Buzzards Bay Watershed

Regional Open Space Plan

Draft - October 2008

A Guide for the Protection of Biodiversity
in the Buzzards Bay Watershed,
Southeastern Massachusetts

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I. PLAN SUMMARY

As growth pressures in the Buzzards Bay watershed place greater stress upon our limited natural resources it becomes increasingly important for municipalities to have a more regional focus when it comes to land protection. The purpose of this plan is to encourage communities and land conservation organizations in the watershed to work cooperatively toward land acquisition and protection goals on a regional scale; to protect biodiversity and safeguard water resources through the protection of undeveloped lands in their natural state; to help leverage funding and resources for open space protection; and to provide a clear and cohesive direction for land protection in Southeastern Massachusetts that is consistent with existing state goals.

The goals, objectives and actions of the *Buzzards Bay Regional Open Space Plan* were formulated based on resource protection needs previously identified by the Commonwealth of Massachusetts, as well as those in local open space and recreation plans. A general list of goals and objectives is presented below. Municipalities will also find a list of resource areas to target for protection, specific in their community, in the Recommended Priority Protection Areas for Municipalities section of this plan.

The overall aim of this plan is to preserve the ecological integrity of Buzzards Bay and its watershed and to increase the amount of protected open space in the region.

Buzzards Bay Watershed Plan of Action

Goal 1: Preserve the ecological integrity of Buzzards Bay and its watershed

Objectives:

1. Protect biodiversity in the watershed.
2. Protect coastal and inland surface water resources.
3. Protect the region's groundwater supplies.

Goal 2: Increase the amount of protected open space in the watershed

Objectives:

1. Improve the land conservation community's ability to protect open space.
2. Review and reform planning and zoning regulations to better protect natural resources.
3. Provide dedicated funding sources for land protection in each community.
4. Increase the public's appreciation for open space protection.

II. INTRODUCTION

In the 2000s, the Executive Office of Energy and Environmental Affairs (EEA) began promoting the development of Regional Open Space Plans to help guide state funding by identifying areas of the Commonwealth that have regional significance in terms of biodiversity. The *Buzzards Bay Regional Open Space Plan* was created to encourage communities and land conservation organizations in the watershed to work cooperatively toward land acquisition and protection goals on a regional scale and to help leverage funding and resources for open space protection.

This plan is a synthesis of individual municipal open space and recreation plans from Buzzards Bay watershed communities. Individual plans were reviewed with an eye toward identifying common goals, resources, issues, and land protection projects on a watershed-wide basis. The need for municipal parks and other active recreational facilities was not a focus of this plan, as these issues have been dealt with in greater detail within each community's open space and recreation plan.

As part of the process, a Geographic Information System (GIS) coverage of all existing protected open space in the watershed was created using ArcGIS® software. This data, as well as statewide data from MassGIS, was used to create the map series contained within this plan. Additionally, an Open Space Protection Strategy was developed to help towns determine the best properties to preserve to meet regional watershed protection goals.

The following towns have been included: Acushnet, Bourne, Carver, Dartmouth, Fairhaven, Fall River, Falmouth, Freetown, Marion, Mattapoisett, Middleborough, New Bedford, Plymouth, Rochester, Wareham, and Westport. For municipalities only partially in the Buzzards Bay watershed, only the portion of the community falling within the watershed was addressed in this plan. The towns of Bourne and Plymouth, which are split between the Buzzards Bay and South Coastal watersheds, have been covered by a similar project, *The South Coastal Watershed Regional Open Space Plan* (2003), but were also included in this document for regional planning purposes. Additionally, Bourne and Falmouth are included in the Cape Cod Commission's *Regional Open Space Plan and Interactive GIS Web Tool*. The towns of Kingston, Lakeville, and Sandwich were not included as only very small areas of these municipalities lie within the Buzzards Bay watershed.

There have been many documents produced that address the declining state of our natural resources and advocate for the protection of biodiversity. The EEA has produced several reports including *BioMap - Guiding Land Conservation for Biodiversity in Massachusetts* (BioMap) and *Living Waters - Guiding the Protection of Freshwater Biodiversity in Massachusetts* (Living Waters), *Commonwealth Connections – A Greenway Vision for Massachusetts, An Open Space Plan for Massachusetts – Partnerships in Action*, and the *Massachusetts Coastal and Estuarine Land Conservation Plan*. Many other organizations have also contributed to assessing the land use challenges that lay ahead of us: Southeastern Regional Planning and Economic Development District's *Southeastern Massachusetts - Vision 2020* report, Massachusetts Audubon Society's *Losing Ground* series, and The Trustees of Reservations' *Conserving our Commonwealth*, to name a few. These reports and many others were consulted during the creation of this plan.

III. REGIONAL CONTEXT

Buzzards Bay is a moderately large estuary located between the western most part of Cape Cod, Southeastern Massachusetts, and the Elizabeth Islands. The Buzzards Bay Watershed encompasses 432 square miles and contains many different land uses, with much of it still remaining undeveloped. In fact, land use characterizations using 1999 aerial photography suggest forested lands and vegetated wetlands cover 60% of the watershed, with only 21% being developed[1]. Nonetheless, land use patterns in the Buzzards Bay watershed have been shifting dramatically since the 1970s, and both forested and agricultural lands are declining dramatically in the face of new residential and commercial development.

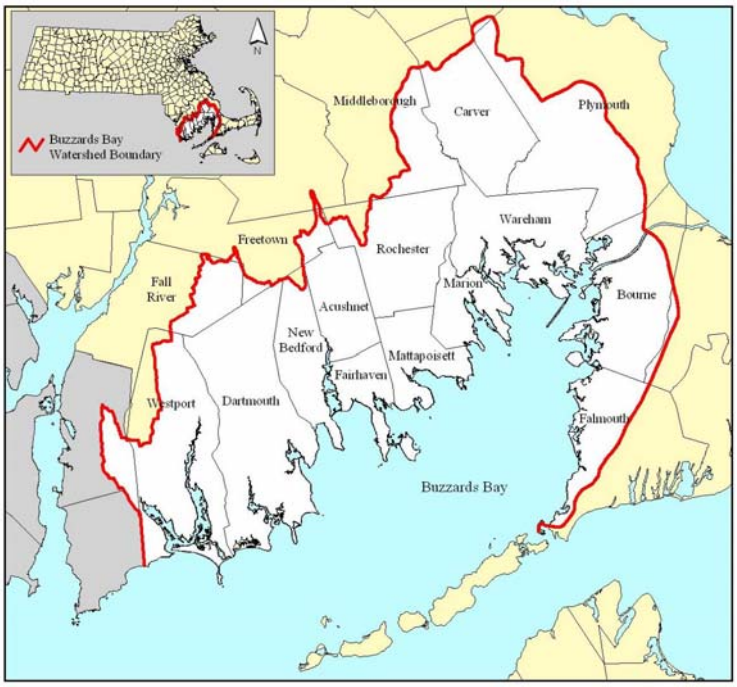


Figure 1. Buzzards Bay watershed and towns.

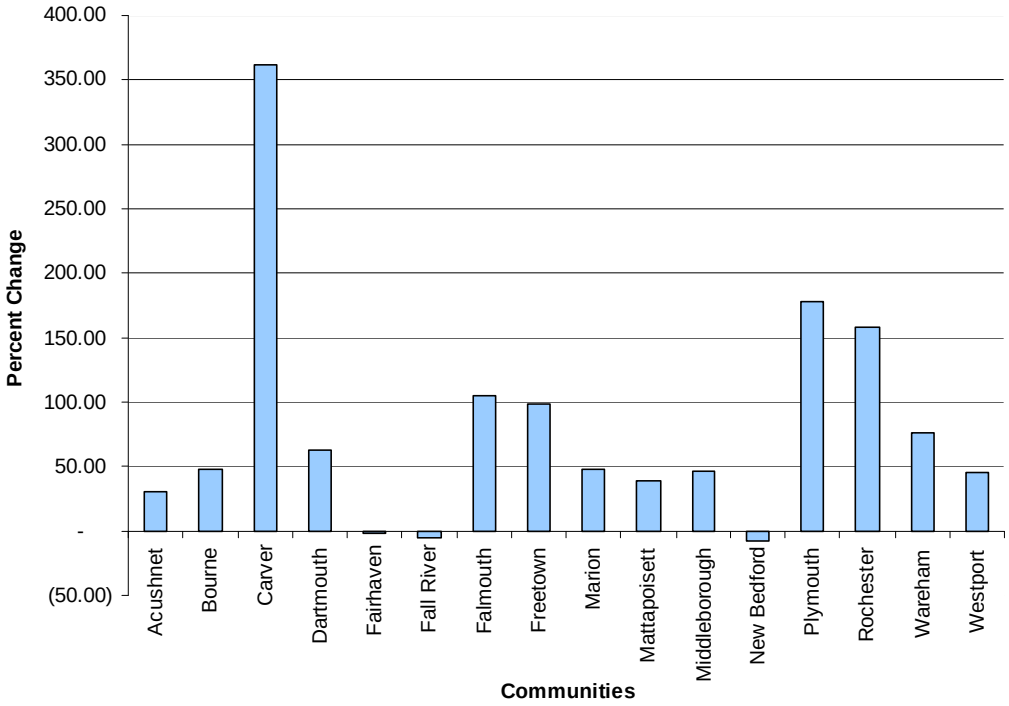
According to the *Southeastern Massachusetts - Vision 2020: an Agenda for the Future* report produced by the Southeastern Regional Planning and Economic Development District, southeastern Massachusetts is the fastest growing region of the state. By 2020 it is projected that 200,000 new residents will live in the area. Between 1960 and 1990, southeastern Massachusetts grew by 46% - more than triple the rate for Massachusetts as a whole (SRPEDD 2004).

While New Bedford is still home to the largest number and highest density of residents in the watershed (93,768 people or 25% of the watershed's population), it has been experiencing steady declines in population since the 1930s. The city of Fall River has experienced a similar decline in population, as has the town of Fairhaven, a smaller urbanized community. This pattern is typical of what is happening nationwide; residents are leaving walkable, mixed-use neighborhoods in urban settings for single-family homes in suburban communities.

Of the 16 communities included in this study, Carver has experienced the greatest increase in population. Between 1970 and 2000, Carver's population grew by more than 360%. This was followed by a 178% increase in Plymouth and a 159% increase in Rochester. Falmouth and Freetown doubled in population, while the remaining towns had more modest increases during the same 30-year period.

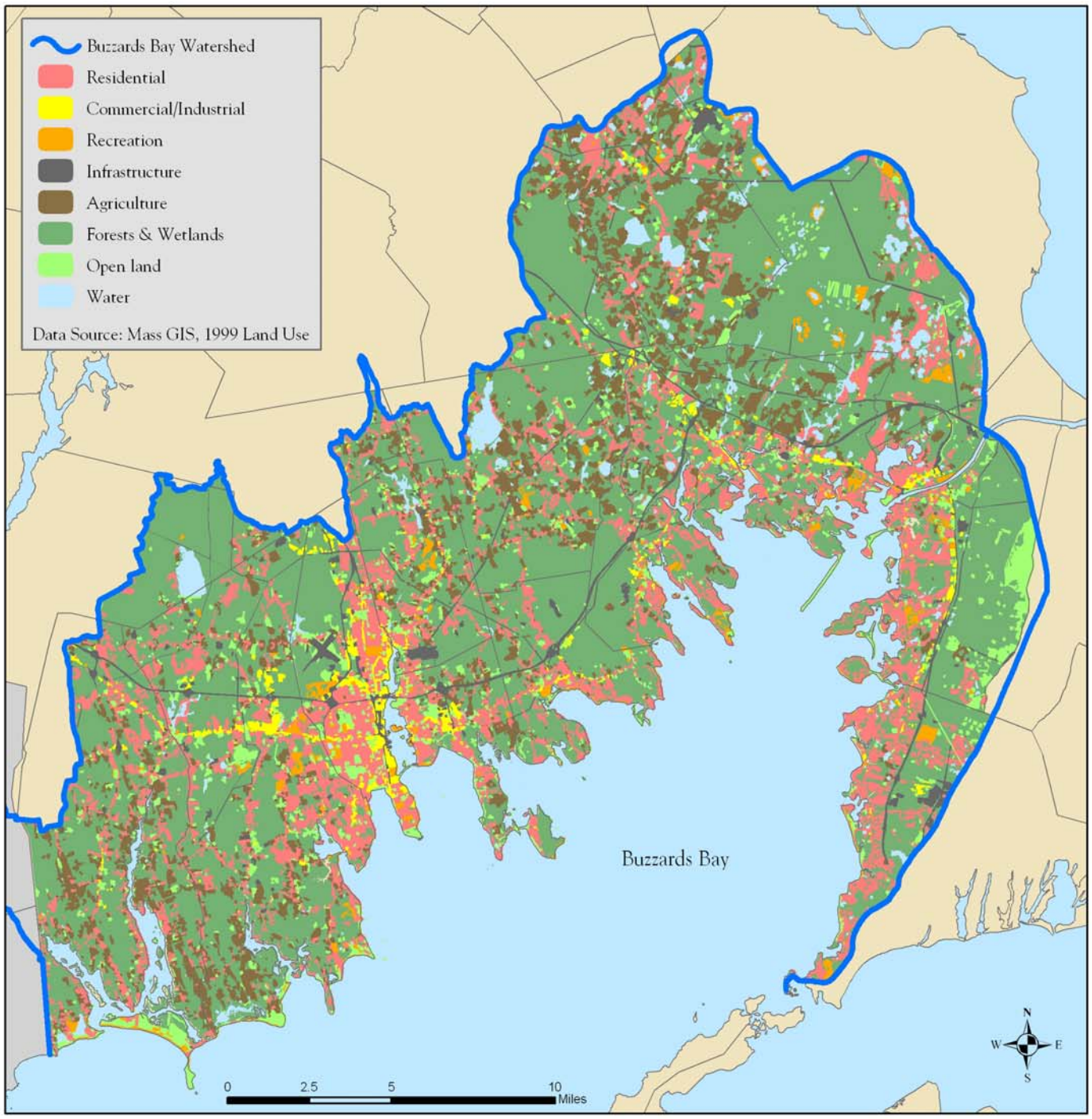
[1] Developed areas include the MassGIS 1999 land use categories of residential, commercial and industrial, and infrastructure uses.

Table 1: Population Change, 1970-2000



Construction of single-family housing dominates all types of development within the Buzzards Bay watershed. The Massachusetts Audubon Society's *Losing Ground* report states that the number of housing units in the Commonwealth has increased roughly in pace with the population – for every new person, there has been roughly one new housing unit developed (Breunig 2003).

As detailed in Figure 2 on the following page, forests and wetlands account for 60% of the total area of the watershed, water bodies account for 3%, and the remaining 37% is comprised of residences, commercial and industrial enterprises, recreational areas, and agricultural activities.



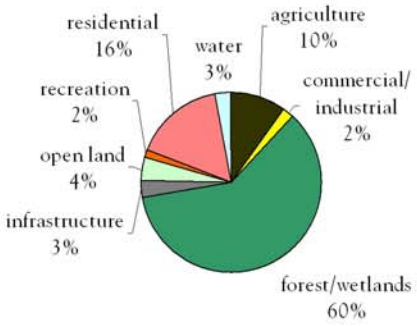


Figure 2. 1999 Land Use

IV. REGIONAL OPEN SPACE PROTECTION

A. Status of Open Space in the Region

Over 64,000 acres (24% of the total land area), of the Buzzards Bay watershed, from Fall River to Falmouth, exists as permanently protected open space (See Existing Protected Lands map in section VII. Natural Resource Mapping). The amount of protected acreage within each watershed town varies and is dependant on many factors. Local dedication to land protection, availability of affordable land, eminent threats from development, and socio-economic factors all contribute to the culture of land conservation in each municipality. Municipalities with the highest percentage of open space are those that contain a state forest, wildlife management area or water supply reserve.

Table 2: Protected Lands by Municipality, within the Confines of the Buzzards Bay Watershed – June 2008

Municipality	Acres of protected open space, within watershed[2]	Percent of town protected, within watershed[3]
Acushnet	1,036	9%
Wareham	2,298	10%
Carver	2,163	10%
New Bedford	2,023	16%
Freetown	522	17%
Westport	4,509	16%
Fairhaven	1,396	19%
Rochester	3,463	16%
Falmouth	2,192	18%
Mattapoisett	2,371	21%
Dartmouth	9,426	25%
Middleborough	3,187	30%
Marion	2,798	33%
Plymouth	11,445	40%
Bourne	10,507	52%
Fall River	4,918	73%

Table 3: Protected Lands by Type, within the Confines of the Buzzards Bay Watershed – June 2008

Type	Acreage	Percent
State/Federal Lands	36,110	56%
Municipal Lands	10,735	17%
Land Trust Lands (fee simple)	7,513	12%
Land Trust CRs	4,464	7%
APRs	3,425	5%
State CRs	803	1%
Municipal CRs	527	1%
Other Deed Restrictions	678	1%
TOTAL	64,255	100%

[2] 'Acres of protected open space' includes only protected land that falls within the Buzzards Bay watershed area. The actual acreage within an entire town may be much greater.

[3] 'Percent of town protected' are acres of protected open space, divided by the municipal area (including freshwater ponds) within the watershed.

The Commonwealth of Massachusetts

The Commonwealth of Massachusetts is a big player in land protection in Southeastern Massachusetts and owns more than 36,000 acres - 56% of all the protected land - in the Buzzards Bay watershed. The Commonwealth generally purchases land that has extraordinary natural resource features and it prefers to buy lands that build on its existing wildlife management areas and reserves. Some of the Commonwealth's most notable properties include: the Southeastern Massachusetts Bioreserve, Rocky Gutter Wildlife Management Area, Myles Standish State Forest, Haskell Swamp Wildlife Management Area, Nasketucket Bay State Park, Demarest Lloyd State Park, Horseneck Beach State Park, and the Upper Cape Water Supply Reserve. The Commonwealth's large landholdings form an arc across the watershed and are critical to maintaining the region's biodiversity.

The Commonwealth also controls an additional 5% of the watershed's protected open space through the Agricultural Preservation Restriction (APR) program. Administered by the Massachusetts Department of Agricultural Resources (MDAR), the APR program is a voluntary program aimed at protecting the state's most significant farmland soils. It offers a non-development alternative to owners of important agricultural lands by purchasing the development rights to the land. In the Buzzards Bay watershed, the majority of working farms (not including cranberry bog operations) exist in the towns of Westport and Dartmouth. Westport in particular is one of the top-producing farm communities and the leading dairy producing area in the Commonwealth. The APR program has been actively working with these towns and local land conservation organizations to protect hundreds of acres of farmland.

Municipalities

Municipalities play an important role in watershed land preservation. Conservation commission or other deed-restricted municipal lands account for the second largest percentage of protected open space in the watershed – 11,262 acres or 18%.

Finding sufficient funding for open space acquisitions is often an issue for towns. However, with the enactment of the Community Preservation Act (CPA) [G.L. Ch. 44B] in September 2000, municipalities now have a source of land protection funding. This statewide enabling legislation allows communities to establish a local Community Preservation Fund, which may be used to buy open space, protect historic sites, or provide affordable housing. The CPA is funded through a local surcharge of up to 3% of the real estate tax on real property. Additionally, the state has committed to a matching fund of more than $25 million annually. The CPA is an excellent tool to use for open space preservation and 11 of the 16 towns included in this plan have adopted the Act. They include: Acushnet, Bourne, Carver, Dartmouth, Falmouth, Fairhaven, Marion, Mattapoisett, Plymouth, Wareham, and Westport. Three towns (Fall River, Freetown and New Bedford) have yet to bring a CPA ballot to the polls. The CPA ballot failed in Rochester and Middleborough.

Table 4: Status of CPA Adoption in Buzzards Bay Watershed Towns

Municipality	Status of CPA	Surcharge	Exemptions	Year CPA adopted
Acushnet	passed	1.5%	first $100,000	2003
Bourne	passed	3%	none	2005
Carver	passed	3%	low income, first $100,000	2006
Dartmouth	passed	1.5%	first $100,000	2002
Fairhaven	passed	2%	low income, first $100,000	2005
Fall River	never voted			
Falmouth	passed	3%	none	2005
Freetown	never voted			
Marion	passed	2%	low income, first $100,000	2005
Mattapoisett	passed	1%		
Middleborough	failed			
New Bedford	never voted			
Plymouth	passed	1.5%	none	2002
Rochester	failed			
Wareham	passed	3%	first $100,000	2002
Westport	passed	2%	none	2002

Non-profit Land Conservation Organizations

Dating back to the early 1970s, land trusts have a long history of protecting land in Southeastern Massachusetts. There are currently 13 local and four regional land trusts working to protect the Southeastern Massachusetts landscape. Most towns – with the exceptions of Carver, Freetown, Middleborough, New Bedford, and Plymouth – have their own local land trust. Land trusts conserve, through acquisitions and conservation restrictions, 19% of the watershed's protected lands, which amounts to nearly 12,000 acres.

While the land trust community has made great strides in open space protection, few area land trusts can afford to fund full-time staff members, and most function with only a dedicated board of volunteers. To help the land trust community with their endeavor, the Coalition for Buzzards Bay initiated the Bay Lands Center. The Bay Lands Center focuses on enhancing the land acquisition capabilities of area land trusts by serving as a coordination and service arm to land trusts and property owners. The Center develops land protection strategies, provides staff assistance, and maintains contact with large landowners. The Buzzards Bay National Estuary Program works cooperatively with the Bay Land Center by maintaining an open space database and providing high quality Geographic Information System (GIS) maps to the Center.

B. Statewide Land Conservation Plan

In 2001, the Executive Office of Energy and Environmental Affairs (formerly called the Executive Office of Environmental Affairs) developed the Statewide Land Conservation Plan (SLCP), also referred to as the Statewide Open Space Plan of Partnerships. Involved in the development of this plan were 33 individuals representing Massachusetts land trusts, conservation commissions, watershed associations, state and federal natural resource agencies, and regional planning agencies. Using existing statewide and regional plans and other available data, this task force worked to locate the most important undeveloped lands needing protection to create a connected network of water resources, core habitat, working farms and forests, and outdoor recreation areas. Habitat data from the *BioMap* project was a key component in the development of the SLCP; *Living Waters* was not included in the SLCP, as it was produced subsequent to it. Besides *BioMap*, the task forced added additional priority areas to the SLCP if they were contained in three or more regional conservation planning documents (Massachusetts Office of Coastal Zone Management). Publically released as a poster-sized map, the SLCP is also available in a digital format through MassGIS. The SLCP was never published as a final written report.

The Division of Conservation Services uses the Statewide Land Conservation Plan as part of its project ranking methodology for its land conservation grant programs, including Land Acquisition for Natural Diversity (LAND) and the Land and Water Conservation Fund (LWCF). If property falls within an area identified by the SLCP it will receive up to 4 points toward its total score. A map of the areas identified for protection in the SLCP is in the Natural Resource Mapping section of this plan.

C. Municipal Open Space Plans and the Commonwealth Capital Policy

Municipalities are required to have an approved Open Space and Recreation Plan on file with the Division of Conservation Services to be eligible for several state grant programs. Open Space and Recreation plans must follow an established outline and discuss issues related to population characteristics, growth and development patterns, natural resources, and protection of open space. Plans must also include a goals and objectives section and an action plan. To continue to be eligible for grant funding towns must update and resubmit their plans to the Division of Conservation Services every five years.

The goals and objectives and action plans for the 15 available town open space and recreation plans (Freetown does not have a plan) were reviewed and compared. For ease of comparison, goals were grouped under the following six categories:

- Protection of Natural Resources,
- Maintaining the Community's Rural Character,
- Improving Land Conservation Efforts/Protecting Open Space,
- Open Space Policy and Funding Strategies,
- Increasing Public Awareness,
- Recreational Uses.

Protection of natural resources was by far the most resounding goal of all open space plans considered in this study. Specifically, there was an emphasis on the protection of wetlands, wildlife habitat and drinking water supplies. This goal echoes the collective understanding that our natural resources are limited, and more importantly, that they are threatened.

Communities also expressed a desire to maintain a rural, small-town character and to improve their ability to protect and acquire open space parcels. Developing definitive strategies to change the open space ethic within town government, providing decision makers with better policies and tools, and enacting strategic planning efforts were often suggested as means to reach these goals.

Table 5: Comparison of Goals in Watershed Towns

General Goal Categories	Number of Towns With Related Goals
Protection of natural resources	14
Maintaining the community's rural character	10
Improving land conservation efforts/protecting open space	10
Open space policy and funding strategies	10
Recreational uses	9
Increasing public awareness	5

The Commonwealth imposes other requirements besides an approved open space and recreation plan to be eligible for state grant funding. The most important of these requirements, adopted in 2005, is that towns must complete and submit annually a Commonwealth Capital application. Based on the information in these applications, the state assigns a score to each community. State granting agencies, such as the Division of Conservation Services, use Commonwealth Capital scores when ranking potential projects, with scores accounting for 30% of the municipality's total points (30 points out of 100 possible).

According to state documents, the Commonwealth Capital policy seeks to "encourage municipalities to work in partnership with the Commonwealth to achieve smart growth. Commonwealth Capital explicitly endorses planning and zoning measures that are consistent with its Sustainable Development Principles and encourages municipalities to implement them using state funding as an incentive." Smart growth does not stop growth but seeks to redirect it to places that are more appropriate. Its sustainable practices include zoning techniques such as transfer of development rights, cluster or open space residential design, and agricultural preservation district zoning, as well as water resource management, low impact development, and traditional neighborhood development.

Nearly half the Commonwealth Capital policies focus on achieving environmental actions, or actions that achieve or support smart growth. Therefore, if municipalities can improve their Commonwealth Capital scores, they not only improve their chances of receiving discretionary state funds, but will also protect or enhance the environment or natural resources.

V. REGIONAL VISION AND GENERAL RECOMMENDATIONS

This purpose of this plan is to encourage communities and land conservation organizations in the Buzzards Bay watershed to work cooperatively toward land acquisition and protection goals on a regional scale. Today, 24% of the watershed exists as protected open space. However, without a long-term land preservation commitment by watershed towns, the percentage of developed land - currently 21% - will soon outpace protected open space.

A series of general recommendations, based on resource protection needs identified by the Commonwealth, municipal open space and recreation plans and regional conservation organizations, are provided below. These recommendations provide a direction for land protection in Southeastern Massachusetts and are applicable to municipalities, government agencies and land conservation organizations.

A. General Recommendations for Regional Land Protection

i. Protect Critical Natural Resources

Biodiversity/Core Habitat

Development in the Buzzards Bay watershed, and elsewhere in the state, is creating isolated islands of habitat. This fragmentation of the landscape disrupts wildlife corridors, the areas of interconnected habitat that allow for the movement and migration of species. Without adequate migratory routes, genetic isolation can occur within a population, which may lead to inbreeding and weakening of a species' ability to adapt to changes in its environment. Habitat fragmentation is a major threat to biodiversity, particularly where rare species are concerned.

In an effort to protect biodiversity and rare species habitat, the Massachusetts Natural Heritage and Endangered Species Program (NHESP) has used its database of rare plant and animal species and natural communities to identify and map those areas of the state that are most in need of protection. Released in 2001, *BioMap - Guiding Land Conservation for Biodiversity in Massachusetts* (BioMap) identifies these "core habitats" as well as "supporting natural landscapes" that safeguard the core areas and provide habitat for more common species.

A companion document, *Living Waters – Guiding the Protection of Freshwater Biodiversity in Massachusetts* (Living Waters), seeks to protect freshwater ecosystems by identifying and mapping lakes, ponds, rivers and streams that should be the highest priority for conservation. Like *BioMap*, it identifies core habitats, but it also locates "critical supporting watersheds," the upstream and upland areas that have the greatest affect, either positively or negatively, on downstream habitat.

The USDA Natural Resources Conservation Service publication, *Conservation Corridor Planning at the Landscape Level: Managing for Wildlife Habitat*, is an excellent source of information on planning for wildlife habitat and is located online at http://www.whmi.nrcs.usda.gov/technical/. According to this publication, adequate wildlife

corridor systems should 1) preserve important core reserves, 2) provide corridors or linkages between reserves, and 3) establish multiple use buffer zones around the reserves and corridor. It also outlines several ecological principals that may be used by land managers to maintain existing corridors and protect biodiversity (Johnson 1999).

Wildlife corridors are as diverse as the various species that use them. While the resource needs of species vary, in general, maintaining watershed-wide corridors that support the larger, more mobile wildlife species will, at the same time, provide habitat for smaller, less mobile species. It is also important to maintain multiple examples of a diverse assortment of high quality interconnected habitat types, such as forests, fields, riparian corridors, and inland and coastal wetlands. Conservation priority should be given to core habitats, supporting natural landscapes and supporting watersheds as identified by the Natural Heritage and Endangered Species Program.

Groundwater Resources

The Plymouth-Carver aquifer, one of the largest aquifers in New England, covers an area of 199 square miles (127,380 acres) and contains more than 500 billion gallons of fresh water. Within the Buzzards Bay watershed, it underlies the towns of Carver, Plymouth, Bourne, and Wareham; outside the watershed it extends into the towns of Sandwich, Plympton, and Kingston. Carver, Plymouth, two districts in Bourne, and most of Wareham rely exclusively on this aquifer for their drinking water needs (Carver Open Space Committee 2004). The sandy soils that overlay the Plymouth-Carver aquifer allow precipitation to readily percolate and recharge the aquifer; however, they also make the groundwater supply highly susceptible to pollution from various sources. Of particular threat are large-scale developments, such as those proposed by the A.D. Makepeace Company on 6,000 acres of land in the towns of Plymouth, Carver, and Wareham; an area that is also home to globally rare habitats.

Another important resource in the region is the Mattapoisett River and its aquifer. The Mattapoisett River's drainage basin encompasses nearly 20,000 acres and provides fresh drinking water for the towns of Mattapoisett, Marion, Fairhaven, and Rochester. Acushnet uses it as a secondary water source. The river is also used for recreational purposes, as spawning passage for river herring up to Snipatuit Pond in Rochester, and as a water source for cranberry growers for irrigation and wet harvesting. In 1997, the towns that withdraw water from the aquifer established the Water Supply Protection Fund, which levels a fee for water withdrawls of up to one cent per 1,000 gallons. Fees acquired through this fund are used to protect land within the aquifer by outright purchase or conservation restrictions, to pay for engineering or other studies, and for public education relating to water conservation. As of 2008, permanently protected land within the Mattapoisett River watershed amounted 2,306 acres or 12% of the watershed area.

The Cape Cod aquifer is the only source of drinking water for the Buzzards Bay watershed towns of Bourne and Falmouth; it also provides water to Mashpee and Sandwich. This sole source aquifer is especially vulnerable to contamination due to the loose, sandy, highly permeable soils that make up the Cape's landscape. Over a 60-year period, activities at the 34 square-mile Massachusetts Military Reservation (MMR) have resulted in the contamination of the public

water supply. Toxic substances, including industrial chemicals, solvents, and jet fuel were disposed of onsite at MMR and have been percolating through the soils and forming "plumes" of contamination that move through the aquifer at a rate of about a foot a day. Fourteen major plumes have been documented over the last decade. In 1989, the southern portion of the MMR was classified as a Superfund site by the U.S. Environmental Protection Agency.

Potable drinking water, our most precious natural resource, is often taken for granted. Protected lands in the form of woods and wetlands are vital to the region's water supply because of their ability to recharge groundwater and act as filters for pollution. Municipalities can protect groundwater resources through the use of aquifer protection overlay districts and land acquisitions. Direct acquisition and protection of land within the recharge areas to aquifers (Zone IIs and Interim Wellhead Protection Areas) is especially important.

Surface Waters and Riparian Corridors

Surface waters provide habitat for an abundance of species, both rare and common. Riparian corridors, the vegetated lands that border these water bodies, are particularly important to the health of freshwater ecosystems. Riparian corridors act as buffers to surrounding land uses. They also provide habitat for wildlife, filter pollution, absorb floodwaters, and prevent erosion and moderate water temperatures by shading water with overhanging vegetation.

Unfortunately, cumulative impacts from human activities - on land and in the water - have degraded the health of many of our surface waters. The three main threats to freshwater species are changes in water quantity, degradation of water quality, and the invasion of non-native species (NHESP 2003). Much of the damage to surface water is caused by non-point source pollution carried by stormwater runoff. Urbanization and the accompanying increase in impervious surfaces are contributing to the problem. One of the most commonly recognized effects of non-point source pollution is over-enrichment of water bodies with nutrients, or eutrophication. Protecting the health and biodiversity of surface water is complicated because pollution sources can originate from far upstream in the watershed.

As the demand for water from residential, commercial, and agricultural uses increases, some of our waterways are experiencing the effects of excessive water withdrawls. When more water is pumped from surface and ground water sources than can be recharged by the aquifer, rivers and streams can be left with an inadequate amount of water to support aquatic life. Lower surface water levels also lead to increased temperatures as the cooling effect of groundwater inputs is diminished.

The National Academy of Sciences recommends making restoration and protection of riparian zones a national policy goal. The width of the riparian buffer that needs protection depends on its purpose and function. If the purpose is to trap sediment, it can be as narrow as seven meters (23 feet). If the purpose is to remove soluble pollutants, such as nitrates and pesticides, it should be 30-50 meters (98-164 feet) wide. If the purpose is to protect habitat and provide recreational opportunities and flood control, the entire riparian area should be protected.

Excerpted from "The Source Protection Handbook: Using Land Conservation to Protect Drinking Water Supplies" (Hopper 2004).

In 2003, the Natural Heritage and Endangered Species Program (NHESP) published its *Living Waters* report, a compliment to the *BioMap* project released in 2001. The *Living Waters* conservation plan identifies "core habitats" for rare species and "critical supporting watersheds," which are the upstream and upland areas that have the greatest affect, either positively or negatively, on downstream habitat. The NHESP's report recommends protection of these critical habitat areas, as well as dam removal, water conservation, improved stormwater management, and mitigation of the effects of impervious surfaces as a means to maintaining freshwater biodiversity.

The NHESP identifies the following waterbodies and their watersheds as priority areas to protect in the Buzzards Bay watershed:

Table 7: NHESP Priority Waterbodies and Watersheds to Protect

Municipality	Areas to Protect in the Buzzards Bay Watershed
Westport	Bread and Cheese Brook
Dartmouth	Destruction Brook; Shingle Island River; Shingle Island Swamp
New Bedford	Acushnet Cedar Swamp
Mattapoisett	Wetland areas surrounding the Mattapoisett River
Rochester	Snipatuit and surrounding cedar swamp
Carver	Sampson's Pond and the cranberry bog lands connecting it to Federal Pond
Plymouth	Several ponds and wetland systems located within the Myles Standish State Forest; area surrounding Halfway and Long Ponds; Big Sandy Pond; Agawam River corridor
Wareham	Agawam River corridor; Red Brook corridor
Falmouth	Crooked and Deep Ponds

Coastal plain ponds are another important water resource in the Buzzards Bay watershed. The towns of Dartmouth, Plymouth, Rochester, and Wareham contain coastal plain ponds, which are shallow, highly acidic groundwater-fed ponds that occupy depressions in glacial outwash plains. They are significant because they are both regionally and globally rare and support an abundance of threatened plant species. Increased groundwater withdrawals and excessive nutrient loading are major threats to coastal plain ponds.

Surface waters provide wildlife habitat, drinking water, flood control and areas for recreation. Riparian corridors, the vegetated lands that border surface waters, are particularly important to the health of freshwater ecosystems because they act as buffers to surrounding land uses. Protection of surface waters and adjacent riparian lands should be a land conservation priority as these areas build the foundation of open space corridors.

Forestlands

Prior to colonization of the watershed, old growth forests of white pine, oak, walnut, beech, and holly dominated the landscape (Howes 1996). Human activities, however, have greatly altered our forests over the last several hundred years. In 1602, approximately 75% of the watershed was upland forest. Deforestation of large areas occurred mainly during the late 1600s through the 1800s as agriculture and logging took hold. Using 1999 land use data from MassGIS, the Woods Hole Research Center has determined that 153,000 acres, or 76%, of the region's original forested coverage remains (The Coalition for Buzzards Bay 2003).

Contiguous, intact, mature forests provide habitat for many species, but they also protect our water supplies by acting as filters for nitrogen and sediment. Forests reduce erosion by slowing the rate of water runoff; regulate water levels in rivers and streams; moderate the Earth's climate by removing greenhouse gasses and producing large amounts of oxygen; and they provide areas for community recreation. Some of the most important forest areas to protect include large contiguous blocks, riparian areas, unique communities, and habitat for rare or endangered species.

Southeastern Massachusetts is home to some unique and rare forest communities. Atlantic white cedar swamps have an extremely limited distribution in New England and are considered by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) to be a priority natural community for protection. Found mainly in Dartmouth and New Bedford, but also in Marion, Bourne and Falmouth, Atlantic white cedar swamps are forested wetlands with a dense primarily evergreen canopy, a deciduous shrub layer, and a sparse herb layer dominated by mosses. They are often associated with red maple swamps and open bogs (NHESP 2007). In 1971, the Commonwealth of Massachusetts purchased the 1,800-acre Acushnet Cedar Swamp in Dartmouth and New Bedford. Considered one of the wildest remaining places in Massachusetts, the Acushnet Cedar Swamp is priority habitat for several state-listed rare species and is considered a National Natural Landmark.

The NHESP also considers Atlantic coastal pine barrens to be priority natural communities for protection. Pine barrens are globally rare and occur most notably in New Jersey, Long Island, Southeastern Massachusetts and Cape Cod. Pine barrens in the watershed are concentrated in the Plymouth-Carver-Wareham region, directly over the Plymouth-Carver aquifer. Myles Standish State Forest in Plymouth is an excellent example of a pine barren community.

The vegetation of pine barrens is adapted to frequent fires and sandy, nutrient poor soils. Habitat fragmentation and fire suppression are major threats to these communities. Suburban encroachment on pine barrens often leads to longer intervals between fire episodes. Longer intervals allow for succession to occur, with species not adapted to frequent fires, such as oaks, eventually displacing native pine species. Massachusetts' pine barrens are home to several rare species of butterflies, moths, beetles, and dragonflies.

Saltwater and Freshwater Wetlands

With few exceptions, freshwater and coastal wetlands are biologically among the most productive areas on earth in the amount of organic material produced per acre (Imes 1990). Wetlands serve many important purposes, but have only recently been accorded the protection they deserve. In the early 1960s, Massachusetts was the first state in the country to adopt a wetlands protection law. Unfortunately, before the 1960s, it is estimated that nearly 50% of the state's wetland resources had been lost. Today, municipal, state, and federal laws protect wetlands with varying degrees of success.

Wetlands serve many important purposes including flood control, prevention of pollution and storm damage, protection of public and private water supplies, and protection of fisheries, shellfisheries, and wildlife habitat. Wetlands have substantial protection under state and local wetlands regulations. However, municipalities are encouraged to continue their efforts to strengthen local wetlands bylaws to provide greater protection to these important resources. Land conservation organizations should work to establish connections between major wetland systems through protected land corridors.

The Massachusetts wetland laws and regulations are viewed as one of the most protective in the country. However, given the State's historic loss of wetlands and the fact that this loss continues today, concerns remain about the adequacy and enforcement of the law. Municipal conservation commissions administer the Wetlands Protection Act and may also enact their own stricter local wetlands regulations under home rule. Local regulations provide an important and enhanced layer of protection to wetland resources over the State's minimum standards. Eight Buzzards Bay communities (Bourne, Carver, Dartmouth, Fairhaven, Falmouth, Plymouth, Rochester and Wareham) have adopted non-zoning wetlands bylaws to supplement the Wetlands Protection Act. Bourne, Dartmouth and Falmouth have also adopted regulations to further define their bylaws (Buzzards Bay NEP 2007).

Starting in the early 1970s, Massachusetts placed permanent deed restrictions on coastal wetlands in 50 communities under the Coastal Wetlands Restrictions Act [MGL Chapter 130, Section 105]. These restrictions, recorded at the Registry of Deeds, provide additional protection to lands subject to tidal action or coastal storm flowage. The Buzzards Bay watershed towns of Bourne, Marion, Falmouth, Wareham, and Westport have coastal wetland deed restrictions. Work within one of these restricted wetland areas requires the filing of a Notice of Intent under the Wetlands Protection Act with the local community and the Department of Environmental Protection (DEP). However, compliance with these deed restrictions is inconsistent because many landowners and conservation commissions are unaware of their existence. At the time these restrictions were recorded, maps were attached to the deed, but they did not indicate property boundaries or reference town assessors' map and lot numbers. This is further complicated by the fact that the restrictions were never converted to a digital format.

Coastal Shorelines and Resources

Coastal shorelines, in their natural state, perform beneficial functions and are important to protect for many reasons. Coastal shorelines support an abundance of life, are key to the region's economy and residents' quality of life. However, shoreline habitat is rapidly diminishing due to development pressures, which compromise ecological functions by reducing habitat availability and negatively affecting water quality. Communities are strongly encouraged to protect natural shoreline conditions by minimizing the effects of shoreline use/development, restricting harmful activities and reducing stormwater impacts. Degraded shoreline habitat should be restored, where possible.

Scenic and Historic Areas

Scenic open spaces maintain an area's rural character, contribute to quality of life and provide visual relief; and historic places give each community unique character. Visual quality affects how people feel about a community and influences whether they would want to live in, visit or locate a business in a particular area. Residents and visitors alike see the majority of a community while riding in their vehicles, making scenic vistas from roadways particularly important to protect. Views from sidewalks, hiking trails, bike paths, and recreational areas also contribute to a community's desirability.

Agricultural Lands

Active agricultural lands not only provide food and contribute to the local economy, but they hold aesthetic qualities and bring a sense of place to the region. Well-managed farmland can also benefit the environment by filtering stormwater runoff and providing groundwater recharge. However, development located too close to farming operations often results in conflicts when normal farming practices interfere with residential uses. Municipalities with prime or locally important farmland should review their regulations to ensure they support the continued operation of active farms.

ii. Promote Interconnectedness of Protected Lands

Development in the watershed is fragmenting habitat and disrupting critical ecological processes. Fragmentation limits habitat, destroys wildlife corridors and genetically isolates members of a species. Connecting large tracts of land and maintaining multiple examples of a diverse assortment of high quality interconnected habitat types, such as forests, fields, riparian corridors, and inland and coastal wetlands is crucial to protecting biodiversity in the watershed. From a regional perspective, it is important to examine the location of existing protected lands to determine if it is feasible to make connections when planning future conservation activities.

iii. Protect Natural Resources through Improved Regulations and Zoning

Single-use zoning has made it impossible to recreate traditional mixed-use villages, and it has lead to sprawl development and our dependence on automobiles. Most planners would agree that concentrated, walkable communities re-invigorate economically depressed areas and protect natural resources, and there is now a shift toward replacing sprawl growth with mixed-use

development. Referred to as Smart Growth, it seeks to combine certain types of commercial uses with residential units, usually close to a public transportation source. Concentrating growth makes sense not only from an economical point of view, but an environmental one as well. By bringing retail and residential uses together you allow people the opportunity to walk or bike to their destinations, rather than driving in cars. This reduces pollution and the consumption of open lands, lowers infrastructure costs, and it also creates more affordable housing options, such as apartments over stores. All towns in the watershed are encouraged to use Smart Growth planning techniques where appropriate, including mixed-use zoning, cluster zoning, transfer of development rights, and water resource protection overlay districts. Municipalities are also encouraged to focus on redevelopment and directing new development in and around existing village centers.

iv. Promote Regional Cooperation in Land Protection

Critical resources, such as aquifers, river corridors, and coastlines, all cross municipal boundaries and regional efforts to protect theses areas need to be more strongly encouraged, as these shared resources are better protected when towns and land trusts work together toward a common goal. Municipalities and land conservation organizations should make contact with neighboring communities and other conservation organizations in the region when planning future conservation efforts.

v. Establish Consistent Funding For Open Space Protection

All watershed communities need to establish a dedicated and significant funding source for land protection initiatives. The Community Preservation Act is an excellent tool for this purpose, yet only 11 of the 16 towns covered in this plan have adopted it. Public education efforts must be made before attempting to initiate a new funding source. The case can be made for land protection by highlighting the success of neighboring towns and discussing the cost saving benefits of open space versus development.

vi. Increase Public Access to Protected Lands

Providing access gives the public a feeling of ownership of the land, which in turn leads to greater support for the protection of open space. Public access is an important aspect in open space planning, however, each situation requires careful consideration. The fragility and uniqueness of the natural resources contained must be considered when determining the type or extent of access to be allowed. In certain cases, allowing access may be detrimental. Protection efforts within each community should include planning for an assortment of property types (e.g. forests, fresh water, coastlines) that will serve as dedicated access areas.

vii. Strategize For Large and Continuous Tracts of Land

Conserving large tracts of contiguous land not only protects the genetic viability and long-term survival rate of many diverse species, but it also protects fragile ecological processes. Regional planning efforts should be aimed at identifying and protecting the remaining areas of the watershed that contain sizable and undeveloped blocks of land.

VI. REGIONAL PLAN OF ACTION

As growth pressures in the watershed place greater stress upon our limited natural resources it becomes increasingly important for municipalities to have a more regional focus when it comes to land protection. Open space benefits the public by protecting ground and surface water quality and ensuring diversity by protecting habitat and wetlands.

The Regional Plan of Action, presented below, was formulated based on resource protection needs identified by the Commonwealth of Massachusetts and local open space and recreation plans. The overall aim of this plan is to preserve the ecological integrity of Buzzards Bay and its watershed and to increase the amount of protected open space in the region.

Goal 1: Preserve the ecological integrity of Buzzards Bay and its watershed

Objectives:

1. Protect biodiversity in the watershed.
    - Focus primary conservation efforts on protecting "core habitats" as identified by NHESP in *BioMap* and *Living Waters*.
    - Focus secondary conservation efforts on protecting "supporting natural landscapes" and "critical supporting watersheds" as identified by NHESP in *BioMap* and *Living Waters*.
    - Protect intact forestlands and NHESP natural communities.
    - Protect unique or outstanding habitats such as coastal plain ponds, pine barrens, Atlantic cedar swamps, and others.
    - Protect habitat for rare and endangered species.
    - Work to expand and link existing conservation areas to create continuous corridors of interconnected open space.

2. Protect coastal and inland surface water resources.
    - Identify large wetland systems (freshwater and tidal) and make them a priority for protection.
    - Protect naturally vegetated riparian areas.
    - Protect land surrounding priority waterbodies as identified by NHESP (see page 18 of this plan).
    - Protect undeveloped coastal lands in their natural state.

3. Protect the region's groundwater supplies.
    - Protect land within the contributing area (watershed) to surface water sources, including headwaters to streams and areas surrounding wellheads.
    - Protect land within the recharge areas to aquifers (Zone IIs, Interim Wellhead Protection Areas).
    - Protect land designated as having potential for future water supply sources, especially regionally important water sources.

Goal 2: Increase the amount of protected open space in the watershed

Objectives:

1. Improve the land conservation community's ability to protect open space.
    - Create a permanent Regional Open Space Committee.
    - Support and encourage the creation of local land trust organizations in towns without one.
    - Municipalities, state agencies and land trusts should work cooperatively on regional land protection projects.
    - Support local and regional corridor planning.
    - Cultivate relationships with large landowners.

2. Review and reform planning and zoning regulations to better protect natural resources.
    - All watershed communities should have a current Open Space and Recreation Plan on file with the Division of Conservation Services.
    - All municipalities should adopt various Smart Growth planning techniques that best protect their critical resources and minimize growth impacts on water quality and habitat; such as (but not limited to) mandatory cluster zoning; transfer of development rights; water resources protection overlay districts; and prohibitions on building in the velocity zone.
    - Municipalities should address current weaknesses in the Wetlands Protection Act by adopting more stringent bylaws and regulations based on local needs.

3. Provide dedicated funding sources for land protection.
    - Communities without the Community Preservation Act should adopt it.
    - Promote viable LAND, PARC, Federal Land and Water Conservation, Coastal and Estuarine Land Conservation Program, and Agricultural Preservation Restriction projects, etc.

4. Increase the public's appreciation for open space protection
    - Provide greater public access to protected land.
    - Provide areas for passive recreation such as trails and coastal access.
    - Protect scenic vistas.
    - Protect our agricultural heritage.

A. Recommended Priority Protection Areas for Municipalities

The following section details critical resource areas within each community that are currently unprotected but should be considered priorities for permanent protection. These resource areas were selected based on regional goals and the maps located in the Natural Resource Mapping section of this plan.

Acushnet

BioMap Supporting Natural Landscapes
Living Waters Critical Supporting Watersheds
Acushnet River Valley aquifer and Zone II in northeast corner of town
NHESP Priority Habitats for Rare Species
Freshwater and saltwater wetlands (especially along the Acushnet River)

Bourne

BioMap Core Habitat & Supporting Natural Landscapes
Cape Cod Aquifer (especially Zone II)
NHESP Priority Habitats for Rare Species
Freshwater and saltwater wetlands

Carver

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Core Habitats & Critical Supporting Watersheds
Plymouth-Carver Aquifer
NHESP Priority Habitats for Rare Species
Surface waters (Atwood Reservoir and Sampson's Pond)
Pine barrens
NHESP Natural Communities
Sampsons Pond and cranberry bogs connecting it to Federal Pond (NHESP priority)
Freshwater wetlands

Dartmouth

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Core Habitats & Critical Supporting Watersheds
Slocums/Paskamansett River watershed and Deerfield Swamp (especially Zone II)
NHESP Priority Habitats for Rare Species
Coastal plain pond (Cedar Dell Lake)
NHESP Natural Communities
Agricultural lands
Areas identified in the Scenic Landscape Inventory
Destruction Brook, Shingle Island River and Shingle Island Swamp (NHESP priority)
Freshwater and saltwater wetlands

Fairhaven
BioMap Core Habitat & Supporting Natural Landscapes
NHESP Priority Habitats for Rare Species
Freshwater and saltwater wetlands

Fall River
BioMap Core Habitat
Living Waters Critical Supporting Watersheds
Expand on existing Bioreserve area
Freshwater wetlands

Falmouth
BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Core Habitats & Critical Supporting Watersheds
Cape Cod Aquifer
NHESP Priority Habitats for Rare Species
Crooked and Deep Ponds (NHESP priority)
Freshwater and saltwater wetlands

Freetown
BioMap Supporting Natural Landscapes
Aquifer areas (Squam Brook)
Freshwater wetlands

Marion
BioMap Core Habitat & Supporting Natural Landscapes
NHESP Priority Habitats for Rare Species
Freshwater and saltwater wetlands

Mattapoisett
BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Critical Supporting Watersheds
Mattapoisett River Valley (Zone II)
NHESP Priority Habitats for Rare Species
NHESP Natural Communities
Wetlands around the Mattapoisett River (NHESP priority)
Freshwater and saltwater wetlands

Middleborough
BioMap Supporting Natural Landscapes
Living Waters Critical Supporting Watersheds
Aquifer areas (Rocky Meadow and expanding on Rocky Gutter WMA to Weweantic River)
NHESP Priority Habitats for Rare Species
Freshwater wetlands

New Bedford

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Critical Supporting Watersheds
NHESP Priority Habitats for Rare Species
Areas around the Acushnet Cedar Swamp (NHESP priority) - Hobomock Swamp and Apponagansett Swamp
Freshwater and saltwater wetlands

Plymouth

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Core Habitats & Critical Supporting Watersheds
Plymouth Carver Aquifer (especially Zone II)
NHESP Priority Habitats for Rare Species
NHESP Natural Communities
Pine barrens
Coastal plain ponds (Darby, Whites, Grassy, Little Sandy, and Little Rocky Ponds)
Ponds and wetland systems located in Myles Standish State Forest, areas around Halfway Pond, Long Pond, Big Sandy Pond and Agawam River (NHESP priorities)
Freshwater wetlands

Rochester

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Core Habitats & Critical Supporting Watersheds
Mattapoisett River Valley and Sippican River Aquifers
NHESP Priority Habitats for Rare Species
NHESP Natural Communities
Coastal plain ponds (Mary & Snows Ponds)
Snipatuit Pond and surrounding cedar swamp (NHESP priorities)
Agricultural lands
Freshwater wetlands

Wareham

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Core Habitats & Critical Supporting Watersheds
Plymouth Carver Aquifer (especially Zone II)
NHESP Priority Habitats for Rare Species
NHESP Natural Communities
Coastal plain ponds (Spectacle and Bartlett Ponds)
Agawam River corridor and Red Brook corridor (NHESP priorities)
Freshwater and saltwater wetlands

Westport

BioMap Core Habitat & Supporting Natural Landscapes
Living Waters Critical Supporting Watersheds
Aquifer areas along the East Branch of the Westport River
NHESP Priority Habitats for Rare Species
NHESP Natural Communities
Agricultural lands
Areas identified in the Scenic Landscape Inventory
Bread and Cheese Brook (NHESP priorities)
Freshwater and saltwater wetlands

VII. NATURAL RESOURCE MAPPING

Identifying the most environmentally sensitive areas in need of protection and focusing on how they may be linked together is key to protecting natural resources, wildlife habitat and water quality. The resource maps in this plan are an essential first step in identifying areas of the watershed that are too environmentally sensitive to develop. These maps provide communities with a planning tool to begin strategizing how best to protect critical lands, to determine where to target development, and to regulate potentially detrimental future land uses. It is important to note that these maps are limited in their accuracy due to the regional scale in which they are presented. They are meant to provide an understanding of the spatial relationship between resource areas, existing preserved lands and development. They should not, however, be used for parcel-level analysis. The data used to create the maps is available through MassGIS and the Buzzards Bay National Estuary Program.

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Appendix

A. Open Space Protection Strategy

i. Evaluating Perspective Properties for Open Space Preservation

Due to the scale of this project, individual parcels were not prioritized for protection. Scoring methodologies can be very useful; however, they are only as accurate as the current information available for a particular parcel. Additionally, the development of a list of high priority, privately held lands could have the negative, and unintended, effects of increasing the potential purchase price or straining existing relationships between landowners and the land protection community.

Opportunities for land protection do not present themselves in any logical or timely order and there are often many variables involved. To aid decision makers, a process for evaluating property for preservation has been included in this plan. This process was used by the Marion Open Space Committee[4] for their 1998-2003 Open Space and Recreation Plan and has been adapted here to suit a regional perspective. A committee made up of representatives from the Buzzards Bay NEP, MA Coastal Zone Management, and the USDA Natural Resources Conservation Service developed the acquisition criteria and point system to evaluate specific parcels contained in this strategy.

This point system is meant to act as a guide and should be used as one of many tools in the decision making process. It is not intended to provide a definitive answer as to whether a particular parcel should, or should not, be preserved.

The evaluation process that follows includes three sections:

- Open Space Protection Criteria
- Open Space Protection Criteria Ranking
- Evaluating Open Space Protection Criteria

[4] Thomas H. Athey originally developed the methodology used by the Marion Open Space Committee as found in *Systematic Systems Approach – an Integrated Method for Solving Systems Problems*.

Open Space Protection Criteria

Development of the open space protection criteria began by reviewing the criteria used in the *Marion Open Space and Recreation Plan*, which were generated through a survey of over 250 residents. The Marion criteria were adapted to meet a more regional perspective and to steer land protection initiatives toward projects that will ultimately provide protection to water quality and living resources in the watershed. Active recreational facilities were not used as criteria, but they may be incorporated into this process if individual towns so desire.

- **Core habitat:** Does it contain "core habitat" as identified by the NHESP in the *BioMap* and *Living Waters* reports?
- **Supporting landscapes/watersheds:** Does it contain "supporting natural landscapes" and "critical supporting watersheds" as identified by NHESP in the *BioMap* and *Living Waters* reports?
- **Saltmarsh:** Does it contain tidal wetlands?
- **Endangered species habitat:** Does it contain habitat for rare and endangered species?
- **Water supply protection:** Is it located within the watershed to a public drinking water supply or aquifer?
- **Maintain coastal water quality:** Does it protect coastal water quality?
- **Coastal habitat:** Does it contain coastal shoreline?
- **Fresh water resources:** Does it contain or abut fresh water resources such as rivers, streams, or ponds?
- **Expanding conservation areas:** Does it build upon existing conservation land or have the potential to become a significant conservation holding through future acquisitions?
- **Habitat restoration:** Does it provide opportunity for restoration of a degraded natural resource?
- **Fix an environmental problem:** Will changing the property's current use eliminate a significant environmental pollution source or activity?
- **Maintain fresh water quality:** Does it protect fresh water quality?
- **Freshwater wetlands:** Does it contain freshwater wetlands and/or vernal pools?
- **Size:** Does it have regional significance due to the project's size?
- **Coastal resources:** Does it contain or abut coastal resources such as barrier beaches or dunes?
- **Adjacent to saltmarsh:** Does it provide a buffer to tidal wetlands?
- **Development threat:** Is there an immediate threat of development?
- **Linkages:** Does it promote connectivity of habitat and prevent fragmentation?
- **Adjacent to freshwater wetlands:** Does it provide a buffer to freshwater wetlands?
- **Passive recreation:** Does it provide passive, environmentally-compatible recreational opportunities, such as shoreline access or trail networks?
- **Aesthetics:** Does the property provide scenic vistas from a public vantage point?
- **Agricultural lands:** Does it contain agricultural lands?

Open Space Criteria Ranking

The committee ranked individual criteria against each other using a 5 to 1 scoring method, with the rank of 5 equaling "much more important" and 1 equaling "much less important."[5] Scores were then averaged and mathematically manipulated to retain the same 5 to 1 scoring range. The table below lists the criteria ranked in order of importance.

Table 11: Open Space Criteria Ranking

Rank	Criteria	Importance Factor
1	Core habitat	5.0
2	Supporting landscapes/watersheds	5.0
3	Saltmarsh	4.7
4	Endangered species habitat	4.7
5	Water supply protection	4.6
6	Coastal water quality	4.4
7	Coastal habitat	4.4
8	Freshwater resources	4.4
9	Expanding conservation areas	4.2
10	Habitat restoration	3.8
11	Fix environmental problem	3.7
12	Fresh water quality	3.7
13	Freshwater wetlands	3.5
14	Size	3.5
15	Coastal resources	3.5
16	Adjacent to saltmarsh	3.2
17	Development threat	3.0
18	Linkages	2.8
19	Adjacent to freshwater wetlands	1.7
20	Passive recreation	1.3
21	Aesthetics	1.2
22	Agricultural lands	1.0

[5] Methodology developed by Thomas H. Athey as found in *Systematic Systems Approach – an Integrated Method for Solving Systems Problems*.

Evaluating Open Space Protection Criteria

To evaluate a parcel, it must be determined how well it meets the 22 open space criteria. Using the "Evaluating Open Space Protection Criteria" table below, points may be assigned (0-10) for each criterion. To fairly evaluate the parcel (and so it may be compared with others under consideration) it is important to use actual facts and not anecdotal information. If it is found that this evaluation form is inappropriate for a given site, numbers may be adjusted accordingly.

Directions for Use

1. Using the Evaluating Open Space Protection Criteria table (Table 12), assign points (0-10) for each of the 22 criteria.
2. For each criterion, multiply the number of points awarded by the "importance factor" for that criterion found in Open Space Criteria Ranking table (Table 11).
3. Total all adjusted criteria points for a final score.

Table 12: Evaluating Open Space Protection Criteria

	0	**1** Barely Acceptable	**2**	**3** Below Average	**4**	**5** Average	**6**	**7** Above Average	**8**	**9** Exceptional	**10**
Core Habitat		10% of parcel		30%		50%		70%		90%	
Supporting landscapes/watersheds		10% of parcel		30%		50%		70%		90%	
Saltmarsh		10% of parcel		30%		50%		70%		90%	
Endangered Species Habitat		"watch list" habitat, 1 species		"watch list" habitat, 2 species		"watch list" or threatened breeding habitat, 1 species		threatened breeding 2 species, endangered habitat		endangered breeding	
Water supply protection		Within watershed to well (Zone II)		No well, but low yield aquifer		No well, but high-med yield aquifer		Within 1000-2000 ft. wetlands or glacial outwash		Within 400-1000 ft. of existing well	
Coastal water quality		The location of the parcel in the watershed relative to receiving waters and existing or potential pollution sources is of key importance. Sliding scale with land directly abutting water body receiving a 10.									
Coastal habitat		100 ft. of shoreline		300 ft.		500 ft.		700 ft.		900 ft.	
Freshwater Resources		50 ft. along waterbody		150 ft.		250 ft.		350 ft.		450 ft.	

	0	1 Barely Acceptable	2	3 Below Average	4	5 Average	6	7 Above Average	8	9 Exceptional	10
Expanding conservation areas		Within 300 ft of existing protected area		Within 100 ft.		Directly abutting boundary		50% of one boundary		All of one boundary	
Habitat Restoration		One point for each of the following criteria met: herring run restoration, remove fill from saltmarsh or freshwater wetland, wetland restoration (no fill), remediate tidal restriction, dam removal.									
Fix environmental problem		Multiple options available to solve problem				Use of conservation restriction will solve problem				Purchase only way to solve problem	
Fresh water quality		The location of the parcel in the watershed relative to receiving waters and existing or potential pollution sources is of key importance. Sliding scale with land directly abutting water body receiving a 10.									
Freshwater wetlands		10% of parcel		30%		50%		70%		90%	
Size		5 acres		15 acres		25 acres		35 acres		50 acres	
Coastal resources		10% of parcel		30%		50%		70%		90%	
Adjacent to saltmarsh		30 ft. buffer provided		60 ft. buffer		90 ft. buffer		120 ft. buffer		150 ft. buffer	
Development threat *- must have frontage on existing or approved road*		for sale sign posted				Ch. 61, 61A, 61B release notice given				approved subdivision	
Linkages		narrow connection				narrow, but connects large (20+ ac) blocks				wide, connects large blocks	
Adjacent to freshwater wetlands		30 ft. buffer provided		60 ft. buffer		90 ft. buffer		120 ft. buffer		150 ft. buffer	
Passive recreation		Next to existing trail or shore access				Existing trail or shore access				existing trail/shore access and next to more trail land/shore access	
Aesthetics		scenic vista with views from public road								scenic vista with parking	
Agricultural lands		5 acres		10 acres		15 acres		20 acres		25 acres	

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