak barrens flourish on the relatively level sandy soils found on the Outer Cape, particularly in close proximity to the ocean and bay where wind and salt spray inhibit trees 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 (*Cladonia* spp.) Heathlands, or communities of low growing shrubs, are also numerous. They include species such as Bearberry and Black Huckleberry (*Gaylussacia baccata*).

Public Shade Tree Law

The first version of Public Shade Tree Law was enacted in 1899 in Massachusetts. Pursuant to the Law, "all trees within a public way or on the boundaries thereof shall be public shade trees". Each public way consists of the paved surface and between 5 and 20 feet to either side of the pavement that is owned by the Town of Eastham. The Department of Public Works (DPW) performs a regular maintenance program of trimming and removal of Public Shade Trees when required.

In Eastham, public shade trees shall not be cut, trimmed or removed, in whole or part, by any person other than a member of DPW or Natural Resources who have been chainsaw certification training. The Town of Eastham's Superintendent of Public Works is trained as an urban tree arborist and is the designated Tree Warden. Unless assigned by the Tree Warden, no other person may without a hearing trim, cut down, or

remove public shade trees. No tree shall be planted in the public way without the approval of the Tree Warden. Public Shade Trees can be planted as far as 20 feet from the public way with the written consent of the land owner.

Sand Plain Grasslands

An important habitat in Eastham is 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 (*Carex pennsylvanica*) and poverty grass (*Danthonia spicata*). Other common vegetation is bearberry (*Arctostopyhlos uva-ursi*), scrub oak (*Quercus ilicifolia*) and stiff aster (*Ionactis linariifolius*). Some wildlife that benefits 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 were naturally maintained by factors such as fire, wind, and salt spray. Threats to this habitat are invasive plants, development and forest succession, in part because natural disturbance factors have been diminished on the contemporary landscape. Sandy Meadow (Roach Property) in North Eastham contains significant amounts of this habitat type and has had numerous state-listed and species of conservation concern documented as occurring there.

In addition to these significant upland habitats, 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 holly trees 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 (*Clethra 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 many species of frogs and salamanders, as well as many invertebrate species. Eastham is particularly rich in vernal ponds, which support both an abundance and diversity of amphibians, including substantial populations of spotted salamanders (*Ambystoma maculatum*), as well locally rare species such as red-spotted newts, wood frogs, and the MA Threatened spadefoot toad. These pools are particularly susceptible to changes in surface topography and hydrology and the introduction of pollutants and sediments 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 and birds. 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.

BUSHY ROCKROSE (Crocanthemum dumosum) –Special Concern-- 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.

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. It has been recorded at a small site in South Eastham, inside the National Seashore and at Sandy Meadow open space area.

COMMONS' PANIC GRASS (*Dicanthelium ovale seudopubescens*) --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. It has been recorded at limited sites in South Eastham, inside the National Seashore and at Sandy Meadow.

DWARF BULRUSH (*Lipocarpha micrantha*) –Threatened—This aquatic species has been recorded in Eastham at Mill Pond, aka Muddy Pond.

PLYMOUTH GENTIAN (*Sabatia kennedyana*) –Special Concern-- 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. It is listed as occurring at Minister's and Moll's ponds.

BROOM CROWBERRY (*Corema conradii*) –recently de-listed, but still globally rare.--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. Extensive areas of broom crowberry still occur at Sandy Meadow.

MITCHELL'S SEDGE (*Carex mitchelliana*) –Threatened—This wetland species occurs in association with Eastham's Cape Cod Bay marsh systems and in the upper reaches of Abelino Creek.

SALT REEDGRASS (***Spartina cynosuroides***) –Threatened—This relative of salt marsh cordgrass occurs in small stands in higher elevation areas of salt marshes. It has been recorded in association with Eastham's Cape Cod Bay marsh systems and in the National Seashore, in association with Nauset Marsh.

E. Fisheries and Wildlife

A diverse array of habitats within Eastham provide for a correspondingly high diversity of plants and wildlife. Outer Cape Cod, although somewhat isolated from the mainland, nevertheless attracts many "mainland" birds and mammals, and is especially important because of its 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 and may contribute to the abundance of some. Moreover, as forest habitats in Eastham and throughout Massachusetts continue to mature, additional species are returning to parts of their original range from which they have been long absent. This includes forest dwelling birds and mid-sized mammals, now able to extend their range back into southeastern Massachusetts and colonize Cape Cod. In addition, with the ending of seal bounties in the and subsequent passage of the Marine Mammal Protection Act in 1972, populations of seals, noted by Thoreau as common in the mid-19th century, have recovered.

Examples of mammals living in Eastham include red squirrel, gray squirrel, white-tailed deer, raccoon, red fox, Eastern cottontail rabbit, striped skunk, opossum, masked and short-tailed shrew, muskrat, several species of bat, long-tailed weasel, white-footed mouse, meadow vole, and coyote. More recently, as described above, river otter and fisher have returned, grey seals are now common, and there have even been recent records of porcupine and black bear in Eastham. Records of bobcat on the upper Cape in 2013 suggest that this species may soon arrive as well.

In addition to the more common species, bird species include songbirds such as the prairie warbler, pine warbler, northern parula warbler, red-eyed vireo, cedar waxwing, red-breasted nuthatch, horned lark, black-billed cuckoo, eastern bluebird 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. These include significant populations of spotted salamanders in the woodland vernal pond habitats within the National Seashore and populations of the Massachusetts listed as Threatened spadefoot toad, primarily on the west side of Route 6. Eastham is also significant on the outer Cape as a town where red-spotted newts have been recorded and the presence of wood frogs. Wood frogs barely extend outward to South Wellfleet and are far more widespread and numerous in Eastham, where they occur at town-owned sites such as Wiley Park Conservation Area, Nickerson Conservation Area, and in the Cape Cod National Seashore. 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 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, river otter, 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 and ecological conditions 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. It can not be overstated that much is unknown regarding the presence, distribution, and abundance of wildlife in the Town of Eastham, and efforts should be undertaken to inventory and document the species occurring on town-owned properties in order to better protect them while also allowing on-going recreational enjoyment of each area.

Reptiles and Amphibians

EASTERN SPADEFOOT TOAD (*Scaphiophus holbrookii holbrookii*) –MA 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. Populations of spadefoot toad are known to occur in a number of sections of Eastham. Small populations have been recorded in the National Seashore near Nauset Road and Ocean View Drive whereas larger numbers have been observed along Herring Brook Road, Kingsbury Beach Road and adjacent red maple swamp, Massasoit Road, and North Sunken Meadow Road. These latter records suggest that town-owned areas such as Wiley Park Conservation Area, Nickerson Conservation Area and Sandy Meadows are providing habitat for this species.

NORTHERN DIAMONDBACK TERRAPIN (*Malaclemys terrapin*) –MA 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 has declined in Massachussetts but may now be recovering due to extensive efforts to protect habitat, nests and nesting areas. Diamondback terrapins occur in Eastham primarily in the salt marshes of Cape Cod Bay, with no recent evidence of them in the Nauset system. Volunteers coordinated by the Massachusetts Audubon Society have worked to protect nests and nesting habitat in the vicinity of Rock Harbor, Boat Meadow salt marsh and First Encounter Beach.

EASTERN BOX TURTLE (*Terrapene c. carolina*) –MA Special Concern-- 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. This animal is considered rare in Massachusetts due to loss of habitat and mortality while crossing roadways. Much of the outer Cape has been recently recognized as important habitat for the protection of box turtle populations in Massachusetts. This is due in part to the Cape's natural suitability to box turtles. Because winter kill limits box turtle populations at the northern limits of its range, the Cape's easy to burrow down into sandy soil, plus its mild winter weather, provide an ideal situation. In addition, the moderate levels of development on much of the outer Cape provide quality habitat with only modest amounts of road kill, allowing populations to persist here whereas they have declined throughout much of their original range. Box turtles are found throughout Eastham, with some of the greatest numbers being recorded from in and around the National Seashore, including "Town Woods" and at Sandy Meadows, where several records of hatchlings and juveniles in 2012 and 2013 attest to successful reproduction.

SPOTTED TURTLE (Clemmys guttata) –MA Species of Conservation 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 vernal pond and red-maple swamp 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. Small populations have been documented at a couple of sites within the National Seashore, although recent observations suggest that the population is declining.

NORTHERN BLACK RACER (*Coluber constrictor*) –MA Species of Conservation Concern--This large, harmless snake requires large tracts of semi-open land for it to range over. It has declined in much of the Northeast due to development and habitat fragmentation, but still remains fairly common on the outer Cape, in large protected natural areas. In Eastham it occurs in the National Seashore, including the "Town Woods" area

EASTERN RIBBON SNAKE (*Thamnophis sauritis*) – MA Species of Conservation Concern—This small harmless snake is a wetland specialist that feeds primarily on small amphibians. It has declined in many areas of the Northeast, but remains fairly common within relatively large tracts of land that include vernal ponds. In Eastham, the ribbonsnake is known to occur within the National Seashore, including "Town Woods", but this species may also occur elsewhere in town.

Birds

PIPING PLOVER (*Charadrius melodus*) --Federal and MA Threatened-- nests on sandy beaches and dunes. Numerous programs have been implemented to protect and help the population recover from declines that occurred in the 1950's and 1960's. Threats to piping plover include loss of habitat, disturbance by recreational activity from both pedestrians and from oversand vehicles, and unnaturally high levels of predation from predator populations enhanced by human food sources. Oversand vehicle traffic can be a major factor in the loss of unfledged plover chicks. Because chicks cannot fly, closure of beaches to motor vehicle traffic during times when chicks are present has significantly increased the success rate of fledged young. These birds can be found foraging around First Encounter Beach, South Sunken Meadow Beach and on the beaches within the Cape Cod National Seashore.

COMMON TERN (*Sterna hirundo*)—MA Special Concern—Historically has nested on beaches in Eastham and on New Island, in vicinity of Nauset Marsh. In recent years, a few pairs none have nested on New Island. Recent studies by Massachusetts Audubon and USGS have documented flocks of up to 10,000 individuals using the Nauset Marsh-Coast Guard Beach-Nauset Beach complex for resting and feeding during their post-breeding "staging" period from July through mid-October.

ROSEATE TERN (*Sterna dougallii*) – Federal and MA Endangered—Like the common tern they nest in colonies on islands, beaches and sand dunes. In recent years, but no longer, a few pairs nested on New Island in Nauset Marsh. Roseate terns spend their post-breeding period within flocks of common terns. Studies by Massachusetts Audubon and USGS have shown that from July to mid-October, the Nauset Marsh-Coast Guard Beach-Nauset Beach complex is one of the most important feeding and resting (staging) areas for this species.

ARCTIC TERN (*Sterna paradisaea*)--MA Special Concern--The Arctic Tern nests colonially in similar habitat to the Roseate and Common Tern. However, Cape Cod is at the southern limits of this species' breeding range, and only a few pairs have nested in recent decades, in the Coast Guard Beach-New Island area.

LEAST TERN (*Sterna antillarum*) –MA 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. Formerly several hundred to a couple of thousand nested on Coast Guard Beach, in recent years, groups of less than 100 have nested on Coast Guard Beach. However, additional colonies are nesting within

Eastham town limits on the north spit of Nauset Beach. Due to high levels of predation and human disturbance, productivity has been low.

LAUGHING GULL (*Laurus atricilla*) –MA Species of Conservation Concern-- nests colonially on islands, beaches, and sand dunes or in similar habitat to the Arctic and Roseate Terns. Hundreds nested on New Island in the late 1990's-early 2000's, but due to predator pressures that colony no longer exists.

RED KNOT (*Calidris canutus*) –Federally Threatened-- uses sandy beaches with extensive tidal flats and nearby salt marshes during migration stopovers for feeding and resting. The Red Knot does not breed in Massachusetts, but the stopover habitat is important in its life cycle. The Nauset Marsh-Coast Guard Beach-Nauset Beach complex is known to be an important area for this species on the Outer Cape for foraging and resting.

AMERICAN OYSTERCATCHER (*Haematopus palliates*) —MA Species of Conservation Concern—This species nests on the ground on open sand spits, such as on Coast Guard Beach and New Island. Productivity is low due to high predation pressure. This species is very sensitive to human presence.

WHIMBREL (*Numenius phaeopus*)—MA Species of Conservation Concern—Uses salt marsh and beach habitats for resting and feeding during their southward migration, from July through September. They are frequently observed feeding in the Nauset marsh complex and along the upper dry section of beach at Coast Guard Beach, feeding on caterpillars. They are also frequently seen feeding on tidal flats of Cape Cod Bay.

SANDERLING (*Calidris alba*)-- MA Species of Conservation Concern-- MA Species of Conservation Concern—Uses salt marsh and beach habitats for resting and feeding during their southward migration, from July through December. They are frequently observed feeding in the Nauset Marsh complex, on tidal flats of Cape Cod Bay, and in the swash zone of ocean beaches.

SHORT-BILLED DOWITCHER (*Limnodromus griseus*)-- MA Species of Conservation Concern-- MA Species of Conservation Concern—Uses salt marsh habitats for resting and feeding during their southward migration, from July through September. They are frequently observed feeding in the Nauset Marsh complex and on tidal flats of Cape Cod Bay.

AMERICAN WOODCOCK (*Scolopax minor*)-- MA Species of Conservation Concern—This upland inhabiting sandpiper nests locally in early successional landscapes that are a mix of shrub thickets, incipient forest and open field. They are known to nest in several areas adjacent to Nauset Marsh (e.g. Cedar Banks, Fort Hill) at Sandy Meadows, and may occur elsewhere. This species is declining throughout much of North America due to habit loss from development and forest succession.

BLACK-CROWNED NIGHT HERON (Nycticorax nycticorax)-- MA Species of Conservation Concern—Once commonly nesting in rookeries near Fort Hill-Hemenway Landing. This species now only occurs in late summer-early fall as post-breeding season migrants, roosting in the day in woods near Nauset Marsh, and emerging at dusk to feed in Nauset Marsh. Their numbers have declined locally due to habitat loss to development and human disturbance.

OSPREY (Pandion haliaetus) –no longer listed-- 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. As a result of successful management efforts (provision of nesting platforms), osprey populations have recovered and this species is no longer listed.

EASTERN WHIP-POOR-WILL (*Caprimulgus vociferous*)—MA Special Concern—Nests in summer in open pitch pine forests. It is known to occur in the National Seashore, including the "Town Woods" section, and targeted surveys might show it to be present elsewhere in town. It is declining due to habitat loss from development and forest succession.

SALTMARSH SHARP-TAILED SPARROW (*Ammodramus caudactus*)-- MA Species of Conservation Concern-This species nests and feeds in upper elevations of extensive salt marsh systems. It occurs in Eastham in the salt marshes of Nauset Marsh and Cape Cod Bay. Loss of habitat to development has led to its decline regionally, and impacts of sea level rise make this species' future uncertain.

SEASIDE SPARROW (*Ammodramus maritimus*) -- MA Species of Conservation Concern-- This species nests and feeds in upper elevations of extensive salt marsh systems. It has been documented in Eastham in Nauset Marsh. Loss of habitat to development has led to its decline regionally, and impacts of sea level rise make this species' future uncertain.

FIELD SPARROW (*Spizella pusilla*) -- MA Species of Conservation Concern—This bird nests on or near the ground in shrub thickets. It has been documented in Eastham at a number of open pitch pine/bear oak sites in the National Seashore, such as above the west and north sides of Nauset Marsh, above the coastal bluffs along Ocean View Drive, and at Sandy Meadows. Loss of habitat to development and forest succession are driving this species' decline.

Invertebrates

Moths

COASTAL HEATHLAND CUTWORM (*Abagrotis nefascia*)--MA Special Concern—The coastal heathland cutworm is a moth that inhabits dry open sandy habitats such as dunes and bluffs, sandplain grasslands and heathlands, and maritime shrubs. The larvae are thought to feed on low-growing shrubs. This species is threatened by habitat loss and fire suppression and presently is only known in Eastham from within the National Seashore.

GERHARD'S UNDERWING (*Catocala herodias gerhardi*) --MA Special Concern—This species inhabits open canopy pitch pine – scrub oak barrens and scrub oak thickets. Adults fly in July and August. Eggs are laid on the leaves of scrub oak and overwinter. They hatch out in early spring and the larvae feed on the flowers and emerging leaves of scrub oak. Threats to this species include habitat loss, fire suppression, pestcides, invasion by alien plants and parasites, and off-road vehicles. In Eastham, this species has been recorded from within the National Seashore and at Sandy Meadows.

MELSHEIMER'S SACK BEARER (*Cicinnus melsheimeri*) --MA Threatened—In Massachusetts, this species is restricted to sandplain pitch pine/bear oak barrens. Adults fly in June and July and larvae feed on scrub oaf from summer through the fall, when they construct a protective shelter out of leaves and silk to overwinter in. Threats to this species include habitat loss, fire suppression, pesticides, invasion by alien plants and parasites, and off-road vehicles. This species has been recorded from within the National Seashore and at Sandy Meadows.

WATER-WILLOW STEM BORER (*Papaiperma sulphurata*) --MA Threatened— This species depends on the wetland plant water willow (*Decadon verticillatus*), which typically occurs in shallow freshwater wetlands and vernal ponds. It is widespread, listed as present in 10 of 20 BioMap2 "Core Habitat Areas", including Abelino Creek, Red-maple Swamp, and Town Woods.

CHAIN FERN BORER (*Papaiperma stenocelis)* --MA Threatened—In Massachusetts, the chain fern borer

inhabits acidic wetlands along the coastal plain, where chain fern (*Woodwardia virginica*)is present, such as wooded and shrubby swamps and bogs. Adults fly in late summer, laying eggs in chain fern which overwinter and hatch in spring. The larvae feed on chain fern, pupate, and emerge as adults in late summer. This species has declined due to habitat loss and hydrologic alteration. This species has been documented in Eastham within the National Seashore

DUNE NOCTUID MOTH (*Sympistris riparia*) --MA Special Concern—In Masschusetts this species occurs in coastal dunes, dunegrass grasslands, sandplain grasslands and heathlands, and pitch pine-scrub oak barrens. Its host plant is undocumented, but it is known to overwinter in the egg or pupal stage. Threats to this species include habitat loss, fire suppression, pesticides, invasion by alien plants and parasites, and off-road vehicles. In Eastham, this species has been recorded from within the National Seashore and at Sandy Meadows.

NORTHERN BROCADE MOTH (*Neoligia semicana*) --MA Special Concern—In Massachusetts, the northern brocade moth occurs in fresh or brackish wetlands along the coastal plain, including marshes, bogs, and coastal plain pond shores. Larval host plants are uncertain, but are likely species of wetland grasses. This species is threatened by habitat loss and hydrologic alteration that disrupts natural flooding of its habitat. This species has been documented in Eastham within the National Seashore

SANDPLAIN EUCHLAENA (*Euchlaena madusaria*) --MA Special Concern—The sandplain euchlaena inhabits sandplain pitch pine-scrub oak barrens, heathlands, and grasslands. It has two larval broods per season and larval are thought to prefer lowbush blueberry. Threats to this species include habitat loss, fire suppression, pesticides, invasion by alien plants and parasites, and off-road vehicles. This species was documented for the first time in Eastham in 2011 at Sandy Meadows by moth specialist Mark Mello of the Lloyd Center for the Environment.

PINK SALLOW (*Psectraglaea carnosa*) --MA Special Concern—The pink sallow moth occurs in sandplain pitch pine-scrub oak barrens and heathlands, where its larvae are thought to feed on lowbush blueberry. Threats to this species include habitat loss, fire suppression, pestcides, invasion by alien plants and parasites, and off-road vehicles. This species was documented in 2011 at Sandy Meadows by moth specialist Mark Mello of the Lloyd Center for the Environment and occurs elsewhere in Eastham.

UNEXPECTED CYCNIA MOTH (*Cycnia inopinatus*) --MA Threatened--This species was discovered and documented in 2012 as numerous larvae feeding on several clumps of butterfly weed (*Asclepias tuberosa*) in the sandplain grassland habitats of Sandy Meadows. Identification was confirmed by Mark Mello of the Lloyd Center for the Environment, who indicated this is only the second location known for this species on Cape Cod. It is threatened by habitat loss and fire suppression.

Damselflies

SCARLET BLUET (*Engallama pictum*) --MA Threatened—Scarlet bluets are found in acidic, sandy ponds, including coastal plain ponds, with floating vegetation that includes water lilies. The nymphs are aquatic and live among the aquatic vegetation. Adults, who only live for 3-4 weeks, spend much of their time flying out over the pond feeding on aquatic insects and landing on lily pads, prior to mating. The primary threats to this species is degradation and destruction of wetland habitats from construction, development, water level drawdown, sewage, road runoff, and trampling of pond vegetation. At present, the only known occurrences of this species in Eastham are in the National Seashore, but the extent to which other parts of Eastham have been surveyed is unknown.

NEW ENGLAND BLUET (Engallama laterale) --MA Species of Conservation Concern--The New England Bluet occurs in a variety of open pond habitats, particularly at coastal plain ponds. The nymphs are aquatic and live among aquatic vegetation and the adults live among the wetland emergent vegetation

and in nearby fields and forest. Adult life-span is about 3-4 weeks and is spent feeding on flying insects and breeding. The primary threats to this species is degradation and destruction of wetland habitats from construction, development, water level drawdown, sewage, road runoff and trampling of pond vegetation. At present the only known occurrences of this species in Eastham are in the National Seashore, but the extent to which other parts of Eastham have been surveyed is unknown.

LITTLE BLUET (Engallama minisculum) --MA Species of Conservation Concern--The Little Bluet occurs in a variety of open ponds and lakes with sparse emergent, submergent, or floating vegetation and a sandy bottom, such as coastal plain ponds. The nymphs are aquatic and live among aquatic vegetation and the adults live among the wetland emergent vegetation and in nearby fields and forest. The primary threats to this species is degradation and destruction of wetland habitats from construction, development, water level drawdown, sewage, road runoff, and trampling of pond vegetation. Although this species is most common on Cape Cod, at present its only known occurrences in Eastham are in the National Seashore. But, the extent to which other parts of Eastham have been surveyed is unknown.

Dragonflies

SPATTERDOCK DARNER (*Rhionaeschna mutata*) --MA Special Concern—The spatterdock darner typically occurs in boggy ponds with emergent and floating vegetation. The nymphs are aquatic and live among aquatic vegetation and may take 3-4 years to reach maturity. The adults live in nearby fields and forest, feeding on flying insects during their several week long lifespan. Most sites for this species in Massachusetts are small fragile wetlands, are vulnerable to human destruction, degradation and disturbance. The only known sites for this species are in the National Seashore, including vernal ponds in the "Town Woods" section.

F. Scenic Resources and Unique Environments

Wildlife Corridors

A wildlife corridor is a link of wildlife habitat, generally native vegetation, which joins two or more larger areas of similar wildlife habitat. Eastham is blessed with a natural wildlife corridor which comprises a link of wetland habitats that extend into protected conservation lands, critical for the maintenance of ecological processes including allowing for the movement of animals and the continuation of viable populations.

The Town of Eastham Conservation Commission, along with the Conservation Agent and the Eastham Department of Natural Resources manages the protection of open space and the wetlands, so that animals may move between isolated patches of the wildlife corridor on a daily basis, but also patrol, protect and assist those animals that migrate between habitats seasonally. For instance, during spring and summer the department assists the threatened Diamondback Terrapin turtle and other turtles of special concern; to cross roads and make it safely to the places they breed.

The management of Eastham's wildlife corridor by Natural Resources aims to protect corridor function while allowing for other land uses. This may include:

- allowing expansion of corridor width by regeneration and protection of vegetated areas and remnants by excluding, or reducing stocking rates and reducing the frequency of hazard reduction burns;
- improving the ecological value of corridors by undertaking invasive vegetation control;
- protecting key habitat resources within conservation lands such as retention of live and dead hollow-bearing trees, ground litter resources including thickets and fallen logs and protecting specific feed trees;
- minimizing barriers to fauna movement (e.g. reducing cleared areas within the corridor and constructing fences that allow for the free movement of wildlife).

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 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 ecosystems. 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 Cottontail Conservation Areas, the Fort Hill area looking out to Town Cove, Coast Guard Beach and Nauset Beach in Orleans as well as Nauset Light Beach, the Cape Cod Bay beaches and history Rock Harbor.

The road through Eastham to the Cape Cod National Seashore’s Fort Hill area ends at a parking area with a panoramic view of an old farmland and a brilliant view of the geologically unique barrier beach protecting the Nauset Marsh area and Atlantic Ocean beyond. It is one of the more dramatic views on Cape Cod. It is a vista appreciated by bird-watchers, nature photographers, painters, and those looking for quiet contemplation throughout the seasons. Walking trails pass around the farmland fields, along wetlands and to Skiff Hill, an overlook with benches and informative plaques under a pavilion cover. Also on Skiff Hill is “Sharpening Rock” also called “Indian Rock”, a large glacial erratic once used by the local Nauset tribe as a sharpening stone, the rock is cut with deep grooves and smoothed in circles where ax heads were whetted.

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 considered the Seashore as one of the visually most appealing areas of the Town, and residents use the National Seashore’s hiking trails and expansive beaches for walking, hiking and bicycling throughout the year. In addition to its visual qualities, the presence of the Seashore guarantees that one third of the Town will be preserved as open space and as a habitat for wildlife.

Unique Geologic Features

Doane Rock is a glacial erratic (a boulder rock) located in Eastham on the grounds of the Cape Cod National Seashore. It is the largest exposed boulder on Cape Cod. It stands 18 feet (5.5m) tall and extends below the ground an estimated 12 feet (3.7m).

This boulder is named after Deacon John Doane, one of Eastham’s original settlers. It has also been called Enoch’s or Enos rock for the deacon’s son, as well as Great Rock. The rock was left by the Laurentide Ice Sheet approximately 18,000-12,000 years ago.

Doane Rock in the Cape Cod National Seashore

In Henry David Thoreau's book, "Cape Cod" a chapter was written about the outwash plain, Nauset, which forms to the north and west of Nauset Marsh and extends to Provincetown. "These were the "Plains of Nauset," once covered with wood, where in winter the winds howl and the snow blows right merrily in the face of the traveler".

Tidal Flats

The Massachusetts Wetlands Protection Act defines tidal flats as "those nearly level portions of coastal beaches extending from mean low water landward to the more steeply sloping face of the beach". Eastham tidal flats are unique geological features that extend from the Orleans town boundary to the south six miles to the northerly town boundary at Wellfleet. Eastham's tidal flats change their size and shape as the tide ebbs and flows, uncovering and then covering sand or mud tidal surfaces on a daily basis. With a tidal range that peaks at approximately 12.2 feet at highest tide, and lowers to -1.2 at the lowest tides, these extensive tidal flats a very dynamic offering recreational opportunities for the harvesting of shellfish.

The tidal flats along the Cape Cod Bay in Eastham

Sand Dunes

The dunes of Cape Cod are probably one of the first images that pop into your head when you envision visiting Cape Cod. The dunes also happen to extend the six mile boundary of Eastham on the east side of town. Many locals, and especially the many tourists that visit Eastham think of our dunes as one of New England's remarkable natural wonders.

Culturally Significant Landscapes and Scenic Roads

What gives a community its character? If asked, how would a citizen of Eastham describe their town? Perhaps they would describe beaches, ponds, marshes, or historic farmsteads. They may also describe buildings like the historic Penniman House at Fort Hill, the Three Sisters by Nauset Lighthouse, or Town Hall. Perhaps he would describe Eastham's scenic roads, Route 6, or the Cape Cod Rail Trail. Or perhaps she would describe the neighborhood in which she lives. Together, all of these resources reflect the history of Eastham and provide its townspeople with a sense of place. These special places created by human interaction with the natural environment can be classified as heritage landscapes.

Heritage landscapes assist in defining the character of a community by reflecting its past as well as its present; as a result, the landscapes are constantly evolving. In order to help Eastham identify and protect their valued resources, the Massachusetts Department of Recreational and Conservation established the Heritage Landscape Inventory Program in 1999. The primary goal of the program is to help communities identify a wide range of cultural landscapes, particularly those that are significant and unprotected or that have not been the focus of previous survey work. In partnership with the Cape Cod Commission, the Boston University Preservation Studies Program has endeavored to compile a Heritage Landscape Inventory Report for the Town of Eastham. The aim of the report is to provide Eastham assistance in identifying, evaluating and protecting selected heritage landscapes.

Eastham's heritage landscape identification meeting was held on October 13, 2010, and was attended by approximately fifteen residents, including representatives from town boards and local non-profit organizations. The participants compiled an extensive list of Eastham's heritage landscapes for each of the nine heritage landscape categories: Agriculture, Industrial and Commercial, Residential, Civic, Institutional, Natural Features, Cemeteries, Transportation Routes and Recreation and Open Space.

Following the Department of Conservation and Recreation methodology, each person voted for their top three "priority" heritage landscapes – valued landscapes that both contribute to the character of the community and are not permanently protected or preserved. The ten landscapes receiving the most votes were designated priority heritage landscapes and were the focus of the report.

The priority heritage landscapes identified for Eastham are:

Boat Meadow
Rock Harbor
Dyer Prince Road
Town Cove
First Encounter Beach
Freshwater Ponds
Fort Hill
Turnip Farms
Route 6 (State Highway)

These landscapes represent the natural and cultural resources that play an important role in the history of Eastham, as well as cemeteries, the town green and many scenic roads. In a survey taken in 2008, Eastham's cemeteries were considered 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.

During the same survey, 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 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.

The Village Green during Windmill Weekend celebration, 2014

Historic Sites and Districts

Several sites and structures in Eastham are listed in the National Register of Historic Places including those within 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; Also on the National Register are 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 the Eastham's first local comprehensive plan, several 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 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.

Collins Cottages Historic District, consisting of thirteen (13) properties, are located on Town Cove. 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. 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 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.

Unique Environments

Area of Environmental Critical Concern

Areas of Critical Environmental Concern (ACECs) are places in Massachusetts that receive special recognition because of the quality, uniqueness and significance of their natural and cultural resources. These areas are identified and nominated at the community level and are reviewed and designated by the state's Secretary of Environmental Affairs. ACEC designation creates a framework for local and regional stewardship of critical resources and ecosystems.

The 2,600-acre *Inner Cape Cod Bay ACEC* covers three towns (Eastham, Orleans, and Brewster), 56% of the area being with the Town of Eastham. The Inner Cape Cod Bay ACEC was nominated by the Conservation Commissions, Boards of Selectmen, and Planning Boards from the Town of Brewster, Eastham and Orleans and was designated as an ACEC in 1985 because of the area's extraordinary natural resources. The boundary for this ACEC generally follows the 10-foot contour line on the landward side, and the mean low water on the seaward side, and extends from the north end of Eastham's First Encounter Beach south to include Orleans' Namskaket Creek. Included within the ACEC boundary are hundreds of acres of salt marsh, highly productive shellfish beds, undisturbed wildlife habitat, barrier beaches, salt ponds and tidal rivers and creeks. These areas provide flood control, storm damage prevention and improved water quality and recreation opportunities to surrounding communities.

The size of this unaltered (except for Rock Harbor) system of flats, marshes, and tidal creeks makes this area unusual for the generally developed Massachusetts coastline. The area is highly productive and remarkable for its natural resources. The geology of the area is unique in that it includes the dividing line between the cliff-edged plains of Nauset and the flats of Cape Cod Bay. The Boat Meadow Aquaculture Development Area (ADA) is located within the northern boundaries of the Inner Cape Cod Bay ACEC. Consistent NW breezes has introduced kite-boarding to the ACEC.

Imminence of Threat to the ACEC

Despite laws and regulations to the contrary, construction along marshes and waterways can also bring incremental filling of sediment over time. Eastham, in the past decades, has been under ever-increasing development pressures. All predictions see these pressures increasing even more rapidly in the future. These development activities present two particular forms of threat to the areas included with the ACEC.

First is the incremental effect of construction along the edges of the marshes and waterways. Run-off from

roadways and landscaped areas can bring increased levels of nutrients to the aquatic system resulting in eutrophication, possible algal blooms and resultant lowering of oxygen levels in the water to the detriment of marine organisms. Eastham's population has not changed over the last decade, but over the last fifty years, the increasing population has led to increased proposals for dredging the tidal creeks of the Lower Cape Cod ACEC. Ten years ago (Rock Harbor in the ACEC) was dredged for boating activities. Rock Harbor was recently dredged in hopes of withstanding the next ten years.

G. Environmental Challenges

Groundwater, Surface Water and Coastal Water Contamination

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 recharges into the ground. Additional recharge to the aquifer is provided by wastewater discharge from septic systems. This wastewater may still harbor contaminants and nutrients that can impact drinking water, freshwater ponds and estuaries. For this reason, wastewater disposal needs to be carefully managed and reviewed to minimize adverse impacts. Ponds, streams and groundwater all flow to larger rivers and coastal areas. This interconnection means that all water uses -- drinking, swimming, boating, shellfishing, cranberry farming or wetlands habitat -- depend on the quality of groundwater.

A common potential contamination source for the on-site domestic water supply wells in Eastham is on-site sewage disposal systems. Furthermore, the small size of the Town 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 and domestic underground fuel storage tanks. An additional significant contamination source is stormwater runoff.

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 while also attempting to cleanup 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 water quality in that zone. The Town, has an extensive monitoring program in place and the site is capped and closed. Future actions will include public education as well as additional measures to reduce the use of excess phosphorous, nitrogen and other chemicals.

Groundwater Issue Background

The Town's landfill was capped in 1997. The closure of the landfill consisted of the construction of a low permeability cap and the implementation of a groundwater monitoring program. This monitoring program included routine collection and laboratory analysis of groundwater samples from monitoring wells around the landfill and private drinking water wells in the neighborhood of the landfill.

In a report titled "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 determined that there were no Lower Explosive Limit exceedances at any landfill 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.

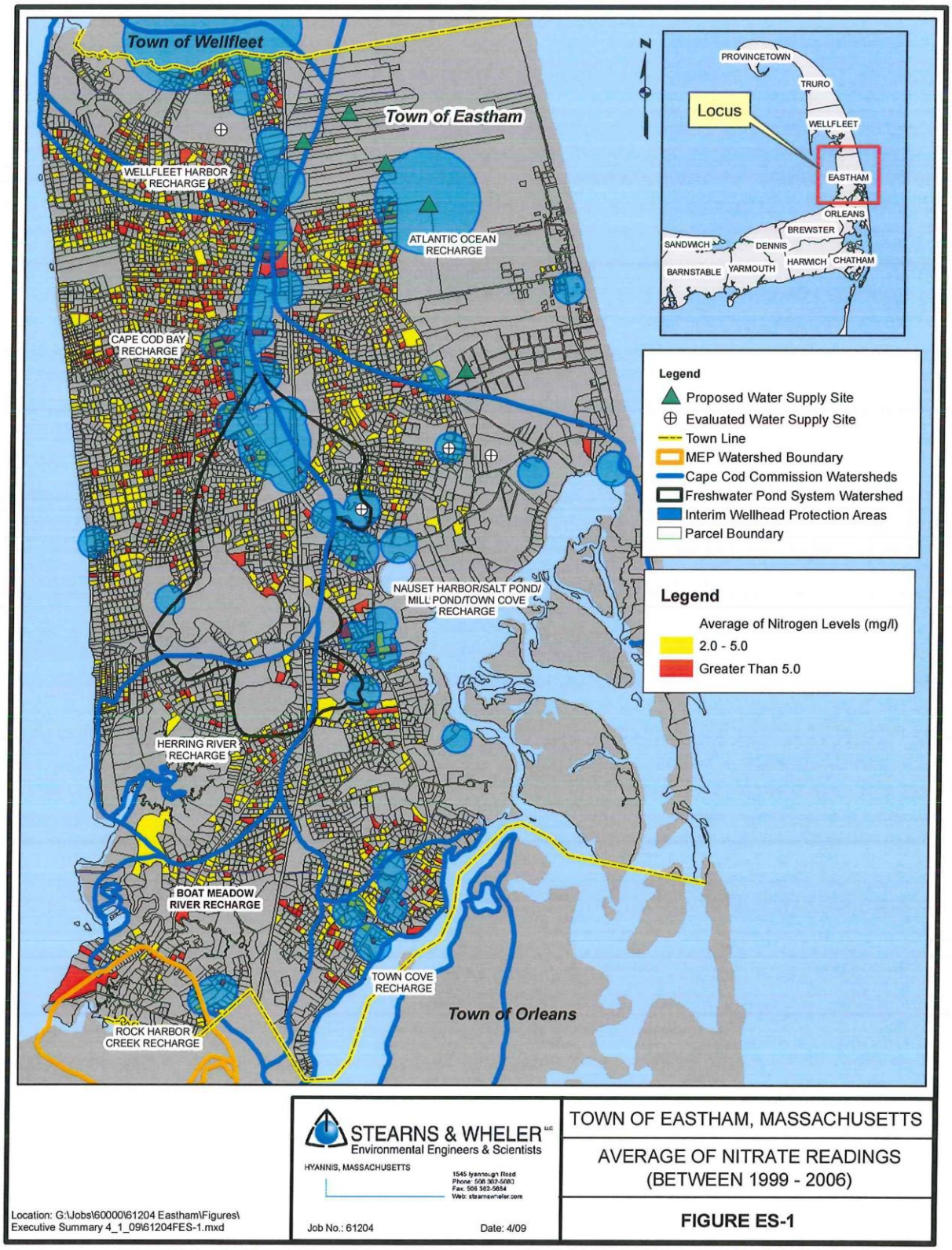
In March 2004, vinyl chloride was detected in a water sample collected from a private drinking water well at a concentration of two micrograms per liter. Response actions related to this discovery included collection and analysis of water samples over a five year period. A comprehensive report was submitted in 2009 to document that a permanent solution had been achieved under the Massachusetts Contingency Plan (MCP). The term 'permanent solution' as defined by the MCP means that a condition of no significant risk of harm to humans and the environment has been achieved.

Included in a MassDEP letter dated August 14, 2012 to the Town of Eastham, it was required by DEP to analyze groundwater samples for 1, 4-dioxane. This compound is considered an "emerging" contaminant, meaning that it occurrence in the environment and its potential toxicity have only recently been considered by the regulatory and scientific community. It is for this reason that groundwater within and around the landfill had not previously been tested for 1, 4-dioxane. Following the detection of 1, 4-dioxane in monitoring wells and private drinking water wells near and down-gradient of the landfill, the Town initiated an extensive drinking water well testing program. Between February and August, water samples were collected from 227 drinking water wells under this program.

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 Management Committee, 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 both for evaluation of the treat form nitrate and as a marker of septic infiltration.

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.


Town of Wellfleet
Town of Eastham
Town of Orleans
WELLFLEET HARBOR RECHARGE
ATLANTIC OCEAN RECHARGE
CAPE COD BAY RECHARGE
NAUSET HARBOR/SALT POND/ MILL POND/TOWN COVE RECHARGE
HERRING RIVER RECHARGE
BOAT MEADOW RIVER RECHARGE
TOWN COVE RECHARGE
ROCK HARBOR CREEK RECHARGE
N
Locus
PROVINCETOWN
TRURO
WELLFLEET
EASTHAM
ORLEANS
BREWSTER
SANDWICH
DENNIS
HARWICH
CHATHAM
BARNSTABLE
YARMOUTH
Legend
Proposed Water Supply Site
Evaluated Water Supply Site
Town Line
MEP Watershed Boundary
Cape Cod Commission Watersheds
Freshwater Pond System Watershed
Interim Wellhead Protection Areas
Parcel Boundary
Legend
Average of Nitrogen Levels (mg/l)
2.0 - 5.0
Greater Than 5.0
STEARNS & WHELER LLC
Environmental Engineers & Scientists
HYANNIS, MASSACHUSETTS
Job No.: 61204
Date: 4/09
TOWN OF EASTHAM, MASSACHUSETTS
AVERAGE OF NITRATE READINGS (BETWEEN 1999 - 2006)
FIGURE ES-1
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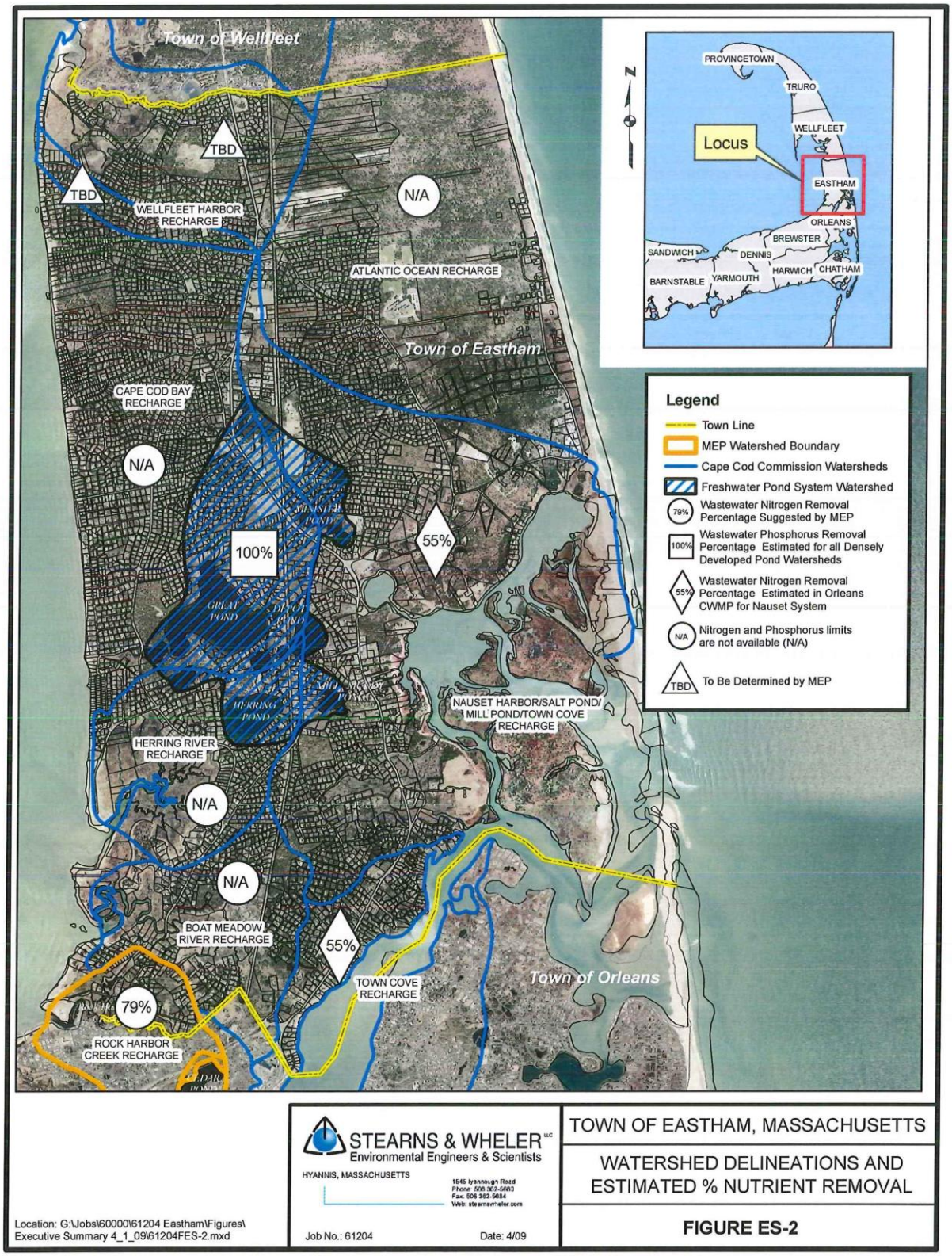

Town of Wellfleet
TBD
TBD
WELLFLEET HARBOR RECHARGE
N/A
ATLANTIC OCEAN RECHARGE
Town of Eastham
CAPE COD BAY RECHARGE
N/A
100%
55%
GREAT POND
MERRING POND
NAUSET HARBOR/SALT POND/ MILL POND/TOWN COVE RECHARGE
HERRING RIVER RECHARGE
N/A
N/A
BOAT MEADOW RIVER RECHARGE
55%
TOWN COVE RECHARGE
Town of Orleans
79%
ROCK HARBOR CREEK RECHARGE
PROVINCETOWN
TRURO
WELLFLEET
Locus
EASTHAM
ORLEANS
BREWSTER
SANDWICH
DENNIS
HARWICH
CHATHAM
BARNSTABLE
YARMOUTH
N
Legend
Town Line
MEP Watershed Boundary
Cape Cod Commission Watersheds
Freshwater Pond System Watershed
79% Wastewater Nitrogen Removal Percentage Suggested by MEP
100% Wastewater Phosphorus Removal Percentage Estimated for all Densely Developed Pond Watersheds
55% Wastewater Nitrogen Removal Percentage Estimated in Orleans CWMP for Nauset System
N/A Nitrogen and Phosphorus limits are not available (N/A)
TBD To Be Determined by MEP
STEARNS & WHELER LLC
Environmental Engineers & Scientists
HYANNIS, MASSACHUSETTS
1545 Iyannough Road
Phone: 508 362-5080
Fax: 508 362-5654
Web: stearnswheler.com
Job No.: 61204
Date: 4/09
Location: G:\Jobs\60000\61204 Eastham\Figures\
Executive Summary 4_1_09\61204FES-2.mxd
TOWN OF EASTHAM, MASSACHUSETTS
WATERSHED DELINEATIONS AND ESTIMATED % NUTRIENT REMOVAL
FIGURE ES-2

Water Management Committee

In 2002, the Board of Selectmen appointed a Water 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 Water Management Committee in cooperation with the Conservation Commission and the Board of Health, recently proposed 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. 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 indicates that all the ponds suffer from at least moderate eutrophication, which although a natural process, is influenced by human activity.

By 2011, an Action Plan for the Town of Eastham Ponds was published as one component for a comprehensive nutrient management initiative underway. Eleven kettle ponds in the Town are the focus of the Action Plan. The existing conditions were reviewed; current water quality and habitat conditions with respect to the ponds' desired uses were evaluated, from both the human and ecological perspective. Potential sources of phosphorus were identified. The data sources for the assessment of current conditions include the Cape Cod Commission's detailed review of pond water quality conditions, as measured between 2001 and 2006 (Eichner 2009). Additional sources of data and information included PALS and National Seashore monitoring data from 2008-2010, beach monitoring for bacterial counts, and an August 2011 field assessment and sampling program.

The Action Plan included an evaluation of alternatives including a suite of potential remedial measures, designed to improve the ponds' water quality and habitat conditions. The alternatives culminated in a series of recommendations for remedial measures. These measures included alum treatment programs for Herring Pond (alum treatment administered 2012) and Great Pond (alum treatment administered 2013).

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. 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 standards. 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.

Coastal Water Contamination

The protection of coastal areas is an important environmental issue that is directly related to the economic vitality of Eastham. Embayments serve as important habitat for shellfish and finfish. The land areas surrounding these areas are most desirable 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 parcels, each with its own septic system. Each of these septic systems adds contaminants to the groundwater, which is then discharged into the coastal resource areas. Non-point source contaminants from septic systems can include metals from plumbing, nitrogen and other chemicals and contaminants added to disposed of by residents or visitors unfamiliar or unconcerned with the immediate impact of untreated septage on the surrounding environment.

Among these contaminants, nitrogen is a primary concern for coastal waters. It is usually the nutrient, that can limit coastal productivity. Too much nitrogen can lead to changes to ecosystems 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 algae growth. Coastal ecosystems around Cape Cod are particularly sensitive to excessive nitrogen because they 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.

State, Federal and regional agencies have set up nutrient limits (called Total Maximum Daily Loads or TMDLs) on the amounts of nitrogen that can go into an estuary. They have determined that septic systems discharges into the estuarine watersheds are the main sources of nitrogen to these water bodies. A report from EcoLogic LLC and GHD in December 2011 concluded that the limits are still being developed, but evaluations indicated that 55 percent of current wastewater nitrogen discharges need to be removed from the Nauset-Town Cove Estuary Watershed to restore and manage long term water quality. Furthermore, 79 percent of the current wastewater nitrogen discharges need to be removed from the Rock Harbor Estuary Watershed to restore and manage long-term water quality.

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 or action 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 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 been 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 12: 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

Eastham's current Tipping Fee at SEMASS is $37.51. Eastham's proposed annual MSW in 2008 Guaranteed tonnage was 4,000, and the annual tonnage handled at the Eastham Transfer Station in 2008 was 5,204

A private company hauls most of Eastham's solid waste in town-owned trailers to SEMASS, 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.

In the late 1980's, communities in southeastern Massachusetts were faced with the closure of their unlined municipal landfills under Massachusetts Department of Environmental Protection (MassDEP) regulations. Many of these communities, including Eastham, entered into long-term agreements with the SEMASS waster-to-energy facility in Rochester, Massachusetts for disposal of their municipal solid waste (MSW). The communities constructed an infrastructure including local and regional solid waste transfer stations to transport their MSW to the SEMASS facility. The infrastructure and SEMASS agreements have provided reliable, cost-effective and environmentally sound disposal of the Eastham's MSW for over 20 years.

Camp Dresser & McKee Inc. (CDM) was retained by the Cape Cod Commission to evaluate long-term alternatives for the disposal of Municipal Solid Waste (MSW) from 14 Cape Cod and four off-Cape

communities.

Based on the review of the CDM report, future waste quantities at the Eastham 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.

The future of the Tri-town Septage Treatment facility, the 25-year old plant in Orleans that operates under an inter-municipal agreement with the towns of Orleans, Brewster, and Eastham, was unknown until the May 6, 2014 Town Meetings, when residents in all three towns voted to approve articles seeking $100,000 in funding from their town meetings to keep the plant in operation until May 2016. With $300,000 from the three towns, the selectmen will have time to think of the next step: whether they'll come back to their town meetings in May 2016 to seek additional funding of up to $1.7 million per town to renovate the plant and keep it running for another 20 years, or decide instead to demolish it.

Wiley Park Conservation Area

Section 5. INVENTORY OF LANDS OF CONSERVATION AND RECREATION INTEREST

"More than anything else, we found in Americans a love of the land, and a shared conviction that it is our legacy for the future. We found that recreation is important to people in their daily lives, and that most of them cannot imagine a world in which they did not have access to the outdoors"
~ The President's Commission on Americans Outdoors

What is Open Space?

For the purpose of this Open Space and Recreation Plan, Open Space is defined in the Town of Eastham By-Laws as having the following meaning: "An unoccupied space, open to the sky, free of all structures, parking, pavement and other impervious surfaces; consisting of lands used for agricultural or forest uses; and any land area that would, if preserved and continued in its present use:

1. Conserve and enhance natural or scenic resources;
2. Protect air or streams or water supply;
3. Promote conservation of soils, wetlands, beaches or tidal marshes, and
4. Enhance the value to the public of abutting or neighboring parks, forests, wildlife preserves, nature reservations or sanctuaries or other open space."

Open space in Eastham may be a public beach, a playground at a town park, a bicycle path, a series of conservation lands joined by trails, the historic windmill on the green, wildlife corridors within marsh habitats, and of course, in the case of Eastham, the Cape Cod National Seashore exemplifies the types of open space used for active and passive recreation.

When requested to define 'open space' during a televised Open Space Committee meeting, members of the committee defined open space as 'land and water and the natural, cultural, and recreational resources within town." They further discussed how open space helps to conserve a variety of unique resources, create many types of recreational opportunities, and most importantly, "open space is a link to special places for all residents and visitors."Open Space is comprised of both public and private lands, and can include a habitat and resource area, unique natural features, historic structures, it may be a vacant lot purchased for waterway protection, a forestland, and successional pastures –any resource that is significant to the community.

Open Space can be as simple as a foot trail connecting two ponds, or a multi-use recreational area behind town hall.

While open space may vary in size, ownership, custodial management, and purpose, all open space in Eastham protects the resources that help create the unique character of the town and integrates these special features into the surrounding landscape.

What does the word "protected" mean with regards to Conservation and Recreation lands?

From an open space planning perspective, open space generally falls into three categories in Eastham.

Dedicated Open Space: Land preserved in perpetuity as open space, with public use.

Managed Open Space: Land set aside for open space purposes, and at the present moment is being used as open space, but the group that has custodial management or owns it, has the ability to change that use at any time.

Protected Open Space: Land protected from development, such as with a conservation restriction, but public use may not be allowed.

As defined by the Eastham Open Space committee, a protected area is a restricted area purchased and managed by the Town of Eastham under by-laws and the Wetlands Protection Act 310 CMR 10.00 as not to allow access to or development of (land) so as to preserve its natural state. Protected open space may also be protected and managed land that was acquired with a conservation restriction, trust and gift, and tax takings. Geographically speaking, a protected area is a clearly defined geographical space, recognized, dedicated, and managed through legal or other effective means to achieve the long-term conservation of nature with associated ecological and cultural values.

How Do We Protect Our Open Space?

If land is to have meaning at all as protected open space, the land must be immune from pressures to "do something" with it." Mark H. Robinson, Executive Director, The Compact of Cape Cod Trusts, Inc.

There has been an effort by residents trying to preserve that which they thought they had voted to preserve as open space stays preserved as open space. However, the biggest threat to open space may come from all sorts of good intentions to devote the land to other uses. The Town of Eastham has a long and active history of acquiring land for conservation. In addition to 1,285 acres of Cape Cod National Seashore stewarded by the National Park Service, and 65 acres held by the Massachusetts Department of Conservation and Recreation (for the bike trail, a section of The Cape Cod Rail Trail), the Town and various non-profit conservation organizations have acquired interests in approximately 1,000 additional acres in Eastham for the purpose of conservation.

In 2010, Eastham initiated a comprehensive analysis of parcels that are listed as "Town Conservation Land." Woods Hole Group completed an inventory and analysis of conservation lands in Eastham for the Open Space Committee and Conservation Commission.

ECLAP (The Town of Eastham Conservation Land inventory and Analysis):

a. Document the custodial authority of each parcel;
b. Document the legal protections for each parcel;
c. Identify opportunities to increase the level of protection in conservation land;
d. Focus future research efforts by identifying data gaps and/or records inconsistencies; and
e. Assist the Town in the development of a land protection and acquisition plan that ensures the long-

term protection of individual parcels exhibiting high conservation value (evidenced by the presence of important wildlife habitat, wetlands, rare species, etc.).

ECLAP identified all town-owned and nonprofit-owned parcels commonly understood to be held for conservation purposes, as well as all private parcels commonly understood to have conservation restrictions in Eastham. The Open Space Committee is presently taking the ECLAP inventory list, cross referencing each parcel with the Barnstable County of Deeds, the Town Assessors office, to the MassGIS protected open space data layer.

The Open Space committee is also in support of the "No-Net-Loss of Open Space legislation, currently pending in the state legislature. Now known as the Public Land Protection Act, the legislature would set up a more rigorous framework for decision-making when towns and state agencies come calling to convert managed (public) open space to other uses.

The Community Preservation Act calls for towns to place permanent restrictions on all conservation land acquired through that funding source. The Community Preservation Committee secures implementation of the conservation restriction.

Protected Parcels

Eastham has a strong network of Town staff, public boards, commissions, committee, public agencies and private organizations working to protect open space and natural resources in the community. While much has been accomplished, with roughly 22% protected open space, critical lands are at risk including Core Habitat, Critical Natural Landscape, and land with temporary restrictions. Due diligence is necessary to ensure that Eastham's critical natural resources do not fall prey to development pressures as well as increases in population and the accompanying recreational pressures.

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.

Federally Protected Lands in Eastham

The Cape Cod National Seashore along Eastham's eastern boundary provides a passive and active recreational facility of more than 1,285 acres. 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 Nation Seashore manages two beaches in Eastham. The beaches extend from the barrier beach south of Coast Guard Beach to the Wellfleet line. 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 National Park Service maintains 55 parking spaces at Coast Guard Beach 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 and provides 50 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.

Eastham's Open Space Inventory

Town-owned Open Space

Eastham has over five hundred 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. Table 12 shows significant Town owned parcels with primary upland areas, most of which may be enjoyed by the public. This table does not include town-owned beaches, landings, or cemeteries (included elsewhere in the report), nor does it include more than 300 additional acres of Town owned marsh and wetlands.

Table 13: Town-owned Open Space

Name	Location	Acres
South Eastham Conservation area	Smith Land	**45**
Cottontail Acres	Samoset Road	**18**
Upper Boat Meadow	off Bridge Road	**6**
Minister's Pond	Schoolhouse Road (behind Eastham Elementary)	**5**
North Sunken Meadow	North Sunken Meadow Road	**3**
Nickerson Conservation Area	Herringbrook Road	**28**
Rock Harbor	Dyer Prince Road	**13**
Turtle Covw	Off Herring Brook Road	**1.6**
Town Forest	Bayside between Ocean View Dr and Nauset Rd	**172**
Eastham Windmill	Samoset Road	**1.6**
Wiley Park	Herring Brook Road	**44**
Walters/Anderson Property	State Highway/ Bike Path	**9**
Sandy Meadow	Sandy Meadow Way	**43**

Source: Town of Eastham, Assessor's Office

Eastham Conservation Foundation

Table 13 lists land holdings of the Eastham Conservation Foundation (ECF), which include fifty-three (53) parcels ranging in size from under one acre to more than thirty acres. The Eastham Conservation Foundation is a private nonprofit group unaffiliated with the Town. To date, the ECF has acquired over two hundred and forty (240) acres, of which over seventy-five percent is designated wetlands. In addition to these holdings, an additional 208 acres, primarily marsh wetlands, are protected under ownership of other non-profit organizations, including Mass Audubon, The Nature Conservancy, and Orenda Wildlife Land Trust. Much of these holdings are not, for the most part, areas that have trails or other attributes that would make them appropriate for public access and recreation.

Table 14: Landholdings of the Eastham Conservation Foundation

Location	Total	Habitat Type
South Eastham, bike trail	38.2	Salt marsh/woodlands
Boat Meadow/Dyer Prince	5.7	Salt marsh/dune/beach

Upper Boat Meadow/Bridge Rd	18.1	Salt marsh/dike/wetlands
Off Samoset	76.6	Salt marsh/bank
ColeRoad	1.0	Beach/coastal dune
Governor Prence area	23.9	White cedar/maple swamp
Hemenway area	4.6	Maple swamp/woodland
Mill and Locust Rds	3.4	Shrub swamp/woodland
Off McKoy	1.4	Pondshore/wetland
Duck Marsh Way/Piper Lane	1.4	Vernal pool/wetland
North and South Sunken Mdw	28.2	Salt marsh/dune/wetland
Off Nauset/Old County Rds	19.7	Woodlands
Off Doane Rd	7.9	Barrier beach/dune/cedars
Youth Hostel and area	9.6	Salt marsh/woods/AYH

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, usually in perpetuity. 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 privately-owned parcels are subject to a conservation restriction in the town.

Table 15: Land Protected by Conservation Restrictions

Source: Eastham Conservation Foundation, Inc.

Table 16: Town of Eastham Asset Inventory and Location

Title	Address
General Government:	
*Town Hall and Recreation Building	2500 State Highway (Rt. 6)
Public Safety:	
*Police Station	2600 State Highway (Rt. 6)
*Fire Station	2550 State Highway (Rt. 6)
Education:	
Elementary School	Schoolhouse Road
Public Services:	
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
Common Facility and Service Assets:	
Public Library	Samoset Road
*Senior Citizens Center	Nauset Road
Recreation System:	
Little League Field	2500 State Hwy. (Rt. 6)
Information Booth	Route 6
Comfort Stations (3)	First Encounter
(Cont)	Cooks Brook Beach
Playground/Swimming Lessons	Wiley Park
Congregational and Soldiers **	Route 6
Historic Site – Old Windmills	Route 6
Old Cove Burial Ground	Route 6
Public Beaches with Parking Lots:	
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
Great Pond	Great Pond Road
Herring Pond	Off Herring Brook Road

Rock Harbor (marina)	Off Dyer Prince Road
Collins' Landing (boat launch)	Off Route 6
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 (excluding land covered by a conservation restriction)

Program	**Owner/Location**	**Acres**
Chapter 61	255 Higgins Rd.	19.2
Chapter 61	365 Higgins Rd.	6.2
Chapter 61	650 Dyer Prince	0.952
Chapter 61	560 Dyer Prince	0.918
Chapter 61	8 Keene Way	0.96
Chapter 61A	1765 Massasoit Rd.	11.1
Chapter 61B	Atlantic Oaks (Campground) Rt. 6	16
	Total Acres of Land Subject to Preferential Taxation	**55.33**

Source: Eastham Assessors Records (2015)

Ponds

There are seventeen (17) ponds in Eastham, of which twelve (12) ponds are six acres or larger: Molls, Minister, Great, Long, Jemima, Muddy, Herring, Depot, Widow Harding, Bridge, Baker's, and Deborah's Pond. These ponds are surface expressions of groundwater, have suitable water quality, and provide swimming and boating opportunities. Some 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	Acres
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 National 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. The 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 2016 produced a list of 44 (down from 136 in 1999) privately owned developable (i.e. buildable) parcels of one acre and larger. As a result of the survey in 1999, twelve properties had been 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 had indicated a willingness to consider sale of the parcels to the Town at some future date,. .

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 in Eastham

Location	Docks/Piers/ Floats	Launch	Beach	Picnic	Showers	Restroom
Boat Meadow			X			
Campground Beach			X			Portable
Coast Guard Beach			X		X	X
Cole Road			X			Portable
Collins Landing			X			
Cooks Brook Beach			X		X	X
Doane Rock				X		X
First Encounter Beach			X			X
Great Pond Beach		X	X			Portable
Hemenway		X				Portable
Herring Pond		X	X			Portable
Jemima Pond		X				
Kingsbury Beach			X			
Minister's Pond			X			
Nauset Light Beach			X		X	X
Rock Harbor	X	X				Portable
Salt Pond		X				Portable
Sunken Meadow Beach			X			Portable
Thumpertown Beach			X			Portable
Wiley Park	X		X	X		X

Source: Local Comprehensive Planning Committee

Camping Opportunities

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

Cape Cod Rail Trail

Cape Cod is the home of famous Cape Cod Rail Trail; a twenty-three-mile paved recreational trail. The Rail Trail extends from Route 134 in South Dennis to LeCount 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 Massachusetts Department of Conservation and Recreation (DCR) 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.

Eastham Town Hall,
2500 State Highway
Constructed in 1913

Section 6. COMMUNITY VISION

A. Description of Process

Town Meeting

The Eastham Town Meetings first began a little over 300 years ago, when the first early settlers developed a type of public forum to discuss particular issues regarding the "goings-on" around town. Today, the Eastham Town Meeting has evolved into an integral component to how town decisions are made.

In Eastham, Town Meeting is an open forum (towns with less than 6,000 residents must have an open Town Meeting) that promotes democracy. Town Meeting means that all of the town's voters may vote on all matters. The purpose of Town Meeting is to include all registered voters of Eastham in discussion and to vote on warrant articles and budgets in a public forum. The outcomes ensure that all policy decisions are in the public interest since no intermediaries are placed between the voters and the public decision.

While the final decisions on how to improve the Eastham community is decided at Town Meeting, the process of creating a solid information base, prioritizing key values, identifying a broad range of solutions, weighing the pros and cons, and making the best decision possible is based upon open discussions from public workshops, meetings with various Town Boards, commissions, committees and

civic organizations throughout the year.

Community Survey Results

There are really as many definitions of "community-based" surveys as there are definitions for "community-based research". Though the Town of Eastham did not sponsor one town-wide, community-based survey over the last seven years, the Town relentlessly gathered opinion and data from two town-sponsored community research workshops, both incorporating survey components.
In partnership with the Cape Cod Commission, the Boston University Preservation Studies Program compiled a Heritage Landscape Inventory Report for the Town of Eastham in December 2010. The project followed guidelines established by the Department of Conservation and Recreation and summarized in the organization's publication, *Reading the Land – Massachusetts Heritage Landscapes: Guide to Identification and Protection.*

One of the primary goals of the Heritage Landscape Inventory is to foster community involvement in preservation and conservation. The Cape Cod Commission selected Eastham for the heritage landscape survey based on need and interest; once selected Eastham designated a 'local project coordinator" to serve as a liaison between individual community members, local preservation and conservation groups, and the project team. A community meeting was arranged in which individuals were invited to learn about the program, voice their opinions on the community's valued heritage landscap, and choose priority landscapes that will be the subject of future study.

The "Community-Meeting" included residents, representatives from town boards and local non-profit land trust organizations. From the meeting, the project team conducted field work to photograph and document the list of priority landscapes compiled by the meeting participants. This provided the initial mapping and parcel number documentation, which the Cape Cod Commission used to produce GIS mapping of priority heritage landscapes in Eastham.

April 2014, The Eastham Community Preservation Committee held a community workshop that included a digital group polling exercise. The digital polling exercise included 19 questions that the participants answered anonymously with handheld digital polling devises. The results were displayed live at the workshop. Polling questions included a range of topics to discover participant's characteristics, knowledge, and purpose.

The polling exercise uncovered the following key characteristics of participants:

1. 67% of participants currently serve on a town board or committee;
2. 44% have been associated with the town for more than 30 years;
3. 93% were year-round residents, no participants were part-time residents, 7% were other including a town employee and a representative from a non-profit land trust;
4. 71% were between 55 and 74 years of age and 36% had children under 18 years old living in Eastham.
5. 50% recall voting for the Community Preservation Act when it was on the ballot in 2005.

The insights and perspectives of community participation, over the last seven years, enhance the knowledge and understanding of town officials about community dynamics and conditions. The workshops and surveys strengthen the skills of residents in gathering and using data to facilitate planned community change.

The knowledge-building process is connected to the community vision, as participants work together to define and critically analyze Town concerns, and to plan, implement, and evaluate actions to address those community concerns.

From these meetings a broad vision statement was expressed by participants: To keep Eastham…..

……"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."

Achieving the Vision

The Town of Eastham Long Range Planning Advisory Board makes recommendations to the Town Meeting and to the Town Administrator on all matters concerning the physical, economic, human services needs and environmental development of the town as prescribed by General Laws, the Charter and By-Laws. The Board seeks a balanced approach to resolve potential conflicts inherent in achieving the above mission statement. For instance, during the 2012 Local Comprehensive Plan discussions, the discussion took place for improved traffic flow and safety along Route 6 with the desire of the Town to protect it historic and rural character. The Long Range Planning Plan attempts to build on the historic and current data available, and to prepare a comprehensive framework for future policies which address the issues identified and which will guide the Town for the next twenty years.

It is evident as illustrated by Town Meeting votes that the residents of Eastham believe the amount of open space is important to them in making the decision to live in Eastham. During the last series of "vision" workshops held in the spring of 2000, participants reaffirmed Eastham's commitment to open space with 67% supporting a town land acquisition program; and, despite the presence of the Cape Cod National Seashore, 43% of Eastham residents stated in 2000 "that loss of open space was a serious problem facing their town." At the same time, approximately 75% of residents when surveyed listed that "recreational opportunities" are very important too.

Town Actions for Protection of Conservation Lands

Eastham has a strong network of public agencies and private organizations working to protect open space and natural resources in the community. While much has been accomplished, with roughly 22% protected open space, the Open Space Committee is accessing better ways to identify and acquire priority habitats, and to develop management plans for already existing town-owned open space.

Since its completion, the Open Space Committee has been performing an internal search to verify the legal protections documented in the Eastham Conservation Land Inventory and Analysis Report (2012). Working collaboratively with the Eastham Conservation Foundation and the Compact of Cape Cod Conservation Trusts, conservation restrictions and deeds are being reviewed to ensure threat to the levels of protections are minimized.

The Natural Resources Department 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 overseen by the Open Space Committee.

Town Actions for Maintenance of Recreational Facilities

According to responses at the recent Community Preservation Committee Tetris Exercise, "Eastham's most critical recreation needs are the rehabilitation of existing active recreation facilities including playgrounds, tennis courts, and athletic fields, as well as a creation of a new town park."

With support from CPA funds, the Town intends to conduct a comprehensive assessment of its current recreation resources and needs and to identify priority strategies improving and protecting outdoor recreation facilities. To that end, the Town voted to appropriate $35,000 to contract a recreation consultant to identify recreational land use opportunities in Eastham and develop a plan to renovate, repair, and/or expand the Field of Dreams recreational offerings. An early 2015 start date was scheduled for the Field of Dream development plan.

In the meantime, the dredging of Rock Harbor, one of the top recreational priorities in Town, was completed in 2015. At the 2014 Town Meeting, voters appropriated $700,000 to pay (half the cost with Orleans) for engineering, design, permits, dredging, and material disposal to dredge Rock Harbor in order to maintain a navigable channel in the harbor for recreational and charter boating for the next ten years.

The Town also voted to transfer $366,240 from the Community Preservation Fund Balance to repair and construct the tennis courts located at Nauset High School, Eastham. This was completed in 2015.

Public Beach Access

Beach parking during July and August can be problematic sometimes, but it is not a significant problem. First Encounter Beach contains 110 parking spaces, Campground Beach has 109 parking spaces and Cook's Brook Beach has 106 parking spaces. Parking fees apply to all beaches during July and August. Parking fees can be paid directly at the gates at Cook's Brook Beach, Campground Beach, First Encounter Beach, Wiley Park Beach, Coast Guard Beach and Nauset Beaches on the Cape Cod National Seashore. The other beaches, Dyer Prince Beach, Boat Meadow Beach, Great Pond Beach, Herring Pond Beach, Cole Road Beach, Thumpertown Beach, and South Sunken Meadow require purchasing a parking sticker in advance from the Town's Sticker Office at the DPW facilities. The Recreation and Beach Department web page has a link to directions to all area beaches, as well as directions to the Sticker Office.

Daily Parking Pass (Weekdays)	$15.00
(Weekends)	$18.00
One Week Visitor Beach Sticker	$65.00
Two Week Visitor	$100.00
Seasonal Beach Sticker	$180.00

Campground Beach, Cook's Brook Beach, Great Pond Beach, Cole Road Beach, Wiley Park, and Coast Guard Beach are Handicapped Accessible. First Encounter Beach and Cole Road Beach have Mobi-Mats. First Encounter Beach and Campground Beach have Handicapped Surf Mobi-Chairs. Boat Meadow Beach is the only beach in town that does not yet have either a portable rest room or public rest room building.

Town-owned Open Space Access

Eastham has a network of walking trails in the Glacial Pond Trails Network. For this plan, hiking differs from walking, hence Eastham has a network of walking trails. Hiking obviously involves walking. However, when you hike, it usually means you are walking from a lower elevation to a higher elevation. On the other hand, when you walk, it means that you are only trekking a relatively smooth and flat path without too many hurdles. In other words, when you are hiking the trails on the Lower Cape you are really walking. Walking is when the path you are taking is only rough not necessarily hilly.

The terrain is the driving force behind a trial system that is very active. Each day the Eastham Dog Association gathers at Wiley Park to join together to walk their dogs. The trails link between the glacial

ponds and offer maintained access to all walkers, including maintained trails and an ADA compliant bridge connecting Wiley Park trail to the Nickerson Trails.

A bid went out in early 2015 for an RFP to construct an ADA Compliant trail at the Sandy Meadow Conservation area (approved at Town Meeting), which will be made of crusher fines for trail and scenic vista platform at the trail rest area.

Active Recreation and Youth Recreation Opportunities

With the support from Community Preservation Funds, the town intends to conduct a comprehensive assessment of the Town's current recreation resources and needs. This "Recreation Plan" is envisioned to identify priority strategies to improve and protect Eastham's recreation facilities. In addition, the community perceives a demand for additional outdoor recreation facilities, including a new park, playground, community garden, fitness track, and picnic areas.

An ADA Assessment of Town facilities commenced in the Spring of 2015. The assessment is being conducted by the Department of Natural Resources, in conjunction with the Beach and Recreation Department, and led by the Town's P.A.C.E committee's 'Community Access Monitor' and Town's ADA coordinator, Building Inspector Tom Wingard.

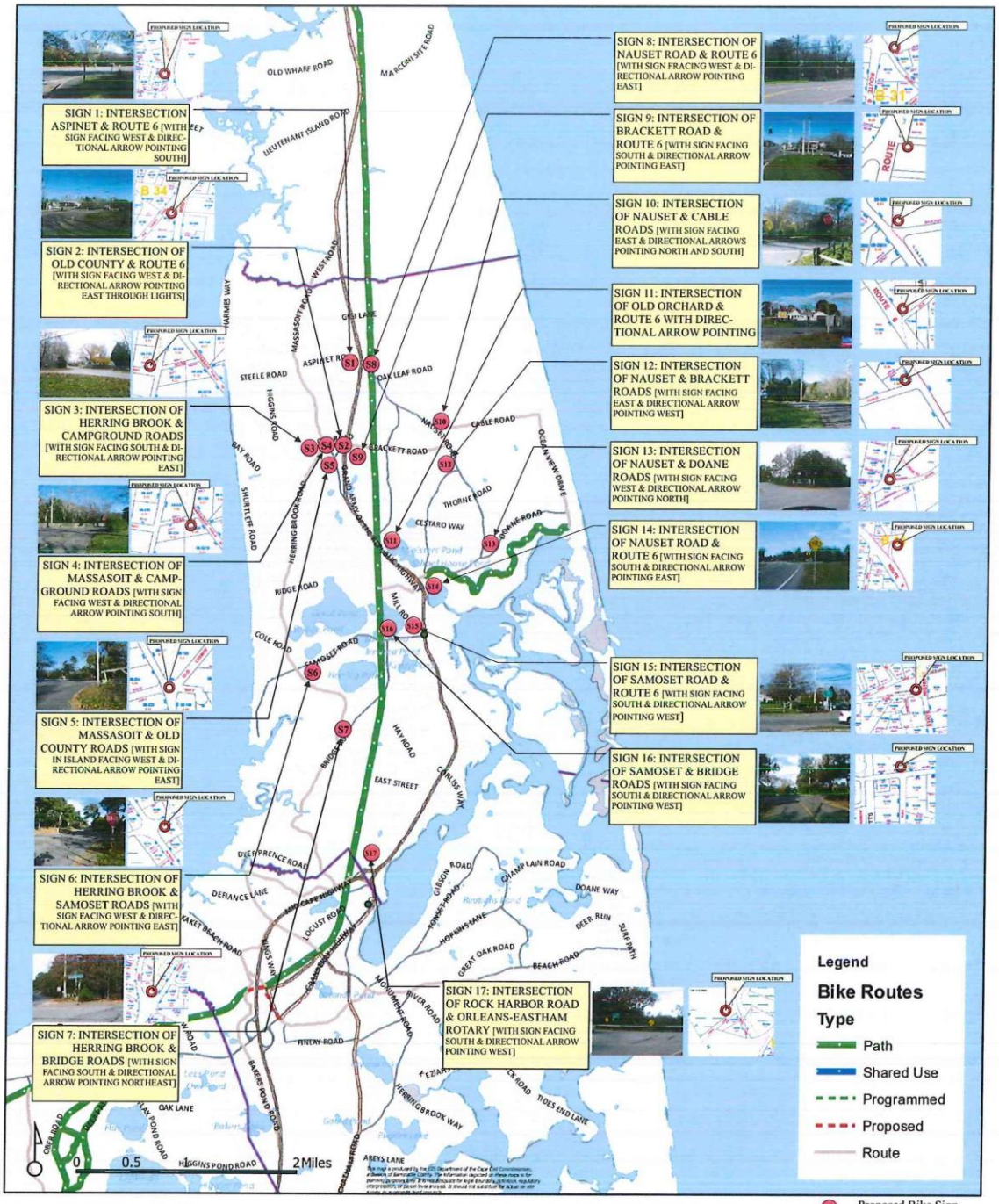
Safety on the Rail Trail

The Cape Cod Rail Trail ("the Bike Path") is a twenty-two mile path that begins at Route 134 in Dennis and ends at LeCount Hollow in Wellfleet, having traveled the entire length of Eastham. The trail follows the old Penn Central Railway tracks. Today the tracks are gone, but the convenience to all of Eastham is easily accessible. Just off the path, side trips offer ocean beaches and fishing piers, country stores and quaint villages, parks, picnic areas, and places to lodge and dine.

Safety issues are a 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. 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.

It is the goal of the Town and Eastham Bikeways Committee to help the Department of Conservation and Recreation improve the safety at bike tunnel which goes under Route 6 in Eastham on the Cape Cod Rail Trail that has long been known as a safety hazard.

During September 2104, it was announced that the tunnel would finally get some improvements. Jack Murray, state commissioner of the Department of Conservation and Recreation, and local officials visited the tunnel that goes under Route 6. A consultant was hired to look at safety and maintenance issues. The state has improved the tunnel's lighting, among other short-term measures.



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

Eastham Police Chief Edward Kulhawik said the commissioner recognizes that the long-term solution is to try to straighten out the section of bike path that leads to the tunnel. The goal is to identify land acquisitions adjacent the tunnel that may allow the tunnel to be straightened.

Community Survey Results

Over the last six years, the two community surveys were at the backbone of Eastham's community vision. The vision and goals recommended in this plan were derived from those meetings, workshops, and the results of public comments. The following broad goals reflect the interests and issues expressed by residents of Eastham, town boards and committees, and town departments.

The consensus goal still remains after all these years, "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."

B. 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

From the beginning 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. Provide open space and recreation opportunities to maintain Eastham's rural character: In order to preserve and enhance the available open space parcels, acquire and manage wildlife habitat, rehabilitate recreation facilities, increase recreational opportunities, and sustain the Towns' historic and cultural uniqueness.
2. Protection of the Town's Water Resources: In order to maintain an adequate supply of drinking water and preserve its good quality for the foreseeable future.
3. Enhance recreational opportunities appropriate and accessible to all ages: In order to meet the needs of residents and visitors by inventorying recreation resources to ensure universal access.
4. Protect and manage critical natural resources: In order to protect and enhance maritime interests, including public access, and safeguard fragile habitats.
5. Protect and Manage Wetlands Wildlife and Habitat: In order to prevent the loss of critical habitat and minimize the impact to wetlands and wildlife.

Sandy Meadow Trail

SECTION 7 Analysis of Open Space and Recreation Needs

Needs Analysis Summary

The recent Town Meeting votes to approve both a new library and a town-wide water system has now allowed the Town to address and act upon other priority resource and community needs.

Analysis of Town-owned open space and recreation resources, as well as public input reveals that the town needs to focus on land inventory assessments, needs to improve on the how we manage our open space and recreation facilities and the Town needs to increase universal accessibility of all types of open space for recreation.

It is also necessary that the Town continue to protect and preserve its historic and rural character.

Year-round and Part-time taxpayers need to continue to be attentive to ensure that future development does not impact our water quality, public access and transform our scenic views. The need to manage natural resources (especially recreational open space coastal areas) and preserve community character creates a need to acquire critical wildlife habitat and water recharge areas and to develop management policies that protect natural resources.

Eastham needs to conduct a comprehensive assessment of its current recreational resources and needs and

to identify priority strategies improving and protecting outdoor recreation facilities. There is always a need for additional recreation facilities for youths, in particular, but for all ages generally. There is a need to acquire additional land for fields and other active recreation opportunities.

We must look at undeveloped corridors of land that links among our current open spaces and future open space. Such links promote wildlife migration corridors (thus allowing greater biodiversity) as well as provide opportunities for passive recreation for humans. The demand for athletic facilities that are accessible to the handicapped will continue to be a priority. There is an increase in outdoor active recreation around town due to the increase of recreational user-groups, residents and visitors, walking our trails and road biking, as well as taking up Stand-Up Paddle boarding. Discussions have begun to consider the need to increase management policies for habitat protection, recreation safety, and figure out the absolute carrying capacities for each outdoor recreation facility.

It should be noted again, that active recreational programs have expanded significantly in recent years, and that a recreational consultant intends to conduct a comprehensive assessment of our current recreational resources and needs.

A. Summary of Resource Protection Needs

Recognizing Eastham's well-documented needs to protect natural resources, particularly water resources, and enhance active recreation opportunities in town, civic organizations like the Community Preservation Committee, Wastewater Management Committee and Open Space Committee have prioritized projects that serve these needs.

Collectively, most of our needs have been assessed and action plans suggested that will enable the Town of Eastham to protect town-owned land (ECLAP); to preserve our Heritage Landscape (Heritage Landscape Assessment Workshop); to clean-up our ponds (Action Plan for Town of Eastham Ponds); to rehabilitate existing recreation facilities (Active Recreation Plan) and how to best allocate CPA funds in the near future (Community Preservation Plan) to do everything need to protect the Town's resources.

A priority need for the Town is to conduct a series of comprehensive open space and recreation inventory assessments.

Protection of Public Water Supply

Eastham has three water supplies that have been permitted through the DEP New Source Approval process for the new Town of Eastham Water System (preliminarily under construction): District G, Nauset Regional High School (NRHS) and District H. All of these well fields are located on Town-owned land, and their locations are within the Cape Cod National Seashore Park boundaries.

District G and NRHS will be constructed as part of the water system that was authorized by Eastham's May 2014 Town Meeting. The third well field, District H well field will be constructed as part of a subsequent phase of the water system, should the Town choose to do so. These well fields 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. NRHS well field is located off Cable Road. The property lies within the boundaries of the Cape Cod National Seashore. District H lies in 120 acres of town-owned land.

Fortunately, most of the land within the contributing areas of drinking water wells are already town-owned parcels designated as open space, hence protected by Eastham's Water Resources Protection District designation.

Protect Town-Owned Open Space

Because the Town commissioned the Conservation Land Inventory and Analysis and because private lands with conservation restrictions and lands owned by land trusts are considered protected "In Perpetuity", the Town of Eastham needs to focus on strategies they can implement to improve the protection of its current landholdings and increase the protection on Eastham land in general.

Based on the analysis of conservation lands in Eastham, the Open Space Committee should to determine whether the four town-owned parcels not subject to the MA Article 97 Land Disposition Policy should be pursued as conservation lands. The Open Space Committee also needs to clarify the custodial jurisdiction for nine town-owned parcels where the manager was not specified or could not be inferred.

Protection of Marine and Fresh Surface Water Bodies

Keeping in mind the connection between water and wastewater issues, the town's Wastewater Management Committee have been meeting and operating jointly since 2005. The thorough merging of these committees has been adopted and is imminent. With respect to commercial point sources of contamination, stringent measures to guard against leakages from gasoline storage tanks are already mandated by law and are rigorously enforced by the town. A regulation issued by the Board of Health in 2001 seeks to protect Environmentally Sensitive Areas (ESAs) (such as areas near marshlands, surface waters, tidal flats, etc.) by restricting the issuance of variances from septage disposal regulations in these locations. Significantly, areas where clusters of small lots (less than 20,000 square feet) exist are defined as environmentally sensitive. Freshwater ponds serve as a window on our drinking water supply. At the same time, our ponds provide opportunities for recreational activities. Careful monitoring of these resources is imperative to protect against accelerated eutrophication and disruption of the normal aquatic processes. Impacts of the residential population on groundwater are transmitted to the ponds, a situation which calls for vigilance and increased attention to the mitigation of non-point contributions of contamination to groundwater.

Eastham's ponds are annually monitored since 2002 by a group of volunteers (Pond Stewards) who collect samples at regular intervals for the measurement of nutrient. Freshwater ponds and marine beaches are tested weekly in the summers season for bathing water quality and that information can be found in The Marine and Freshwater Beach Testing in Massachusetts Annual Report (2009 Season). Preliminary evaluation of the accumulated data revealed all of the nine tested ponds to be impacted to varying degrees. This ongoing program is anticipated to provide guidance for preventative and remedial measures that will improve the condition of the ponds. For more information about Eastham's freshwater wetlands, see the Wetlands, Wildlife, and Habitat chapter of this plan. In 2011 the Town hired consultants to evaluate an action plan for eleven ponds and develop a remediation strategy for two ponds that will result in permit applications to proceed with treatment options. **(See Section V…Water Ponds Action Plan 2012)**

The Department of Natural Resources works to support sensitive shellfish habitats and marsh grass beds. Protection of coastal estuaries is a key environmental issue in Eastham. With sea-level rise and global warming, predicting the water quality changes will result from higher and lower tidal flow, increased temperatures and wind conditions, and land use management decisions. Increased monitoring of the Town's sand flats and wetlands where shellfish live and much of the finfish population in the surrounding ocean originates will remain a priority need in order to protect our historic fishing traditions.

Habitat Protection - Wetlands

Wetlands in Eastham are a top priority to protect, both freshwater wetland and salt marsh vegetation. The Town is fortunate to have extensive wetlands on both the Atlantic Ocean side and on Cape Cod Bay. 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 outstandingly good feeding and nesting cover for songbirds and small mammals. Eastham is a habitat for over 30 endangered, threatened or special concern species of plants and animals. These include the Piping Plover, the Diamond-backed Terrapin, the Eastern Box Turtle and the Broom Crowberry plant.

Eastham also has vernal pools and great ponds. The Town has a wetland protection policy (based upon 310 CMR 10.00: Wetlands Protection Act and Eastham Wetlands By-Laws) of monitoring and protecting these resources. The ponds are regularly tested to determine if action needs to be taken to prevent their deterioration. These wetlands provide many benefits to the residents and visitors including flood control, water filtration, recreation, and wildlife habitat. Town of Eastham's Department of Natural Resources continues to patrol for wetland violations and the Town's Conservation Commission issues stringent conditions on projects near wetlands to protect the buffer areas.

Sea level rise and its effect on the wetlands should continue to be mapped. Stephen M. Smith, Ph.D., Plant Ecologist in the National Park Service at Cape Cod National Seashore, has been mapping marsh vegetation on the Outer Cape for over a decade. Sharing his findings with the Town's Natural Resource Department, in "Sea Level Rise and Vegetation" it is evident and documented that sea level rise is affecting marsh vegetation, causing dieback, and impeding growth. With this baseline of data, wetlands and vernal pools should continue to be mapped, identified, and protected so as to maintain their ability to provide natural functions.

Habitat Protection – Forests

Eastham's original forest was stripped in the early years of the area's settlement. Today the majority habitat is successional forests and extensive heathlands. The most abundant tree is – as it is on most of Cape Cod – is the pitch pine, a species highly adapted to the Cape's well-drained sandy soil. When not set back periodically by a natural disturbance, such as fire, pitch pines will slowly dominate the landscape, casting shade on smaller trees and shrubs. If pitch pines continue to shade out and kill scrub oak, an area will gradually transition from being shrubland into forest. Today, more forest cloaks Eastham than at any other time since European settlement.

Similar to the need to map the wetlands and vernal pools, the Town needs to develop a review process for activities in critical plant and wildlife habitats, including forests, identifying those that could be adversely impacted as well as those threatened by development. The map developed for the analysis should be used to develop strategies to address identified threats to our forests and wetlands.

B. Summary of Community Needs

Protect Town Drinking Water

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.

Cultural and Historical Resources Protection

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 Local Historical Commission or other agency referral to the Cape Cod Commission for review.

Scenic Vista bylaws are useful for limiting the impact of development on scenic views that have been identified by the town. Scenic vistas are often considered heritage landscapes and may encompass natural, cultural, and historic feature that are important to Eastham residents.

Establish a working waterfront overlay zone at Collins Landing. An overlay zone is a separate zoning district, applied over current zoning, which can be written to include special criteria that protects traditional development and landscape patterns and uses. As suggested by Eastham's Local Comprehensive Plan, a working waterfront overlay established in the area of Collins Landing would promote the traditional maritime uses of the area. The Local Comprehensive Plan also suggest including provisions for boat preservation and limited construction of new buildings (with specific maritime uses0 in the overlay zone.

Public Rights along the Shoreline

Conflicts between the private and public use of coastal area beaches during low tide have arisen in Eastham. In one case, a property owner placed restrictions on beach walking.

In an article published on the EEA website "Who owns the sea and shore?"

"Tideland is the legal term for all land beneath the waters of the ocean, including lands that are always submerged as well as those in the intertidal area (i.e., between the high and low tide marks). In every coastal state, the use of tidelands is governed by a concept in property law known as the Public Trust Doctrine, which dates back centuries to ancient Roman law. The doctrine states that all rights in tidelands and the water itself are held by the state "in trust" for the benefit of the public. In most states, this means

that public ownership begins at the high water mark.

The Massachusetts Bay Colony originally followed this rule, until its legislators decided to transfer ownership of certain tidelands to coastal landowners, in order to encourage private wharf construction on these so-called "intertidal flats." This general land grant was accomplished by the Colonial Ordinances of 1641-47, which in effect moved the line between public and private property to the low water mark, but not farther seaward of the high water mark than "100 rods," or 1,650 feet. This intertidal area (now called "private tidelands") is presumed to belong to the upland property owner, unless legal documentation proves otherwise for a given parcel (as is true in certain segments of Eastham, for example).

Although the Colonial Ordinance changed the ownership of most intertidal flats from public to private, it did not transfer all property rights originally held in trust by the state. For one thing, no rights to the water itself (as distinct from the underlying lands) were relinquished by the Ordinance. Moreover, the law specifically reserved for the public the right to continue to use private tidelands for three purposes-fishing, fowling, and navigation.

Scope of Public and Private Rights along the Shoreline

Over the years, Massachusetts courts have ruled that the scope of activities on private tidelands covered by the reserved public rights of fishing, fowling, and navigation is broad, and includes all of their "natural derivatives." For example:

> The right to fish includes the right to seek or take any fish, shellfish, or floating marine plants, from a vessel or on foot;
>
> The right to navigate includes the right to conduct any activity involving the movement of a boat, vessel, float, or other watercraft, as well as the transport of people and materials and related loading and unloading activity; and
>
> The right to fowl includes the right to hunt birds for sport as well as sustenance. (The Massachusetts Attorney General takes the position that the right of fowling also includes other ways that birds can be "used," such as birdwatching, but also notes that this issue has not yet been addressed by the courts.)

Clearly, these rights cover a variety of both old and new activities that many people enjoy, such as surfcasting and windsurfing. Still, the courts have imposed some limits. The right of fishing, for example, does not allow the use of structures for aquaculture or the taking of plant debris washed up on the beach. Also, courts have made it clear that the public right to use this area does not include the right to simply stroll, sunbathe, or otherwise engage in recreation unrelated to fishing, fowling, or navigation. Without permission from the landowner, such general recreation is trespassing. There is only one narrow exception to this rule-because there are no private property rights in the water itself, the public is allowed to swim in the intertidal zone provided the swimmer does not touch the private land underneath or use it to enter or leave the water.”

Need to Respect Rights along the Coast

“The distinction between public and private rights of others-private property rights as well as public access and use rights-is an important part of visiting the coast. To prevent infringements on everyone's

rights, it may be helpful to follow these guidelines. To help keep the peace, the visiting public should be careful not to trespass or otherwise infringe on the privacy of shorefront property owners, and should minimize their impact on the environment. Likewise, in posting signs and taking other steps to identify their private property, coastal landowners should not attempt to discourage the public from using the water's edge to the full extent allowable by law. In short, mutual respect is the key to meaningful coastal access for everyone." (Coastal Zone Management 2005)

To eliminate conflicts between property owners and the public, easements for public use should be established and clearly marked between high and low watermarks, as suggested in the Local Comprehensive Plan. It's not that easy, and the management of private and pubic rights along the shoreline is even more difficult to explain to locals and visitors.

Current and Future Demand for Open Space and Recreational Opportunities

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.

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 parcels 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.

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 Trial 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."*

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.

Cape Cod Pathways

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. This network, when complete will extend from Provincetown to Falmouth and Bourne and provide a connection between the seashore and the Cape's wooded areas and villages.

Need for Recreation Assessment

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 because there is no 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 Town also needs to conduct a comprehensive assessment of recreation facilities which will dovetail with the need to produce and publish an ADA self-evaluation and Inventory Assessment.

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 located 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. 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.

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.

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.

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.

SCORP - Need to Increase All Types of Trails

Massachusetts Statewide Comprehensive Outdoor Recreation Plan 2012 (SCORP) is a comprehensive plan for Massachusetts outdoor recreation. Outdoor recreation, broadly defined, is any leisure time activity conducted outdoors. Within the vast range of such a definition, Eastham opportunities for possible activities can generally be subdivided into "resource-based" and "user-oriented" recreation. Resource-based outdoor recreation is dependent on a particular element or combination of elements in the natural and cultural environments that cannot be easily duplicated by man. In contrast, user-oriented recreation can generally be provided anywhere, assuming the availability of space and funds for development.

The Town of Eastham OSRP provides a narrowed down list of outdoor recreation activities that are commonly provided on Eastham's conservation lands. For the purpose of planning outdoor recreation, some commonly identified activities are walking, birding, beachcombing, visiting historic sites, and more active recreation activities are swimming, tennis, fishing, boating, clamming and biking.

The following two proposed projects (a Fitness Trail designed and built in one of Eastham's Open Space areas and a Water Trail developed within Nauset Marsh and Town Cove) are in keeping with the SCORP goals, the goals of America's Great Outdoors (AGO) and Cape Cod National Seashore (part of the National Park Service).

SCORP – Need to Create a Fitness Trail

A fitness trail (FitTrail) is an attractive and useful community amenity designed to encourage people of all ages to get outdoors, get onto town-owned open space, to exercise, stretch, and strengthen the user's personal fitness. The FitTrail combines scientifically designed exercises with walking, jogging or running to provide a well-balanced physical fitness routine for the entire body. Individual exercise stations with apparatus are spaced along a walking trail. The user proceeds from one exercise station to the next and performs the exercises illustrated at each station.

The trail will be fully illustrated and the user can progress at their own pace around the perimeter and interior of the open space property.

SCORP – Need to Create the Nauset Water Trail

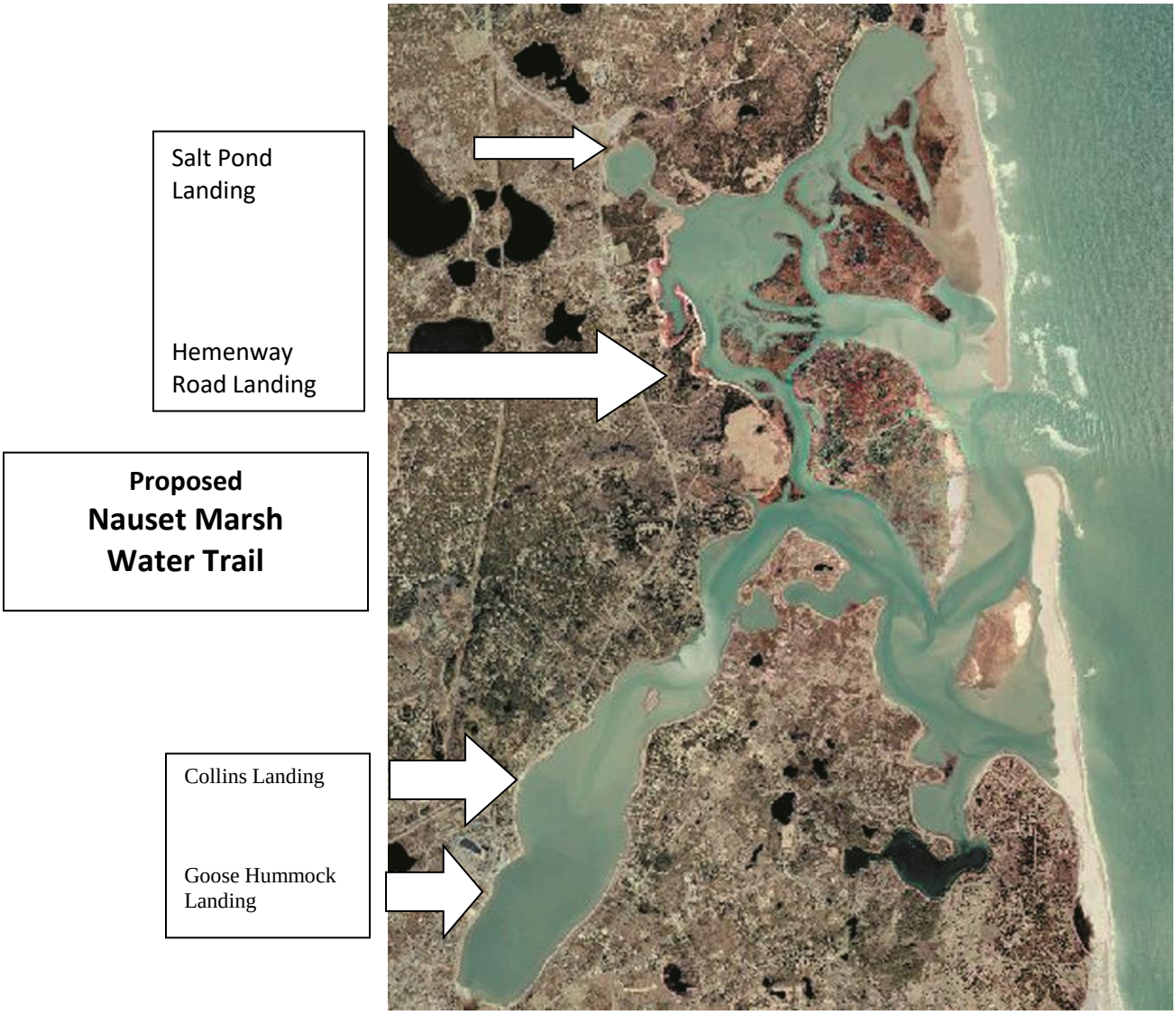
Water trails foster self-discovery, they build skills, teach nature and history, and the serve the public interest by acting as a passive management tool. The purpose of the Nauset Marsh Water Trail is to ensure a sustainable future for the wildlife, marsh, waterways, landings, and the adjacent shorelines.

The Nauset Water Trail is an encompassing concept. It integrates active and passive recreation, with a focus on stewardship, within the boundaries of the Cape Cod National Seashore, and along the shores of Eastham. A water trail invites the paddler or small boat operator to connect with trailside plants, animals, fish and birds.

An accompanying water trail guide is a resource for educating and informing paddlers and small boat operators and to promote respectful, low impact us, including respect for private property and etiquette at town landings. The guide provides a map showing the network of marsh channels, the directions and distance between Salt Pond Town Landing, Hemenway Road Town Landing, Collins Landing, and Goose Hummock Landing. The trail is 3.5 miles taking the shortest trail from Salt Pond to Goose Hummock, and along the way each landing has parking for motorized vehicles, Salt Pond, Hemenway, and Goose Landing have sanitation facilities.

A municipal water trail is comprised of a number of public landings (facilities) including a safe place to put in, parking for motorized vehicles, sanitation facilities, a safe place to take out.

Eastham has an opportunity to call itself a “Trail Town”. A Trail Town is a destination along a trail, whether on a bike trail, water trail, or hiking trail. The Town needs to create a water trail where trail users can venture off the trail to enjoy the scenery and heritage of the nearby community with its own character and charm. It is a safe place where both town residents and trail users can walk, or bike, kayak or canoe and easily access both trail and town by foot or vehicle.



Much of Nauset Marsh's allure to paddlers comes from its natural beauty, the barrier beach, and its unique location within the Cape Cod National Seashore, on the backside of Cape Cod, that opens to the Atlantic Ocean through Nauset Inlet.

Two critical factors have been identified which pose a serious threat to long-term non-motorized boating access to Nauset Marsh. These factors are a rapid increase in participation in non-motorized boating on the Cape, and the lack of user management at the four town landings that offer access to the Nauset Marsh Estuary (Salt Pond, Hemenway, Collins, and Goose Hummock).
It is essential that any comprehensive vision for non-motorized boating management in Eastham proactively address Codes of Conduct in the parking lots, on and around the landing shorefront, and navigational rules of the road when on the water.

Objective 1: Develop water trail information standards.
Objective 2: Encourage the Safe and Low Impact Use at the landings and on the water.

There is a need to develop resources such as a Leave No Trace program; to develop a water trail code of ethics outlining simple universal principles of conduct when launching at a boat landing and include this

water trail code of ethics in brochures, feature a map at each town landing, and site signage.

A water trail is good for the economy. The Town can engage the Chamber of Commerce to work with hotels and inns, restaurants, and retailers to promote and help distribute code of ethics information for water recreation to non-motorized boaters.

It is good practice for all boaters to review existing "good boater" safety and user conduct information (e.g. materials from the American Canoe Association and Leave No Trace) and repackage these materials as a voluntary code of conduct for responsible water trails use (with emphasis on respecting the resource including the conduct at town landings that protects the marsh habitat. Include this voluntary code of conduct at all town landings including maps and site signage and Town of Eastham Nauset Marsh Water Trail Website. Inform non-motorized boaters where they can unload and load their kayak, canoe, or Stand-up Paddleboard without inflicting harm on the wetlands.

Beach and Recreation Department July 4th Parade Float

SECTION 8. GOALS AND OBJECTIVES

The following set of goals and objectives provide clear guidelines for Eastham's open space and recreation planning for the next seven years. They represent more specific, generally measurable, steps that can be taken to advance the open space and recreation goals.

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 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 seven years.

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

8.1 GOAL A: 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.

Objectives:

A-1 Complete a comprehensive review and inventory of existing town-owned properties.
A-2 Identify the best potential use of town owned land for conservation, for active, or passive recreation, and / or general use.
A-3 Develop land management plans for existing conservation lands.
A-4 Identify future open space purchases in accordance to the ongoing land acquisition program.
A-5 Investigate possible loops or connectors with existing biking and walking paths.
A-6 Protect and enhance natural and historic properties, including restoration of damaged or degraded resources.
A-7 Take advantage of Section 81U of the Subdivision Control Law to require open space set-asides within subdivision for future acquisition.
A-8 Continue to maintain and protect public access to both freshwater and saltwater bodies for recreation purposes.
A-9 Maintain Town-owned land within the Cape Cod National Seashore as open space.

8.2 GOAL B: Protection of the Town's Water Resources

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

Objectives

B-1 Delineate specific actions that will apply and benefit all ponds in Eastham.
B-2 Continue the Town's strong commitment to acquiring open space for the purpose of protecting future wellhead sites.
B-3 Maintain communication and coordination with neighboring town(s), which share the same aquifer lens.
B-4 Promote an educational Municipal Water Action Plan.
B-5 Reduce the use of fertilizers and pesticides.
B-6 Continue to actively encourage water conservation.
B-7 Continue freshwater pond sampling to monitor water quality.
B-8 Preserve and improve the ecological integrity of marine and fresh surface waters.
B-9 Continue the systematic and regular monitoring of the quality of Eastham's well water.
B-10 Work with relevant town departments and boards to develop mutually acceptable policies for boundary delineation and the citing of new subsurface disposal systems as well as improving and retrofitting areas with failing systems.

8.3 GOAL C: 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.

Objectives

C-1 Conduct a comprehensive assessment of current recreation resources and identify needs

C-2 Produce and publish an ADA Self-Evaluation and Inventory Assessment, with transition plan.

C-3 Continue to expand recreation programs to include all ages.

C-4 Rehabilitate existing active recreation facilities including school facilities, Wiley Park, and Field of Dreams.

C-5 Create a new town park that includes multiple facilities and recreation opportunities, including a town garden, fitness track, and bocci court.

8.4 Goal D: 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.

Objectives

D-1 Designate Collins Landing a working waterfront overlay zone.

D-2 Continue to Implement the Rock Harbor Marina Improvement Management Plan:

1. Dredge Rock Harbor and maintain the channel.
2. Increase the capacity for additional boat slips, improvements to infrastructure and increase revenue generation.
3. Ensure No Discharge Zones for boats meet Federal and State Guidelines.
4. Build a pump out station to eliminate marine head waste.

D-3 Update List of Public Access points to ocean, bay, marsh and pond shorelines.

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

D-4 Encourage 'soft' solutions to coastal erosion revetment.

1. Continue to require annual beach nourishment as a condition of revetment maintenance.
2. Continue to require conditional permits to install, maintain,, and a build revetment.

D-5 Expand the shellfish propagation program for both recreational and commercial areas.

1. Evaluate the aquatic predatory control plan.

D-6 Identify and cleanup point source discharges of storm water runoff.

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

D-7 Develop and Implement a management plan for Hemenway Road Landing.

8-5 GOAL E: Protect and Manage Wetlands Wildlife and Plant Habitat

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

Objectives

E-1 Document growth impacts upon wetland areas.

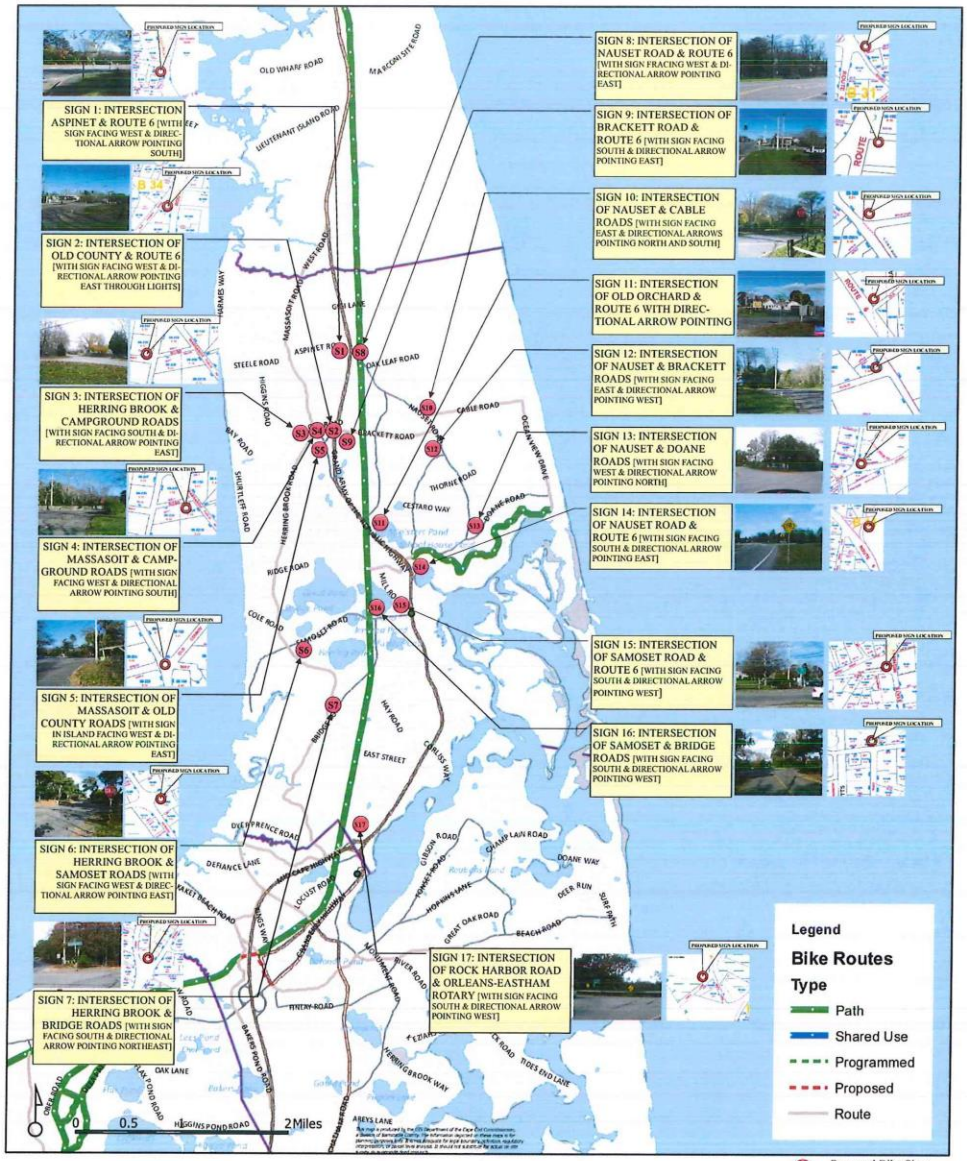
1. Restrict development or increases in use in environmentally sensitive near shore areas and limit septic impact development.

E-2 Document potential growth impacts upon wildlife and plant habitat areas

E-3 Continue to monitor the Wetlands Action Plan:

1. Identify, map and protect wetlands and vernal pools

2. Continue to enforce the Eastham Wetlands Bylaw in conjunction with the Massachusetts Wetlands Protection Act Regulations 310 CMR 10.00.
3. Conduct an analysis to assess potential growth impacts to wetland areas, identifying those that are protected as well as those threatened by development.
4. Develop and implement plans to address storm water management problems.
5. Continue to seek ways to remediate tidal restrictions.


SIGN 1: INTERSECTION ASPINET & ROUTE 6 [WITH SIGN FACING WEST & DIRECTIONAL ARROW POINTING SOUTH]
SIGN 2: INTERSECTION OF OLD COUNTY & ROUTE 6 [WITH SIGN FACING WEST & DIRECTIONAL ARROW POINTING EAST THROUGH LIGHTS]
SIGN 3: INTERSECTION OF HERRING BROOK & CAMPGROUND ROADS [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING EAST]
SIGN 4: INTERSECTION OF MASSASOIT & CAMPGROUND ROADS [WITH SIGN FACING WEST & DIRECTIONAL ARROW POINTING SOUTH]
SIGN 5: INTERSECTION OF MASSASOIT & OLD COUNTY ROADS [WITH SIGN IN ISLAND FACING WEST & DIRECTIONAL ARROW POINTING EAST]
SIGN 6: INTERSECTION OF HERRING BROOK & SAMOSET ROADS [WITH SIGN FACING WEST & DIRECTIONAL ARROW POINTING EAST]
SIGN 7: INTERSECTION OF HERRING BROOK & BRIDGE ROADS [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING NORTHEAST]
SIGN 8: INTERSECTION OF NAUSET ROAD & ROUTE 6 [WITH SIGN FRACING WEST & DIRECTIONAL ARROW POINTING EAST]
SIGN 9: INTERSECTION OF BRACKETT ROAD & ROUTE 6 [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING EAST]
SIGN 10: INTERSECTION OF NAUSET & CABLE ROADS [WITH SIGN FACING EAST & DIRECTIONAL ARROWS POINTING NORTH AND SOUTH]
SIGN 11: INTERSECTION OF OLD ORCHARD & ROUTE 6 WITH DIRECTIONAL ARROW POINTING
SIGN 12: INTERSECTION OF NAUSET & BRACKETT ROADS [WITH SIGN FACING EAST & DIRECTIONAL ARROW POINTING WEST]
SIGN 13: INTERSECTION OF NAUSET & DOANE ROADS [WITH SIGN FACING WEST & DIRECTIONAL ARROW POINTING NORTH]
SIGN 14: INTERSECTION OF NAUSET ROAD & ROUTE 6 [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING EAST]
SIGN 15: INTERSECTION OF SAMOSET ROAD & ROUTE 6 [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING WEST]
SIGN 16: INTERSECTION OF SAMOSET & BRIDGE ROADS [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING WEST]
SIGN 17: INTERSECTION OF ROCK HARBOR ROAD & ORLEANS-EASTHAM ROTARY [WITH SIGN FACING SOUTH & DIRECTIONAL ARROW POINTING WEST]
Legend
Bike Routes
Type
Path
Shared Use
Programmed
Proposed
Route
0 0.5 2 Miles
Proposed Bike Sign Location
Proposed Bike Sign Design
BIKE ROUTE
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

SECTION 9. SEVEN YEAR ACTION PLAN

This Action Plan is intended to guide future planning efforts to protect natural resources, acquire open space and improve recreational opportunities for the Town of Eastham. The following plan is designed to implement the goals and objectives outlined in Section 8 and to address the needs identified in Section 7.

As mentioned in Section 2 - Introduction, the Action Plan is consistent with the Town's Local Comprehensive Plan, the Community Preservation Plan FY15-19, the Cape Cod Regional Policy Plan, the Massachusetts Statewide Comprehensive Outdoor Recreation Plan 2012, the Water System Plan, the Freshwater Ponds Water Quality Reports and the Cape Cod Commissions Heritage Landscape Report.

The following chart lists the Goals and Objectives from the preceding section in a format that identifies the recommended lead department or organization (first listed) for each objective, other departments and organizations which may need to be involved, potential funding sources, and a general priority and schedule during which each objective should be implemented or acted upon.

For each of the action items, ON (ongoing) means the action item is continually implemented. UN (undertaken) means the action item is under development to be completed between 2014 and 2022. TBD (to be determined) means the action plan will be initiated before 2022.

Responsible Board(s) / Agent

BOS – Board of Selectmen	DPW – Department of Public Works
NatRes – Department of Natural Resources	HIST – Historical Commission
BRD – Recreation and Beach Department	FinCom – Finance Committee
PlanBD– Planning Board	WMC - Water Management Committee
Building – Building Inspector	BOH – Board of Health
OS – Open Space Committee	ConsCom – Conservation Commission
CCT – CC Compact of Conservation Trusts	ECF – Eastham Conservation Foundation
CPA– Community Preservation Act	OB – Town Operating Budget

Key to Estimated Scheduling Priorities:

A – Most Important
B – Very Important
C – Important

Implementation Status:

ON - Ongoing
TBD – To Be Determined
UN - Undertaken

Public outreach through the Town's Public Access Television, the internet, the Town's website and public education brochures and pamphlets is an integral component to the success of many of the goals, objectives, and action items. It is also essential that information is easily accessible at public meetings and that public meetings continue to be videoed and placed on the Town's website for video-on-demand viewing.

Town of Eastham Open Space and Recreation Plan

Seven-Year Action Plan

Goal A: PROVIDE OPEN SPACE AND RECREATION OPPORTUNITIES TO MAINTAIN EASTHAM'S RURAL CHARACTER

Action Plan	*Department*	*Fund Source*	*Priority and Schedule*
A-1 Complete a comprehensive review and inventory of existing town-owned properties and document protections or lack thereof, on town owned properties	OS/ConsCom/BRD NatRes	OB / Grants	A – ON 2012-2015
A-2 Identify the best potential use of town-owned land for conservation, for active or passive recreation, and / or general use	OS / ConsCom / BRD/ Planning Board / NatRes	OB / CPA	A – ON 2012-2016
A-3 Develop land-use management plans for existing conservation lands	NatRes / ConsCom	OB	B – ON 2003-2015
A-4 Identify future open space purchases in accordance to the ongoing land acquisition to the ongoing land acquisition program	OS/ ConsCom / NatRes	OB	A – ON 2014-2022
A-5 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	OS/ ConsCom / Assessors / NatRes / CCT / ECF	OB	B - UN 2015
A-6 Investigate possible loops or connectors with existing recreation trails	OS / Assessors / NatRes	OB	C – UN 2013-2022
A-7 Protect and enhance natural and historic properties, including restoration of damaged or degraded resources	OS / Hist / Assessors / NatRes	OB / CPA	C – UN 2014-2022
A-8 Take advantage of Section 81U of the Subdivision Control Law to require open space set-asides with subdivision for future acquisitions	Build / OS / NatRes Assessors / PlanBd	OB	C – UN 2014-2022
A-9 Continue to maintain and protect public access to both freshwater and saltwater bodies for recreation purpose	OS / ConCom / NatRes	OB	A – On 2014-2022

A-10 Maintain Town-owned land with Cape Cod National Seashore as open space	OS / NatRes	OB	C – UN 2014-2022

GOAL B: PROTECTION OF WATER RESOURCES

Action	***Department***	***Fund Source***	***Time Frame***
B-1 Delineate specific actions that will apply and benefit all ponds in Eastham	BOH / ConsCom / WMC	OB / Grants	A – UN 2014 - 2021
B-2 Continue the Town's strong commitment to acquiring open space for the purpose of protecting future wellhead sites	OS/ ConsCom / BoS CCT / ECF	Grants	B – ON 2014 - 2021
B-3 Maintain communications and coordination with neighboring town(s) which share the Lower Cape Cod's aquifers	BOH / ConsCom / WMC	OB	B – ON 2014 - 2021
B-4 Promote an educational Municipal Water Action Plan	WMC / BOH	Grants	A – UN 2014 - 2021
B-5 Reduce the use of fertilizers and pesticides	BOH / WMC / ConsCom	Grants	A – UN 2014 - 2021
B-6 Continue to actively encourage water conservation	BOH / WMC	OB / Grants	B – UN 2014 - 2021
B-7 Continue freshwater pond sampling to monitor water quality	BOH / WMC	OB / CPA	A – UN / ON 2014 - 2021
B-8 Preserve and improve the ecological integrity of marine and fresh surface waters.	BOH / WMC / ConsCom	OB / Grants	A – UN / ON 2014 - 2021
B-9 Continue the systematic and regular monitoring of the quality of Eastham's well water	Board of Health / DPW	OB	A – UN / ON 2014 - 2021
B-10 Continue protection of potential sites for municipal water supply wells and their zones of contribution	ConsCom / OS / DPW / BOH	OB / Grants	A – UN / ON 2014 - 2021
B-11 Ensure protection of fresh water wetlands and ponds and ponds from storm water discharges	DPW / BOH / ConsCom	OB / Grants	A – UN / ON 2014 - 2021
B-12 Work with relevant town departments and boards to develop mutually acceptable policies for boundary delineation and the citing of new subsurface disposal systems as well as improving and retrofitting areas with failing systems	BoS / BOH / ConsCom	OB	B – UN / ON 2014 - 2021

GOAL C: ENHANCE RECREATIONAL OPPORTUNITIES APPROPRIATE AND ACCESSIBLE TO ALL AGES

Action	*Department*	*Fund Source*	*Priority & Schedule*
C-1 Conduct a comprehensive assessment of current facilities of current resources and identify needs	CPC / BRD / OS / Hist / NatRes	OB / CPA	A – UN / TBD 2015 - 2016
C-2 Produce and publish an ADA self-evaluation and Inventory Assessment	BRD / NatRes	OB / Grants	A – TBD 2015 - 2016
C-3 Evaluate the need for a youth center / community facility	BRD / CPC / BOS	OB / Grants	B – TBD 2017 - 2021
C-4 Continue to expand recreation programs to include all ages.	BRD	OB / Grants	A – ON 2014 - 2021
C-5 Rehabilitate existing active recreation facilities including school facilities, Wiley Park, and Field of Dreams.	BRD / DPW / BOS	OB / Grants	A – TBD 2015 - 2017
C-6 Create a new town park that includes multiple facilities and recreation opportunities, including a town garden, fitness track, and bocci court.	OS / ConsCom/ NatRes/ DPW	OB / CPA	B – TBD 2016 - 2018
C-7 Improve accessibility and protect habitat at Sandy Meadows, including trail improvements for improved handicapped accessibility	OS / NatRes / DPW	CPA / OB	A – UN 2014-2015
C-8 Protect areas containing cultural / historic features that have outstanding or unique value because of their inherent rarity and cultural / historical significance	Hist / ConsCom/ Natural Resources	OB / Grants	C – ON 2014 - 2021
C-9 Increase the availability of all types of trails	OS / BOS / NatRes	OB / Grants	B – TBD 2015 - 2017

GOAL D: PROTECT AND MANAGE CRITICAL NATURAL RESOURCES

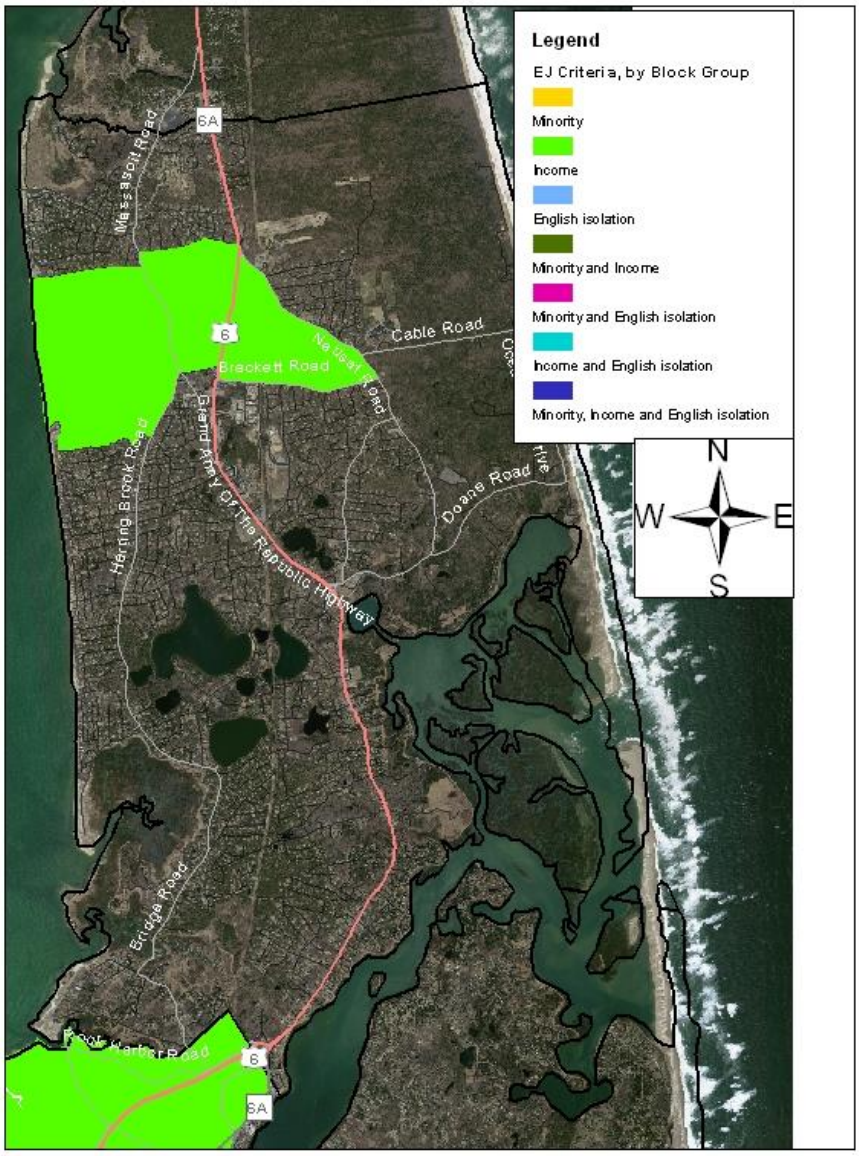
Action	*Department*	*Funding Source*	*Priority and Schedule*
D-1 Designate Collins Landing a working waterfront overlay zone	BoS/ ConsCom / OS / NatRes	OB	B – TBD FY 2016

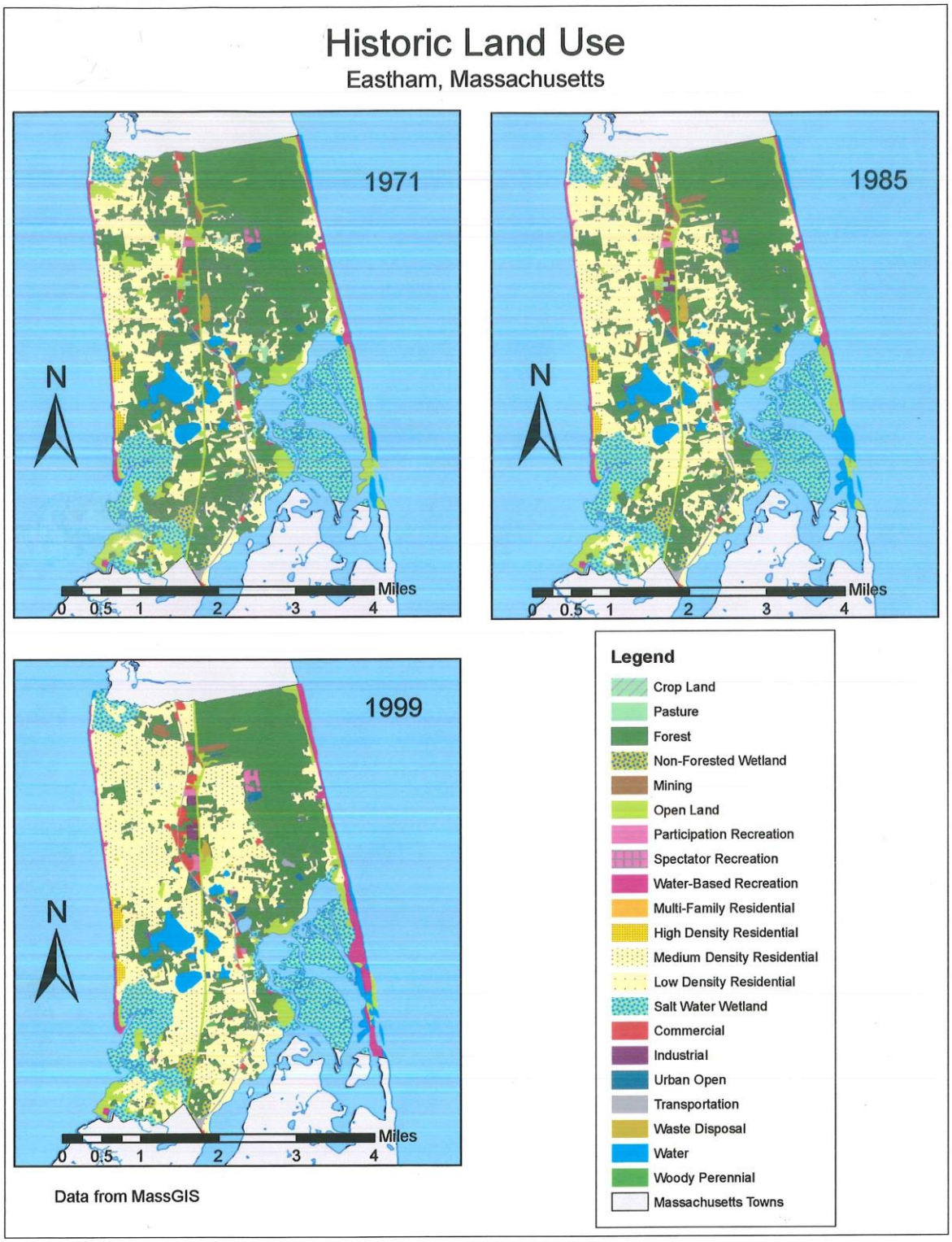
D-2 Continue to implement the Rock Harbor Marina Improvement Management Plan	DPW / BoS/ ConsCom	OB / Grants	A – Dredging UN A - ON 2014 - 2021
D-3 Update List of Public Access points to ocean, bay, marsh, and pond shorelines	ConsCom / OS / NatRes / DPW	Grants	B – UN 2014 - 2016
D-4 Encourage "Soft" solutions to coastal erosion reveting	ConsCom	OB	A – ON 2014 – 2021
D-5 Expand the shellfish propagation program for both recreation and commercial areas	NatRes	OB /Grants	C – ON 2014 - 2014
D-6 Identify and cleanup point source discharges of storm water runoff	BOH / DPW / ConsCom / WMC	OB / Grants	A – ON 2014 - 2012
D-7 Develop and Implement a management plan for Hemenway Road Landing	Bos / ConCom / NatRes	OB / Grants	C- TBD 2015 – 2016

GOAL E: PROTECT AND MANAGE WETLANDS WILDLIFE AND PLANT HABITAT

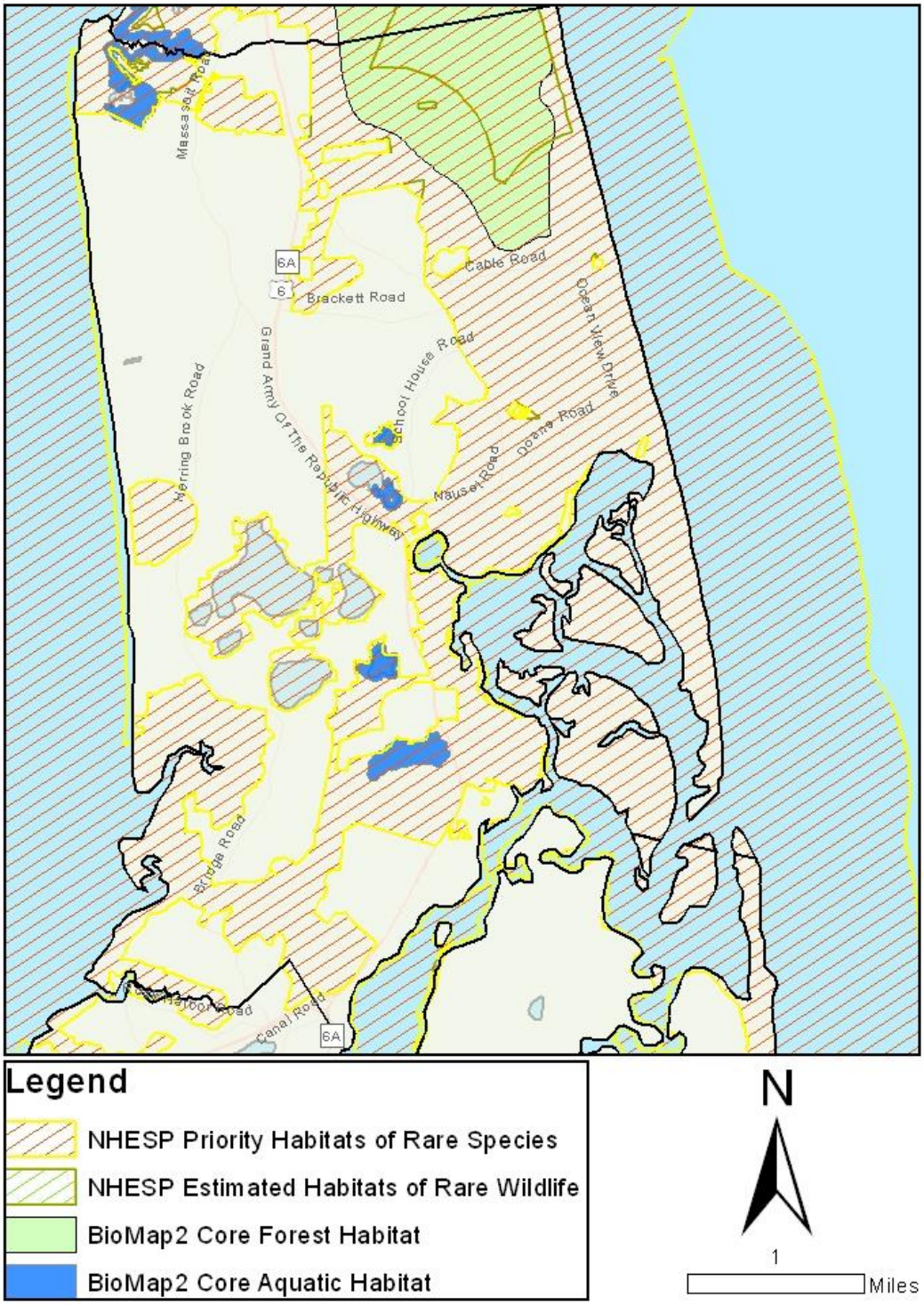
Action	*Department*	*Funding Source*	*Priority and Schedule*
E-1 Document growth impacts upon wetlands areas	NatRes / ConsCom /	OB	A – ON 2014 - 2021
E-2 Document potential growth impacts upon wildlife and plant habitat areas	Conservation/ Board of Health / Natural Resources	OB	A – ON 2014 - 2021
E-3 Continue to monitor the Wetlands Action Plan	ConsCom / NatRes	OB / Grants	A – ON 2014 - 2021

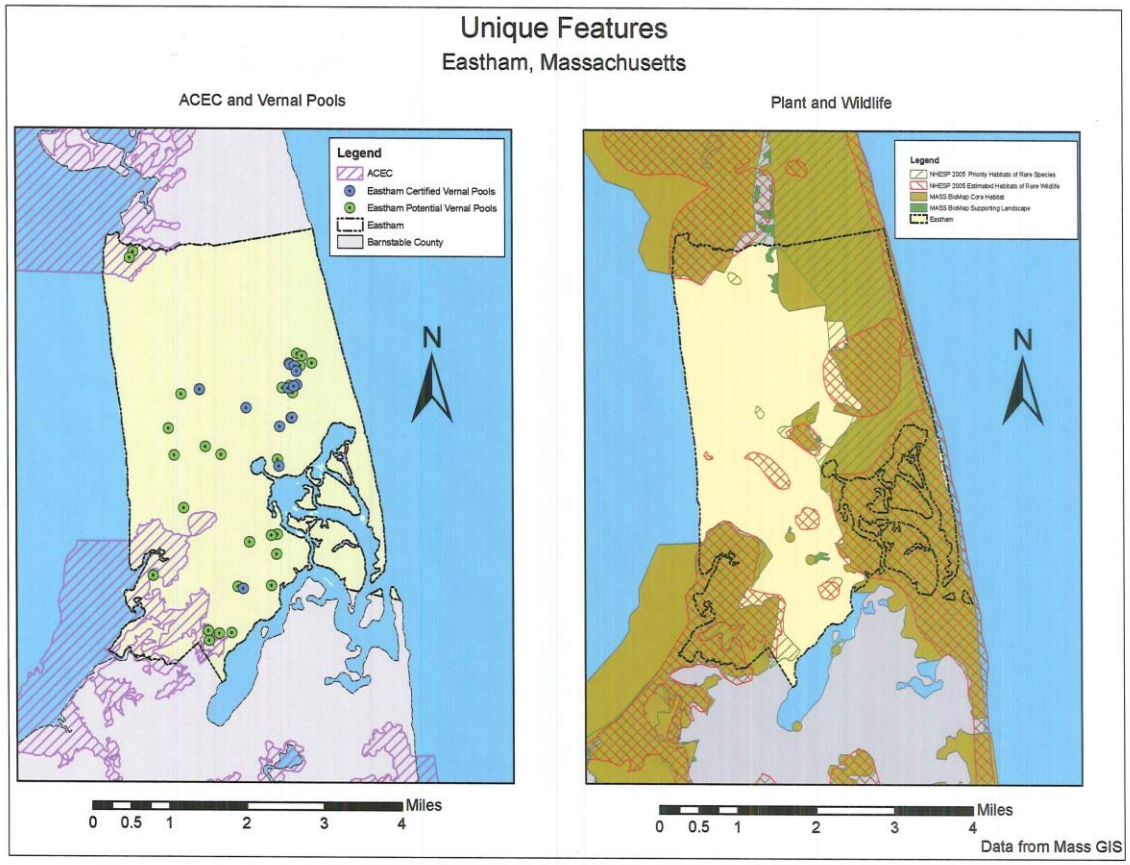
Environmental Justice Populations




Historic Land Use
Eastham, Massachusetts
1971
1985
1999
N
Miles
0 0.5 1 2 3 4
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
Data from MassGIS

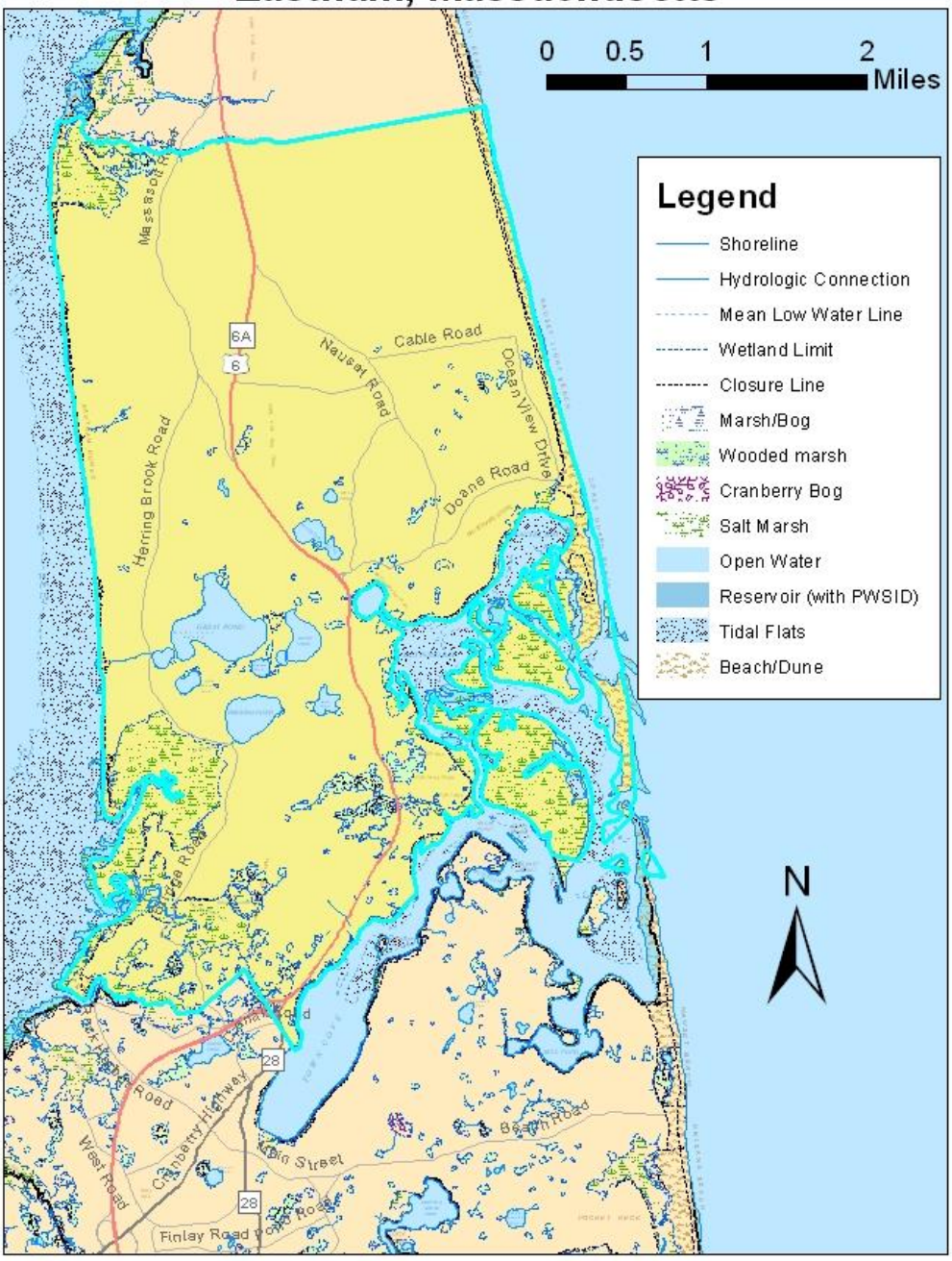
Eastham Endangered Species Habitat




Unique Features
Eastham, Massachusetts
ACEC and Vernal Pools
Legend
ACEC
Eastham Certified Vernal Pools
Eastham Potential Vernal Pools
Eastham
Barnstable County
N
Miles
0 0.5 1 2 3 4
Plant and Wildlife
Legend
NHESP 2005 Priority Habitats of Rare Species
NHESP 2005 Estimated Habitats of Rare Wildlife
MASS BioMap Core Habitat
MASS BioMap Supporting Landscape
Eastham
N
Miles
0 0.5 1 2 3 4
Data from Mass GIS

Town of Wellfleet
District G Well
District G Tank
NRHS Well
District H Wells & Tank
Atlantic Ocean
Cape Cod Bay
Nauset Bay
Salt Pond
Great Pond
Depot Pond
Salt Pond Bay
Herring Pond
Town of Orleans
Legend
Phases IA and IB
Phase II
Phase III
Phase IV
Phase V
Phase VI
Water Distribution System Development
All Phases
Eastham, Massachusetts
Environmental Partners
February 2013

Water Resources
Surface Water and Wetlands
Eastham, Massachusetts



Data from MassGIS

APPENDIX A: ADA ACCESS SELF-EVALUATION

The three parts of the required, self-evaluation provide an outline of how accessible the Town's conservation and recreation properties and programs are to people with disabilities.

The Town of Eastham recognizes the necessity of complying with the Americans with Disabilities Act in order to properly serve all of its citizens, employees, and customers. Town staff are attuned to the requirements of ADA, and staff members take an active role in ensuring the Town's compliance. In addition, the Town of Eastham seeks and welcomes technical assistance and guidance from relevant agencies such as the Massachusetts Office on Disability and the Architectural Access Board.

Administrative Requirements: The Town of Eastham designates the Building Inspector as the ADA Coordinator. The Town of Eastham officially designates the Inspector of Buildings as the ADA Coordinator. Presently, Thomas Winguard, the Building Inspector, is the ADA Coordinator.

See attached documentation regarding the designation of an ADA Coordinator, the Town of Eastham's grievance procedures, and public notification requirements at the end of this section.

Grievance Procedures: This is a procedure for the general public to follow in the event that a complaint must be made.

Public Notification Requirements: Employees and the public must be notified that the community not discriminate on the basis of disability. Notification must be in a format that is accessible such as large print, simple language and in an auditory form. An "EOE" clause must also be included in any recruitment materials or publications. Please submit copies of these documents and evidence that notices were also made for the visual and learning impaired.

Participation of Individuals with Disabilities or Organizations Representing the Disabled Community
Completion of the Self-Evaluation must involve people with disabilities.

Public Access Committee

The Public Access Committee of Eastham (P.A.C.E.) continues to educate citizens of the need for accommodations for the disabled as well s the laws currently in place. Members of the P.A.C.E committee are certified state community access monitors who oversee the implementation of these laws when appropriate. The committee updated its brochure of accessible public sites and local businesses that provide access. These are available in regular and large print form throughout the town in strategic locations such as the Visitor's Center, Town Hall, the COA, Library and Post Office as well as several businesses sites.

Beach attendant training is held at Nauset Light Beach each summer by Mark Powers, Director of Recreation and Beach, and P.A.C.E. members to familiarize them with the use of beach wheelchairs and the importance of monitoring the use of handicapped parking spaces.

P.A.C.E presented certificates of appreciation to Mac Gallant, owner of Local Break Restaurant, for make his business accessible. A special commendation was issued to Nathan Garran for building the ramp for the United Methodist Church Office for his Eagle Scout project.

We note that the plan does not thoroughly address the issue of Handicapped accessibility as required by the 2014 guidelines for preparing an Open Space and Recreation Plan.

People with disabilities have access to 85% of business in Eastham due to the work of the P.A.C.E. committee's education program and going door to door. People also have access to a wide range of recreational opportunities. Though Eastham has not prepared a formal inventory of recreational resources for the 2014 OSRP, universal access is available for all user groups at (a) all town buildings, including the recreation building at 2500 State Highway; (b) the Field of Dreams recreational fields behind town hall, the Wiley Park playground, the Elementary School playground, High School athletic fields, the Village Green and Windmill; First Encounter Beach and Cook's Brook Beach provide accessible parking, accessible bathhouses, changing facilities, and beach wheelchairs. The other Cape Cod Bay beaches all have handicapped accessible portable toilets; and, Doane Rock recreation area is surfaced to accommodate wheelchairs.

Conservation trails are found in all parts of Eastham, providing residents and visitors alike with opportunities to walk through habitats on surfaces that range from basic woodland trails to an elaborate boardwalk Braille trail in the Cape Cod National Seashore, to the Mobi mats at public beaches for increased handicapped accessibility. Most conservation areas had very limited accessibility beyond their entrance areas due to irregular terrain, rolling dune terrain and unimproved dirt trails. With the exception of the Sandy Meadow ADA trail scheduled to be completed in early 2015 and have a crusher fine hard-packed wheelchair accessible surface.

Eastham is working to reach the goal of total accessibility in the town. Since the creation of the Community Access Monitor Project in 1985, over 1300 people have been trained by the Massachusetts Office on Disability to survey buildings in their communities for accessibility and to advocate for compliance with the law, and 3 people have been certified as Community Access Monitors in the Town of Eastham.

Eastham's Community Access Monitor program emphasizes the enforcement of the Architectural Access Board's Rules and Regulations. Now, with the federal Americans with Disabilities Act in effect, requirements for access have broadened to include communication and programmatic as well as architectural accessibility. As the scope of accessibility legislation has broadened, so has the role of the Community Access Monitor.

Eastham is very aware that "Accessibility" means much more than ramps for wheelchair access. People with all types of physical, sensory, cognitive and other disabilities must be ensured equal access to facilities, services, and programs. People with disabilities must not be discriminated against through structural barriers, unequal policies and practices, or inaccessible means of communication and dissemination of information. The Role of the P.A.C.E. Community Access Monitor Community Access Monitors play an essential role in encouraging access improvements. While they do not have legal enforcement authority, monitors have proven to be highly effective advocates.

The ADA coordinator, the building inspector, make an enormous contribution to the implementation process. Being a Community Access Monitor requires knowledge of access laws and regulations, understanding of the range of organizations that have responsibilities under both state and federal regulations, skill in surveying and advocacy, and the ability to be persuasive and persistent. Through this training program, you will gain the knowledge and skills you need to become an effective accessibility advocate. Getting Involved Accessibility in Massachusetts is mandated by complex and far-reaching state and federal laws, whose enforcement depends upon the active involvement of the disability community. Get involved; every individual makes a difference. The law is behind you. Through your efforts, and the collective effort of the Community Access Monitor Project and the whole advocacy movement, you will help bring about change.

Since Eastham has a historic district and over _____ places of cultural distinction, The ADA requires

readily achievable barrier removal in historic buildings (i.e., buildings eligible for listing in the National Register of Historic Places or designated as historic under state or local law) and access in historic buildings undergoing alterations, unless this would threaten or destroy the historic significance of the property.

The P.A.C.E. website has a survey posted, but responses are quite limited. The questionnaire/survey is attached.

December 2, 2014

Town of Eastham ADA Coordinator
Tom Winguard, Town of Eastham Building Inspector
2500 State Highway
Eastham, MA 02642

TOWN OF EASTHAM
Draft Grievance Procedure under
Americans with Disabilities Act

This Grievance Procedure is established to meet the requirements of the Americans with Disabilities Act of 1990 ("ADA"). It may be used by anyone who wishes to file a complaint alleging discrimination on the basis of disability in the provision of services, activities, programs, or benefits by the Town of Eastham. The Town's Personnel Policy governs employment-related complaints of disability discrimination. The complaint should be in writing and contain information about the alleged discrimination such as name, address, phone number of complainant and location, date, and description of the problem. Alternative means of filing complaints, such as personal interviews or a tape recording of the complaint, will be made available for persons with disabilities upon request. The complaint should be submitted by the grievant and/or his/her/her designee no later than 60 calendar days after the alleged violation to:

ADA Coordinator, Building Inspector, Town of Eastham, 2500 State Highway, Eastham, MA 02642

Within 15 calendar days after receipt of the complaint, the ADA Coordinator or his/her designee will meet with the complainant to discuss the complaint and the possible resolutions. Within 15 calendar days of the meeting, the ADA Coordinator or his/her designee will respond in writing, and where appropriate, in a format accessible to the complainant, such as large print, Braille, or audio tape. The response will explain the position of the Town of Eastham and offer options for substantive resolution of the complaint. If the response by the ADA Coordinator or his/her designee does not satisfactorily resolve the issue, the complainant and/or his/her/her designee may appeal the decision within 15 calendar days after receipt of the response to the Town Manager or his/her designee.

Within 15 calendar days after receipt of the appeal, the Town Administer or her designee will meet with the complainant to discuss the complaint and possible resolutions. Within 15 calendar days after the meeting, the Town Administer or her designee will respond in writing, and, where appropriate, in a format accessible to the complainant, with a final resolution of the complaint.

All written complaints received by the ADA Coordinator or his/her designee, appeals to the Town Administer or her designee, and responses from these two offices will be retained by the Town of Eastham for at least three years.

Effective 12/1/2008

Section XI: Public Comments

Letters of Review

1. Cape Cod Commission
2. Eastham Board of Selectmen
3. Eastham Conservation Commission
4. Eastham Planning Board
5. Eastham Health Department
6. Eastham Recreation Commission

Results of Survey Questions: Eastham Community Preservation Committee Workshop

Workshop Date: April 1, 2014

Question 1:	Do you serve on a town board / committee?
Question 2:	How long have you been associated with Eastham?
Question 3:	Are you a (multiple choice) resident/part-time resident?
Question 4:	What is your age?
Question 5:	Do you have any children under the age of 18 living in Eastham?
Question 6:	Did you vote for CPA when it was on the ballot in April 2005?
Question 7:	How familiar are you with the Community Preservation Act?
Question 8:	Which one of the following project categories is not eligible for CPA?
Question 9:	What are the minimum spending requirements for the CPA Categories?
Question 10:	How much did the average household contribute to CPA in FY 2013?
Question 11:	How much CPA revenue has Eastham received from the State?
Question 12:	Which one of the four CPA categories has been allocated more than 25%?
Question 13:	Do you consider yourself primarily an advocate for (multiple choice)?
Question 14:	Which of the following can be considered historic resources?
Question 15:	Which of the following statements is true? Eastham has….(multiple choice)?
Question 16:	What minimum household income would be needed to afford to buy a home?
Question 17:	Roughly, what percent of land is unprotected from development?
Question 18:	Which of the following types of recreation facilities are not eligible for CPA funding?
Question 19:	What was your primary purpose in come here this evening?

References

Open Space and Recreation Requirements 2014
Open Space Planners Workbook 2014
Eastham Open Space and Recreation Plan Draft 2007/Adopted 2009
Eastham Local Comprehensive Plan 2012
Cape Cod Regional Policy Plan 2012 and 2002
Eastham BioMap2 2012
Eastham Conservation Land Inventory and Analysis 2013
Eastham Town Meeting Warrants and Minutes 2007-2014
Eastham Annual Town Reports 2007-2014
Eastham Assessing Online Assessment Database 2014
Community Preservation Plan – Fiscal Years 2015-2019
Eastham Landfill Updates Facts and Findings 2014
Eastham Policy on Content and Application of Fertilizer and Pesticides 2013
Eastham Ponds Action Plan – Final Report 2012
Eastham Kettle Ponds and Remediation Plan 2011
Draft Plan to Protect Pond Water Quality 2013
Massachusetts Office on Disability – Community Access Monitor Program
Division of Fisheries and Wildlife, Massachusetts Natural Heritage Atlas 13th Edition
Wastewater Report 2009
Draft Water Quality Standards and Recommendations for Future Activities Report
Bikeways Committee Long Range Plan 2008
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United States Department of Commerce, U.S. Census
Cape Cod Aquifer Management Project 1988
Freshwater Ponds Water Quality Report 2013
Organic Land Management Policy 2012
Water Supply Environmental Report 2010
Wildland Fire Protection and Preparedness Plan 2009
Open Space Managed Land Plan 2003
Land Acquisition Program 1999-present
Outer Cape Capacity Study, Cape Cod Commission 1996