



# Town of Bourne Open Space & Recreation Plan

February 8, 2018



**Prepared for:  
Bourne Open Space Committee**

**Prepared by:  
Horsley Witten Group, Inc.**

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Cover photos by Michelle West



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## 1.0 Plan Summary

When a community provides access to open space and recreational opportunities to its residents, it is making investments that have environmental, social, and economic benefits. Planning for these resources allows the Town of Bourne to assess where it is at and where it needs to be. Documenting how it determined those needs and how to achieve them (an Open Space and Recreation Plan) gives the Town a clear and direct roadmap of how to apply limited financial and human resources. It also puts the Town in position to be eligible for a variety of state and federal funding sources for implementation.

The Town of Bourne's 2017 Open Space and Recreation Plan (OSRP) serves as a guide to committees, boards, commissions, and volunteer groups in Bourne that are involved in open space and recreational opportunities. The plan encourages programs and policies that follow sustainable principles that support environmental, social, and economic health in Bourne. Public input was a key component to developing the OSRP, which included public workshops, an online survey, and interviews with municipal departments. Taken together, they helped focus the OSRP on the needs of residents and the town operations necessary to deliver high quality services.

The OSRP is divided into seven distinct parts. **Community Setting** provides a snapshot of Bourne, describing the social and economic characteristics of residents and how that can impact current and future needs for open space and recreation amenities. The Town and Cape Cod as a whole are getting older. As Baby Boomers retire, Cape Cod is a natural draw for those wanting to live an active lifestyle. Also influencing needs and quality of amenities are the tens of thousands of tourists that descend on Cape Cod in the summer months. This takes a toll on resources and managing usage from this influx is important.

**Environmental Inventory and Analysis** gives an overview of the Town's natural environment, discussing its geological makeup, unique landscape features, water resources, vegetation, fisheries, and wildlife habitat. This section also includes the historic and cultural features of Bourne, such as its many historic structures, and the environmental challenges the town faces in the short and long term. Examples include maintaining and improving water quality, protecting critical habitats, and addressing coastal erosion and areas of chronic flooding.

**Inventory of Lands of Conservation and Recreation Interest** provides a complete listing of private and public open space and recreation lands in Bourne, noting the level of protection from development, public access, and recreation potential. The level of protection imposed on these lands varies; some are protected in perpetuity from future development while others may only have limited or temporary protection. Those with limited or no protection may be of interest to the Town to acquire or impose stronger legal protection. Acquiring properties can build wildlife corridors or connect open space and recreational resources for public access.

**Analysis of Needs** evaluates public input to determine natural resource protection needs, community needs (residents), and management needs (municipal administration and operation). Overarching themes for protecting natural resources include protecting water supply and groundwater, improving wastewater management, managing invasive species, and protecting coastal and inland habitats. Community needs focused on the Town's aging population, accessibility (physical access and access to information), and new and expanded recreational opportunities. At the municipal level, management needs focus on staffing, maintenance, and improved communication with residents about resources, where they are, and their usage.

**Community Vision** and **Goals and Objectives** sections outline high-level statements that guide decision makers around natural resource protection, open space needs, and recreational opportunities for the Town.

Finally, the most significant section in the OSRP is the **Action Plan**, which details steps that local boards, commissions, and committees in Bourne can take to achieve the stated goals and objectives. Cooperation and collaboration are key to successful implementation. For each action item, a lead department or committee is listed along with others that can offer support. Most actions fall within the existing charge of a committee or purview of a department. Those that require additional financial resources are given potential funding sources to pursue.

The overall goal of planning for open space and recreational needs is to develop a tool for the town and residents to understand where they currently are in meeting these needs, where they need to be, and how to get there in a sustainable and financially responsible way. This is the purpose of the Bourne OSRP. The existing open space and recreation amenities and opportunities in Bourne are diverse, from regional bike paths to the small neighborhood parks. Keeping these characteristics and continuing to think about open space, recreation, and natural resources in a meaningful manner is an essential piece of the quality of life in this seaside community.

## **2.0 Introduction**

### **2.1 Statement of Purpose**

#### **2.1.1 Purpose of 2017 OSRP**

The Town of Bourne has diverse natural resources, open space, and recreational amenities for each of its separate village areas. It is a strikingly beautiful community that prides itself on its heritage, devoted local residents and both natural and man-made assets. A tremendous amount of work has gone into researching the type of community that Bourne was historically and how it has progressed. The 2017 OSRP update is laid out to highlight the town's history and define how residents can continue to sustain the quality of life they currently have through continued focus on the natural resources and recreational amenities that exist or may be needed in the future. The purpose of this OSRP update is to:

- Review and update the 2008 Bourne OSRP in order to create a more current, usable document that will better detail Bourne's natural resources, open spaces and recreational amenities to guide the Town for the next five years on how best to protect and enhance these resources.
- Inventory existing open space and recreational resources to identify where amenities are and what might be needed in the future.
- Inform local residents and visitors about the economic, social and environmental benefits of Bourne's natural resources, open space, and recreational amenities so that there is a better understanding of what and where they are and how and why they need to be protected, acquired, or improved.
- Ensure that there is a sustained momentum and dedicated constituency that will be charged with implementing the Action Plan created for the 2017 Bourne OSRP update.

The full 2017 Bourne OSRP is organized so that anyone reading it will have a comprehensive knowledge of the natural resources, open space, and recreational amenities, community needs and resources available to achieve each goal, objective and action item that is detailed in the document.

### **2.2 Progress from the 2008 Open Space and Recreation Plan**

The Five-Year Action Plan of the 2008 Bourne OSRP outlined, by year, action items the Town planned to complete to achieve its goals and objectives. Since 2008, the following is a sample of what has been accomplished. A full checklist of the Action Plan is provided in Appendix A.

#### **Year 1**

- Open Space Committee and Recreation Committee met with the Board of Selectmen and Town Administrator to discuss implementation of the OSRP. (#1)
- Open Space Committee and Recreation Committee developed a checklist of action items and responsibilities for the OSRP. (#2)
- All commissions, committees, boards, and pertinent town staff received copies of the OSRP and understood their role in its implementation. (#3)
- Open Space Committee developed an approach to enhance and improve signage and landscaping at gateway locations. (#7)
- The Town promotes the donation of land or easements in coastal areas to the Conservation Commission or other appropriate organizations. (#9)



## Year 2

- Activities and events were coordinated between the Recreation and School Departments. (#13)
- The Town had regular communications with the Bourne Conservation Trust. (#14)
- Needed maintenance was completed at Monument Beach Marina. (#17)
- An inventory and review of available parking at all town-owned conservation and recreational areas was completed. (#22)
- Water access points for shellfishing, boat ramps and beachgoers were mapped. (#27)
- A point of contact was made with the U.S. Army Corps of Engineers and the Buzzards Bay Visualization Association to move forward with the Greenbelt Pathway project. (#32)
- The Town continued to seek and secure funding for remediation efforts of impaired coastal embayments. (#40)
- Strategies were developed to control invasive species on public lands. (#43)
- The Town worked with volunteers to help maintain public access to conservation lands. (#51)

## Years 3 and 4

- The Town continued with efforts to address recreational needs identified in the Statewide Comprehensive Outdoor Recreation Plan. (#53)
- The Town continued with efforts to work with boards and commissions to increase public awareness of its natural and cultural resources. (#55)
- The Town continues to acquire open space for recreation, resource protection, wildlife habitat, and groundwater protection as well as maintain community character. (#57)

## Year 5

- The Town continued to work on action items not completed in prior years.

## **2.3 Planning Process and Public Participation**

In the summer of 2016, the Town of Bourne contracted with the Horsley Witten Group, Inc. (HW) to assist them in the update of the OSRP. The public participation process has several components, including regular meetings with the Open Space Committee, interviews other town committees and municipal department staff, a community survey, and public workshops.

### **2.3.1 Town Committees**

The Open Space Committee helped guide the update process and regular meetings were held to review material. The Recreation Committee also provided input and guidance on OSRP objectives, management needs, and the Action Plan.

### **2.3.2 Municipal Staff**

Town staff were the primary source in updating the community setting and environmental inventory and analysis pieces of the OSRP. They also provided input on community and management needs as well as direction on developing the Action Plan.

### **2.3.3 Community Survey**

The Bourne OSRP Community Survey was administered as part of the Town's OSRP update process. It was available online from October 31 to November 25, 2016. Hardcopies were also available at the Town Clerk's Office, Library, and Community Center. The survey link was posted on the Town's website.

The link was also emailed to a various groups asking them to send the link to their membership or post on their Facebook pages. These included Library, Recreation Department, and Police Department. Flyers promoting the survey were posted on the community bulletin boards in Sagamore, Sagamore Beach, Buzzards Bay, Bourne Village, Monument Beach, Pocasset and Cataumet. The survey was also included in the advertisements (Bourne Enterprise) and promotional materials for the Public Workshop held on November 16, 2016.

Fifty (50) responses were received, both online and hardcopy. The survey was reopened from March 31 to April 14, 2017 and an additional 59 responses (109 total) were received. While this is a very small sample compared to the Town's population, responses were viewed in conjunction with input from the first and anticipated second public workshops, municipal staff, and town committees to gauge the weight of the issues and needs expressed by respondents.

A complete summary of the community survey is provided in Appendix B.

### **2.3.4 Public Workshops**

#### **Public Workshop #1**

The first of two public workshops was held on November 16, 2016 in the Media Center of the Bourne Middle School from 7 pm to 9 pm. Approximately 19 residents participated. Details of the public workshop are provided in Appendix C. Below is a summary of the event and the key takeaways.

The workshop started with a brief presentation on the OSRP update process and findings around existing environmental conditions. Attendees provided two general comments:

- Joint Base Cape Cod should not be included when discussing open space and recreation resources because it currently does not allow public access and, due to conditions on-site, will not in the future.
- The need should also take into consideration the large influx of tourists during the summer months because their usage of local resources greatly impacts maintenance and upkeep. It is estimated that the visiting population is about 30,000 annually.

After questions and comments, attendees were divided into three groups to discuss three questions:

- What is the Town doing well with regards to open space and recreation?
- What is the Town doing that could be better, and how?
- What are new opportunities the Town could pursue to meet community needs for open space and recreation?

For each question, a participant wrote their idea on a sticky-note, which was posted on a board. After everyone had a chance to offer their ideas, the group organized the sticky-notes into common themes. While all ideas would be considered important, the group was asked to help prioritize. Using dots, each participant voted on what general theme and associated ideas should be done in the next five to seven years.

Among all the ideas discussed, common themes emerged from all three groups. For "what are we doing well," many agreed that the Town is doing a good job at conserving important natural resources for trails, public access to the shore, and natural resource protection, including water quality. The Town is

also doing a good job at providing recreational opportunities for the youth, and the Community Center is popular.

For “what could we do better,” there was a need to improve communication to the public about local parks and conservation areas through online and marketing materials as well as on-site. Specific ideas included trail maps and signage. Connecting conservation and recreation properties could also be better through biking and walking trails.

Improved upkeep was also discussed among all three groups as “what could we do better”. Maintenance is a challenge with limited staff and resources for both recreation and conservation areas. Suggested ideas focused on the use of volunteers to promote environmental stewardship in conservation areas and partnering with groups that already exist.

As with the prior question, “What more could we do” also focused expanding public education and communication. There was a need to increase promotion of town resources by publishing materials that describe what activities and resources are available at each property and if public access is permitted. Educational kiosks at each property can also be used. Public education should also focus on what individual residents can do to protect natural resources, including programs to conserve their properties without town acquisition (tax relief programs such as Chapter 61) and personal decisions around maintenance of septic systems, use of fertilizers, and other actions.

In addition to connecting municipal resources through biking and walking paths, the Town should also start to develop integrated networks with neighboring towns. The Bourne Rail Trail was cited as an example. Adding to or improving existing recreational facilities was also discussed, such as lighting for soccer fields, bathrooms, parking, and bike racks.

## **Public Workshop #2**

The second public workshop was held on March 29, 2017 at in the Media Center of the Bourne Middle School, from 7 pm to 9 pm. A presentation provided an overview of the update process, community and resource needs heard at the first public workshop and through the survey, and proposed next steps. Attendees were asked to comment on the draft Seven-Year Action Plan: what’s missing, what could be revised. They could write comments on a printout of the Action Plan or on index cards. General discussion, comments, and questions:

- The JBCC feels like it is a negative (because of the plume) but it is wonderful to know that it is actually a positive in terms of providing habitat. Additionally, the town should continue to monitor the plume and its impact on drinking water wells.
- Wastewater improvements are going to come to Town meeting soon. The Open Space Committee was concerned about where the new police station will go near Queen Sewell Park. They will maintain the ball park and the package wastewater treatment will be underground. It will be able to treat an additional 100,000 gallons per day. Also, the Committee has a constant battle with our projects and mitigation projects. The Cape Cod Commission says that if entities do a construction project, the developer must find another location to preserve for open space. Lastly, it is interesting to see how the Federal government portrays Bourne and how we compare with Barnstable County. These demographic numbers can be incorporated into the OSRP if they are more telling than the American Community Survey Estimates. As the demographic data are updated, they can be part of the annual review of the Action Plan.

- When you talked about having connections between open spaces, one educational component would be to get the word out to donate easements across private property to connect trails. When we go out to talk to people, they have already heard about it. Also, we need to get more word about tax benefits of selling land below market price.
- On the survey, there were identified needs: walking, biking, dog park and indoor facilities. In the plan, it only addresses walking and biking. There is nothing in the plan to research the dog park or the indoor facilities.
- There is concern that only 50 surveys were received. Many of the avenues for promoting it suggested by those in attendance were verified by the Open Space Committee.
- Because there were so few surveys received (50 count), the Committee will reopen it for two weeks (through April 14th). Additionally, an email will be provided on the Town's website with the Draft OSRP to provide additional comments through the 14th. Those in attendance would receive an email with the link and were asked to distribute it to their networks and neighbors in Bourne.
- Sidewalks good! Dog park; improve water access at Monks Park, consider dredging; open up beach ways
- "What's missing?" Card: Open space is important but when there are so many restrictions that the land can't be used except for walking. Now a huge check of land that can't be used as sports field, or other recreation areas, playgrounds, dog park, etc.

A full listing of comments can be found in Appendix C.

## 3.0 Community Setting

### 3.1 Regional Context

The Town of Bourne is a medium sized rural community that is unique for several reasons; it is a community of villages, it is rich in cultural and natural resources, it is the home to the Cape Cod Canal and it is widely known as the “Gateway to Cape Cod.” Bourne is located approximately 60 miles southeast of Boston, Massachusetts and 55 miles east of Providence, Rhode Island. It is comprised of a total area of 52.82 square miles and a land area of 40.90 square miles which includes 15 square miles located in the Joint Base Cape Cod (JBCC) and the National Cemetery. Residents and visitors who travel via local roadways between off-Cape locations and all parts of Cape Cod must pass through Bourne, traveling over the Cape Cod Canal on either the Bourne or Sagamore bridges (Map 1).

Buzzards Bay, Bournedale, Sagamore Beach, Sagamore, Bourne Village, Gray Gables, Monument Beach, Cataumet and Pocasset are the villages of Bourne. While each has its own character, personality and in most cases post office, together the villages form a larger community that resonates with charm and pride. Bourne has a number of harbors, bays and inlets for boating, swimming and shellfishing, yet the town does not seem to experience the summer tourist swath that many other Cape Cod communities experience annually.

Two different aquifers that are separated by the Cape Cod Canal are utilized by Bourne residents for water supplies. To the north of the canal, water resources come from the Plymouth Carver Aquifer while the southern portions of town rely on the Sagamore Lens. Due to Cape Cod’s sole source aquifer, Bourne has implemented several regulatory tools to help manage the situation, including the creation of a groundwater protection overlay district.

There are a number of physical resources with regional significance that have affected Bourne’s development.

- 1) **Cape Cod Canal** - The Town of Bourne contains most of the length of the Cape Cod Canal, a man-made waterway that bisects the land that formerly connected Cape Cod to “mainland” Massachusetts. The entire canal is approximately 17.4 miles long and 540 feet wide and it connects the Cape Cod Bay in the north to Buzzards Bay in the south. The Cape Cod Canal Railroad Bridge and the Bourne and Sagamore bridges span the width of the canal which is also part of the Atlantic Intracoastal Waterway.<sup>1</sup>

In 1907, wealthy New Yorker August Belmont founded the Cape Cod Construction Company and the digging for the canal began. The canal opened in 1914, 17 days ahead of the Panama Canal. Early operation of the narrow waterway was marked by frequent accidents and lengthy closures due to the currents. As a result, mariners began to fear using the intercoastal waterway so they returned to the coastal route and revenue decreased significantly. Although Belmont built the canal as a commercial venture, he ultimately sold it to the United States government in 1928 for \$11.5 million dollars.

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
<sup>1</sup> The AIW is a 3,000 mile recreational and commercial waterway along the Atlantic and Gulf coasts of the United States, some portions of which are natural and manmade. The creation of the waterway was authorized by the U.S. Congress in 1919 and it is maintained by the U.S. Army Corps of Engineers.



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Document Path: H:\Projects\2016\16069 Town of Bourne OSRP\GIS\Maps\Map 1 Regional\_Context.mxd

**Legend**

-  Town of Bourne
-  Joint Base Cape Cod

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**Regional Context  
Bourne Open Space and  
Recreation Plan**

Date: 8/10/2017

Map 1

**Map 1. Regional Context**

After the government purchased the canal, they widened it from 100 feet to 540 feet and dredged it from a depth of 15 feet to 32 feet. They replaced the narrow portions with a straight channel to Buzzards Bay. Today, the Cape Cod Canal is operated by the United States Army Corps of Engineers. Nearly 90 years after its construction, the Cape Cod Canal remains one of the most physically impressive elements of Bourne's landscape. Its scenic and recreational value is an indisputable asset to the community; however, the canal also geographically split the town into essentially two separate communities when it was created. The Cape Cod Canal is home to the only bike path in Bourne with its own right-of-way, the 7.1 mile one way Cape Cod Canal Bike Path, which runs on both sides of the canal (14.2 miles total).

- 2) **Massachusetts Maritime Academy (MMA)** – The Massachusetts Maritime Academy is another major landmark in the Town of Bourne. MMA is located in the village of Buzzards Bay and enrolls approximately 900 students while employing nearly 200 people.

In the next two to three years, the MMA anticipates increasing the number of students who attend the academy to 1,200 and to expand its on- and off-campus facilities. Due to the location of the MMA and its commitment to remaining a part of the community, any upgrades to the school and its facilities could help serve as a catalyst to the revitalization of Buzzards Bay.

- 3) **Joint Base Cape Cod<sup>2</sup>** – Joint Base Cape Cod (JBCC; formerly the Massachusetts Military Reservation) is a military training facility located on the upper western portion of Cape Cod, immediately south of the Cape Cod Canal in Barnstable County, Massachusetts. It includes parts of the towns of Bourne, Mashpee, and Sandwich and abuts the town of Falmouth. JBCC covers about 22,000 acres (approximately 30 square miles) and it is located over a sole source aquifer that provides drinking water for 200,000 year-round and 500,000 seasonal residents of Cape Cod. The Sagamore Lens of the Cape Cod Aquifer is a valuable drinking water supply resource.

As a military installation, the JBCC has been used since National Guard training began on the Cape in 1911. During the 1940s, the base was activated by the U.S. Army and used to train and deploy troops being sent to fight in World War II. After the war, the reservation was transferred to the Department of the Air Force and is still often referred to as Otis Air Force Base. In the 1970s, the Army National Guard assumed operational control of JBCC from the U.S. Army, while around the same time Otis became Otis Air National Guard Base. The U.S. Coast Guard Air Station Cape Cod was established on JBCC in 1970 and in 2008 assumed full responsibility for all airfield operations on the base.

Historically, the land comprising the JBCC was home to the Wampanoag tribe, who used the area for daily living and sacred sites. Before becoming fully used as a military installation, part of the land that makes up the reservation was used for sheep farming and the trees were harvested for the shipbuilding trade.

Of the 22,000 acres, 15,000 acres comprise the northern training area, the major training area for Army National Guard soldiers in the Northeast, where soldiers practice maneuvering exercises and bivouacking, or camping, and use the small arms ranges. The northern 15,000 acres of the JBCC is the largest piece of undeveloped land on Cape Cod and is home to 37 state-listed species living in a variety of habitats throughout the base. In the cantonment or developed

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<sup>2</sup> <http://www.thenationsfirst.org/JBCC/jbcc-overview.html>

area in the southern part of the base are training support facilities such as training simulators, hangars and support facilities for Massachusetts Army National Guard aviation units and the Massachusetts Air National Guard 102nd Intelligence Wing, 253rd Combat Communications Group and U.S. Coast Guard facilities, including Coast Guard family housing, with almost 2,000 residents.

- 4) **Areas of Critical Environmental Concern (ACEC)** – The Town of Bourne is home to two full ACECs and one partial ACEC that is also partially located in Plymouth, MA. The Bourne Back River ACEC is approximately 1,850 acres and was designated in 1989, the Herring River Watershed ACEC (located in Bourne and Plymouth) is nearly 4,450 acres and was designated in 1991 and the Pocasset River ACEC which is 150 acres and was designated in 1980. For more information about all three of these ACECs, see Section 4.2.2.

### 3.1.1 History of the Community

According to the Mashpee Wampanoag Tribe,<sup>3</sup> the Wampanoag Nation encompassed all of Cape Cod and westward. In 1616, contact with European traders brought yellow fever and two thirds of the Wampanoag Nation, an estimated 45,000, died. When the Pilgrims arrived at Provincetown in 1620 and moved through the Cape to Plymouth, the Native Americans did not approach the Europeans for three months for fear of disease.

Originally the villages of Buzzards Bay, Sagamore, Cataumet, Pocasset, Monument Beach, and Bourne were all a part of Sandwich, which was founded in 1627 when the Aptucxet Trading Post (the first private commercial enterprise in the country) was established on the banks of the Manomet River. The Post allowed for trading with the Dutch from New Amsterdam (New York) and with the Wampanoag natives residing in the area. Typical objects that were traded at the time were sugar, tobacco, textiles, and fur, which were either bought or bartered using a Native American shell currency called wampum. The trading post was closed in the late 1650s, but a replica of it is still in place on the original foundation. Today, the trading post is a major historic landmark and tourist attraction in town.

In 1884 the Town of Bourne was officially incorporated. It is named after Jonathan Bourne, one of the town's first prominent citizens. Jonathan Bourne served in general court for 14 years and was very successful in the whaling industry. When Bourne separated from Sandwich, it included two foundries, one railroad car works that employed 100 men, five blacksmith shops, two boat-building shops, one lumber yard, and one axe factory.

By the mid 1800s, industrial development expanded onto the Cape. Early manufacturers in Bourne utilized locally-obtained raw materials and water resources. However, very little evidence of this early manufacturing period remains. It was not until the 1900s that the Cape Cod Canal was constructed to shorten the trip between Boston and Long Island Sound, although the first survey for the canal's construction was requested more than 150 years prior by President George Washington.

At one time, the New Bedford Onset Street Railway ran from New Bedford to Monument Beach with stops along the way in various towns. With the expansion of highways as the major form of transportation, the railroad slowly reduced its daily trips and eventually, eliminated them entirely.

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<sup>3</sup> <http://www.mashpeewampanoagtribe.com/timeline>



Before the Route 25/I-495 corridor was constructed, most tourists accessing the Cape from the south had to pass through the village of Buzzards Bay along Route 6. Since construction of the limited-access, Route 25 corridor, most tourists now bypass Buzzards Bay to access the Bourne Bridge. Although this bypass has greatly improved traffic flow and bridge access, it has caused economic hardship on Buzzards Bay village. Once known as the hub of the community, there are various plans underway to revitalize the village,<sup>4</sup> including revitalizing Main Street Park, expanding wastewater treatment capacity, establishing growth incentive zones, and bringing commuter rail to town.

### 3.1.2 Bourne – A Town of Villages

The original villages in the area that is now the Town of Bourne were: Monument, Monument Beach, Pocasset, Cohasset, Head of the Bay, West Sandwich, North Sandwich, and Cataumet. The Town of Bourne was incorporated in 1884, and after that time the villages of Mashnee and Gray Gables were established. Most villages had a railroad station and some had electric cars that linked them with the village in Buzzards Bay. Over time, several villages were renamed:

- Cataumet became South Pocasset
- Monument became Bourne Village
- North Sandwich was divided into Sagamore and Sagamore Beach
- West Sandwich became Bournedale
- Cohasset and Head of the Bay became Buzzards Bay

The following is a brief description of the existing villages of Bourne:

**South Pocasset** – The village had a tavern, there were cranberry bogs, a wind-powered grist mill, and a Herring Run at Red Brook.

**Pocasset** – A village known for shipping cordwood and the location of Tahanto Foundry. Wing’s Neck Light, located at the end of Wing’s Neck, was the only lighthouse in the area at the time.

**Monument Beach** – In 1884, it had more summer homes than any other village in Bourne. It was known as a fishing and shellfishing village. It now has the main marina, mooring field, and swimming beach in Bourne. The Bourne Community Sailing program is headquartered there.

**Monument** – This village was chosen as the location where the town’s official business would be conducted. It was the “metropolis” amongst the villages.

**North Sandwich** – A village that was home to many Italian families whose men were employed by railroad car works and the Keith Car Manufacturing Company.

**Sagamore/Sagamore Beach** – A village that started in 1904 as a summer colony with the formation of Sagamore Beach Company. Two vacation hotels were built, the Sagamore Lodge and Bradford Arms; both have been destroyed by fires. Sagamore Beach harbors a large complex of beaches and dunes on Cape Cod Bay.

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<sup>4</sup> [http://www.townofbourne.com/sites/bournema/files/file/file/downtown\\_action\\_plan.pdf](http://www.townofbourne.com/sites/bournema/files/file/file/downtown_action_plan.pdf)

**Bournedale** – In 1884, Bournedale was bustling with industry. In fact, it was the largest industrial area in the region. Industry was based on water power from the Herring River, which powered a Nail Factory, Saw Mill, Howard Iron Foundry, Grist Mill, and the Holway Axe Factory. The advent of steam power caused these businesses close within over time. An historic Native Burial Ground is also located in Bournedale. Today, Bournedale is well-known for its Herring Run, originating at the canal.

**Buzzards Bay** – Town Hall was built here in 1914 and it is still the center of community life for the town's eight villages. The village is being revitalized to attract businesses and residents. It is bordered by bogs farms, open space, and the Cape Cod Canal.

**Mashnee** – Originally, this village was Mashnee Island, an island occupied by a sailing camp for boys during the 1920s and 1930s. Dredged material from the Cape Cod Canal was used to connect the island to the mainland when the canal was rerouted to the other side of Mashnee Island; the connecting peninsula is owned and managed by the USACE and Mashnee Island is now a community of private homes.

**Gray Gables** – For approximately 13 years, this area of Bourne was the summer home of President Grover Cleveland and for the four years of his presidency, it was the summer White House. Cleveland had two children born at his home in Gray Gables, one of whom died in 1904. He never returned after that. His home became an Inn and burned down on December 13, 1974. Today, Gray Gables is a community of private homes and a town beach.

Bourne's villages have existed for over one hundred years and although it has been said that the Cape Cod Canal somewhat divides the town, according to the 1884 Town Report, "In natural resources our town is unsurpassed, among our people all the elements of success abound."

### 3.1.3 National and State Register of Historic Places

The Town of Bourne has a large number of sites and structures that have architectural, archaeological or historical significance. Currently, there are three properties listed on the National and Commonwealth of Massachusetts Register of Historic Places. They include the George I. Briggs House, the Cleveland Ledge Light Station and Wing's Neck Light.

**George I. Briggs House** – The George I. Briggs House is located on Sandwich Road and was listed on the National Register in September, 1981. George I. Briggs was instrumental in the incorporation of Bourne as a Town after its separation from Sandwich in 1884. A friend of President Grover Cleveland, Briggs became one of Bourne's first selectmen, the first school committee chairman, a library trustee, and chairman of the Barnstable County Commission for many years. This Greek revival style house has been restored and furnished to reflect the period from 1840 to 1910, an important time for the Briggs family and Bourne.

**Cleveland Ledge Light Station** – The Cleveland Light Station is located in Buzzards Bay and was listed on the National Register in June 1987. The station was established in 1943 and it was automated in 1978 with a white light that flashes every ten seconds. Cleveland Ledge Light, at the western entrance to the Cape Cod Canal, is the last commissioned lighthouse built in New England, and the only one built by the Coast Guard. Cleveland Ledge was named after President Grover Cleveland, who frequently fished in the area. Built by the J.F. Fitzgerald Construction Company of Boston of steel and reinforced concrete, the style of Cleveland Ledge Light is unique among New England's lighthouses. As Donald Davidson wrote in

*America's Landfall: The Lighthouses of Cape Cod, Nantucket and Martha's Vineyard*, its architecture is "uncharacteristic of any frugal, Yankee heritage, and it closely resembles instead the art deco lines of some other time and place."

The 50-foot tower is on top of two stories that were used as living and work quarters. Below the main deck were the engine room, fuel tanks and four water tanks with a capacity of 4,800 gallons. The entire structure sits on a 52-foot cylindrical caisson pier.

**Wing's Neck Light** – The Wing's Neck Light is located on Wing's Neck Road and it was listed on the National Register in June, 1987. The lighthouse was built in 1849 and it was deactivated in 1945. The peninsula called Wing's Neck extends from Pocasset on Cape Cod out into Buzzards Bay. The land where the lighthouse is located was once swampy and mosquito-infested.

The first Wing's Neck Light, built in 1849 for \$3,251, was a so-called Cape Cod- style structure, with a white, wooden hexagonal tower and lantern room on top of a stone keeper's house. The light was 38-feet above the ground and 50-feet above sea level. In the 1870s, it was reported that the weight of the lantern was crushing the roof of the dwelling.

The first keeper, Edward D. Lawrence, was removed in 1854 for belonging to the wrong political party. Lawrence returned as keeper in 1865 and remained until 1887, serving a total of 28 years at Wing's Neck. John Maxim, who was keeper in the 1850s, was killed at the Battle of Gettysburg. A Fresnel lens was added to Wing's Neck Light in 1856. A fire badly damaged the structure in 1878.

Repairs put off the building of a new light, but finally in 1889-90 a new keeper's house and hexagonal lighthouse tower were built. The walkway connecting the house and tower was added in 1899, and a fog bell tower was erected in 1902.

With the building of Cleveland Ledge Light, Wing's Neck Light was considered expendable. The station was discontinued in 1945 and went up for sale in 1947. It was bought by Frank and Irene Flanagan of Boston for \$13,738. Wing's Neck Light is on private property and the grounds are not accessible to the public. It can be viewed from a gate about 100 yards from the lighthouse or by water.

### **3.1.4 Population Characteristics**

Examining demographic data as part of the OSRP update helps to form a framework of who is living in Bourne. Understanding how many people live in a community, who owns a home and who can afford to buy a home is important to recreation and open space because it helps define how much a community has developed and whether or not land needs to be preserved. It also highlights different population groups that may or may not have their recreational needs met through existing amenities and programs in the community.

#### Population Trends

Historically, Bourne started as a small, rural community that became incorporated as its own Town in 1884, when it seceded from Sandwich. In the early 1900s, the Town had a population of approximately 1,600 people. Between 1910 and 1940, Bourne grew at about the same pace as other neighboring communities on Cape Cod. By the 1950s, after World War II and with the increased reliance on the automobile, more and more people began to discover Bourne and the other towns on Cape Cod. Bourne

saw its largest population increase between 1950 and 1960 where it grew from 4,720 to 14,011 residents (or almost 200%). Interestingly, the population declined in the next decade by 10%, but since then, it has steadily increased to a population of 18,721 in 2000.<sup>5</sup>

In 2014, the Town of Bourne had an estimated population of approximately 19,700 residents, which was little changed from 2010, when the Town experienced a 5.5% increase from 2000 (Table 1). While seasonal residents and tourists annually increase Bourne’s population dramatically (doubles) between June and September, the Town’s overall year-round population growth and that of Barnstable County has remained relatively flat.

**Table 1. Population Change**

	2000	2010	2014 (Est)	% Change 2010-2014	County Share in 2014	Population Density 2014 (persons per square mile)
<i>Massachusetts</i>	6,349,113	6,547,629	6,745,408	3.0%	-	
<i>Barnstable County</i>	222,232	215,888	214,914	-0.5%	-	543.4
Barnstable	47,821	45,193	44,529	-1.5%	20.7%	741.7
<b>Bourne</b>	<b>18,721</b>	<b>19,754</b>	<b>19,711</b>	<b>-0.2%</b>	<b>9.2%</b>	<b>481.8</b>
Falmouth	32,660	31,531	31,631	0.3%	14.7%	714.9
Mashpee	12,946	14,006	14,049	0.3%	6.5%	598.4
Sandwich	20,136	20,675	20,536	-0.7%	9.6%	477.1
Yarmouth	24,807	23,793	23,592	-0.8%	11.0%	972.9

Source: U.S. Census Decennial Census 2000 and 2010; 2014 American Community Survey 5-Year Estimates.

Bourne is one of the smaller communities in the area. According to U.S. Census, Bourne’s population makes up approximately 9.2% of Barnstable County’s population overall. The nearby communities of Barnstable, Falmouth, Sandwich and Yarmouth all have larger populations, ranging from 20,500 to 44,500 residents. Only Mashpee’s population is smaller; however, Bourne has a lower population density (persons per square mile) than Mashpee, and only slightly higher than Sandwich.

In 2008, population projections for 2020 were expected to be 24,000 or more; however, projections prepared by UMASS Amherst’s Donohue Institute are more conservative in that they predict Bourne’s population to remain below 20,500 (Table 2). Much of this is based on slow economic growth over the past five years regionally and across the country following the 2008 Great Recession.

**Table 2. Population Projections (2015-2035)**

	Census 2010	Projection 2015	Projection 2020	Projection 2025	Projection 2030	Projection 2035
Bourne	19,754	20,721	20,480	20,430	20,361	20,387
Growth	-	4.9%	-1.2%	-0.2%	-0.3%	0.1%

Source: UMass Donohue Institute Vintage 2015 Population Projections. March 2015. Available at <http://pep.donahue-institute.org/>. Obtained September 20, 2016.

Understanding the make-up of Bourne’s population over time is important because it allows for insight into how the town has grown and changed. For the Open Space and Recreation Plan, it is helpful way to understand the composition of the local population, by age. The open space and recreation needs of

<sup>5</sup> U.S. Census Bureau Decennial Census, 1900-2000.

children and young adults are different than those of teenagers, which in turn differ from those of adults and the elderly.

As illustrated in Table 3, Bourne residents are getting older. This shift was evident in 2000, where the U.S. Census reported a major increase in residents over the age of 45 from the previous decade, in particular between the ages of 45 to 54 years, which grew by 84%. The table also shows a decrease in the number of children 9 years and younger. The trend continued through 2014, where the American Community Survey (ACS) estimated a continued increase in cohorts over the age of 45, and a decrease in younger age groups, including youth under the age of 14. From 2000 to 2014, the median age of Bourne residents increased by 8.5 years, from 39.2 to 47.7. More significantly, in the last five of those 14 years (2009 to 2014), the median age increased by nearly six years.

**Table 3. Bourne Population by Age**

	1990	2000	Change 1990-2000	2009 Estimate	2014 Estimate	% 2014 Popn	Change 2000-2014
Under 5 years	1,278	1,171	-8.4%	1,035	857	4.3%	-26.8%
5 to 9 years	1,158	1,136	-1.9%	1,069	687	3.5%	-39.5%
10 to 14 years	1,022	1,162	13.7%	1,030	1,033	5.2%	-11.1%
15 to 19 years	1,032	1,169	13.3%	1,719	1,570	7.9%	34.3%
20 to 24 years	1,299	1,209	-6.9%	1,718	1,444	7.3%	19.4%
25 to 34 years	2,667	2,355	-11.7%	1,458	1,513	7.7%	-35.8%
35 to 44 years	2,349	2,756	17.3%	2,522	2,112	10.7%	-23.4%
45 to 54 years	1,412	2,598	84.0%	2,944	2,999	15.2%	15.4%
55 to 59 years	678	1,005	48.2%	1,215	1,712	8.7%	70.3%
60 to 64 years	783	861	10.0%	1,015	1,404	7.1%	63.1%
65 to 74 years	1,380	1,783	29.2%	1,864	2,193	11.1%	23.0%
75 to 84 years	784	1,138	45.2%	1,282	1,506	7.6%	32.3%
85 years and over	222	378	70.3%	524	719	3.6%	90.2%
Median age (years)	NA	39.2	-	42	47.7	-	8.5

Source: U.S. Census 1990 and 2000 Decennial Census; 2009 and 2014 American Community Survey 5-Year Estimates

Table 3 also shows that residents ages 45 to 54 years make up the largest portion of the Town’s population (15.2%), followed by those ages 65 to 74 years (11.1%) and 35 to 44 years (10.7%). Residents 64 years and older comprise nearly one quarter (22.4%) of the Town. Youth (19 years and younger) also represent nearly one quarter (21%), but if the trend toward an older community continues, the proportion of young people will continue to decline.

While open space amenities and recreational facilities should be available to residents of all ages, there may be opportunities to investigate where to enhance opportunities relative to specific age groups. That is, various types of passive and active recreational facilities could be added, maintained, and improved near specific population groups. For example, an opportunity for adding a walking trail, or new park bench may be appropriate near the Veterans Memorial Community Center, which is where the Council on Aging is located and where they already offer a considerable number of programs such as knitting, exercise classes, and woodworking. Likewise, adding a pocket park or improving a park would be beneficial in a neighborhood where there is known to be a concentration of families with children. The Town should also consider spaces that bring various age groups together. A great local example is the

Town’s new inclusive playground at the Canal Crossways parcel, adjacent to Keystone Place, a Buzzards Bay assisted living facility. The playground includes equipment accessible to children with disabilities and includes an area with exercise equipment that can be used by adults with and without disabilities.

### Economic Trends

Early industries on Cape Cod after the first settlers arrived in the early 1600s, included whaling, fishing and shellfishing. However, the Cape also created a land-based economy to support these maritime pursuits. Manufactured products included rope (hemp), ship building, sail making, and anchor forging. However, despite the usefulness of these products and the overall success of these industries, Cape Cod remained largely undeveloped until the 1920s, when Cape Cod began to emerge as a tourist destination. After World War II, it became a major regional tourist area for out-of-state vacationers. Today, a large portion of Cape Cod’s economic base comes from money generated outside the region brought in by tourists, second home owners, and retirees.

Residents 16 years and older make up the Town’s potential labor force, which has been estimated to be 86% of year-round residents. Approximately 61% of residents over the age of 16 were working (ACS 2014). Those not in the labor force are mainly students, homemakers, retired workers, seasonal workers who were not looking for work off-season, institutionalized people, and people doing only incidental unpaid family work (less than 15 hours during the reference week).<sup>6</sup> This indicates that 39% of residents over the age of 16 are not working, and so if we consider the demographic make-up of the population, many may be retirees who live in Bourne year round.

Since 2010, the unemployment rate in Bourne has decreased from 8.8% to 5.9% in 2015 (Table 4). In 2014, it was estimated that the working labor force was employed predominately in the private sector (Table 5). Because tourism is a large part of the local economy, Table 6 shows that approximately one quarter of residents were employed in industries that support tourism, including retail, arts, entertainment, recreation, accommodations, and food services (21.8% combined). Another quarter worked in educational services and health care and social assistance industries.

**Table 4. Bourne Unemployment Rates (2010-2015)**

Year	Labor Force	Employed	Unemployed	Unemployment Rate
2015	10,402	9,791	611	5.9
2014	10,380	9,684	696	6.7
2013	10,283	9,488	795	7.7
2012	10,248	9,433	815	8.0
2011	10,199	9,300	899	8.8
2010	10,304	9,302	1,002	9.7

Source: Massachusetts Department of Labor and Workforce Development

<sup>6</sup> U.S. Census Labor Force Statistics Definition. Available at [http://www.census.gov/people/laborforce/about/acs\\_employ.html](http://www.census.gov/people/laborforce/about/acs_employ.html). Obtained September 21, 2016.

**Table 5. Class of Workers in Bourne**

Employed Civilian Workers (16 years and older)	Private Wage/Salaries	Government Workers	Self Employed
9,302	75.6%	16.5%	7.9%

Source: 2014 American Community Survey 5-Year Estimates

**Table 6. Employment Industries of Bourne Residents**

Industry	% of Labor Force
Civilian labor force employed population 16 years and over	9,302
Agriculture, forestry, fishing and hunting, and mining	0.3%
Construction	9.4%
Manufacturing	5.4%
Wholesale trade	3.0%
Retail trade	11.7%
Transportation and warehousing, and utilities	5.1%
Information	2.9%
Finance and insurance, and real estate and rental and leasing	6.0%
Professional, scientific, and management, and administrative and waste management services	9.6%
Educational services, and health care and social assistance	26.7%
Arts, entertainment, and recreation, and accommodation and food services	10.1%
Other services, except public administration	3.4%
Public administration	6.4%

Source: 2014 American Community Survey 5-Year Estimates

During the fourth quarter of 2015, there were over 700 businesses in Bourne, employing an average 8,256 people monthly, with total wages for the quarter over \$100 million (Table 7). Overall, Bourne’s local businesses are service-oriented and can be influenced by the seasonality of Cape Cod. Similar figures were reported during the third quarter (July through September, peak season in the Cape Cod region): 714 businesses, slightly higher average monthly employment (8,482), but lower total wages (\$98,578,276).

**Table 7. Local Business Composition (Fourth Quarter, 2015)**

	No. of Businesses	Number of Employees			Total Wages	Average Monthly Employment	Average Weekly Wages
		Oct-15	Nov-15	Dec-15			
<b>All Businesses</b>	<b>716</b>	<b>8,361</b>	<b>8,215</b>	<b>8,193</b>	<b>\$106,821,834</b>	<b>8,256</b>	<b>\$995</b>
<b>Goods-Producing Industries</b>	<b>128</b>	<b>1,059</b>	<b>1,027</b>	<b>1,016</b>	<b>\$18,783,703</b>	<b>1,034</b>	<b>\$1,397</b>
Natural Resources (Agriculture, Forestry, Fishing, Hunting)	9	49	51	46	\$670,491	49	\$1,053
Construction	92	546	517	503	\$8,403,885	522	\$1,238
Manufacturing	27	464	459	467	\$9,709,327	463	\$1,613
Durable Goods Manufacturing	19	444	441	448	\$9,525,299	444	\$1,650
Non-Durable Goods Manufacturing	8	20	18	19	\$184,028	19	\$745
<b>Service-Providing Industries</b>	<b>588</b>	<b>7,302</b>	<b>7,188</b>	<b>7,177</b>	<b>\$88,038,131</b>	<b>7,222</b>	<b>\$938</b>
Trade, Transportation and Utilities	155	1,940	1,969	2,003	\$25,814,925	1,971	\$1,007
Information	17	221	225	228	\$4,060,716	225	\$1,388
Financial Activities	42	202	199	190	\$2,755,804	197	\$1,076
Professional and Business Services	120	726	706	676	\$11,384,502	703	\$1,246
Education and Health Services	101	2,032	2,070	2,020	\$22,742,327	2,041	\$857
Leisure and Hospitality	84	1,195	1,090	1,082	\$6,506,257	1,122	\$446
Other Services	52	341	343	336	\$3,472,951	340	\$786
Public Administration	17	645	586	642	\$11,300,650	624	\$1,393

Source: Massachusetts Department of Labor and Workforce Development. ES-202 Report, Fourth Quarter 2015.

Household income information for Bourne from the ACS estimates that the median household income in 2014 was \$80,740, and the median family income was \$63,664 (2014 inflation-adjusted dollars).

### Housing Trends

In 2014, Bourne had an estimate 11,286 housing units, an increase of 17% from 2000. Of these units, 72.2% were occupied units, meaning someone lived there year-round. Of the occupied housing units, 77.4% were owner-occupied, and 22.6% were rented. Nearly 3,100 units were estimated to be vacant (27.8% of all housing units), but as with many other Cape Cod communities, 80.7% of them are considered to be seasonally occupied. The number of seasonally vacant units has increased since 2000, but the proportion of the overall number of units has slightly decreased. This may indicate that more units are being rented year-round than seasonally and are available for new tenants. Overall there is an increase in the number of year-round units and residents.

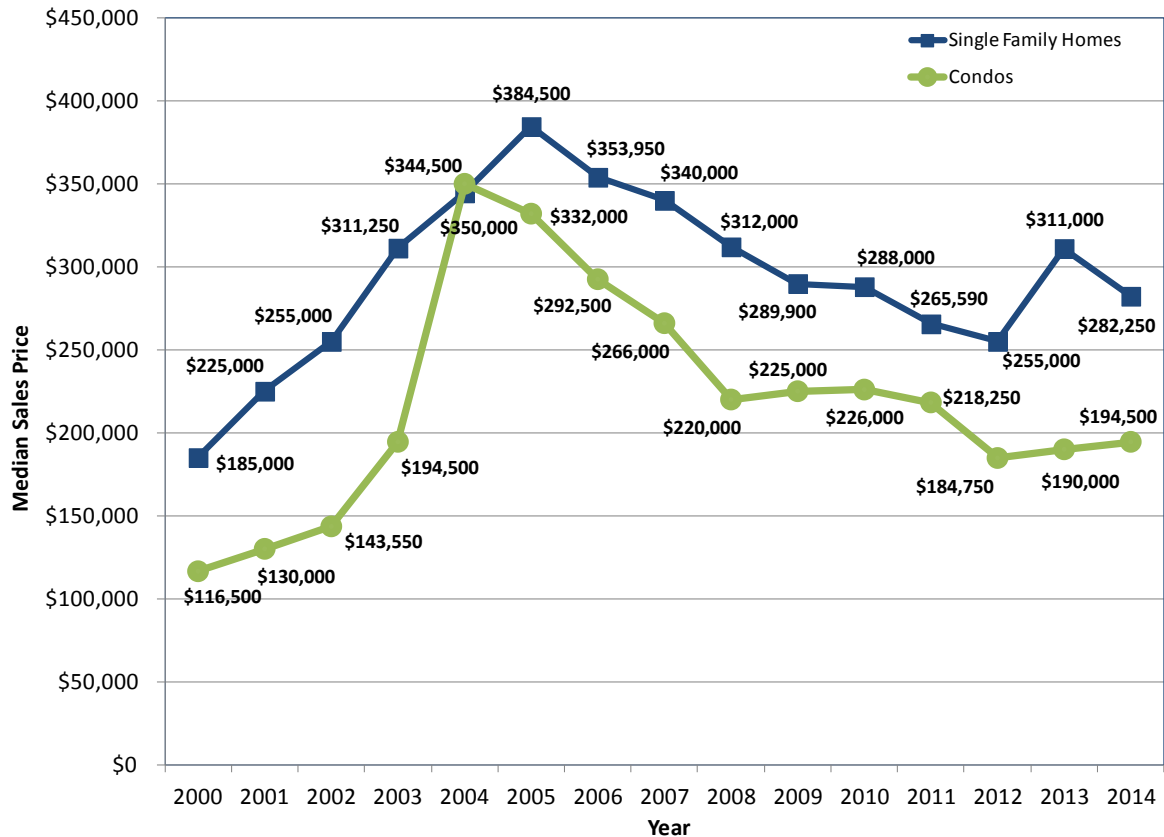
**Table 8. Types of Housing Units**

	2000	2010	2014
Total housing units	9,648	10,805	11,286
Occupied units	7,439	7,866	8,152
Owner occupied	5,324	5,951	6,306
Renter occupied	2,115	1,915	1,846
Vacant units	2,209	2,939	3,134
Seasonally occupied	1,861	2,221	2,529

Source: 2000 and 2010 U.S. Census Decennial Census; 2014 American Community Survey 5-Year Estimates



According to the Bourne Housing Production Plan (2014), the Town’s housing market, which peaked in 2005, has rebounded from the housing retraction of early 2006, which ultimately led to the 2008 Great Recession. As show in Figure 1, median single-family sale prices began to increase from 2012 to 2013. The decline from 2013 to May of 2014 is due to the relatively small number of sales the first part of 2014, 72, compared to 231 in 2013. Overall, the number of home sales has steadily increased since 2009 as the region has slowly recovered economically (Table 9).



Source: Bourne Housing Production Plan (July 2014), Table III-16 Median Sales Prices, 1990 through May 2014

**Figure 1. Median Home Sale Prices in Bourne (2000 to May 2014)**

**Table 9. Number of Home Sales (2005 to May 2014)**

Year	# of Single Family Home Sales	# of Condo Sales
Up to May 2014	72	12
2013	231	43
2012	243	58
2011	177	50
2010	194	58
2009	190	40
2008	190	51
2007	187	72
2006	214	77
2005	282	125

Source: Bourne Housing Production Plan (July 2014), Table III-16 Median Sales Prices, 1990 through May 2014

## 3.2 Regional Planning

### 3.2.1 Cape Cod Comprehensive Economic Development Strategy (CEDS)

The overall economic development strategy for Cape Cod which is administered by the Cape Cod Commission is to “implement a balanced, sustainable economic development strategy capable of absorbing the effects of seasonal fluctuations in economic activity, which integrates economic and environmental concerns.” This overall vision is the focus of the Cape Cod region’s Comprehensive Economic Development Strategy which is a five-year strategic plan that is updated annually.

Cape Cod has been hailed as a popular tourist and seasonal destination for years. Strong industries that blanket all of Cape Cod include fishing, real estate, tourism and hospitality, education and locally owned businesses.

### 3.2.2 Cape Cod Regional Policy Plan

The Cape Cod Regional Policy Plan (CCRPP) is a document that is written and updated every five years by the Cape Cod Commission. The purpose of the report is to develop a growth policy for Cape Cod, identify key resources of regional importance and to provide a framework for local comprehensive planning efforts. The current regional policy plan was completed in 2009 and most recently amended in 2012.

The CCRPP discusses land use and growth management, natural resources, economic development, community facilities and services, affordable housing, and community character. The planning effort undertaken to create and update this resource are invaluable to the Town of Bourne because it provides an in-depth evaluation of how Bourne functions in its region and relative to neighboring towns. In addition, the CCRPP offers Bourne the opportunity to evaluate issues that are of regional significance, like water quality and conservation.

One section of the CCRPP identifies Resources of Regional Importance as required by the Cape Cod Commission Act Section 7(b)(1), which states that critical resources and management needs must be specified. For the purposes of the CCRPP, criteria for selecting these resources were those that are significant to more than one town and those that cross jurisdictional boundaries. Key regional resources on Cape Cod with relevance to the Bourne OSRP update include, but are not limited to:

#### Natural Resources

- Groundwater recharge areas to existing and future public water supply wells
- Groundwater-defined watersheds that discharge to coastal embayments
- Inland and coastal wetlands and ponds and their recharge areas floodplains, coastal banks, beaches, and dunes
- Shellfish and finfish habitat
- Rare plant and animal habitat and unusual habitats
- Designated Areas of Critical Environmental Concern
- Federal, state and regional parks and natural reserves
- Town conservation lands
- Private open space

#### Economic, Historic and Cultural Resources

- Historic village centers

- Working waterfronts and harbor areas
- Active aquacultural and agricultural areas, including cranberry bogs
- Properties listed or eligible for listing on the National or State Register of Historic Places
- Scenic Landscapes
- Archaeological resource areas

After the identification of these regional resource areas, Districts of Critical Planning Concern (DCPC) were designated, one of which is located in Bourne. Such a designation is given to an area where the CCC and a local community feel there is a resource of critical value to the area and in need of protection from inappropriate development. According to the Cape Cod Commission Act, a proposed district must possess “significant natural, coastal, scientific, cultural, architectural, archaeological, historic, economic, or recreational resources or values of regional, statewide or national significance.” The DCPC designation is a regulatory tool that can augment existing local bylaws and regulations in areas where the laws may be unable to prevent environmental degradation or may discourage sound economic development or construction of affordable housing. It is a tool that gives a community a “time-out” to conducting planning and analysis of the area and adopt special rules or regulations to govern development within the district to protect the critical resources.

The DCPC in Bourne is located in Bournedale and was designated in 1998 by the Barnstable County Assembly of Delegates. It should be noted that most DCPCs on Cape Cod are designated by local communities and not necessarily the CCC. The Bournedale district encompasses nearly 2,000 acres of land in the northeastern part of Bourne. The town nominated the district to protect drinking water quality, preserve an adequate water supply, assure an adequate and safe transportation network, preserve the area’s unique historic resources and community character, and protect rare wildlife habitat and significant natural resources. The town approved implementing regulations that encourage cluster development and increase resource protection.

### **3.2.3 Regional Open Space**

The Cape Cod Commission (CCC) was visionary in the Regional Policy Plan when they stated that one of their goals is to protect one half of the remaining developable land on Cape Cod as permanently protected open space in order to preserve rural character, scenic amenities and ecological integrity of Cape Cod. With so many fragile environmental resources and real water quality and quantity issues, this goal is both logical and necessary. Protecting a large quantity of open space will require local, regional and statewide cooperation and partnerships. The Town of Bourne has already taken a step towards cementing its commitment by making it a personal goal of the community to protect one half of its remaining developable land as permanently protected open space as detailed in the recently updated Local Comprehensive Plan (2008).

Steps towards reaching this goal have been taken with the formation of the Cape Cod land bank, communities adopting the Community Preservation Act, the Cape Cod Pathways program, local open space initiatives (e.g. committees) and private land trusts. According to the Cape Cod Regional Policy Plan, Cape Cod towns should consider taking the following actions at a local level:

- Seek to protect Significant Natural Resource Areas (SNRAs) through local bylaw mechanisms like mandatory clustering, increased lot sizes and overlay districts, where appropriate. SNRAs are areas identified by the CCC that presently provide a system of wildlife habitats and corridors across the Cape. Areas are shown on the Cape Cod SNRA Map in the Regional Policy Plan and

include wellhead protection areas, rare species habitat, priority natural communities, critical upland areas, among others.

- Work with local land conservation organizations to identify, acquire, and manage open space to meet projected community needs.
- Maintain and protect public access for recreation to freshwater and saltwater bodies.
- Seek to acquire tax title lands and hold them for purposes like open space, affordable housing or municipal services. Properties with environmental significance should be put under the Conservation Commission's jurisdiction.
- Create a local pathway committee to work with the CCC to identify and designate suitable locations for walking paths that would be added to the pathways network.
- Establish procedures for evaluating and approving and conservation restrictions.
- Revisit cluster or open space bylaws (if existing) and provide provisions that encourage clustering lots outside of the most sensitive resources areas and providing meaningful and usable open space with shared access. Encourage landowners to restore blighted or abandoned areas to open space either as a landscaped park or natural area.

Bourne has done very well with the list.

### **3.2.4 Regional Transportation**

The draft 2016 - 2019 Regional Transportation Plan prepared by the CCC was endorsed on June 20, 2015. It highlights transportation projects across the Cape and specifically for bicycle and pedestrian projects reported in the Town of Bourne. A website ([www.capecodcommission.org/rtp](http://www.capecodcommission.org/rtp)) has been developed to track the plan's progress and provide updates on meeting schedules as well as key decisions.

Since 2012, there have been two Roadway Safety Audits completed for Bourne:

#### Route 28 between Bourne Rotary and Otis Rotary

Completed in 2013, the audit includes recommendations to improve bicyclist and pedestrian safety:

- As part of long-term reconstruction efforts, consider providing pedestrian and bicycle accommodations, such as the planned shared-use path parallel to Route 28.
- Consider pedestrian and bicycle crossing infrastructure in conjunction with the proposed Route 28 parallel shared-use path.

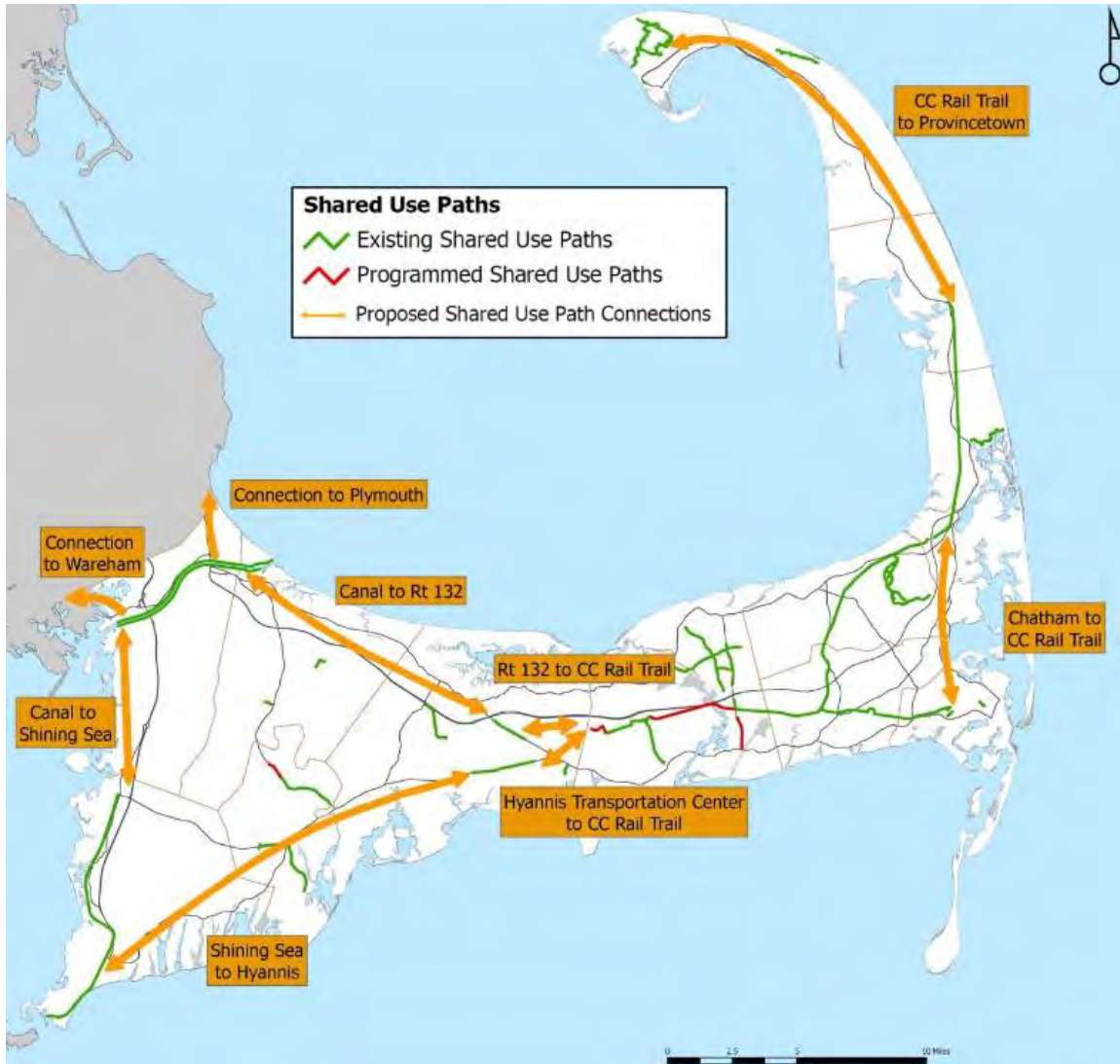
#### Sandwich Road at Cranberry Highway

Completed in 2012, the audit includes recommendations to improve bicyclist and pedestrian safety:

- Provide improved accommodation for pedestrians and bicyclists through roadway improvements or maintenance efforts.

### **Integrated Bicycle Plan for Cape Cod/Bicycle Feasibility Study**

The Cape Cod National Seashore, in partnership with the CCC, is undertaking a major transportation planning effort likely to yield projects for inclusion in the Regional Transportation Plan. Figure 2 serves as an overall vision for bicycle path connections to and within Cape Cod through an expansion of the Cape's bicycle path infrastructure.



Source: Cape Cod 2016 Regional Transportation Plan

**Figure 2. Shared Use Paths Vision Map**

### **Claire Saltonstall Bikeway**

The Claire Saltonstall Bikeway (State Bicycle Route 1) starts on Cape Cod at Route 3A in Bourne and is a series of paths and on-street routes that travel from Boston to Provincetown and Falmouth. It is also considered one of the best signed bicycle routes on Cape Cod, according to MassBike. However, many of the signature green oval signs have disappeared, making the route difficult to follow. In February of 2015, the CCC in collaboration with bikeway committee members from Bourne published “Claire Saltonstall memorial Bikeway: Cape Cod Segment – Recommended Route Revisions” to create more comfortable conditions for bicyclists, including the use of lower volume roads and shared-use paths. The full report is available online ([www.capecodcommission.org/bikeped](http://www.capecodcommission.org/bikeped)).

### **Connecting Town Centers to the Regional Pedestrian & Bicycling Network on Cape Cod**

Produced in 2014, this study evaluates connectivity between town center areas and existing bicycle paths and routes, identifying areas where sidewalks are needed as part of the regional goal to facilitate

bicycling and walking as viable transportation modes on Cape Cod. A recommended connector for Bourne includes Old Bridge Road which would connect the Cape Cod Canal bike path to Main Street. This would include a 0.3 mile segment with share the road treatment options for signage and/or pavement markings to guide bicyclists and to alert vehicles of cyclists' presence.

### **Closing the Gaps: Connecting Cape Cod's Bicycle and Pedestrian Network to Transit Routes**

Released in 2013, the intent of this effort was to evaluate connectivity of existing bicycle routes and paths with existing public transit (bus) routes to identify improvements to eliminate gaps and sidewalk accessibility along bus routes. Recommendations in Bourne include the following:

#### Perry Ave. Connector

- Connects Canal bike path to Main Street (bus route). Share the road – striping, signage, bike lanes.
- Connects to 3 Mile Park Overlook, but not direct access to Canal bike path.

#### Old Bridge Road Connector

- Connects Canal bike path to Main Street (bus route). Share the road – striping, signage, bike lanes.
- Direct connection.

#### County Road sidewalk

- Bus route pedestrian access.
- Lacks sidewalks

#### Route 28A/Sandwich Road sidewalk

- Bus route pedestrian access.
- Lacks sidewalks most of route.

The studies completed to date include a range of infrastructure improvements (i.e., improvements to existing routes and the construction of new facilities) and programmatic initiatives (i.e., education and outreach efforts, maintenance plans) intended to promote bicycling, enhancing bicycle access and improve safety. Classifications were developed to categorize proposed projects; improvements to existing facilities; new facilities; and other initiatives. The selected projects were determined based on the level of benefit and the barriers to implementation.<sup>7</sup>

### Improvements to Existing Facilities

#### *Project 5.2.13: Connect Cape Cod Canal Bikeway to Hyannis Transportation Center*

Project Description – Linking the developed areas of Bourne and Sandwich to the Hyannis Transportation Center, approximately 22 miles away would improve multimodal transportation options to the Upper Cape.

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[http://www.capecodcommission.org/resources/transportation/rtp/2016/FinalReport/Appendices/RTP%20Appendix%20F%20-%20Bicycle%20&%20Pedestrian%20\(Endorsed%207-20-15\).pdf](http://www.capecodcommission.org/resources/transportation/rtp/2016/FinalReport/Appendices/RTP%20Appendix%20F%20-%20Bicycle%20&%20Pedestrian%20(Endorsed%207-20-15).pdf)

*Project 5.3.7: Identify a “Bay Route” from the Cape Cod Canal in Bourne to Orleans*  
Project Description – A “Shore Route” of approximately 30 miles is envisioned to provide continuous bicycle access and connectivity across the six localities along Cape Cod Bay.

*Project 5.3.8: Extend Shining Sea Bikeway through Bourne to Cape Cod Canal Bikeway*  
Project Description – This 6 mile project in the Town of Bourne proposes to create a rails-with-trails facility from the northern terminus of the Shining Sea Bike Path to the Cape Cod Canal Bikeway via the existing MassDOT/Bay Colony railroad right-of-way (ROW).

#### Other Initiatives

*Project 5.4.3: Cape Cod Nonmotorized Master Plan*  
Project Description – Develop a nonmotorized transportation master plan for Cape Cod that consolidates and integrates facilities, routes, and accommodations for bicyclists and pedestrians, including those owned or managed by localities, the National Park Service, and nonprofit organizations (such as conservation groups) into a single coherent network.

*Project 5.4.4: Development of Trail Access Parking Agreements*  
Project Description – Develop agreements with schools to use school parking lots during off-times for trail parking to in order to alleviate parking demands resulting from trail use.

*Project 5.4.5: Safety Education & Outreach*  
Project Description – Develop and implement an education and outreach initiative aimed at bicyclists and motorists with the intent of improving safety for bicyclists.

*Project 5.4.6: Maintenance Program Development & Implementation*  
Project Description –Develop and implement a maintenance program to ensure appropriate and routine maintenance is provided for bicycle facilities and accommodations.

*Project 5.4.7: Interpretive Film Promoting Cape-Wide Bicycle Network and Bicycle Safety*  
Project Description – Many of the attributes that make Cape Cod a popular destination are accessible and enjoyable by bicycle. As efforts to expand the bicycle network on Cape Cod continue, bicycling as both recreation and a transportation mode on the Cape will continue to grow in popularity.

*Project 5.4.8: Enhance Bicycle Shuttling Opportunities*  
Project Description – As a result of the many gaps in the existing bicycle infrastructure on the Cape, there is a need for convenient and widely accessible bicycle shuttle between destinations.

*Project 5.4.9: Utilize Utility Easements and Infrastructure projects to Establish Bicycle Routes and Corridors*  
Project Description – Use of utility rights of way and easements for bicycle routes and corridors has the potential to both increase the options for bicycle routes, while also reducing costs related to acquisition of right of way.

### 3.3 Growth and Development Patterns & Local Planning Efforts

#### 3.3.1 Land Use

The Town of Bourne was historically a small fishing and shellfishing village that over time has evolved into a medium sized rural community that as the first town on Cape Cod, welcomes residents and visitors to the region. Bourne is largely a residential community of villages that are dispersed throughout the 52.82 square miles (total land area is 40.90 square miles). Scattered throughout town are numerous business districts with several commercial strips, water resource districts and overlay zones, and a scenic development district. Due to its location on Cape Cod, Bourne has a significant amount of sensitive natural resources such as wetlands, salt marshes, cranberry bogs (mostly located in the southern and northernmost villages) and prime wildlife habitat that it must manage in conjunction with continued residential, commercial and industrial growth.

A snapshot of land uses in Bourne was developed using the most current data available through MassGIS.<sup>8</sup> Land is categorized as follows:

Cropland	Generally tilled land used to grow row crops. Boundaries follow the shape of the fields and include associated buildings (e.g., barns). This category also includes turf farms that grow sod.
Pasture	Fields and associated facilities (barns and other outbuildings) used for animal grazing and for the growing of grasses for hay.
Forest	Areas where tree canopy covers at least 50% of the land. Both coniferous and deciduous forests belong to this class.
Non-Forested Wetland	As defined by MassDEP
Mining	Includes sand and gravel pits, mines and quarries and any on-site machinery, parking lots, roads and buildings.
Open Land	Vacant land, idle agriculture, rock outcrops, and barren areas. Vacant land is not maintained for any evident purpose and it does not support large plant growth.
Participation Recreation	Facilities used by the public for active recreation, including ball fields, tennis courts, basketball courts, athletic tracks, ski areas, playgrounds, and bike paths plus associated parking lots. Primary and secondary school recreational facilities are in this category.
Water-Based Recreation	Swimming pools, water parks, developed freshwater and saltwater sandy beach areas and associated parking lots, including scenic areas overlooking lakes or other water bodies, which may or may not include access to the water (such as a boat launch). Marinas are separated (see below).
Multi-Family Residential	Duplexes (usually with two front doors, two entrance pathways, and sometimes two driveways), apartment buildings, condominium complexes, including buildings and maintained lawns.
High Density Residential	Housing on smaller than 1/4 acre lots.

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<sup>8</sup> Massachusetts Office of Geographic Information ([MassGIS](#))



Medium Density Residential	Housing on 1/4 - 1/2 acre lots.
Low Density Residential	Housing on 1/2 - 1 acre lots.
Saltwater Wetland	As defined by MassDEP
Commercial	Malls, shopping centers and larger strip commercial areas, plus neighborhood stores and medical offices (not hospitals).
Industrial	Light and heavy industry, including buildings, equipment and parking areas.
Transitional	Open areas in the process of being developed from one land use to another (if the future land use is at all uncertain).
Transportation	Airports (including landing strips, hangars, parking areas and related facilities), railroads and rail stations, and divided highways (related facilities would include rest areas, highway maintenance areas, storage areas, and on/off ramps). Also includes docks, warehouses, and related land-based storage facilities, and terminal freight and storage facilities. Roads and bridges less than 200 feet in width that are the center of two differing land use classes will have the land use classes meet at the center line of the road (i.e., these roads/bridges themselves will not be separated into this class).
Waste Disposal	Landfills, dumps, and water and sewage treatment facilities such as pump houses, and associated parking lots. Capped landfills that have been converted to other uses are coded with their present land use.
Water	As defined by MassDEP
Cranberry bog	Both active and recently inactive cranberry bogs and the sandy areas adjacent to the bogs that are used in the growing process. Includes parking lots and machinery.
Powerline/Utility	Powerline and other maintained public utility corridors and associated facilities, including power plants and their parking areas.
Saltwater Sandy Beach	As defined by MassDEP
Golf Course	Includes the greenways, sand traps, water bodies within the course, associated buildings and parking lots.
Marina	Include parking lots and associated facilities but not docks.
Urban Public/ Institutional	Lands comprising schools, churches, colleges, hospitals, museums, prisons, town halls or court houses, police and fire stations, including parking lots, dormitories, and university housing. Also may include public open green spaces like town commons.
Cemetery	Includes the gravestones, monuments, parking lots, road networks and associated buildings.
Nursery	Greenhouses and associated buildings as well as any surrounding maintained lawn.
Forested Wetland	As defined by MassDEP

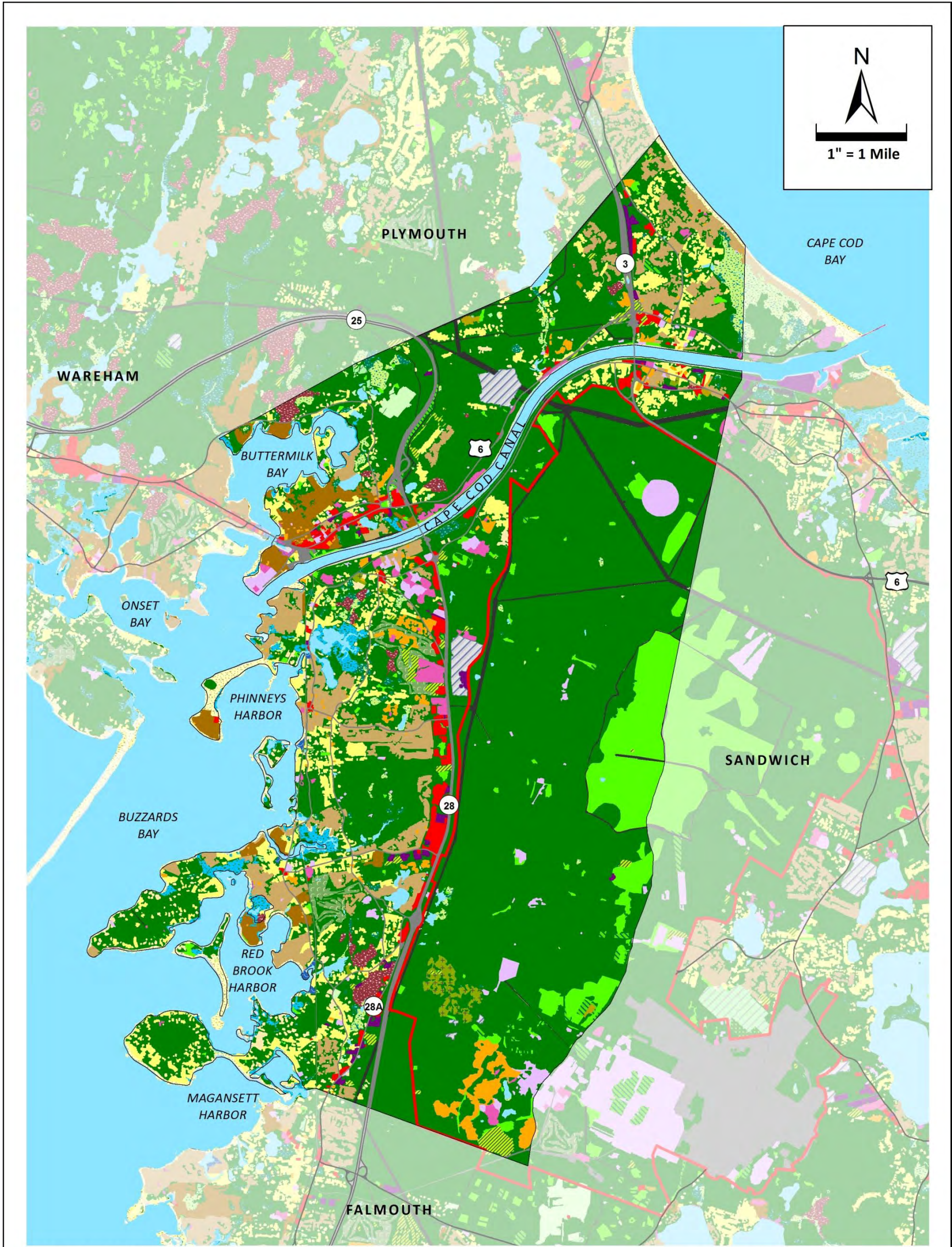
Very Low Density Residential	Housing on > 1 acre lots and very remote, rural housing.
Junkyard	Includes the storage of car, metal, machinery and other debris as well as associated buildings as a business.
Brushland/ Successional	Predominantly (> 25%) shrub cover, and some immature trees not large or dense enough to be classified as forest.

Nearly 62% of the Town’s land is categorized as forest (Table 10, Map 2). While a majority of this land is within JBCC, there are large tracts of undeveloped forest north of the Cape Cod Canal (Carter Beal Conservation Area/Sacrifice Rock Woods) and off of County Road (Town Forest). Residences are the next largest land use (15.9%).

**Table 10. Land Uses in Acres, 2005**

Land Use Category	Acres	% of Total Land Area
Agriculture (pasture, cropland)	82.59	0.3%
Commercial (commercial, urban public/institutional)	806.13	3.1%
Forest	16,115.95	61.4%
Industrial (industrial, mining, waste disposal, junkyard)	338.22	1.3%
Open Land (brushland, cemeteries, cranberry bogs, transitional, open land)	1,956.66	7.5%
Recreation (golf course, marina, participation recreation, beaches, water-based recreation)	767.63	2.9%
Residential	4,179.29	15.9%
<i>Residential - High to Medium Density</i>	1,982.21	-
<i>Residential - Low to Very Low Density</i>	1,768.67	-
<i>Residential - Multifamily</i>	428.40	-
Transportation/Utility	914.13	3.5%
Water	319.77	1.2%
Wetlands (forested, non-forested, salt water)	752.24	2.9%
<b>Total</b>	<b>26,232.60</b>	-

Source: MassGIS land use categories, 2005



\*GIS Data - MassGIS (2005)

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<b>Legend</b>		Town of Bourne	Joint Base Cape Cod	Major Roads	Urban Public Institutional
Forest	Cranberry Bog	Salt Water Wetland	Multi-Family Residential	Commercial	<p><b>Horsley Witten Group</b> Sustainable Environmental Solutions 90 Route 6A • Unit 1 • Sandwich, MA 02563 508-833-6600 • horsleywitten.com</p>
Brushland/Successional	Nursery	Saltwater Sandy Beach	High Density Residential	Industrial	
Open Land	Cropland	Marina	Medium Density Residential	Transportation	
Water	Pasture	Participation Recreation	Low Density Residential	Powerline/Utility	
Forested Wetland Non-Forested	Cemetery	Water-Based Recreation	Very Low Density Residential	Mining Waste Disposal	
Wetland	Golf Course	Transitional	Junkyard		

**Land Use (2005)**  
**Bourne Open Space and Recreation Plan**

Date: 8/10/2017 Map 2

Map 2. Current Land Use (2005)

Over the last several years, building permits for new single-family residential development has consistently increased from a total of seven in 2011 to 18 mid-stream (fiscal year-end June 30, 2016), with a combined total of 1,096 (Table 11), and generated \$99,956 in permit fees.

**Table 11. Building Permits Issued 2011-2015 by Construction Type**

	2011	2012	2013	2014	2015
New Single-Family	7	16	26	30	18
New Condo	11	6	14	0	0
Demo/Rebuild	6	5	5	8	6
Mixed Use (Residential/Commercial)	0	0	0	0	2
New Commercial	1	0	1	3	1
Other (Additions/Renovations)	970	962	825	968	1,069
<b>Total</b>	<b>995</b>	<b>989</b>	<b>871</b>	<b>1,009</b>	<b>1,096</b>

Source: 2015 Annual Town Report - Report of the Inspector of Buildings, Town of Bourne.

### 3.3.2 Zoning

Map 3 is the unofficial zoning map for the Town. According to the Bourne Zoning Bylaw (as amended at Special Town Meeting February 2015), there are 18 established zoning districts:

RESIDENCE (R-80) and RESIDENCE (R-40): To ensure continuance of a residential environment, with any development carefully related to environmental capacities and existing character.

VILLAGE BUSINESS (V-B): To provide for village-oriented business compatible with small scale environs and nearby residences.

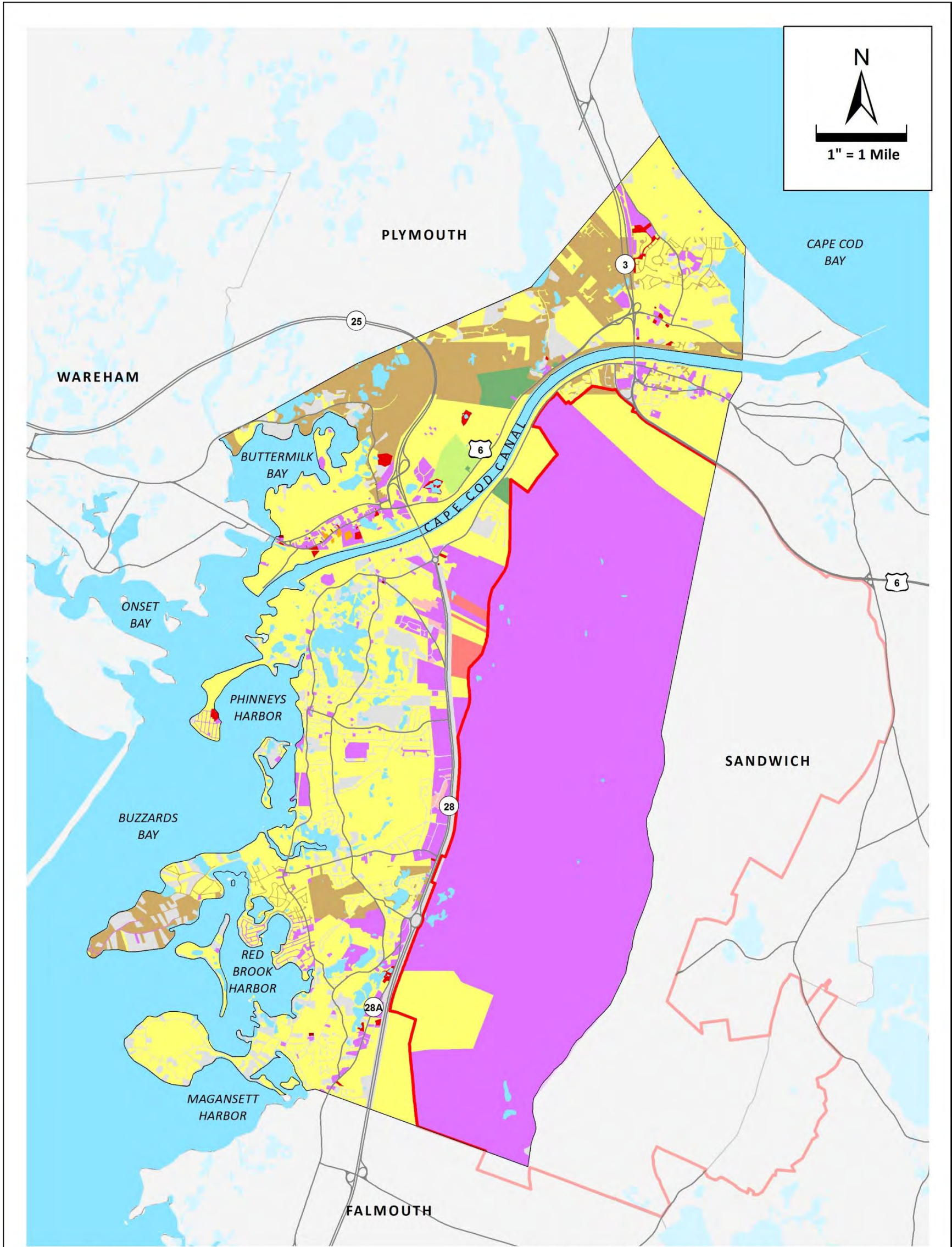
BUSINESS (B-1): To provide high-intensity generally pedestrian-oriented activity concentrations at village centers.

BUSINESS (B-2): To accommodate general business development in areas serviced by major traffic arteries, and where conflict with residential development will not be substantial.

BUSINESS (B-3): To reserve areas for business development without single-family residential development, in areas of 10 acres or more well suited by utilities, access, topography, and surroundings for such use.

BUSINESS (B-4): To provide for business development along arterial routes with careful control over environmental and traffic impacts.

SCENIC DEVELOPMENT DISTRICT (SDD): To gain intensive use of land, while at the same time preserving or enhancing highway views of the canal, ocean, or bay, preserving or enhancing landscaping and tree cover, minimizing visibility of parked autos and the intrusion of commercial signs, and avoiding creation of hazards or congestion. Each Scenic Development District created on the Zoning Map shall be not smaller than 40 acres in extent, shall be accessible directly via state-owned highway, and shall be so located that ocean or canal visibility exists or can reasonably be expected to be gained.



\*GIS Data - MassGIS (2005)

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**Legend**

- Town of Bourne
- Joint Base Cape Cod
- Major Roads

**Zoning Districts**

- |                        |             |             |
|------------------------|-------------|-------------|
| <all other values> (0) | B-3 (6)     | R-80 (504)  |
| [undefined] (1,312)    | B-4 (16)    | SDD (5)     |
| B-1 (6)                | DTD (6)     | SDD/R80 (1) |
| B-2 (41)               | R40 (8,438) |             |

**Horsley Witten Group**  
 Sustainable Environmental Solutions  
 90 Route 6A • Unit 1 • Sandwich, MA 02563  
 508-833-8600 • horsleywitten.com



**Zoning (Unofficial Map)  
 Bourne Open Space and  
 Recreation Plan**

Date: 8/10/2017

Map 3

Map 3. Unofficial Zoning Map

**GOVERNMENT DISTRICT (GD):** To provide for necessary governmental functions on publicly owned land.

**WATER RESOURCE DISTRICT (WR):** To protect the public health by preventing contamination of the ground and surface water resources providing water supply for the Town.

**SENSITIVE USE DISTRICT (SUD):** To provide for rarely encountered uses whose consequences for their surroundings warrant Town Meeting consideration of individual sites.

**BOURNEDALE OVERLAY DISTRICT (BOD):** To provide for the preservation of resources that are unique to the Bournedale area and which are fundamental to the character of the areas.

**TRAFFIC MANAGEMENT DISTRICTS (TMD):** To be superimposed over any other districts established in this Bylaw, and comprise the following areas:

- All land in the SDD Scenic Development District; and
- All land in the R-40 District bounded on the southwest by the Bourne Bridge, on the southeast by the Cape Cod Canal, on the northwest by the B-2 Business District and the SDD Scenic Development District, and on the northeast by the SDD Scenic Development District; and
- All land in the R-40 District bounded on the southwest by the Bourne Bridge, on the northwest by the Cape Cod Canal, on the southeast by Sandwich Road, and on the northeast by the extension of the northeasterly boundary of the Scenic Development District.

**DOWNTOWN DISTRICT (DTD):** To provide for a mixed use zone in Downtown Buzzards Bay that fulfills the goals, objectives and action strategies of the Bourne Local Comprehensive Plan 2007 and achieve the following purposes:

- To facilitate a higher density mix of commercial, entertainment, civic, educational, recreational, marine and residential uses.
- To create an environment that is a desirable place to live, work and socialize.
- To create a network of attractive streets, intermodal transportation modes and open spaces.
- To create a downtown that serves residents, employees, students and visitors alike.
- To connect the downtown with the waterfront.
- To preserve and enhance the distinctive characteristics of buildings and places significant in their architecture or to the history of Bourne, and to maintain and improve settings for such buildings and places with compatible designs.

**DOWNTOWN DISTRICT (DTD):** Contains four (4) subdistricts including the Downtown Core (DTC), Downtown Waterfront (DTW), Downtown Gateway (DTG) and Downtown Neighborhood (DTN). The Downtown District regulations are contained in Section 2800 of the Zoning Bylaws.

**DEVELOPMENT AGREEMENT OVERLAY (DOD):** To enable the Town of Bourne to enter into a consensual binding contract between two or more parties, typically between a land owner/developer and government agency; to allow the Town to gain certain public benefits and to provide protection for land owner/developer against regulatory changes.

THE MARINE CENTER OVERLAY DISTRICT (MCO): To be superimposed over any other districts established in this Bylaw, and to apply to those areas as shown on the map entitled ‘Marine Center Overlay District,’ dated March 22, 2007.

SOLAR PHOTOVOLTAIC OVERLAY DISTRICT (SPOD): To promote the goals of the Local Comprehensive Plan and the Commonwealth of Massachusetts Green Communities Act, by providing expedited project plan review and design standards for large-scale, ground-mounted solar photovoltaic systems.

FLOODPLAIN OVERLAY DISTRICT (FOD): To enable the Town of Bourne to participate in the National Flood Insurance Program (NFIP) and ensure compliance with the NFIP regulations in all areas as defined as 100-yr floodplain on the Flood Insurance Rate Map (FIRM) provided by FEMA, and further defined by the Flood Insurance Study (FIS) and as regulated in Section 3110 of this Bylaw.

### 3.3.3 Build Out Analysis

In July 2012, the Cape Cod Commission developed a Regional Wastewater Management Plan (RWMP) to recommend the best combination of approaches to restore the quality of the region’s coastal waters in a way that contains costs to the extent feasible. To inform this wastewater planning effort, the Commission conducted a cape-wide buildout analysis, in order to quantify the growth potential in the region and with the aim of understanding the spatial distribution of this future growth. The buildout analysis (Table 12) was run on all developable properties, including those that were already developed, in order for any under-developed properties to be captured in the calculations.

**Table 12. Buildout Analysis Statistics (2012)**

	Units/SF
<b>Residential Units</b>	
Existing Dwellings (Units)	9,587
Additional Dwellings (Units)	2,524
Total Buildout	12,111
% Change	26%
<b>Non-Residential SF</b>	
Existing Non-Residential SF	1,861
Additional Non-Residential SF	1,861
Total Buildout	8,720,361
% Change	119%

Source: Cape-Wide Buildout Analysis to Support Regional wastewater Planning (July 2012), Cape Cod Commission

The build-out analysis exercise does not specifically reflect when the actual buildout would occur or the projected population at full buildout; it just provides a regional view of potential areas of growth. Furthermore, the buildout analysis only uses the minimum lot size or density requirements of the zoning to estimate the additional dwelling units allowed. It does not account for additional requirements of the bylaws (particularly frontage requirements and shape requirements) that might otherwise further restrict the density allowed. For some communities, this results in higher than expected buildout numbers. Also, in some communities, certain state class codes were assumed developable (such as commercial parking lots and land held by charitable organizations) which also returned higher than expected numbers. The Commission intends to investigate these anomalies and refine the assumptions

and buildout data layer in the future to establish a more detailed picture of the buildout potential in the region.

### **3.3.4 Transportation**

The growth on Cape Cod as a region since the 1950s has had and will continue to have an effect on transportation infrastructure and needs in the future. As a seasonal tourist area, Cape Cod sees a significant increase in the amount of traffic and traffic congestion between May – September. Bourne is well served by the local highway system that includes Route 6, Route 6A, Route 28, Route 3, Route 3A and Route 25. Traffic access is provided to communities on the other side of the Cape Cod Canal by the Sagamore Bridge and the Bourne Bridge.

The region known as “Upper Cape Cod” consists of Bourne, Sandwich, Falmouth and Mashpee and within this area, there is approximately 1,200 miles of roadway, intercity and local bus service, limited rail service and ferry service. Regional bus service to Boston, MA and Providence, RI is provided by Bonanza Bus Lines/Coach USA. There is also the Plymouth/Brockton bus line that provides transportation direct to Boston from Sagamore Beach. Local bus service has been provided in the past by the Cape Cod Regional Transit Authority (CCRTA) that has stops at Main Street Buzzards Bay, the JBCC, and across the Bourne Bridge at the Cape Cod Convenience store. CCRTA also offers Dial-A-Ride Transportation (DART), a door-to-door service available by appointment. It is available Monday through Saturday between 8 AM and 5 PM. In addition, Falmouth Hospital operates a courtesy bus to residents in Bourne, Mashpee, Sandwich and Falmouth from Monday to Friday.

The closest Ferry Service link to Bourne is the Steamship Authority Ferry that operates out of neighboring Falmouth and travels to Martha’s Vineyard carrying passengers, vehicles and bicycles. Limited rail service involves another bridge in Bourne, the famed Railroad Bridge, which is used by the Bay Colony Railroad Corporation that operates a trash hauling train every morning and the Cape Cod Central Railroad that uses the railroad to operate a seasonal scenic and dinner train.

The Sagamore Rotary was located at the base of the Sagamore Bridge in Bourne and has been the subject of a recent major renovation and overhaul project. On September 10, 2006, the old rotary was removed and replaced by a new interchange that includes ramps which make for convenient access to and from Route 3.

### **3.3.5 Water and Sanitary Sewer**

Of all the residents and businesses in Bourne, only a small percentage have sanitary sewers: Main Street Buzzards Bay and some secondary streets off of that section and the residents in Hideaway Village. All other residents and businesses are serviced by on-site subsurface disposal septic system.

In Bourne, there are three different Water Districts from which residents and businesses get their water. They are the Buzzards Bay Water District, Bourne Water District, and North Sagamore Water District. The majority of residents and businesses obtain their water from one of these districts with only a few residences on Wings Neck and in several other scattered areas that rely on private wells.

The Town of Bourne’s Board of Health has updated and improved its septic system regulations since 1997 when the last OSRP was written. Bourne’s regulations are well written and they take into consideration the many sensitive natural resource areas and issues that affect the Town. One major



issue is enforcement. Due to limited Town staff, it is sometimes difficult to follow up on situations where there is non-compliance. A lot of time is spent on following up on complaints and issuing orders.

### **3.3.6 Bourne Integrated Solid Waste Management Facility**

Bourne's history of landfills is somewhat interesting. Like many other towns on Cape Cod, historically, the town disposed of solid waste at various sites. The current landfill off of MacArthur Boulevard began operating in the 1960s under the direction of the Department of Public Works. In the 1980s, Bourne decided to continue landfilling in Bourne and not join other Cape Cod communities in sending waste to the SEMASS waste to energy facility in Rochester, MA. In the 1990s, Bourne decided to construct a Phase 2 (lined landfill cell) and develop the remaining site-assigned landfill acreage as a regional, non-Municipal Solid Waste (non-MSW) landfill. The facility could then accept regional construction and demolition materials, bulky items and various other waste streams, but not household trash. Bourne's household trash, or Municipal Solid Waste (MSW), would no longer be accepted at the facility and instead would be sent to SEMASS under a long-term contract. The landfill no longer landfills construction and demolition materials, what is accepted is transferred from the landfill to [ a ] construction and demolition processing facilities located off of Cape Cod. In addition the ISWM is back to accepting Municipal Solid Waste.

Bourne set up a department exclusively dedicated to managing a modern integrated operation and today, the ISWM facility is fully self-funded. The ISWM provides solid waste management services such as recycling, composting, waste processing, and landfilling to Bourne, as well as surrounding communities and businesses on Cape Cod and southeastern MA and it is permitted to accept an average of 600 tons per day in the landfill. ISWM's operations are reviewed by several outside parties including: Board of Health, Board of Selectmen, Town Administrator, Finance Committee, [Citizen's ISWM Advisory & Information Board no longer exists], Cape Cod Commission , [and] the Massachusetts Department of Environmental Protection , the financial auditing firm of Melanson Heath & Company, PC, and the Massachusetts Department of Revenue.

The Bourne Residential Recycling Center is located at the Bourne Integrated Solid Waste Management Facility and is open daily except holidays [Monday through Friday] from 7 am to 4 pm [and on Saturday from 7 am to 12:00 pm]. At the center, residents with a sticker can recycle household items, yard waste (leaves and brush) or leave items (in good condition) in the Swap Shop that someone else can take for free. For hazardous waste materials, regional waste collection days are held annually in May and October [annually].

### **3.3.7 Bourne Local Comprehensive Plan 2008 (LCP)**

Top concerns of Bourne residents raised during the recent 2008 Local Comprehensive Planning process were preserving historic and rural community character, improving the village centers, traffic volume, safety, and open space and environmental protection. Wastewater disposal and a comprehensive revision of the Zoning Bylaw were identified as two areas that need immediate action by town officials in order to avoid severe problems in the future.

The Comprehensive Plan notes that it isn't the amount of open space and recreation land that is most important, it is the location. Preserving tracts of open land that are visible and contribute to Bourne's maintenance of its rural image was noted as important to participants at the village meetings for this project.

Pursuing acquisitions or protection of key parcels and revising the zoning bylaw and subdivision regulations to increase the amount of open space preserved and insuring that it remains open are the three highest priority actions for open space in the LCP. Other action items include using planning techniques such as transfer of development rights, land swapping, cluster development and planned unit development for land preservation, developing greenbelts between neighborhoods and villages, supporting activities of private organizations like the Bourne Conservation Trust, appointing a Pathways Committee, establishing a stewardship program to maintain town-owned open space, work with military and Federal officials to protect MMR land and encourage private landowners to restore and preserve privately owned land.

The LCP notes that expanding recognition of the importance of recreation to the town's economy, community character, and the quality of life of residents and visitors is crucial. More passive and active recreation variety is needed to meet different demographic groups and Bourne should consider working with neighboring towns to share recreation facilities and programs. It is noted how important it is to make recreation activities and resources more of a high priority in the Town because it is such an attraction to visitors and people who choose to live in Bourne.

Specific action items in the LCP include creating a Parks and Recreation Department to maintain recreation facilities and coordinate activities, conduct a recreation program and facility inventory, develop a 10 year Capital Improvement Project Plan, address needs identified in the 2012 State SCORP plan, improve maintenance of existing recreation facilities, expand and protect public access to water, develop a bikeway system, evaluate facilities for ADA compliance and set up year-round programs that appeal to teenagers. The 2017 OSRP update will serve to address many of the open space and recreation action items noted in the 2008 LCP.

### **3.3.8 Community Preservation Act (CPA)**

On April 6, 2005, the Town of Bourne overwhelmingly adopted (84% of voters said yes) the Community Preservation Act (CPA) to place a 3% real estate surcharge to help the community fund projects for affordable housing, open space, historic preservation and recreation. The Community Preservation Committee (CPC) consists of nine individuals that are charged with implementing and overseeing projects that are developed in accordance with the provisions of Massachusetts General Law Chapter 44B – the CPA. Due to the result of a court case over a dispute over the proper use of CPA funds in another CPA community, the Legislature and Governor have approved an amendment to the CPA law that further defines the recreational use of CPA funds. These funds may be used for outdoor passive or active recreation, but not limited to, the use of land for: community gardens; trails; noncommercial youth and adult sports; and for parks, playgrounds or athletic fields. CPA funds may not be spent for ordinary maintenance or annual operating expenses; only capital improvements are allowed. CPA funds may not be used for horse racing facilities, or for a stadium, gymnasium, or similar structure. CPA funds may be used for the acquisition of land to be used for recreation, or for creating new recreational facilities on land that the Town owns. This amendment also allows for the rehabilitation of existing outdoor recreational facilities. Rehabilitation could include the replacement of playground equipment and other capital improvements to the land of the facilities thereon to make them more functional for their intended use(s). Finally, the amendment prohibits the use of CPA funds for the acquisition of artificial turf for athletic fields.<sup>9</sup>

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<sup>9</sup> Town of Bourne Annual Report July 1, 2014 – June 30, 2015.

Table 13 lists the CPC has allocated funding for the following open space and recreation projects in Bourne since 2008.

**Table 13. Community Preservation Act Funded Projects**

Item	Sponsor	Vote Date	Project Description	CPA Purpose	CPC Recommended
Article 11	CPC	Annual Town Election May 14, 2015	Improvements to the Hoxie Center at Sagamore Beach for Art, Science, Education and Culture	Historic Preservation	\$226,300
A	Bourne Historic Commission	Special Town Meeting October 27, 2014	Inventory of Historic Homes	Historic Preservation	\$10,000 the CPA undesignated fund balance
B	Bourne Historical Society	Special Town Meeting October 27, 2014	Historical Restoration/Preservation of the Aptucxet Trading Post	Historic Preservation	\$20,000 the CPA undesignated fund balance
C	Facilities Director	Special Town Meeting October 27, 2014	Convert Tennis Court behind the Community Building to a Basketball Court	Recreation	\$60,000 the CPA undesignated fund balance
A	Recreation Dept./DPW	Special Town Meeting May 4, 2015	Cataumet tennis court refurbishment	Recreation	\$8,315 Open Space Reserves
B	Recreation Dept./DPW	Special Town Meeting May 4, 2015	Town Hall tennis court refurbishment	Recreation	\$8,400 Open Space Reserves
C	Recreation Dept./DPW	Special Town Meeting May 4, 2015	Clark Field basketball court refurbishment	Recreation	\$8,995 Open Space Reserves
D	Recreation Dept./DPW	Special Town Meeting May 4, 2015	Pocasset field tennis court refurbishment	Recreation	\$9,150 Open Space Reserves
E	Recreation Dept./DPW	Special Town Meeting May 4, 2015	Clark Field tennis court refurbishment	Recreation	\$24,100 Open Space Reserves
Article 12/ Item A	Affordable Housing Trust	Special Town Meeting May 4, 2015	Affordable housing down payment/assistance/subsidy	Community Housing	\$53,600 Community Housing Revenues
Article 12/ Item B	Bourne Housing Partnership	Special Town Meeting May 4, 2015	Affordable Housing Services and support	Community Housing	\$61,380 Community Housing Revenues
Article 12/ Item C	Bourne Fire Dept. & Bourne Housing Authority	Special Town Meeting May 4, 2015	Sprinkler system installation and generator for Continental Apts.	Community Housing	\$39,115 Community Housing Revenues, \$161,256 Community Housing Reserves and \$10,629 undesignated fund balance
Article 12/ Item D	Bourne Public Schools	Special Town Meeting May 4, 2015	Engineering/Design services for the resurfacing of outdoor track at Jackson Field	Recreation	\$60,000 Open Space Revenues
Article 12/ Item E	Cape Cod Canal Region Chamber of Commerce	Special Town Meeting May 4, 2015	Improvements: Buzzards bay Railroad Station visitors center	Historic Preservation	\$91,630 Historic Reserves

Item	Sponsor	Vote Date	Project Description	CPA Purpose	CPC Recommended
Article 12/ Item F	CPC	Special Town Meeting May 4, 2015	Reserve for Open Space	Open Space	\$185,314 2016 Open Space Estimated Revenues
Article 12/ Item G	CPC	Special Town Meeting May 4, 2015	Reserve for Community Housing	Community Housing	\$0 2016 Open Space Estimated Revenues
Article 12/ Item H	CPC	Special Town Meeting May 4, 2015	Reserve for Historic Resources	Historic resources	\$0 2016 Open Space Estimated Revenues
Article 12/ Item I	CPC	Special Town Meeting May 4, 2015	2016 Budgeted Reserve	All CPA Purposes	\$0 2016 Open Space Estimated Revenues
Article 13	CPC	Special Town Meeting May 4, 2015	Administrative/Operating expenses of CPC	All CPA Purposes	\$50,000
Article 14	CPC	Special Town Meeting May 4, 2015	Upgrade/Restore Town-owned park on Main St. in Buzzards Bay (Phase 1)	Open Space	\$350,000

Source: Town of Bourne Annual Report July 1, 2014 – June 30, 2015

### 3.3.9 Regulatory Tools

Cape Cod has a unique review process that new development projects must follow if they meet a threshold of 30 acres, 30 residential lots or units, ten or more business, office or industrial lots, or greater than 10,000 square feet of new construction (gross floor area). Projects that meet one of these thresholds are subject to review by the CCC as a Development of Regional Impact (DRI). In addition to these triggers, any proposed development which requires an Environmental Notification Form (ENF) under the Massachusetts Environmental Policy Act (MEPA) can be deemed a DRI and any proposed demolition or substantial alteration of a historic structure or destruction or substantial alteration to a historic or archaeological site listed with the National Register of Historic Places or Massachusetts Register of Historic Places is subject to CCC review as a DRI as well.

The Town of Bourne has numerous overlay districts and regulatory tools in place to help manage future growth and protect open space and natural resources, they include:

- In addition to administering the Massachusetts Wetland Protection Act G.L. Chpt. 131 § 40, Bourne also has their own local Wetland Protection Bylaw (Article 3.7).
- Water Resource Overlay District – The purpose of this district is to protect the public by preventing contamination of the surface water resources and groundwater resources providing water supply for the Town.
- Landscaping and Screening requirements.
- Earth Removal specifications including a requirement for a Special Permit for removal in some cases.
- Open Space Community – A Special Permit may be granted in the R-80 District to allow the construction of a subdivision designed as an Open Space Community which would serve to allow a relatively intensive use of land while maintaining existing character, preserving open space for conservation and recreation and introducing a variety of residential development.
- Scenic Development District – The purpose of this district in Bourne is to gain intensive use of the land while preserving or enhancing highway views of the canal, ocean, or bay, preserving or

enhancing landscaping and tree cover, minimizing visibility of parked autos and intrusion of commercial signs, and avoiding creation of hazards or congestion.

- Bournedale Overlay District – The purpose of this district is to provide for preservation of resources that are unique to Bournedale and which are fundamental to the character of the areas.

Within the Bournedale Overlay District, Flexible Resource Development (FRD) is allowed by the Planning Board through the granting of a Special Permit for specific uses. The purpose of FRD is to allow for more flexibility and creativity in the design of the development and to encourage permanent preservation of natural and cultural resources, including open space, agricultural and forestry land, waterbodies and wetlands and historic and archaeological resource (among other reasons). Within the FRD there are specific requirements for open space such as setting aside all land not utilized for lots, roads or drainage as open space and encouraging applicants to include within the open space any natural or cultural resources mentioned in the zoning section.

The Town of Bourne also specifies a number of Environmental Regulations in its Zoning Bylaw with regard to waste, air quality, electronics and lighting.

## 4.0 Environmental Inventory & Analysis

### 4.1 Geology, Soils & Topography

#### 4.1.1 Geology

Bourne lies within the Avalon Terrain, which is a large block of the earth's crust that separated from the Gondwanan supercontinent between 490 and 550 million years ago. The Town also lies within the Fall River batholith, which is a complex of igneous rocks (rock that solidified from the cooling of molten magma) in southeastern Massachusetts. Fall River granite is the most abundant rock in this complex.

The last continental ice sheet, the Wisconsinan, deposited the majority of the glacial debris present in eastern Massachusetts, and Barnstable County owes its origin to this glacier and the subsequent rise in sea level following the subsequent ice sheet retreat. The bedrock of southern New England was worn down by the glacier, producing drift, and re-deposited as the glacial and postglacial sediments of Cape Cod. Subsequent sea level rise eroded the drift along the shoreline, re-depositing it as beaches and spits, with windblown sand deposited as dunes. The Wisconsinan ice sheet likely disappeared from southeastern Massachusetts by about 14,000 to 15,000 years ago.

The Buzzards Bay and Cape Cod Bay glacial ice sheet lobes intersect within and proximate to the Town of Bourne. Semi-circular ridges of glacial till (moraines) were created where the southern portions of the lobes dumped sediments. Since each lobe sloped toward the other, a depression was created where they met. The portion of Bourne south of the Cape Cod Canal consists of the Sandwich Moraine (deposited by the Cape Cod Bay lobe), Buzzards Bay Moraine, and younger ice contact deposits. The Bourne Bridge actually lies on the western side of the Sandwich and Buzzards Bay moraines' junction. Generally, that portion of Bourne north of the Cape Cod Canal lies within the Wareham pitted plain. Pitted plains contain numerous kettle holes, which often mark areas where large pieces of ice melted underneath the outwash sediments.

Very few bedrock outcroppings exist within the Buzzards Bay drainage basin, since glacial deposits generally cover the bedrock. Overall, bedrock geology in the community consists of granite, and above this, overlays a thick mantle of glacial sands and gravels. In fact, Neil Jorgensen's *A Guide to New England's Landscape* notes that, "only in the Cape Cod region does the bedrock layer lie buried so deeply beneath the surface that, except by its absence, it plays no part in the landscape." There is a swath of end (terminal) moraine surficial geology oriented north/south and extending through the approximate center of the Town of Bourne. The surficial aquifer, which supplies drinking water to Bourne, occurs under this moraine. With the exception of several minor areas of floodplain alluvium associated with surface water features within the Town, the remaining surficial geology consists of sand and gravel deposits. The present, postglacial landforms continue to change due to wave erosion, major storm events, and sea level rise, maintaining the Cape's dynamic geologic character.

The majority of Bourne's surficial geology (end moraine, sand and gravel deposits) poses few development limitations, although the highly permeable nature of the geology may become a factor when considering the potential for groundwater contamination. Similarly, depending upon slope and wind effects, the sandy nature of the surficial geology may increase the potential for erosion in specific areas of Bourne, but at the same time prevents flooding during heavy rain events.

### 4.1.2 Soils

Since the soils within Barnstable County have formed after the last glaciation, they are considered relatively young and therefore evidence only weak soil horizon development, with little changes to the parent material. Cape Cod's soil is classified as podzol, a nutrient-poor soil with both sandy and hardpan areas.

Generally, soils within the Town of Bourne are sandy and rocky to bouldery, with the majority exhibiting slopes of less than 15%. With the exception of the hydric/wetland soils, Bourne contains deep soils that are moderately to excessively well drained (Hydrologic soil group A) (Map 4). This permeability can lead to groundwater contamination from septic systems if not properly designed, constructed, or maintained. Many areas with low-lying organic soils have been utilized in the production of cranberries. In addition to soils suitable for agricultural uses, the Town of Bourne also contains several gravel pits.

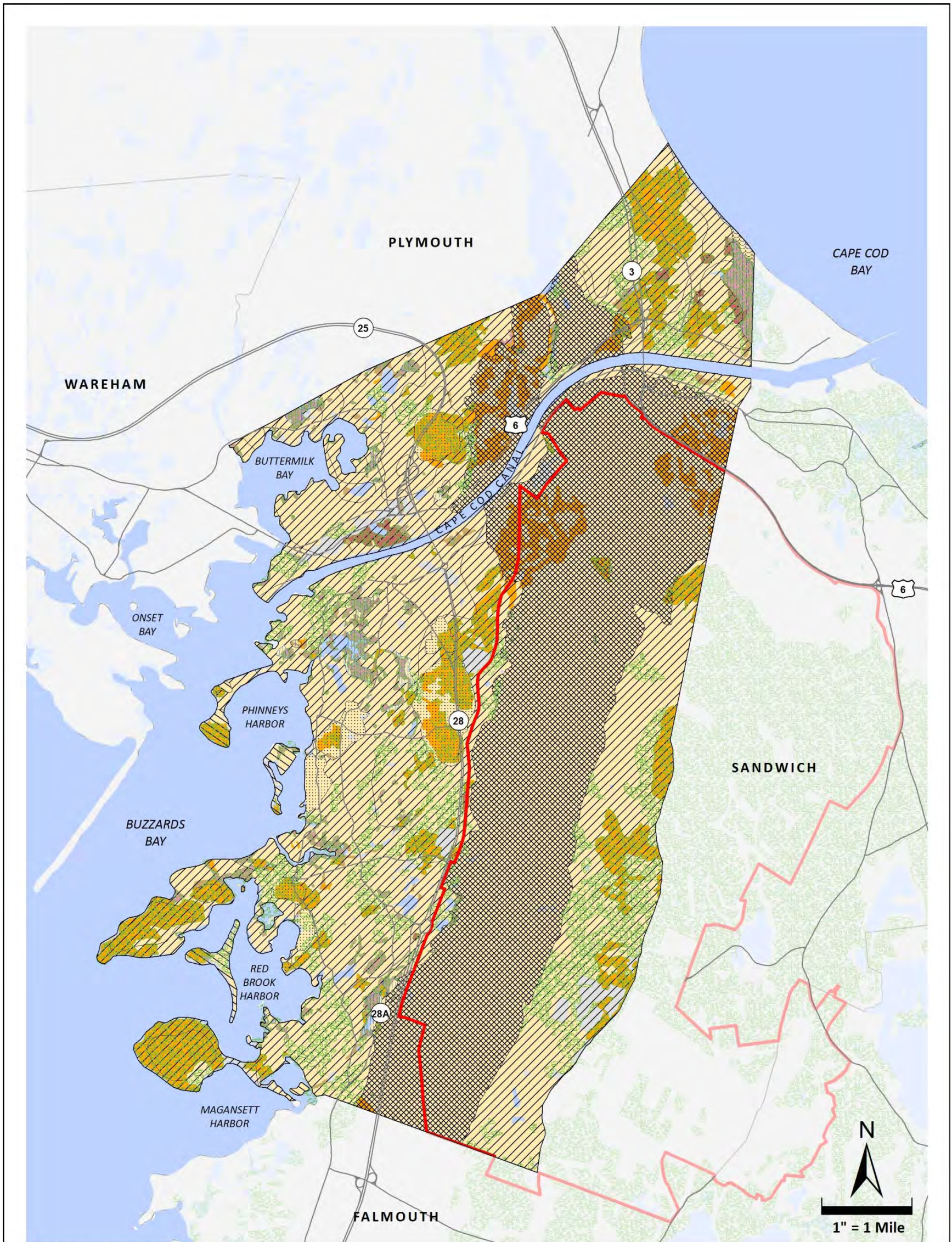
Any reprieve offered by the Cape's mild climate is counterbalanced by the generally poor soil conditions. Post-glaciation meltwater streams impoverished the already sandy Cape Cod soils by removing the clay that would have enriched them and increased their ability to retain water (Jorgensen 1971).

Several soils have also been classified as prime farmland soils, as defined by the U.S. Department of Agriculture. Prime farmland is the most suitable land for food, feed, forage, fiber, and oilseed crops due to its potential to produce high yields with minimal energy and economic inputs. Additionally, farming in prime farmland soils results in the least amount of environmental damage. Prime farmland may consist of cultivated areas, pasture, or woodland. Approximately 2,900-acres of Bourne are classified as prime farmland soils.

### 4.1.3 Topography

Knob- and-kettle- topography resulting in rolling terrain is prevalent throughout Bourne, especially where the Town falls within the Sandwich Moraine. Such topography includes conical hills with flattened tops, and round to irregularly shaped depressions within the overall sandplain character of the area. Elevations vary from sea level proximate to the coast to approximately 200-feet, with the highest altitudes achieved at the Sagamore Highlands (also referred to as Pikes Peak) adjacent to the Plymouth town line, Bournedale Hills, and along both sides of the Cape Cod Canal between the Sagamore and Bourne Bridges. The highest point on Cape Cod occurs on JBCC, Pill Hill at 306 feet.

Although steeply sloping areas often limit development, the Town does not prohibit construction on steep slopes; however, the Town's Subdivision and Zoning Regulations do impose limitations on the finished grades of streets and cul-de-sacs. Additionally, Open Space Community zoning provisions create "bonus points" for the preservation of areas with greater than 15% slopes, and additional stabilization measures are required for slopes exceeding 15% due to site grading for all developments. The kettle holes common to this area are ideal for cranberry bog cultivation.



\*Soils & Surficial Geology - MassGIS

Document Path: H:\Projects\2016\16069 Town of Bourne OSRP\GIS\Maps\Map 4 Soils\_GeologicalFeatures.mxd

<b>Legend</b>	<b>Surficial Geology Composition</b>	<b>Horsley Witten Group</b>
<ul style="list-style-type: none"> <li> Town of Bourne</li> <li> Joint Base Cape Cod</li> <li> Major Roads</li> <li> Open Water</li> <li> Prime Farmland</li> </ul>	<ul style="list-style-type: none"> <li> Sand and Gravel</li> <li> Till or</li> <li> Sandy Till Over</li> <li> End</li> <li> Large Sand Deposits Where Distinguished from Sand and Gravel Deposits</li> <li> Floodplain</li> </ul> <p><b>Hydrologic Soil Group</b></p> <ul style="list-style-type: none"> <li style="margin-right: 10px;"> A</li> <li style="margin-right: 10px;"> B/D</li> <li style="margin-right: 10px;"> D</li> <li style="margin-right: 10px;"> B</li> <li style="margin-right: 10px;"> C</li> </ul>	<p><i>Sustainable Environmental Solutions</i>  <small>90 Route 6A • Unit 1 • Sandwich, MA 02563  508-833-8600 • horsleywitten.com</small></p>
<p><b>Soils and Geological Features</b>  <b>Bourne Open Space and</b>  <b>Recreation Plan</b></p>		<p>Date: 8/14/2017 <span style="float: right;">Map 4</span></p>

Map 4. Soils and Geological Features



## 4.2 Landscape Character

As James W. Skehan states in his Roadside Geology book, “When you cross the Cape Cod Canal, you enter a land shaped entirely by ice, water, and wind.” The Town of Bourne is home to many distinctive landforms, unique environments, and areas of scenic interest, in large part due to the aforementioned environmental factors.

### 4.2.1 Distinctive Landforms

Perhaps the most obvious feature of the Town of Bourne is the “Gateway to Cape Cod,” or the Cape Cod Canal, which is also known as the gateway to America’s Intracoastal Waterways. As noted in the 1997 Open Space and Recreation Area Plan, “Whether passing through the waterway, driving by it on adjacent highways, over it on either of the two highway bridge crossings or merely resting on its shores, it is an impressive site. It is both the size and the unique setting of the project which attracts tourists and locals alike.” Beyond connecting Cape Cod Bay and Buzzards Bay, the Canal provides a plethora of recreational activities, including sightseeing, walking, running, bike riding, saltwater fishing, boating, swimming, picknicking, and camping. The Town of Bourne Recreation Authority, the Scusset Beach State Reservation, and the Army Corps of Engineers, New England Division provides available access areas with picnic and sanitary facilities.

Much of the upland neighboring the Canal is wooded with pitch pine, white pine, oak and black locust. The shore is vegetated along dunes with beachgrass, beachplum rugosa rose, and juniper and along the shoreline by fringing salt marsh. Commercially, the Canal saves between 65 to 150 miles in navigational distance, and although benefits accrued from this efficiency total in the millions of dollars each year, the Canal remains toll free.

### 4.2.2 Unique Environments

#### Areas of Critical Environmental Concern (ACEC)

Bourne contains three Areas of Critical Environmental Concern, as designated by the Secretary of Environmental Affairs: 1) the Pocasset River ACEC; 2) the Bourne Back River ACEC; and 3) the Herring River Watershed ACEC. According to the Massachusetts Department of Conservation and Recreation’s (DCR) ACEC Program website,<sup>10</sup> ACECs “are places in Massachusetts that receive special recognition because of the quality, uniqueness and significance of their natural and cultural resources.” Additionally it states that “Proactive stewardship and collaboration is essential to achieve the purpose and goals of ACEC designation.”

#### Pocasset River ACEC

The Pocasset River ACEC was the first ACEC designated within the Town of Bourne, on December 5, 1980. It is also the smallest, with an area of approximately 160-acres. The Pocasset River ACEC consists of a river and estuarine system located on the eastern shore of Buzzards Bay. Specifically, the ACEC includes the Pocasset River and Freeman, Mill, Shop, and Upper Ponds, all of which are identified as Outstanding Resource Waters.

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<sup>10</sup> <http://www.mass.gov/eea/agencies/dcr/conservation/ecology-acec/areas-of-critical-environmental-concern-acec.html>. Obtained September 14, 2016.

Key habitats within this ACEC consist of salt marsh, floodplain, tidal flats, wetlands, streams, and freshwater ponds, all of which provide flood control, storm damage prevention, improved water quality, wildlife habitat, and recreational opportunities.

A 2003 summary of the Pocasset River ACEC cites 40 confirmed or probable breeding bird species, a productive oyster crop within the estuary, and healthy trout populations within the freshwater ponds. Although the Pocasset River does not presently contain migratory fish runs, the potential for restoration of an established historic fish run exists if fish ladders are installed. American eels do migrate from the upper ponds to spawn at sea, and habitat for softshell clams, quahogs, and oysters is present within the ACEC.

ACEC also houses three state-listed species, according to NHESP, diamondback terrapin, eastern box turtle, and water-willow stem borer. Approximately 25% of the ACEC lies within NHESP designated BioMap core habitat (discussed in Section 4.6.1). Within the ACEC, forest or salt marsh comprises two-thirds of the land area, and only 15% of the ACEC contains low and medium density residential development. However, much of the land adjacent to the Pocasset River ACEC contains residential development.

Mill and Shop Ponds, located within the ACEC, were historically sites for the Pocasset Iron Foundry (1822 – 1881) and the Tahanto Art Works (1882 – 1900), both of which utilized native bog iron. The upper ponds were created by the foundry for the purpose of water storage, and a fish hatchery was later created adjacent to Mill Pond. Finally, an archaeological site has also been recorded within this ACEC.

Past or on-going stewardship activities within the ACEC include water quality and nutrient loading analyses by the Buzzards Bay Baywatchers. This group's sampling indicates that the system is relatively healthy. Additional water quality testing is being performed by the Bourne Selectmen's Taskforce on Local Pollution, which was also placing interpretive signs within the ACEC at the time of the 2003 report.

### **Bourne Back River ACEC**

The Bourne Back River ACEC encompasses 1,850± acres just south of the Cape Cod Canal. According to DCR, the ACEC includes (partially or entirely) Phinneys Harbor, the Back River, Clay, Eel, and Mill Ponds, as well as the Rocky Point Recurved Barrier Spit. Much of the estuary is Town owned.

The Bourne Back River ACEC was designated on April 24, 1989 due to its "outstanding natural resources." At the time of the designation, the majority of the coastal and inland wetlands within this ACEC had not been subject to alteration or development. Therefore, the Bourne Back River ACEC provides important habitat, nursery and spawning grounds, and storm damage prevention. "The estuarine/salt marsh ecosystem...supports a wide variety of shellfish, finfish, amphibians, reptiles, birds, and mammals, within an extraordinary spectrum of habitat types."

In addition to its designation as an ACEC, the US EPA designated the Back River Estuary an "Estuary of National Significance" in 1988. The ACEC also forms part of the Ocean Sanctuaries of Massachusetts, and contains state-listed rare and endangered species, including diamondback terrapin. On top of the ACEC's spectacular natural resources, it also provides excellent recreational opportunities, and is used widely by recreational and educational groups, including the Bourne school system, the Northeast Marine Environmental Institute, and the Woods Hole research community.

The Elijah Perry Grist Mill and Ironworks were located within the ACEC, and the solar saltworks industry was situated on the Eel Pond shoreline and vicinity.

### **Herring River Watershed ACEC**

According to DCS, the Herring River Watershed ACEC totals 4,450± acres within the Towns of Bourne and Plymouth, and was designated as an ACEC on November 5, 1991. Within the Town of Bourne, it contains three ponds, freshwater wetlands, cranberry bogs, and protected open space. It is home to a significant anadromous fish run, with Great Herring Pond supporting a regionally important recreational fishery. Additionally, this ACEC lies within the Plymouth Carver Sole Source Aquifer, and is therefore critical to public water supply. Several of the state-listed species previously discussed, including eastern box turtle, are also present. In addition to these natural resources, the Herring River Watershed ACEC is also believed to be the core habitation area for a Wampanoag settlement.

## **4.3 Water Resources**

Map 5 depicts water resources in Bourne. The majority of Bourne overlies part of the Sagamore groundwater lens, which is the Cape's most abundant source of fresh water. Drainage and groundwater flows from all of Bourne's villages on Buzzards Bay (Bourne, Monument Beach, Pocasset and Cataumet) reach the ocean via constricted embayments which give the coast its beauty and resource value, but render it vulnerable to contamination.

### **4.3.1 Watersheds**

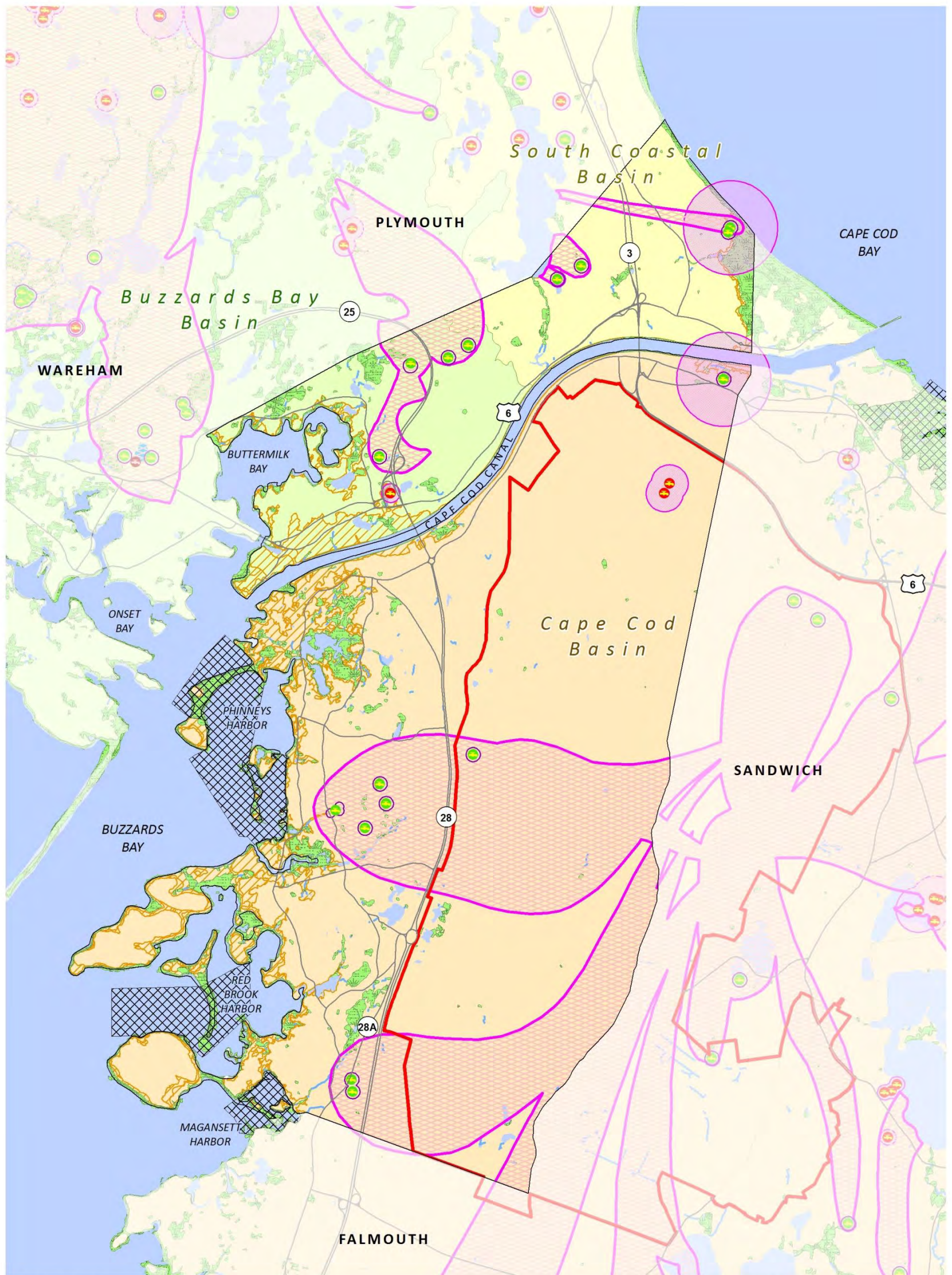
The Town of Bourne is divided between three major watersheds, or drainage basins. A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. A watershed includes surface water (lakes, streams, reservoirs and wetlands) and groundwater.<sup>11</sup>

North of the Canal, the western portion of the Town lies within the Buzzards Bay Basin while the eastern portion lies within the South Coastal Basin. North of the Canal, the Town lies within the Cape Cod Basin.

Approximately 4.7 square miles of the total 380 square miles of the Buzzards Bay Basin are situated within the Town of Bourne. The lower elevation valleys are inundated with seawater, and form a coastline with many inlets valuable for commercial fishing and recreation. This basin exhibits well-drained sandy soils and contains a plethora of kettle ponds and freshwater and saltwater marshes (Skehan 2001). Bourne's northeast corner comprises the southernmost ±4.4 square miles of the South Coastal Basin, and ±32 square miles of Bourne lie within the Cape Cod Basin.

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<sup>11</sup> "What is a Watershed?" Available at <http://water.usgs.gov/edu/watershed.html>, September 14, 2016.



\*GIS Data - MassGIS

Document Path: H:\Projects\2016\16069 Town of Bourne OSRP\GIS\Maps\Map 5 WaterResources.mxd

**Legend**

- Town of Bourne
- Joint Base Cape Cod
- Major Roads
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Emergency Surface Water
- DEP Approved Zone I
- DEP Approved Zone II
- IWPA
- Flood Hazard (Zones A, AE, VE)
- Coastal Barrier Resources System Area
- Wetlands
- Open Water



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**Water Resources  
 Bourne Open Space and  
 Recreation Plan**

Date: 8/14/2017 Map 5

Map 5. Water Resources

### 4.3.2 Surface Water

#### Waterways

Although man-made, the Cape Cod Canal forms the most prominent waterway within the Town of Bourne. While dividing the Town in two, it also provides an excellent recreational amenity, as previously discussed. Prior to the Canal, two rivers, the Scusset and the Monument or Manomet, flowed in its future path. The former ran north into Cape Cod Bay while the latter flowed south into Buzzards Bay (Skehan 2001).

In addition to the Cape Cod Canal, Bourne has several principal tidal creeks, including the Herring River, Pocasset River, and Back River. In addition to these creeks, the following waterways are also present within Bourne: Red Brook, East River, Gibbs Brook, Bass Creek, Crooked River, and Broad Marsh River, along with other unnamed, smaller creeks (Halliwell, et al 1984).

The State Division of Marine Fisheries monitors most tidal creeks in the course of its sanitary surveys, and many storm drains have been monitored by the Coalition for Buzzards Bay. The Bourne Selectmen's Task Force on Local Pollution is also working on stormwater remediation as part of compliance with its National Pollutant Discharge Elimination System (NPDES) Program Phase II General Permit issued by the U.S. Environmental Protection Agency (EPA). Phase II of the NPDES Program requires small municipal separate storm sewer systems (MS4s)<sup>12</sup> that discharge into local rivers and streams without treatment to obtain a general permit from EPA. The General Permit requirements include the development of a stormwater management program to reduce pollutants in stormwater before it enters local waterways. The Town reports annually on the progress of set goals and objectives. Stormwater remediation projects are currently considered for Queen Sewell Pond off Cherry Street and Conservation Pond, where there are issues with a culvert and pollution. The task force also monitors marina water quality with assistance from the Board of Health, and is considering pollution issues associated with nitrogen, including the use of slow-release fertilizers and education of Bourne residents regarding the effects of nutrient loading on coastal ecosystems.

#### Ponds and Lakes

Bourne contains approximately 30 ponds (including man-made), some of the larger of which include Queen Sewell (also known as "Bumps"), Goat Pasture, Great Herring (shared with Plymouth) and Bourne Ponds (all Great Ponds) north of the Canal, and Eel Pond, Mill Pond, Freeman Pond, Lily Pond, Picture Lake (a.k.a. Flax Pond, Red Brook Pond, and Long Pond (all considered Great Ponds<sup>13</sup>) all occur south of the Canal. The Plymouth County Wildlands Trust protects Goat Pasture Pond, while the Town owns and maintains beaches at Queen Sewell and Picture Lake.

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<sup>12</sup> A small MS4 is any MS4 not already covered by the Phase I program as a medium or large MS4 (stormwater systems that serve populations of 100,000 or more). The Phase II Rule automatically covers on a nationwide basis all small MS4s located in "urbanized areas" as defined by the U.S. Census Bureau. See <https://www.epa.gov/npdes/stormwater-phase-ii-final-rule-fact-sheet-series>. Obtained September 28, 2016.

<sup>13</sup> A great pond is defined as any pond or lake that contains more than 10 acres in its natural state. Ponds that once measured 10 or more acres in their natural state, but which are now smaller, are still considered great ponds. Any project located in, on, over, or under the water of a great pond is within the jurisdiction of Chapter 91, The Massachusetts Public Waterfront Act. MassDEP maintains a county-by-county list of great ponds in Massachusetts: <http://www.mass.gov/eea/agencies/massdep/water/watersheds/massachusetts-great-ponds-list.html>. Obtained December 29, 2017.

Other ponds include Black Pond, Nightingale Pond, Ellis Pond, and Foundry Pond north of the Canal, Great Pond, Clay Pond, The Basin, and Cuffs Pond south of the Canal, and Deep Bottom Pond, Little Halfway Pond, Donnelly Pond, Baileys Pond, Succonessett Pond, Opening Pond, Osbourne Pond, Edmunds Pond, Spit Pond, Fish and Game Ponds (North and South), and Connery South Pond within the JBCC. The North Sagamore Water District protects Black Pond, as it lies within the interim wellhead protection area for a municipal wellhead.

In addition to these named water bodies, numerous other smaller ponds, many of which have formed in kettle holes, dot Bourne’s landscape.

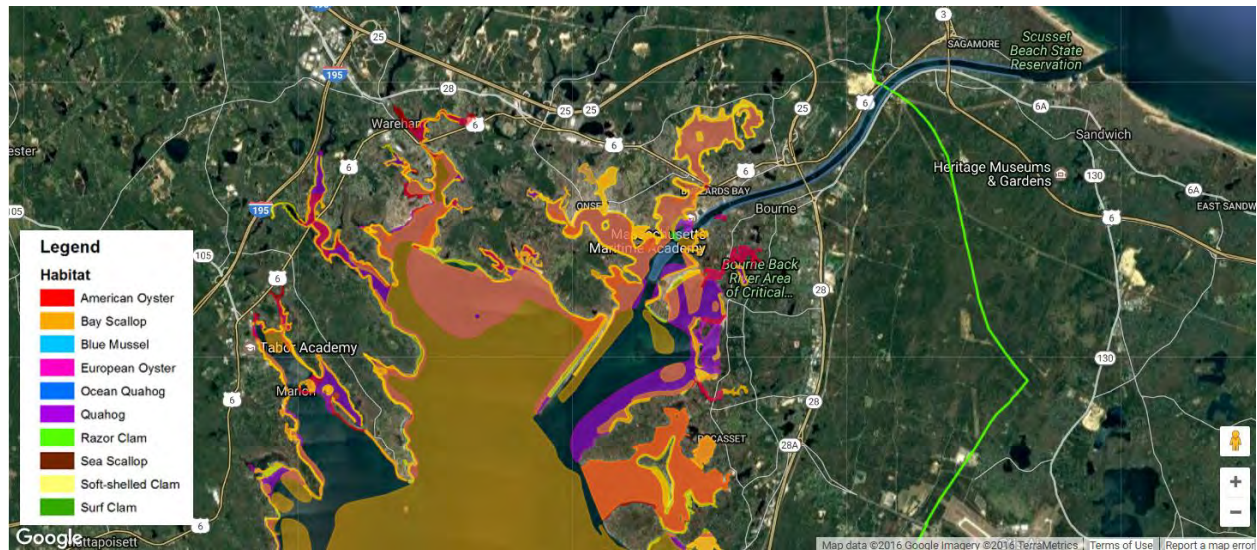
**Coastal Waters**

Bourne is unique in that it borders both Cape Cod Bay and Buzzards Bay, creating the longest coastline on Cape Cod. The shore of Cape Cod Bay coupled with Buzzards Bay’s meandering shoreline creates a profusion of coastal resources within the Town.

The prevalent coastal areas generate abundant recreational and commercial opportunities, in addition to the habitat functions they provide. According to Buzzards Bay National Estuary Program (NEP), nearly every harbor in Buzzards Bay has some good shellfish beds.<sup>14</sup>

Source: MA Division of Fisheries, <http://www.buzzardsbay.org/shellfish.htm>

Figure 3 shows the location of habitat in Buzzards Bay for local shellfish.



Source: MA Division of Fisheries, <http://www.buzzardsbay.org/shellfish.htm>

**Figure 3. Concentrations of Commercial and Recreational Shellfish Species**

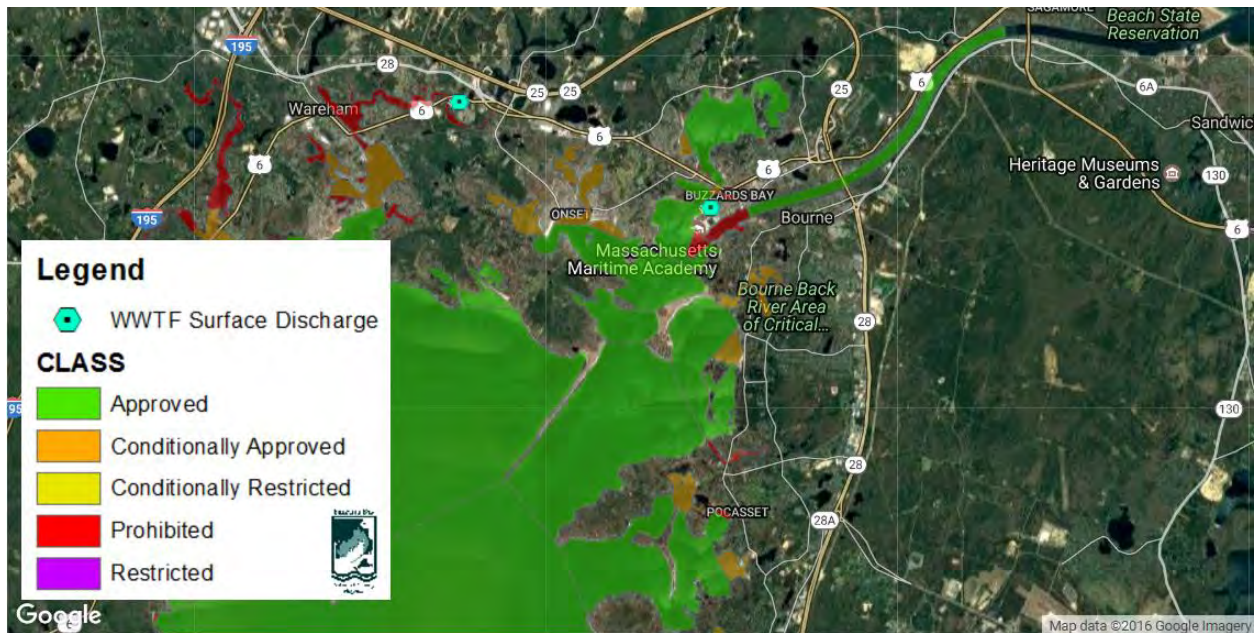
According to the Buzzards Bay NEP,<sup>15</sup> from the 1960s to the 1980s, shellfish beds were increasingly closed due to fecal coliform contamination. The Buzzards Bay NEP, Massachusetts Division of Fisheries (MDF), and local municipal officials have worked together to improve water quality and implement a “conditional closure” program. Through the 1990s and into the 2000s, best management practices have

<sup>14</sup> <http://www.buzzardsbay.org/shellfish.htm>. Obtained December 27, 2016.

<sup>15</sup> [http://www.buzzardsbay.org/shellfish\\_closures\\_buzzards\\_bay.htm](http://www.buzzardsbay.org/shellfish_closures_buzzards_bay.htm). Obtained December 27, 2016.

been implemented to reduce pollutants from municipal stormwater discharges and runoff from local farms. They have also worked to address failing septic systems with the installation of new systems or provide tie-ins to municipal systems. MDF has also reduced the geographic extent of shellfish bed closures in some areas to the vicinity of a discharge pipe. “Seasonal closures” have also been extended. This is primarily due to the warm water period of degraded water quality expanding, which is primarily related to new development, increased year-round residents, and extended occupation of harbors by waterfowl due to delayed migrations.

Seasonal and permanent closing of shellfish areas are posted on the Town’s website (<http://www.townofbourne.com/natural-resources/pages/shellfish>). Maps are also posted on Buzzards Bay NEP’s website with data from MDF (Figure 4).



Source: [http://www.buzzardsbay.org/shellfish\\_closures\\_buzzards\\_bay.htm](http://www.buzzardsbay.org/shellfish_closures_buzzards_bay.htm)

**Figure 4. 2015 Shellfish Area Closure Boundaries**

Areas in Bourne permanently closed during 2015 were portions of Back River, Bourne Marina, Buttermilk Bay North, Cape Cod Canal, Cranberry Bog Creek, Butler Cove, Hen Cove, Fisherman’s Cove, Little Bay, Pocasset River, Queen Sewell Cove, Red Brook River, and Wings Neck Creek.

**Environmentally Sensitive Resources**

Home to some of the most productive ecosystem types (like salt marshes), most coastal areas are also extremely sensitive to negative impacts from anthropogenic sources which are either direct physical alterations to these areas, or indirect effects from nutrient loading. Within Bourne, such sensitive areas include Squeteague Harbor, Bassetts Island, Red Brook Harbor, the Pocasset River, the Back River, Buttermilk Bay, and their associated salt marshes, the Herring/Monument River (which has historically supported one of the largest herring runs in the state, but is presently in decline), and Sagamore Beach Marsh. Many sensitive areas are prime shellfish habitat and have declining areas of eelgrass beds. Today, despite a propagation program, shellfish habitat and numbers are not as strong as they were

historically, although they have not suffered significant declines in recent history. Eelgrass beds continue to decline (see discussion below).

#### Anadromous Fish Runs

Herring is an anadromous fish, meaning that it migrates from saltwater to spawn in freshwater. Therefore, this species is especially sensitive to impediments within its migration routes (e.g. culverts, dams, etc.). Within Bourne, there were historically three herring runs: 1) Bourne Pond (located behind Town Hall, this pond is connected to the Cape Cod Canal); 2) Herring River; and 3) Red Brook. Of these, the Herring River is currently the largest run, although it too has suffered significant declines in the past few years. Bourne Pond no longer functions as a herring run.

#### Eelgrass Beds

Seagrass beds provide food and cover for many commercially and recreationally important marine organisms and their associated prey, and the leaf canopy creates a “micro-climate” of still water, filters particulates, and stabilizes sediment through extensive roots and rhizomes. Eelgrass is the most common seagrass along the Massachusetts coast, and because it is susceptible to effects from nitrogen, is considered an indicator of overall ecosystem health.

The Massachusetts Department of Environmental Protection (DEP) Eelgrass Mapping Project<sup>16</sup> used aerial photography from 1994-2013 to map local eelgrass beds as a way to monitor these critical habitats. Areas of eelgrass that have been mapped within Bourne’s coastal resources are:

- Buttermilk Bay
- Maritime Academy
- Toby’s Island
- Red Brook Harbor

Mapping shows that eelgrass beds are declining overall, but with some improvements. The mapping of Buttermilk Bay indicates that, although significant areas of eelgrass beds were present in 1995, those areas had disappeared by 2013. The narrow waterway between Buttermilk Bay and Buzzards Bay (including Butler Cove and areas of Buzzards Bay adjacent to the Canal) also experienced an overall decline in eelgrass beds. Overall, this portion of Bourne’s waters experienced a ±68% decline in the amount of eelgrass from 1995 to 2013, or a loss of ±159 -acres. It should be noted that between 2006 and 2013, there was an increase in ±7.45 acres of eelgrass, or ±10%.

Eelgrass beds in the coastal waters proximate to the Maritime Academy suffered a ±35% decline between 1995 and 2012, from ±484-acres to ±315-acres. These waters partially overlap with those depicted in the Buttermilk Bay map, but also include areas adjacent to Hog Island, as well as waters not directly adjacent to Bourne, such as Onset Bay. Between 2006 and 2013 there was an increase of ±18 acres, or ±6%.

Coastal waters proximate to Toby’s and Mashnee Islands lost ±122 acres of eelgrass beds, or a ±44% loss between 1995 and 2013. The eelgrass beds of Red Brook and Pocasset Harbors were fairly stable between 1995 and 2001, with the least amount of coverage lost, ±22-acres or a ±7% decline; however, between 2001 and 2013, ±158 acres of eelgrass were lost, ±55%

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<sup>16</sup> <http://www.mass.gov/eea/agencies/massdep/water/watersheds/eelgrass-mapping-project.html>



## Salt Marshes

Salt marshes represent some of Bourne's most productive and important ecosystems. Over two thirds of recreationally and commercially significant saltwater fish utilize coastal marshes as spawning and nursery habitat. The amount of detritus produced by the dieback of herbaceous salt marsh plants is an important source of food for microorganisms, forage fish, and grass shrimp, which in turn act as prey for larger fish, including bluefish, weakfish, and striped bass. Salt marshes not only provide valuable habitat for fish and shellfish, but also maintain water quality by uptaking pollutants and filtering sediments and provide flood and storm damage protection. In addition to these services, salt marshes also provide many direct recreational opportunities such as hunting and bird watching.

The recorded salt marshes within Bourne are restricted under M.G.L. c. 130 s. 105 (1980), and filling is therefore strictly prohibited. Despite this protection, fill associated with transportation projects does occur, and salt marshes are also subject to degradation from tidal restrictions (such as culverts) associated with roadways. A description of salt marsh restoration projects is provided in the following paragraphs.

To help reverse the negative effects of past wetland damage, the Division of Ecological Restoration (DER) of the Department of Fish and Game works with many partners to implement a wide variety of wetland restoration projects across Massachusetts.<sup>17</sup> The Division serves as a facilitator of restoration – working to identify new projects, organize project teams, provide technical assistance, secure project funding, and help manage and coordinate restoration activities from start to finish. DER prioritizes projects that bring significant ecological and community benefits to the Commonwealth. One current project is located in Bourne.<sup>18</sup>

The 10-acre Gray Gables salt marsh is impacted by several impediments to tidal exchange. Two undersized culverts, an earthen dike bisecting the marsh, and frequent shoaling collectively reduce tidal exchange within the system. The goal of this project is to restore Grey Gables to a self-sustaining salt marsh by upgrading the existing culverts and addressing the issue of shoaling that was exacerbated by the construction of Mashnee Island Causeway in 1930s. When complete, this project will enhance fish a wildlife habitat and improve water quality within this 10-acre marsh. Completion of this project is currently undetermined.

## **Working Waterfronts**

The Town of Bourne's coastline generates numerous economic prospects. Commercial shipping and the Massachusetts Maritime Academy represent the most obvious coastal dependant economic contributors; however, services relating to recreational boating and fishing are also a major local industry, while traditional shell and fin-fishing also contribute. Bourne's prevalent coastline also attracts a booming tourism industry, and is an incentive for choosing the town as a primary or secondary residence.

Red Brook Harbor (Parker's Boatyard and Kingman Marine), Barlows Landing, Monument Beach Marina, the Pocasset River (Barlow's Boat Yard and the Pocasset River Marina), and Taylor's Point/Cohasset Narrows (Bourne Marina, a private marina, bait shops, and the Massachusetts Maritime Academy), all represent working waterfronts in Bourne.

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<sup>17</sup> <http://www.mass.gov/eea/agencies/dfg/der/aquatic-habitat-restoration/wetlands-restoration/>

<sup>18</sup> <http://www.mass.gov/eea/agencies/dfg/der/der-priority-projects-map.html>

Bourne has not completed a comprehensive inventory or map of the access points to its various public recreational and/or conservation areas, however it has been discussed in detail and drafts have been prepared in the past. Bourne's Coastal Access Program previously received a grant from Coastal Zone Management to install signage denoting the public access points. The Conservation Commission oversaw the installation of some of these signs during the summer of 2006.

The Shore and Harbor Committee completed a formal inventory and priority list of areas requiring dredging in 1995; however this list has been updated informally several times since then. Based upon the 1995 list, the north and south passages of Red Brook Harbor as well as portions of Buttermilk Bay were top priorities and have undergone dredging, and Gray Gables was dredged three years ago. Generally, the Shore and Harbor Committee tries to undertake a new dredging project every three years. The last dredging project completed was at Monument Beach. The Committee's goal is to complete the major dredging projects required in order to reach a point where all that is necessary are smaller, maintenance dredging of the various working waterfronts.

### **Outstanding Resource Waters**

Outstanding Resource Waters (ORWs) are classified under the Massachusetts Surface Water Quality Standards (314 CMR 4.00), and consist of those waters that offer "outstanding socioeconomic, recreational, ecological, and/or aesthetic values" (314 CMR 4.04(3)). They include public water supplies and certified vernal pools (CVPs), for example. Beyond Bourne's CVPs, Flax Pond, Queen Sewell Pond, Freeman Pond, Mill Pond, Shop Pond, Upper Pond, Herring Pond, the Herring River, and the Pocasset River are also designated ORWs (314 CMR 4.06).

### **4.3.3 Water Supply and Aquifer Recharge Areas**

The vast majority of Bourne north of the Cape Cod Canal consists of a high yield aquifer, the Plymouth Carver Aquifer, while the Sagamore Lens (part of the Cape Cod Sole Source Aquifer) supplies the portion of Bourne south of the Canal. The Plymouth Carver Aquifer is one of the largest in the state, and it has a potential yield of 300 gallons per minute per well, with a total storage capacity of 540 billion gallons of water (Skehan 2001). The Sagamore Lens consists of fresh groundwater overlying bedrock, bounded by marine waters, and separated from the Plymouth Carver Aquifer by tidal waters of the Cape Cod Canal.

Public water supplies north of the Canal are administered by the Buzzards Bay and North Sagamore Water Districts, while the Bourne Water District is responsible for water supplies south of the Canal. Note that another water district, the South Sagamore Water District, previously administered water supplies for a portion of southern Bourne, but was absorbed into the Bourne Water District in 2004. These figures are compiled from the paragraphs specific to each water district that follow, and do not include the Cape Cod Air Force Station and Schooner Pass Trustees Condominiums water supplies.

The Federal Safe Drinking Water Act Amendments of 1996 emphasized the importance of protecting public drinking water from contamination. The law required every state to examine existing and potential threats to the quality of all its public water supply sources and to develop a Source Water Assessment and Protection (SWAP) Programs. The assessments in Massachusetts were completed in 2004 and results showed that the top five potential threats to public water sources are:

1. Residential law care/gardening
2. Residential septic systems and cesspools/septic systems

3. Residential fuel oil storage
4. Stormwater discharge
5. State-regulated underground storage tanks<sup>19</sup>

All of these sources are of concern to the Town of Bourne. Water supplies within Bourne are derived from groundwater sources that are highly vulnerable to contamination due to permeable soils and the absence of hydrogeologic barriers (such as clay) that can prevent contaminant movement into aquifer recharge areas.

Two of the public wells were replaced due to chemical contamination from the JBCC. Non-point source pollution from septic systems, businesses, hazardous waste, and improper disposal of chemical products are also threats to Bourne's water supplies, due to the highly permeable soils. Zoning bylaws afford some protection by requiring setbacks from wells and by limiting septic system density in water contribution areas. In fact, Bourne was the first town on Cape Cod to establish a groundwater protection overlay district, which controls potentially detrimental land uses (such as gasoline storage and hazardous waste facilities) within the district. An annual household hazardous waste collection event also encourages homeowners to properly dispose of waste. Finally, large lot zoning within wellhead protection areas has maintained low nitrogen concentrations within the public water supply systems. Specific potential/existing contaminants within each water supply district are outlined in the subsections that follow.

Each water supply well has an associated Zone I and Zone II or Interim Wellhead Protection Area.

- A Zone I is the area closest to a well. Per the Massachusetts Drinking Water Regulations (310 CMR 22.00), it should be owned or controlled by the water supplier and limited to water supply activities.
- A Zone II consists of the primary recharge area for the aquifer, as defined through a hydrogeologic study.
- An Interim Wellhead Protection Area is the larger area that is likely to contribute water to a well, but that has not been defined through a hydrogeologic study.

### **Buzzards Bay Water District**

The Buzzards Bay Water District contains four wells located in three Zone IIs. Well No. 5 is currently being developed now, also located on the same parcel as well No. 3. All of the wells have an associated 400-foot Zone I, and the following non-water supply related activities occur within the Zone I:

- Dry Cedar Swamp and Bournedale Roads pass through the Zone I for Well #1. Portions of the Zone I are owned by the Wildlands Trust of Southeastern Massachusetts, and although not technically controlled by the water supply authority, are fenced and undisturbed.
- A small section of Bournedale Road crosses through the Zone I associated with Well #4.

The Zone IIs are comprised of mainly undeveloped forest mixed with residential, agricultural, and recreational/open space lands. As of 2003, less than 10% of each of the three Zone II areas was residentially developed, however considerable fractions have the potential for further residential

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<sup>19</sup> <https://www.mass.gov/service-details/the-source-water-assessment-protection-swap-program>. Obtained December 29, 2017.

development. In addition to the residential development, the following is a list of potential contaminant sources within the Zone II's:

- Nursing home - although concerns regarding the operation of older septic systems serving large numbers of people may arise, there is no evidence that the subject septic system is malfunctioning
- Route 25 - a major transportation corridor
- A gas main and electric lines - utilities represent potential contaminant sources considering the possibility of improper herbicide application during maintenance of rights-of-way
- Golf Course (in Plymouth, but within the Zone II for Wells #3 and 4) - possible over-application of pesticides and fertilizers
- Agricultural uses include a horse farm, a pig farm, backyard animals, and cropland. Pesticides and fertilizers, as well as animal waste products, have the potential to contaminate drinking water sources if improperly stored, applied, disposed, or contained
- Illegal dumping occurs within the Zone II for Well #2; such debris sometimes contains hazardous materials or wastes
- DEP Tier Classified Oil or Hazardous Material Release Site within the Zone II for Well #1

A summary list of additional information pertaining to the Buzzards Bay Water District is provided below:

- Total of 54 miles of water main (cast iron, ductile iron, copper, plastic) from 2-inch to 16-inch
- Total of 2,547 service connections
  - 4 non-residential institutions (schools, camps, day care centers, etc.)
  - 86 commercial, 14 with fire sprinkler
  - 1 agricultural
  - 0 industrial (former two purchased by Mass Maritime in 2015)
  - 1 recreational
  - 14 municipal/sanitary improvement district
- Educational program for industrial/commercial users, but not for residential users
- Daily average withdrawal in 2015 = 512,226 gallons

### **North Sagamore Water District**

The North Sagamore Water District is currently supplied by three active gravel-packed wells: the Black Pond Well (installed in 1979), the Beach Well (installed in 1958 and located on Pilgrim Road) and the Church Lane Well (installed in 2001). Three above-ground water storage tanks, the Bournedale tank (located off Scenic Highway), the Clark Road tank, and Norris Road Tank, hold a combined 1.8 million gallons of water. There are presently no interconnections (to facilitate reserve supplies) between the North Sagamore Water District and the other water districts or towns. However, future possible connections with the Buzzards Bay Water District and the Town of Plymouth Water Department may be available options.

The North Sagamore Water District withdraws its drinking water from the Plymouth/Carver Aquifer. Groundwater flows from Herring Pond and the Herring River toward the Cape Cod Canal. The Black Pond Well and the Church Lane Well both feed into the James A. Morgan Water Treatment Plant which is the principal source of water for residents of the District. The Beach Well (Well #1) functions primarily as a peaking well, supplying water only during peak demand periods.

The North Sagamore Water District is proactive in protecting the present and future water supply by purchasing as much land as possible abutting District property. In order to achieve this goal without impacting its ratepayers, the North Sagamore Water District has secured Commonwealth of Massachusetts grant money, along with purchasing land as a “bargain sale.” Currently, the District owns over two hundred and fifty (250) acres, which guarantees possible well sites for future generations of the District, and also provides protection of the existing water supply. Additionally, the North Sagamore Water District has been proactive in making capital improvements. These improvements include rehabilitation of the Clark Road Water Storage Tank, upgrades to the Beach Well Water Treatment Plant and Norris Road Booster Pumping Station as well as updating our meter reading and billing systems.

All three of the District’s water supply wells have a Mass. DEP approved and protected 400 foot radius of land around them referred to as a Zone 1. The Beach Well and Black Pond Well each have a road (Pilgrim Road and Black Pond Road, respectively) passing through the associated Zone I.

The District also has a Mass DEP approved Zone II for each source. The Zone II is a larger area of the aquifer that contributes to each well. These areas are predominantly forested and undeveloped; however residential uses are present with the potential for additional residential and commercial development. The Zone II’s for the Beach Well and Church Lane Well also extend into Plymouth. Other uses within the Zone II’s that may contribute to contamination include:

- Automotive repair shops (Beach Well Zone II) - concerns arising from this land use type include the potential for automotive fluid and solvent leaks/spills.
- Route 3 passes (Beach Well Zone II)
- Electric utility line
- Illegal dumping (Black Pond Well and Church Lane Well Zone II)
- Waterfowl (mostly Canada geese) within Black Pond may contribute to nutrient loading and subsequent contamination of the water supply due to the prolific waste generally produced by these birds.
- Baseball field (Beach Well Zone II) - fertilizer use and storage may be of concern

The zones of contribution for each of the North Sagamore Water District’s three wells are protected under the Town of Bourne’s Water Resource District Zoning Bylaw.

A summary list of additional information pertaining to the North Sagamore Water District is provided below:

- Total of 38 miles of water mains.
- Total of 1,816 service connections
  - 53 Commercial connections
  - 15 Municipal connections
  - 1748 Residential Connections
  - Future development expected to be minimal
- Daily average withdrawal in 2015 = 442,000 gallons
- [www.northsagamorewaterdistrict.com](http://www.northsagamorewaterdistrict.com)

## **Bourne Water District**

The Bourne Water District contains six gravel packed wells and is a member of the Upper Cape Regional Water Supply Cooperative, which provides an emergency water supply. Land uses within the Zone II for the Bourne Water District include a mixture of forested, residential, commercial, and light industrial. A list of issues relating to and potential contaminant sources within the protective radii of these wells is provided below:

- All Zone I's are not publicly owned or controlled.
- County Road encroaches into the 250-foot Zone I for Pumping Station #1.
- Route 28A intersects the Zone I associated with Well #2
- An underground storage tank is located within the Zone I for Well #2.
- Damaged vehicles are being stored at an unpermitted facility within the Zone II, which could potentially contaminate water supply through spills, leaks, or improper handling of chemicals, wastes, and batteries.
- West of Route 28, parts of the Zone II contain residential areas that use septic systems, since public sanitary sewer is not available.
- Other activities associated with residential areas, including household hazardous materials, above- and below ground oil storage tanks, and contaminants (pet waste, lawn chemicals, etc.) in stormwater, can also contribute to drinking water contamination.
- The transportation network, including Route 28 and many other local roads, passes through the Zone II. Roadway construction and maintenance, as well as accidents, illegal dumping, and de-icing materials, can all contribute to potential contamination as materials are washed into catch basins by stormwater.
- The commercial and industrial uses within the Zone II, mainly along the Routes 28 and 28A corridors, are a potential source of hazardous waste contamination, if improperly stored, used, or disposed of.
- The Zone II contains several DEP Tier Classified Oil and/or Hazardous Material Release Sites, as well as the federally classified superfund site at the JBCC.

A summary list of additional information pertaining to the Bourne Water District is provided below:

- Total of 100 miles of water main
- Total of 5,947 accounts
  - 5,706 residential
  - 241 commercial
- Daily average withdrawal in 2006 = 1,303,799 gallons

### **Cape Cod Air Force Station**

The Cape Cod Air Force Station maintains two groundwater wells that supply drinking water to the facility. Both wells have associated Zone I radii of 400-feet and Interim Wellhead Protection Area (IWPA) radii of 2,320 feet.

The Zone I associated with one of the wells (Well #1) contains buildings with above ground diesel fuel storage tanks. An additional tank containing waste oil is present within the IWPA of this well. Above-ground storage tanks can be a threat to drinking water if leaks or spills arise due to improper management. The Zone I for Well #1 also includes the septic system for the Air Force Station, and roads and parking areas lie within the IWPA for the well.

### **Schooner Pass Trustees Condominiums**

The Schooner Pass Trustees Condominiums complex maintains its own drinking water supply well and also purchases some of its water from the Bourne Water District. The Zone I radius for the well is 300 feet, while the Interim Wellhead Protection Area (IWPA) radius is 879 feet. Presently, the Massachusetts Drinking Water Regulations are met in that the Zone I is controlled by the public water system and no non-water-supply activities are permitted within the Zone I.

Residential uses comprise a portion of the IWPA, and, since the area is not serviced by public sanitary sewers, all use on-site septic systems. Athletic fields associated with a nearby school are located within the IWPA. Lawn care products such as pesticides and fertilizers can be transported into the aquifer with stormwater and excess irrigation water. Therefore, the over-application or improper storage and disposal of such materials could result in contamination of the aquifer. Although no oil or hazardous contamination sites appear to be located within the IWPA, it abuts the JBCC, which has multiple areas with DEP Bureau of Waste Site Cleanup Release Tracking Numbers.

### **4.3.4 Flood Hazard Areas**

By 2014, the Federal Emergency Management Agency (FEMA) completed its Map Modernization Project, where it reevaluated floodplain data on its Federal Insurance Rate Maps (FIRMs) across the country. For the Town of Bourne, no changes were made. The FIRMs show that the eastern half (approximately) of Bourne lies within a FEMA designated Zone D, where flood hazards are undetermined. New England “nor’easters” are generally the cause of flooding along the northeastern portion of Bourne’s coast. The larger ponds within the Town are designated as Zone X500 flood areas, which are either subject to the 500-year frequency flood, or the 100-year flood with flooding depths of less than 1-foot or drainage areas less than one square mile. Areas adjacent to the Cape Cod Canal and various bays and inlets along Bourne’s shoreline lie at or below the 100-year flood elevation, and as such, are designated as Zone AEs, where base flood elevations have been determined. Areas most proximate to the shore constitute VE Zones, where velocity hazards (wave action) are present. The western coast is very irregular and experiences flooding during hurricanes. Widely impacted areas during flooding events include the Buzzards Bay and Monument Beach village centers.

In addition to damage caused by smaller, more frequent storm events within these flood hazard areas, serious flooding occurred in association with the hurricanes of 1938, 1944, 1954, 1955, and 1992. Such major storms have resulted in regulatory and investor constraints in some of Bourne’s lower elevation areas targeted for revitalization. The Town does not presently have, or have any future plans for, major flood control structures, although private seawalls and jetties are present in many coastal areas. In most instances, these structures afford little protection from large storm events, and even in smaller storms, wave run-up, wave-induced erosion, and wave-born debris may still damage coastal structures. Another alternative is acquisition as open space. Land that is repeatedly flooded may be less desirable for development and acquiring as open space could be an option. Maintaining land undeveloped within flood hazard areas reduces costs associated with property damage, and maintaining wetlands and other natural features in these areas can minimize impacts of floodwaters or storm surges on inland areas. The Open Space Committee considers properties in the flood hazard areas in its acquisition prioritization criteria and ranking system. Those in Zone A and Velocity Zones are high priority for acquisition.

The Bourne Hazard Mitigation Plan<sup>20</sup> is currently in draft. The plan assesses the Town's vulnerability to natural hazard events such as drought, floods, severe winter weather, hurricanes, Nor'easters, coastal erosion, among others. Understanding where it is most vulnerable allows the Town to develop mitigation strategies to reduce the impact of these events on private and public property and life.

#### **4.3.5 Wetlands**

Wetlands provide a variety of important functions, including 1) the protection of public and private water supply; 2) the protection of groundwater supply; 3) flood control and storm damage prevention; 4) the prevention of pollution; 5) the protection of fisheries and shellfish; and 6) wildlife habitat. Bourne contains many wetland types from coastal (e.g. salt marshes, tidal flats, beaches, land subject to tidal action and/or coastal storm flowage, etc.) to inland (forested- both red maple and Atlantic white cedar swamps, scrub-shrub swamps, freshwater marshes, and bogs etc.) and everything in-between (e.g. estuaries and brackish areas). Larger coastal wetland systems can be found along the inlets of Phinney's, Red Brook, and Magansett Harbors. Larger systems are also along the Pocasset and Back Rivers. A significant system in Sagamore is part of the Scusset Beach State Reservation. See Section 4.4.4 for more discussion on specific wetland resources in Bourne.

In addition to the Massachusetts Wetlands Protection Act, which regulates activities potentially impacting wetland resource areas, the Town of Bourne imposes its own Wetland and Natural Resources Protection Bylaw that considers recreation and navigational issues in addition to those wetland functions listed above. Furthermore, Bourne contains over 200 restricted wetlands under M.G.L.c. 130 s. 105, which prohibits certain development from taking place within delicate areas.

### **4.4 Vegetation**

#### **4.4.1 General Inventory**

The Town of Bourne comprises part of the Cape Cod Coastal Lowland and Islands Ecoregion, as defined by the U.S. Environmental Protection Agency. Due to a prevalence of sandy, upland soils that comprise the majority of southeastern Massachusetts, including Bourne, rain percolates too rapidly to be sufficiently available to many plant species. Therefore, species specialized to grow in xeric, nutrient poor, and acidic conditions are common. In fact, "only a fraction of the plant species that grow in southern New England can tolerate the dry, sterile soils of Cape Cod." A January 2, 2007 letter received for this project from the Natural Heritage and Endangered Species Program (NHESP) details that the Cape Cod Coastal Lowland and Islands Ecoregion may support Hemlock-White Pine and Oak-Pine xeric (dry) forests on moraines and sandy outwash. In addition to vegetation adapted to dry and nutrient-poor conditions, however, species associated with bogs and pondshores are also present, and may be rare due to their affinity for unusual habitats, such as Sandplain Heathlands or Coastal Plain Pondshores. Furthermore, in Bourne "some of the state rare species are locally abundant because of habitats that are locally abundant or locally widespread, supporting good populations that depend on these generally limited local conditions. Another characteristic of Bourne that impacts vegetative communities is the presence of lands subject to regular salt spray. In addition, "areas in the vicinity of daily or regular salt spray are limited in the state and important to a variety of species."

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<sup>20</sup>

<http://www.capecodcommission.org/resources/hazardplans/bourne/DRAFT%20Bourne%20Hazard%20Mitigation%20Plan%20August%2017%202017.pdf>. Obtained December 29, 2017.



#### **4.4.2 Forest Land**

Remaining sizable tracts of forested land within Bourne include:

- Bourne Town Forest and adjacent Four Ponds Conservation Area and Aquifer Protection Lands in Pocasset
- Shawme Crowell Forest State Forest proximate to the northeastern corner of the Massachusetts Military Reservation
- North Sagamore Woodlands north of the Canal
- Carter Beale Conservation Area north of the Canal
- Massachusetts National Cemetery in the southeast portion of Bourne
- Monks Park and Briarwood and Little Bay Conservation Area, owned by Bourne Conservation Trust
- Old Field Pond Preserve, Bournedale Forest, and Buzzards Bay Water District Land north of the Canal
- Red Brook forest, owned by the Bourne Conservation Trust

Additionally, JBCC also contains significant tracts of fire-maintained forested areas. In addition to Town-owned woodlands, Town zoning affords further protection of forested areas through provisions for retaining existing vegetation, and by requiring a Special Permit when vegetative clearing occurs in quantities greater than 10,000 square feet.

Maps from the 1830s depict potential primary forests, in addition to untilled woodlots and wooded pastures within the Town of Bourne. The fact that woodlots were untilled is interesting because untilled lands have greater biodiversity than tilled areas. The soil structure in areas that were never tilled remains relatively undisturbed, and the seed bank and reproductive material (roots and rhizomes) persist, leading to this greater biodiversity. Comparing the 1830s map to 1999 aerial photographs indicates that, despite human activity that may have occurred within these forested areas during that time span, certain areas may never have been tilled, since forest was present in the 1830s and in 1999. Investigations into the soil structure of sites containing forested land during both time periods would be necessary to determine whether any of the sites represent primary forest. Although not old growth forests, which have never been cut, primary forests are areas that have been continually forested, despite possible use as woodlots or wooded pastures, which maintains the forests in a “younger” condition, never reaching the climax of significantly aged trees common to old growth forests. When compared to earlier stage forests or forests that have established on tilled land, primary forests retain more native biodiversity. Specifically, potential primary forests are located north of the Canal and around the North Sagamore Water District.

#### **4.4.3 Agricultural Land**

Agricultural land provides more than just the obvious benefits associated with the production of crops or raising of livestock. In addition to economic benefits, agricultural land contains intrinsic scenic value and open vistas, and also provides open areas and varied habitats for wildlife. Within Bourne, the main agricultural lands consist of cranberry bogs, although other agricultural areas also include other croplands, and pasture.

#### **4.4.4 Wetland Vegetation**

Wetlands are often very productive communities whose vegetation provides an important source of food, cover, and nesting sites for various wildlife habitats. In addition to the more common wetland

types (red maple/high bush blueberry swamps, scrub-shrub swamps containing sweet pepperbush, southern arrowwood, buttonbush, winterberry, among others, and freshwater marshes), these environs within Bourne provide an opportunity for state-wide unusual or rare species to thrive.

Some of Bourne's forested swamps contain Atlantic white cedar, which is becoming less and less common throughout Massachusetts. The largest Atlantic White Cedar (AWC) swamp within Bourne lies proximate to Goat Pasture Pond, although several others are located at Queen Sewell Pond in Buzzards Bay, off Brooks Road in Monument Beach, and at JBCC. None are pure Atlantic White Cedar Stands; instead, the canopy is dominated by both Atlantic white cedar and red maple, with sweet pepperbush, swamp azalea, and high bush blueberry prevalent in the shrub stratum, and various ferns, starflower, and sphagnum moss comprising the herbaceous layer. The Town of Bourne Wetlands and Natural Resources Protection Bylaw prohibits any alteration to AWC swamps.

The Coastal Plain Pondshores present within Bourne are an example of unique environments that create ideal conditions for plants suited to specific habitats.

The Plymouth gentian and creeping St. John's-Wort are examples of state-listed wetland plants that grow along Coastal Plain Pondshores. Overall, Bourne contains a plethora of habitat types, coastal to inland, floodplain to kettle holes, which results in an abundance and diversity of wetland vegetation.

#### 4.4.5 Rare Plant Species

The population status of rare plants in Massachusetts is described using three categories: 1) special concern; 2) threatened; and 3) endangered:

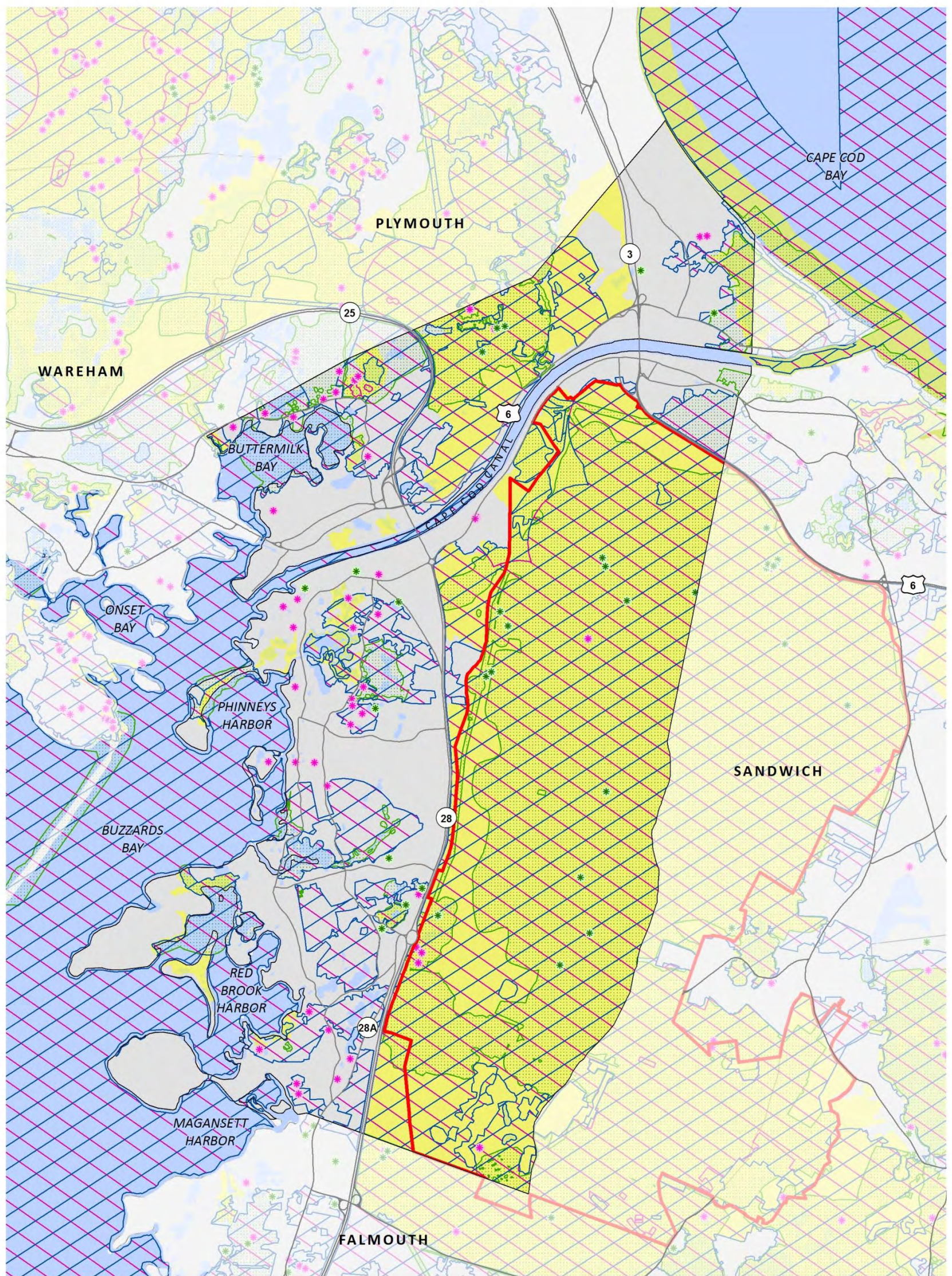
- Special concern species have either experienced a decline that could threaten the species without intervention, or whose populations are so small, localized, or dependent upon specialized habitats that they could become threatened.
- Threatened species are likely to become endangered in the foreseeable future.
- Endangered species are in danger of extirpation from Massachusetts.

In addition to these categories, the NHESP maintains an unofficial watch list of plants. Watch Listed species are those "a) species which have been removed from the official regulatory list but for which the Program still maintains active files and encourages conservation efforts to ensure that its status remains secure; and b) species suspected to be rare or declining but for which information is lacking regarding the number and size of current populations, the severity of threats and decline, or its taxonomic status."<sup>21</sup>

The majority of Bourne (approximately 65%) is mapped as Priority Habitat. Priority Habitat is the geographical extent of habitat for all state-listed plant and animal species. As shown in Map 6 NHESP has identified nine Priority Habitats that either cross into Bourne, or are contained entirely within the town boundary.

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<sup>21</sup> <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/rare-plants/plants-watch-list.html>. Obtained September 28, 2016.



\*GIS Data - MassGIS

Document Path: H:\Projects\2016\16069 Town of Bourne OSRP\GIS\Maps\Map 6 PlantWildlifeHabitat.mxd

**Legend**

-  Town of Bourne
-  Joint Base Cape Cod
-  NHESP Certified Vernal Pools
-  Potential Vernal Pools
-  NHESP Priority Habitats of Rare Species
-  NHESP Estimated Habitats of Rare Wildlife
-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape

\*GIS Data - MassGIS



**Plant and Wildlife Habitat  
Bourne Open Space and  
Recreation Plan**

Date: 8/11/2017

Map 6

Map 6. Plant and Wildlife Habitat

Twenty special concern, threatened, or endangered plant species, as designated by the NHESP, occur within the Town of Bourne (Table 14), most of which have been observed on JBCC.

**Table 14. Plants Species that are Threatened, Endangered or Species of Concern Observed in Bourne**

Scientific Name	Common Name	MESA Status	Most Recent Observation
<i>Aristida purpurascens</i>	Purple Needlegrass	T	1901
<i>Asclepias verticillata</i>	Linear-leaved Milkweed	T	1915
<i>Crocianthemum dumosum</i>	Bushy Rockrose	SC	2011
<i>Eleocharis ovata</i>	Ovate Spike-sedge	E	1992
<i>Hypericum adpressum</i>	Creeping St. John's-wort	T	2008
<i>Juncus debilis</i>	Weak Rush	E	1993
<i>Liatris scariosa</i> var. <i>novae-angliae</i>	New England Blazing Star	SC	2012
<i>Linum intercursum</i>	Sandplain Flax	SC	2013
<i>Lygodium palmatum</i>	Climbing Fern	SC	2013
<i>Malaxis bayardii</i>	Bayard's Green Adder's-mouth	E	1919
<i>Ophioglossum pusillum</i>	Adder's-tongue Fern	T	2014
<i>Persicaria puritanorum</i>	Pondshore Knotweed	SC	1994
<i>Polygonum glaucum</i>	Sea-beach Knotweed	SC	1913
<i>Rhynchospora scirpoides</i>	Long-beaked Bald-sedge	SC	1986
<i>Sabatia kennedyana</i>	Plymouth Gentian	SC	1996
<i>Sagittaria teres</i>	Terete Arrowhead	SC	2008
<i>Setaria parviflora</i>	Bristly Foxtail	SC	1913
<i>Spiranthes vernalis</i>	Grass-leaved Ladies'-tresses	T	1896
<i>Suaeda calceoliformis</i>	American Sea-blite	SC	1995
<i>Triosteum perfoliatum</i>	Broad Tinker's-weed	E	2014

E: Endangered; SC: Species of Concern; T: Threatened

Source: Massachusetts Department of Fish and Game National Heritage and Endangered Species Program. September 28, 2016.

The New England Wildflower Society has coordinated the creation of Conservation and Research Plans for various state-listed species. Thus far, of the species occurring in Bourne, plans have been created for Creeping St. John's-Wort, which is often associated with Coastal Plain Pondshores, and New England Blazing Star. St. John's-Wort is generally considered to be secure in New England, and the conservation objective noted in the plan is to maintain all populations at their current locations and current numbers. The Conservation and Research Plan further notes that this is attainable at all sites except for the mainland site in Bourne. The mainland site is subject to several impacts, including the recreational use of a proximate public beach and invasion by common reed (a non-native, aggressive colonizer) which may be worsened by road run-off. Currently, actions are only being undertaken to control the spread of common reed, and recreational impacts have not been addressed.

According to the Conservation and Research Plan for New England Blazing Star, it grows in coastal sandplain grasslands. Its major threat is habitat loss due to development and succession, particular fire, as well as destructive mowing regimes, extensive deer grazing, seed predation, herbicide use, collection, and lack of public awareness. Conservation efforts to date include habitat protection, managing for habitat, controlled burning, constructing deer exclosures, establishing *ex situ* seed banks, and propagation of New England Blazing Star.

#### 4.4.6 Unique Natural Resources

The Town of Bourne contains both coastal and inland resources. Coastal areas include dune systems, barrier beaches, and salt marshes, among many others, while unusual inland/freshwater communities include Atlantic white cedar swamps and vernal pools (both discussed in other sections of this report).

The NHESP has identified four natural communities<sup>22</sup> that occur within Bourne. Natural communities are defined as “assemblages of species that recur together in particular environmental conditions. These groups of plants and associated animals can be classified and described by their dominant biological and physical features.” NHESP ranks natural communities on a scale from 1 to 5 (S1 to S5), with S1 being vulnerable and S5 being secure. S1, S2, and S3 ranked communities are priorities for conservation.

##### **Black Oak – Scarlet Oak Woodland**

Black Oak – Scarlet Oak Woodland is an open, short oak/health community maintained by regular light fire or other disturbance. The woodland occurs on dry sites, often sandy, gravelly, or rocky slopes. Without fire, a deep accumulation of oak leaf litter impedes germination of seeds that need mineral soil, restricting such species to small patches of disturbance. Except on the driest sites, without regular fire, the woodland community succeeds to more diverse, denser and taller oak-hemlock-white pine forest or one of its variants. This community is ranked as vulnerability level S3/S4, in that while it is apparently secure in Massachusetts (S4), it is growing vulnerable due to limited acreage, recent or widespread declines, or other factors (S3).

##### **Sandplain Heathlands**

Sandplain Heathlands primarily consist of a coastal community that arises on acidic, nutrient poor, droughty soils and is dominated by dwarf shrubs. Historically, Sandplain Heathlands were likely maintained by fire and/or salt spray. Threats to the community include fire suppression, exotic species (especially black pine and scotch broom), fragmentation, vehicular traffic, and development. Additionally, domestic pets and feral animals prey upon ground nesting bird species. Sandplain Heathlands are ranked S1. It is only found in JBCC.

##### **Pitch Pine – Scrub Oak Barrens**

The Town Forest, Shawme-Crowell State Forest, Four Ponds Conservation Area, and other wooded areas within Bourne are classified as pitch pine-oak forests, and pitch pine-scrub oak barrens are a subset of this forest type.

Pitch Pine-Scrub Oak Barrens occur on outwash sandplains with acidic, nutrient poor and drought prone soils, and typically have an open canopy of pitch pine and a dense understory of scrub oaks and huckleberry. Pitch Pine-Scrub Oak Barrens tend to exhibit greater temperature variation (hotter days, cooler nights) than mesic sites during the summer due to the low vegetation, sandy soils, and generally dry environment. The community is dependent upon fire to sustain itself, and some of the associated species even have volatile oils that facilitate the spread of fires. Regular removal of accumulated duff (dead needles and leaves) through prescribed burning can reduce the risk of wildfire and maintain the natural community. In addition to the exclusion of fire, this S2 ranked community is also threatened by human development, since the generally flat terrain and rapid drainage make it very developable.

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<sup>22</sup> <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/natural-communities/>. Obtained on October 11, 2016

### **Scrub Oak Shrublands**

Scrub Oak Shrublands are generally located within Pitch Pine-Scrub Oak communities, and are maintained by frosts that damage more susceptible species. The community is threatened by development and fragmentation, and studies are needed in order to ascertain how fire dependant the community is. Therefore, Scrub Oak Shrublands have an associated S1 ranking.

#### **4.4.7 Invasive Species**

In Massachusetts, invasive plants are defined as those that are exotic in origin and have the ability to out-compete native vegetation. A discussion of the threats invasive species pose to native vegetation is provided in Section 4.8.8; this section focuses on an inventory of the invasive species present within the Town of Bourne. This inventory is not comprehensive and is meant to act as a starting point for future inventory/management of invasive species. Additionally, it would be useful to ascertain if invasive species are present on any of the various Town-owned parcels, and to take management actions to remove or control their populations. The major and most problematic invasive species presently within Bourne consist of multiflora rose, common reed, and oriental bittersweet. The first two are herbaceous wetland plants, although both can grow in upland conditions and readily colonize disturbed areas.

- Common reed spreads mainly via rhizomes as seed viability is usually low. It also forms dense stands with mats of dead biomass that crowd out native plants. Stands of common reed can also result in an increased risk of fire.
- Oriental bittersweet is a woody vine that “strangles” other vegetation through its vigorous growth habit. The vine spreads vegetatively as well as via dispersal of its seeds by a variety of birds.

Other invasive species within Bourne include Norway maple, black locust, tree of heaven, multiflora rose, tartarian and Japanese honeysuckles, autumn olive, winged euonymous, glossy buckthorn, garlic mustard, and Japanese knotweed.

#### **4.4.8 Public Shade Trees**

The Town of Bourne currently does not have a public tree policy. Trees in the public right-of-way are maintained by the Department of Public Works. Through the Town’s Subdivision Regulations, the Town tries to reduce the number of mature trees removed as part of private development projects. Equally, the Planning Board may require the planning of additional trees as an amenity to future residents of a proposed subdivision.

### **4.5 Fisheries and Wildlife**

#### **4.5.1 General Inventory**

Bourne’s natural resources provide both abundant and diverse habitats for fisheries and wildlife species. The Bournedale Office of the Division of Fisheries and Wildlife has noted that areas of Bourne contain plentiful wildlife, including the more common species such as turkey, squirrel, rabbit, raccoon, deer, coyote, turkey vulture, fox and opossum, to less abundant species such as river otter, mink and weasel, to uncommon species such as whip-poor-will, box turtle, diamondback terrapin, osprey, and barn owl. Specifically, Four Ponds Conservation Area and the Town Forest, located in Pocasset, provide valuable wildlife habitat, while Sagamore Marsh and Scusset areas are home to bobcat in addition to the animals previously listed.

The natural environment has been impacted by community growth, including residential and commercial developments as well as improvements to transportation networks; however, some significant natural corridors do remain. The finfish population is sufficiently viable to support recreational fishing, although opportunities for shellfishing and hunting have dwindled. Shellfishing continues to decline, and hunting is generally restricted to the Town Forest and the northern sections of the Four Ponds Conservation Area (between Upper Pond and Town Forest). Beyond the town conservation areas, hunters must follow rules regarding a discharge of firearms, which is illegal within 150-feet of any road or within 500-feet of an inhabited dwelling, thereby limiting the lands that can be hunted upon.

### **Mammals**

The Massachusetts Department of Fish and Game maintain a State Mammal List and it can be viewed here: <http://www.mass.gov/eea/agencies/dfg/dfw/fish-wildlife-plants/state-mammal-list.html>. As noted on the site, not all species are seen statewide.

The largest game species within Bourne is white-tailed deer, while other game mammals include eastern cottontail and weasels (NEsoils.com). According to the NHESP natural communities fact sheets, predatory mammals present in Bourne include red fox and coyote, which often hunt on the beaches of Bourne. Bourne's beaches are also used by seals for resting. In general, pine barrens are not heavily populated by mammalian species, as larger mammals tend to favor more open forests where movement is easier.

### **Avian Species**

The Massachusetts Audubon Society<sup>23</sup> monitors changes patterns and habitats of the state's breeding and as well as migratory birds that do not spend the entire year in Massachusetts. Their website provides data and analyses on the status of statewide bird monitoring and conclusions on threats to declining species.

Bourne's extensive freshwater and coastal shorelines provide nesting opportunities for many species of waterfowl and wading birds, such as various herons and ducks, among others. According to the NHESP natural communities fact sheets and consultation with staff, several shorebird species within Bourne are beach specialists, and nest and forage on beach strands, while raptors such as merlins and peregrine falcons hunt on beaches and from cliffs during migrations of prey bird species. Erosional cliffs within Bourne provide the less common habitat required by bank swallows for nesting. Grasslands and heathlands are utilized by various sparrows and larks and northern harriers nest in heathlands and shrublands. Birds of prey (hawks and owls) hunt in grasslands and open heathlands. The birds present within Pitch Pine-Scrub Oak Barrens are similar to that of oak woodlands, and include various song birds. Openings within the forest are used by whip-poor-wills, common nighthawks, and American woodcock. The exclusion of fire in this fire dependant community type leads to less common but very large, hot fires, which are thought to have contributed to the extinction of heath hens, which used to populate Pitch Pine- Scrub Oak Barrens.

The brackish areas in Bourne, where rivers and streams flow into the ocean, generally do not freeze and so provide overwintering habitat for waterfowl, while the Mashnee Island access road provides habitat for piping plovers and marsh hawks. Maritime shrublands are an important resource for migrating flocks.

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<sup>23</sup> <http://www.massaudubon.org/our-conservation-work/wildlife-research-conservation>

Upland game birds that are likely to be present within Bourne include bobwhite quail, ruffed grouse, ring-necked pheasant, American woodcock, turkey, and common snipe.

### **Herpetofauna**

The Massachusetts Department of Fish and Game maintain a State Reptile and Amphibians List and it can be viewed here: <http://www.mass.gov/eea/agencies/dfg/dfw/fish-wildlife-plants/state-reptiles-and-amphibians-list.html>. As noted on the site, not all species are seen statewide. Although not directly affected by terrestrial activities occurring within the Town of Bourne, sea turtles have been included as development and other land disturbances can result in indirect effects to these creatures via impacts to water quality in Bourne's off-shore areas.

### **Fish/Shellfish**

Shellfish found in Massachusetts, including Bourne, are oysters, blue crab, sand crab, quahog, ocean quahog, soft-shell clam, razor clam, bay scallop, sea clam, blue mussel, and sea scallop. The Town's website provides a wealth of information on shellfishing in Bourne, including access to its shellfishing regulations, permit applications, and educational materials, including a map of shellfish areas, closures, and local tide charts.

In general, New England's, and the majority of the eastern seaboard's, coastal fisheries and shellfisheries face significant threats, including over-fishing, pollution, and habitat loss, which have lead to drastic declines in populations of various species. Bourne is no exception. Oyster and scallop populations are in a severe state of decline, as are alewives and blueback, both types of herring. In addition to causing population declines, pollution has also resulted in closures of shellfish beds, which can have significant commercial impacts to the community. The Town's website provides the most current information on shellfish closures (<http://www.townofbourne.com/natural-resources/pages/shellfish>).

Inland fishing remains popular recreationally, and Bourne's freshwater habitats support a variety of freshwater fish. Specific information was available from the Massachusetts Division of Fisheries and Wildlife regarding fisheries within Flax Pond, Queen Sewell Pond, and Great Herring Pond (only a small portion of which lies within Bourne) and is provided below. A variety of freshwater shellfish are also present within Bourne, some of which, such as eastern pond mussel, are state-listed.

#### Picture Lake

Picture Lake, also called Flax Pond, within Pocasset, exhibits an average depth of 3-feet, with maximum depths of 6-feet. The pond bottom is comprised of muck and sand with abundant aquatic vegetation, and its one-mile shoreline is residentially developed. Two public access points are located off County Road. Picture Lake is an unstratified warm water pond where largemouth bass is the primary gamefish. The pond was intermittently managed and stocked with various species from 1927 to between 1965 and 1971. A fisheries survey undertaken in 1994 found six total species: largemouth bass, bluegill sunfish, pumpkinseed sunfish, white perch, yellow perch, and banded killifish.

#### Queen Sewell Pond

Queen Sewell Pond, also called Bumps Pond, exhibits an average depth of 10-feet with a maximum depth of 24-feet. The Pond is generally infertile, with clear water, a sandy bottom, and scarce aquatic vegetation. The 0.6-mile shore line is moderately developed, and the pond is accessed off Puritan Road.



A 2004 fisheries survey found chain pickerel, largemouth bass, yellow perch, white perch, and bluegill sunfish.

#### Great Herring Pond

Great Herring Pond, historically known as Lake Manomet, exhibits an average depth of 20-feet, with a maximum depth of 42-feet. The pond empties into the Herring River (formerly called Monument River), which historically entered Buzzards Bay, but now enters the Cape Cod Canal. The shoreline is moderately developed with residential uses, cranberry bogs, and a summer camp (Camp Bournedale). The pond bottom consists primarily of sand and rubble with areas of mud. Access is provided via a ramp located off Little Sandy Pond Road. Surveys undertaken in 1984 and 2001 found yellow perch, white perch, white sucker, brown bullhead, banded killifish, smallmouth bass, chain pickerel, golden shiner, American eel, largemouth bass, pumpkinseed sunfish, and tessellated darter. Walleye are also occasionally reported, and alewife and blueback herring are plentiful from late spring through the fall. Great Herring Pond was added to the list of Great Ponds of Massachusetts as identified by the Department of Environmental Protection as of 2006. Designation as a Great Pond means that Chapter 91 Applications are required for waterfront construction pursuant to 310 CMR 9.05.

#### **4.5.2 Vernal Pools**

Vernal pools are unique wetlands that provide specialized breeding habitat for a variety of organisms. The pools are typically ephemeral in nature, with water ponded through the spring but drying by the middle to end of summer, although some pools do contain water year-round. Such intermittent drying precludes fish from establishing permanent populations within these wetlands; many amphibian and invertebrate species rely on breeding habitat that is free of fish predators.

NHESP is responsible for certifying such ephemeral water bodies as vernal pools. Certification is based upon documented evidence of breeding by specific species that is submitted by citizens. Once certified, vernal pools become Outstanding Resource Waters (ORWs) and gain additional protection under the Massachusetts Wetlands Protection Act and the Massachusetts Clean Water Act. According to NHESP, the Town of Bourne has 26 Certified Vernal Pools (CVPs) (Map 6).

In addition to CVPs, NHESP also identifies areas that may function as vernal pools, or Potential Vernal Pools (PVPs), using an aerial photo survey. In total, 51 PVPs have been identified by NHESP within the Town of Bourne (also see Map 6). Several of these PVPs overlay CVPs, while others may not provide the requisite habitat for certification. Several clusters of PVPs, mainly west of Route 25 and Route 28 provide significant habitat value as the character of the pools is varied.

#### **4.5.3 Wildlife Corridors**

Wildlife corridors become increasingly important as natural areas are inevitably divided by development. In the resulting isolated natural territories, the long-term survival of various wildlife populations depends upon patch size, the number of patches, and how isolated each patch is from the next. In order to conserve biodiversity, it is imperative to maximize both the number and size of protected individual natural areas, while maintaining bands of undisturbed or minimally disturbed lands to connect them.

Wildlife corridors should both link patches of natural areas, and provide suitable habitat such that wildlife is encouraged to utilize the corridors to migrate between a network of patches (Manomet Center for Conservation Sciences 2003). In essence, wildlife corridors facilitate the persistence of species

by allowing movement between habitats and populations in an increasingly built environment. Connected undeveloped lands also afford alternate habitats for species as local conditions change and/or vary annually. Important corridors within the Town include Bournedale, Sagamore Beach, the Cape Cod Canal, the Back River and Pocasset River Watersheds, the Red Brook Pond Herring Run, and JBCC.

Bournedale has faced the least development of any other village in Town. Large tracts of undeveloped land and utility easements function as corridors to the north and south of Bournedale Road, and connect to the Herring River ACEC to the east and to rural areas in Plymouth to the north. Despite its relatively undeveloped character, Route 25 and residential developments have encroached upon this corridor. The Sagamore Beach area, including the Scusset State Reservation, contains a noteworthy expanse of connected wetlands and open space.

Although man-made and therefore highly altered, the Cape Cod Canal links the warmer waters of Buzzards Bay and the cooler open waters of Cape Cod Bay. Tidal flows and water quality associated with the Canal impact the Herring River and Bourne Pond Herring Runs, and the man-made saltwater swimming pool at the Bourne Scenic Park joins salt marsh to the Canal. Despite the Canal's potential to function as a corridor for marine animals, it acts as a significant barrier to terrestrial species, the majority of which are unlikely to utilize the bridges to cross the Canal.

Estuaries within the Back River and Pocasset River Watersheds offer valuable habitat, and the Town of Bourne owns a linear parcel of land linking Red Brook Pond to Red Brook Harbor, which functions as a herring run. The Bourne Conservation Trust owns additional lands surrounding the Pond.

The three herring runs within Bourne (Bourne Pond, Monument River, and Red Brook) also comprise (or historically comprised) wildlife corridors, although the number of herring using these runs has declined. Bourne Pond no longer functions as a run, likely due to man-made restrictions preventing herring passage.

In addition to these wildlife corridors, the JBCC itself represents the largest contiguous tract of undeveloped land on all of Cape Cod, although it is sporadically intensely impacted by training exercises. The northern 15,000 acres of the Base have been permanently protected through legislation.<sup>24</sup> Undeveloped land to the north of JBCC (some Town-owned) adds to the large amount of forested area that may support "meta populations," or large moving populations, of insects associated with the Pitch Pine-Scrub Oak communities (Swain 2007). It is unlikely, however, that significant numbers of organisms other than insects and birds are able to utilize both JBCC and adjacent undeveloped lands, due to the fencing/man-made obstructions that surround the JBCC.

Although the above-discussion focuses on local wildlife corridors, parts of Bourne also play important roles in broader migratory corridors. Specifically, coastal areas on Cape Cod are renowned for their importance to migrating birds. Passerines utilize shrub thickets, for example. Core Habitat BM 1237 (discussed further in Section 4.6.1), located in the southeastern corner of that portion of Town north of the Canal, provides important songbird migration habitat. Essentially, any open space with cover and food is important to migrating birds, while the waters of Buzzards Bay proximate to Bourne provide important feeding habitat for terns during the summer. The air space above Bourne is full of migrating

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<sup>24</sup> <http://www.capecodcommission.org/index.php?id=306>

birds, although they may not touch down in Bourne, since many of the birds passing through Massachusetts during migration do not follow narrow routes (Swain 2007).

#### 4.5.4 Rare Animal Species

The population status of rare animals in Massachusetts is described using three categories: 1) special concern; 2) threatened; and 3) endangered:

- Special concern species have either experienced a decline that could threaten the species without intervention, or whose populations are so small, localized, or dependent upon specialized habitats that they could become threatened.
- Threatened species are likely to become endangered in the foreseeable future. Endangered species are in danger of extirpation from Massachusetts.
- Priority Habitat is the geographical extent of habitat for all state-listed plant and animal species.
- Estimated Habitat depicts the geographical extent of habitat of state-listed rare wildlife.<sup>25</sup>

As noted under Section 4.4.5 Rare Plants, the majority of Bourne (approximately 65%) is mapped as Priority Habitat. Priority Habitat is the geographical extent of habitat for all state-listed plant and animal species. As shown in Map 6, NHESP has identified nine Priority Habitats that either cross into Bourne, or are contained entirely within the town boundary.

According to NHESP, 38 special concern, threatened, or endangered animal species occur within the Town of Bourne (Table 15).

**Table 15. Animal Species that are Threatened, Endangered or Species of Concern Observed in Bourne**

Taxonomic Group	Scientific Name	Common Name	MESA Status	Most Recent Observation
Beetle	<i>Cicindela purpurea</i>	Cow Path Tiger Beetle	SC	1935
Amphibian	<i>Ambystoma opacum</i>	Marbled Salamander	T	1936
Bird	<i>Tyto alba</i>	Barn Owl	SC	1970s
Fish	<i>Notropis bifrenatus</i>	Bridle Shiner	SC	1993
Butterfly/Moth	<i>Abagrotis nefascia</i>	Coastal Heathland Cutworm	SC	1996
Mussel	<i>Leptodea ochracea</i>	Tidewater Mucket	SC	1996
Mussel	<i>Ligumia nasuta</i>	Eastern Pondmussel	SC	1997
Butterfly/Moth	<i>Acronicta albarufa</i>	Barrens Dagger Moth	T	1998
Butterfly/Moth	<i>Cicinnus melsheimeri</i>	Melsheimer's Sack Bearer	T	1998
Butterfly/Moth	<i>Metarranthis pilosaria</i>	Coastal Swamp Metarranthis	SC	1998
Dragonfly/Damselfly	<i>Enallagma recurvatum</i>	Pine Barrens Bluet	T	1998
Bird	<i>Accipiter striatus</i>	Sharp-shinned Hawk	SC	2001
Amphibian	<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	T	2003
Reptile	<i>Pseudemys rubriventris</i> pop. 1	Northern Red-bellied Cooter	E	2003
Bird	<i>Sternula antillarum</i>	Least Tern	SC	2004
Bird	<i>Sterna dougallii</i>	Roseate Tern	E	2006
Bird	<i>Sterna hirundo</i>	Common Tern	SC	2006

<sup>25</sup> <http://www.mass.gov/dfwele/dfw/nhesp/nhenvprio.htm>

Taxonomic Group	Scientific Name	Common Name	MESA Status	Most Recent Observation
Butterfly/Moth	<i>Cingilia catenaria</i>	Chain Dot Geometer	SC	2006
Bird	<i>Circus cyaneus</i>	Northern Harrier	T	2009
Butterfly/Moth	<i>Catocala herodias gerhardi</i>	Gerhard's Underwing	SC	2010
Butterfly/Moth	<i>Euchlaena madusaria</i>	Sandplain Euchlaena	SC	2010
Butterfly/Moth	<i>Hemaris gracilis</i>	Slender Clearwing Sphinx	SC	2010
Butterfly/Moth	<i>Lycia ypsilon</i>	Pine Barrens Lycia	T	2010
Butterfly/Moth	<i>Speranza exonerata</i>	Pine Barrens Speranza	SC	2010
Butterfly/Moth	<i>Zale lunifera</i>	Pine Barrens Zale	SC	2010
Mammal	<i>Eubalaena glacialis</i>	Northern Right Whale	E	2010
Reptile	<i>Malaclemys terrapin</i>	Diamond-backed Terrapin	T	2012
Bird	<i>Ammodramus savannarum</i>	Grasshopper Sparrow	T	2014
Bird	<i>Bartramia longicauda</i>	Upland Sandpiper	E	2014
Bird	<i>Caprimulgus vociferus</i>	Eastern Whip-poor-will	SC	2014
Bird	<i>Charadrius melodus</i>	Piping Plover	T	2014
Bird	<i>Falco peregrinus</i>	Peregrine Falcon	E	2014
Bird	<i>Pooecetes gramineus</i>	Vesper Sparrow	T	2014
Butterfly/Moth	<i>Hemileuca maia</i>	Barrens Buckmoth	SC	2014
Dragonfly/Damselfly	<i>Anax longipes</i>	Comet Darner	SC	2014
Dragonfly/Damselfly	<i>Rhionaeschna mutata</i>	Spatterdock Darner	SC	2014
Butterfly/Moth	<i>Papaipema sulphurata</i>	Water-willow Borer Moth	T	2015
Reptile	<i>Terrapene carolina</i>	Eastern Box Turtle	SC	2015

E: Endangered; SC: Species of Concern; T: Threatened

Source: Massachusetts Department of Fish and Game National Heritage and Endangered Species Program. September 28, 2016.

#### 4.5.5 BioMap2

BioMap2<sup>26</sup> is designed to guide strategic biodiversity conservation in Massachusetts over the next decade by focusing land protection and stewardship on the areas that are most critical for ensuring the long-term persistence of rare and other native species and their habitats, exemplary natural communities, and a diversity of ecosystems. BioMap2 is also designed to include the habitats and species of conservation concern identified in the State Wildlife Action Plan. In 2001 and 2003 NHESP produced the original BioMap and Living Waters biodiversity conservation plans. BioMap2, developed in partnership with The Nature Conservancy, replaces the earlier plans. Protection and stewardship of BioMap2 Core Habitat and Critical Natural Landscape is essential to safeguard the diversity of species and their habitats, intact ecosystems, and resilient natural landscapes across Massachusetts.

Areas identified as BioMap 2 Core Habitat include:

- Rare Species: highest quality habitats for rare species and other Species of Conservation Concern

<sup>26</sup> <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/land-protection-and-management/biomap2/>. Obtained September 30, 2016.

- Priority natural communities: assemblages of plant and animal species that share a common environment and occur together repeatedly on the landscape
- Vernal pools
- Forest cores: best examples of large, intact forests that are least impacted by roads and development, providing critical habitat for numerous woodland species
- Wetland cores: least disturbed wetlands within undeveloped landscapes, with intact buffers and little fragmentation or other stressors associated with development
- Aquatic cores: integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern

Areas identified as BioMap 2 Critical Natural Landscape include:

- Landscape blocks: intact large areas of predominately natural vegetation, consisting of forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes
- Upland buffers of wetland and aquatic cores
- Upland habitat to support coastal adaptation: undeveloped lands adjacent to and up to one and a half meters above existing salt marshes as Critical Natural Landscapes with high potential to support inland migration of salt marsh and other coastal habitats over the coming century

According to the BioMap2 Town Report for Bourne (2012), the following Core Habitat and Critical Natural Landscapes are found in Bourne. They are also shown on Map 7. The elements of each Core Habitat and their summaries can be found in the Town Report.<sup>27</sup>

#### Core Habitat

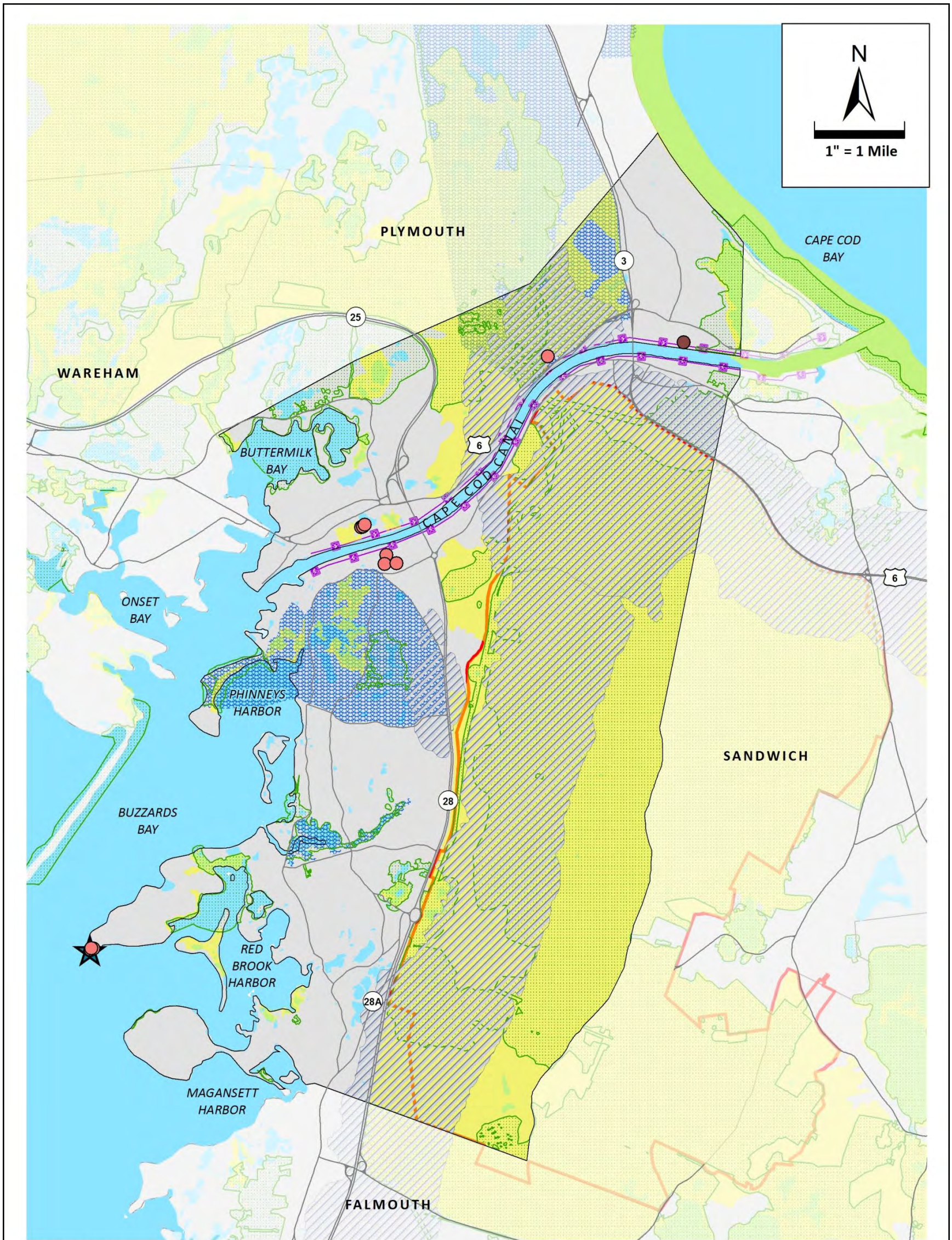
- 1 Exemplary or Priority Natural Community
- 1 Forest Core
- 2 Wetland Cores
- 6 Aquatic Cores
- 25 Species of Conservation Concern Cores
  - 1 mammal, 7 birds, 6 reptiles, 2 amphibians, 1 fish, 16 insects, 1 mussel, 12 plants

#### Critical Natural Landscape

- 2 Landscape Blocks
- 2 Wetland Core Buffers
- 5 Aquatic Core Buffers
- 16 Coastal Adaptation Areas
- 15 Tern Foraging Areas

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<sup>27</sup> [http://maps.massgis.state.ma.us/dfg/biomap/pdf/town\\_core/Bourne.pdf](http://maps.massgis.state.ma.us/dfg/biomap/pdf/town_core/Bourne.pdf). Obtained September 30, 2016.



\*GIS Data - MassGIS (2005)

Document Path: H:\Projects\2016\16069 Town of Bourne OSRP\GIS\Maps\Map 7 UniqueFeatures2.mxd

**Legend**

-  Town of Bourne
-  Joint Base Cape Cod
-  Major Roads
-  Existing Bike Trails
-  Nat'l Register of Historic Places
-  Preservation Restriction
-  Wings Neck Lighthouse
-  BioMap2 Core Habitat
-  BioMap2 Critical Natural Landscape
-  Areas of Critical Environmental Concern (ACEC)
-  Sandwich Glacial Moraine

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 508-833-8600 • horsleywitten.com



**Unique Features  
 Bourne Open Space and  
 Recreation Plan**

Date: 1/24/2018

Map 7

Map 7. Unique Features

## 4.6 Cultural, Archaeological and Historic Resources

### 4.6.1 Archaeological and Historic Resources

The Massachusetts Historic Commission's Inventory contains 426 listings in Bourne, ranging from historic homes, to neighborhoods, to churches (Map 7).<sup>28</sup> Refer to Appendix D for this listing. Of these resources, 12 structures are on the National Register of Historic Places:

1. Bournedale Village School (29 Herring Pond Road)
2. Bourne Town Hall (24 Perry Avenue)
3. Bourne Town Hall Garage (24 Perry Avenue)
4. Bourne Soldiers and Sailors Civil War Monument (24 Perry Avenue)
5. Jonathan Bourne Public Library (30 Keene Street)
6. Bourne High School (85 Cotuit Road, currently Kempton K. Coady Residences)
7. George I. Briggs House (22 Sandwich Road)
8. Wing's Neck Light Keeper's Dwelling (Wing's Neck Road)
9. Wing's Neck Light Oil House (Wing's Neck Road)
10. Wing's Neck Light Second Keeper's House (Wing's Neck Road)
11. Wing's Neck Light Boathouse (Wing's Neck Road)
12. Wing's Neck Lighthouse (Wing's Neck Road)

The Wing's Neck Lighthouse property as a whole is on the National Register of Historic Places.

The Swift Memorial Methodist Episcopal Church (10 Williston Road) is listed on the Massachusetts State Register of Historic Places, and it is protected by a Preservation Restriction.

The Aptuxcet Trading Post and the Cape Cod Canal area also valuable historic amenities to the Town of Bourne and are discussed in detail in Section 3.1 of this plan.

Bourne has not designated local historic districts. Currently, only protection of historic resources is the Town's Demolition Delay bylaw is the only tool to protect historic and cultural resources.

### 4.6.2 Cultural Resources

#### Village of Buzzards Bay

The Village of Buzzards Bay is considered the downtown area of Bourne. Town Hall, Memorial Community Building, and several park parcels are located here. The Village is the focus of recent revitalization efforts spearheaded by the Town, including the use of Community Preservation Act (CPA) funds to develop several parks. To attract new business and residential growth downtown, Bourne has designated Buzzards Bay as a Growth Incentive Zone, which helps streamline permitting processes while also supporting smart growth initiatives.<sup>29</sup> In addition, there are hopes of potentially re-establishing commuter rail service to Boston, though this plan is still under discussion.

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<sup>28</sup> Massachusetts Cultural Resource Information System (MACRIS), on <http://mhc-macris.net/>. Obtained October 12, 2016.

<sup>29</sup> <http://bfdconline.org/bourne-development/growth-incentive-zone-speeds-permitting/>

## **Route 6A**

Route 6A stretches from Sagamore Village east to the Town of Orleans. Thought to have originally been a Native Americans trail Plymouth and Provincetown, the route was eventually the primary east-west route for settlers in the 1600s. Later, during the 17th century agricultural period, homes, farms, and even small villages became established along the road. Maritime activity during the 18th century gave rise to captains' houses and commercial ventures along the thoroughfare. Today, Old Kings Highway functions as a secondary rural road, and passes by many early homes and other historic structures.

The Cape Cod Commission created the *Old King's Highway/Route 6A Corridor Management Plan* (originally published January 1995 and updated June 2010) and the *Route 6A Vegetation Management Plan* (August 1995). The inventories of scenic and sensitive environmental resources provide suggestions for making various improvements and mapping scenic overlay districts. Any open space or recreation management plans within the Route 6A corridor should consider the recommendations of these reports.

Bourne is not part of the Old Kings Highway Regional Historic District; however historical information is available to document the village of Sagamore's industrial development. An area of moderate historic integrity is centered around the Keith Mansion, nearby historic homes, and the industrial housing located near the Sagamore Bridge. According to the 1995 Corridor Management Plan, this area may be eligible for nomination as an historic district because of its architectural integrity and industrial history, including the impact of the Cape Cod Canal on the village. The Canal also had an impact on the history of Bourne Village, located south of the Bourne Bridge rotary. Though not located along the designated Route 6A, Bourne Village is linked to the study area physically by Sandwich Road. Bourne Village became the town's civic focus after separation from Sandwich in 1884 and has significant historic integrity. The area may be eligible for nomination as an historic district, and one structure, the Briggs-McDermott House, is currently listed on the National Register of Historic Places.

## **Canal Bridges**

The Bourne Railroad Bridge began operation on December 27, 1935 as a part of a Cape Cod Canal improvement project undertaken by the US Army Corps of Engineers during the 1930s. The new bridge replaced a single span drawbridge which was built by August Belmont's original canal company. The Railroad Bridge is 544 feet long and it weighs 2,050 tons. It is a scenic and cultural landmark in Bourne.

The Bourne and Sagamore Bridges were constructed beginning in 1933 under the same Cape Cod Canal improvement project. Construction was completed in 1935. Both bridges carry four lanes of traffic over a 616 feet main span, with a 135 feet ship clearance. The bridges replaced a drawbridge, which was built before the canal was widened. The original bridge approaches are still visible to the north of the modern bridges.<sup>30</sup>

## **Scenic Landscapes**

The Town of Bourne contains a wide variety of scenic landscapes, from coastal inlets, beaches and marshes to mature wooded uplands, scenic roads, panoramas of the Canal (including the railroad bridge) and agricultural vistas. Bourne residents have identified the following scenic landscapes and view sheds as being important to its heritage:

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<sup>30</sup> [https://en.wikipedia.org/wiki/Sagamore\\_Bridge](https://en.wikipedia.org/wiki/Sagamore_Bridge) and [https://en.wikipedia.org/wiki/Bourne\\_Bridge](https://en.wikipedia.org/wiki/Bourne_Bridge). Obtained January 4, 2018.



- Monks Park
- The view down the Cape Cod Canal from Upper Cape Technical School dining room (both bridges and several windmills and wind turbines are visible)
- Views of sunrises and sunsets from various perspectives in town (e.g. looking toward the west on Main Street and from the Monument Beach Pier)
- Watching July 4th fireworks from the Mashnee Island Dike and Monument Beach
- Buttermilk Bay, Little Buttermilk Bay, and the many marshes and inlets
- Large/Tall ships passing through the Canal
- Back River Estuary
- Squeteague Harbor
- Amarita Island
- Four Ponds Conservation Area in the fall
- Great Herring Pond from Herring Pond Road
- Cranberry bogs scattered throughout town
- Little Bay

### **Scenic Roads**

The Town of Bourne presently contains approximately 51 scenic roads as designated under the Scenic Roads Act, MGL Chapter 40, Section 15C. These roads were adopted as scenic through a Town Meeting in 1975. The list includes several main thoroughfares, such as County Road, Shore Road, and Barlows Landing Road.

### **Cape Cod Pathways<sup>31</sup>**

Cape Cod Pathways, initiated in 1993, is the name of a network of walking trails that would extend from Provincetown to Falmouth to Bourne (in 15 Cape Cod towns total) providing access and connections to seashore areas on Cape Cod, wooded interior areas and historic villages. The effort to make Cape Cod Pathways a reality is being undertaken by the Cape Cod Commission, the Barnstable County Commissioners and a host of volunteers from numerous Cape Cod communities. The regional significance of this program is to attract visitors to Cape Cod during all seasons of the year to be able to appreciate and experience the natural, cultural and historical resources of multiple Cape Cod communities.

The basic premise of the program begins with local community volunteers who assist the Cape Cod Commission in identifying where existing walking trails are in the community and where new connections may be appropriate. Trails are marked with small aluminum signs and maintenance on them is performed by volunteers who coordinate with landowners. The overall purpose of the trail network is to allow residents and visitors of Cape Cod the opportunity to enjoy the natural surroundings, to enhance public access to woodlands, beaches, ponds, and historic villages and to foster the preservation of open space in order to protect scenic views, wildlife habitat and sensitive natural areas. Currently the Town of Bourne has designated the following trails and areas as a part of the Cape Cod Pathways program, they include:

- Bournedale Hills Trail: 1.4 mile trail along north side of Cape Cod Canal between Herring Run Visitor's Center and Bourne Scenic Park; it includes 0.8 mi. loop near the Visitor's Center which interprets the historic and natural features of the Canal.

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<sup>31</sup> For more information, go to <http://www.capecodcommission.org/pathways/>

- Four Ponds Conservation Area: Color coded trails around Freeman Pond, Upper Pond, the Basin and Shop Pond and through the Town Forest. The trail system is accessed by a trail through the Bourne Water District off Valley Bar Road, or by the main entrance and parking area on Barlow's Landing Road.
- Nivling-Alexander Reserve: 0.5 mi. of wooded trails on 40 acres bordering Red Brook Pond and cranberry bogs. The trail entrance and parking areas are near the intersection of Shore Road and Thaxter Road.
- DeNormandie Woods Conservation Area: 9 acres of wooded upland with 2/3 mile trail to the Broyer and Robinson Conservation Area via Joyce Path. The entrance is on Shore Road between Red Brook Harbor Road and County Road.
- Broyer and Robinson Conservation Areas: 30 acres of wooded upland joined by a 1/2 mile wooded trail. Lady slippers and rhododendrons bloom in late spring/early summer. Entrances are provided along Red Brook Harbor Road, between Scraggy Neck Road and Parker's Boat Yard.
- Sagamore Beach: 169 Phillips Road in Sagamore Beach provides handicapped access to the waterfront. There is a small gravel parking lot and a handicapped-accessible boardwalk, with a widened viewing area at the highest point of the boardwalk overlooking the dunes, Cape Cod Bay, and "The Strand," which is a long stretch of sandy beach owned by the town. The parking area does not require a Bourne beach sticker.

### 4.6.3 Unique Geological Features

As discussed in 4.1.1 Geology, nearly 25,000 years ago, before its retreat, the continental glacier extended as far south as Nantucket and Martha's Vineyard. The ice sheet contained large lobes in depressions of the bedrock: Buzzards Bay lobe, Cape Cod Bay lobe, and the South Channel lobe. As the ice sheet retreated from Cape Cod, melting ice washed into Cape Cod Bay, Buzzards Bay, and Nantucket and Vineyard Sounds.

Much of Bourne is either glacial till or moraine. As a glacier melts and retreats, rock debris left behind is called drift and overlies the bedrock. It is unstratified and unsorted, that is, it is a mixture of different sizes and types of sediment and rocks, and called glacial till. On the other hand, debris deposited by water is separated by the different rock fragment sizes, and called strata. Gravel and sand are sorted and stratified by meltwater flowing in streams draining the glacier.

On Cape Cod, most of the drift has been positioned into either moraines or outwash plains. Moraines are ridges of drift form when the edge of the ice sheet remains more or less in the same place because the advance of the glacier is at the same rate as the melting along the ice front. When the debris falls free of the ice, it accumulates along the ice front much like material at the end of a conveyor belt. However, the Buzzards Bay and Sandwich moraines were formed in a different way. They were formed when an advancing ice front overrode sediments it had previously deposited or sediments that were older than the last glaciation. The advancing ice thrust sheets of drift upward and forward to form a large ridge beyond the ice front. Thus, the formation of the moraine more closely resembles the work of a bulldozer rather than a conveyor belt.

Outwash plains make up most of the Cape Cod landscape with deposits of sand and gravel from meltwater streams flowing across the plain in a braided pattern. This produced a broad flat depositional surface that sloped gently away from the ice front. Outwash deposits also form a highly irregular and unorganized morphology called kame and kettle terrain. A kame is a knoll or hill composed of outwash deposits, which originally filled a hole in the ice. When ice melted away, the deposits collapsed to form a hill. A kettle is just the opposite of a kame. The outwash was deposited around and over an ice block. When the ice block melted away, the outwash collapsed to form a hole. Kettle holes/ponds are found all over Cape Cod, including Bourne.

Most if not all of the outwash plains were formed as deltas in glacial lakes, and this is true of the outwash plains of the upper Cape, which were formed by the glacial lakes that occupied Nantucket Sound and Vineyard Sound. The lower Cape was formed by the lake that occupied Cape Cod Bay, referred to as Glacial Lake Cape Cod because outwash deltas from the lake occurred all around Cape Cod Bay from Duxbury to Truro. The earliest levels of the lake ranged between roughly 80 and 50 feet above present sea level, and during these lake stages, the lake drained across the Sandwich moraine and into the lowland that was to become Buzzards Bay. As the Cape Cod Bay lobe retreated northward, lower outlets were occupied and eventually the lake drained completely. The initial outlet across the Sandwich moraine was continuously lowered by erosion as the water escaped, and when the outlet was eroded to an elevation of about 30 feet, the outlet was abandoned. This low divide across the Sandwich moraine made it the obvious location for a canal connecting Cape Cod Bay and Buzzards Bay, a conclusion reached by both Miles Standish and George Washington. However, the first canal was not completed until 1914, and the improved canal (built and operated by the U.S. Army Corps of Engineers) was completed in 1940.<sup>32</sup>

## **4.7 Environmental Challenges**

### **4.7.1 Hazardous Waste**

Appendix E lists reportable releases available through MassDEP.

### **4.7.2 Landfills**

Refer to Section 3.5.5 for information regarding Bourne's solid waste management, and to Section 4.8.6 for information pertaining to contamination from the JBCC's landfill.

### **4.7.3 Erosion and Sedimentation**

The Bourne Conservation Commission is responsible for ensuring that wetlands within its jurisdiction are not subjected to erosion and sedimentation from proposed/new development, while the Planning Board may require erosion control and sedimentation measures for utility and road construction. Additionally, Town zoning requires the permanent stabilization of slopes in excess of 15% as a result of site grading, and the Bourne Wetland and Natural Resources Protection By-law prohibits new dwellings on slopes greater than 25% (if the site in general is subject to jurisdiction under this Bylaw).

The following areas are high priority due to extensive erosion and will require development restrictions in order to minimize hazards. The Town has implemented several projects to improve conditions.

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<sup>32</sup> <https://pubs.usgs.gov/gip/capecod/glacial.html>. Obtained December 22, 2017.

- Sagamore Highlands  
Stairs built with some erosion control measures installed
- Mashnee Island  
Many revetments/seawalls are present on Mashnee Island
- Bassetts Island  
Two large revetments constructed
- Buttermilk Bay  
Many revetments are present at Hideaway Village Condominiums
- Scraggy Neck/Eustis Beach (bank revegetation project)
- Little Bay  
Salt marsh restoration
- Monk's Park  
Erosion problem from road runoff needs addressing
- Ram Island/Little Bay  
Salt marsh restoration and boardwalk project

As noted in Section 4.3.2 Surface Water, the Town is working on stormwater remediation as part of compliance with Phase II of its NPDES permit. In the spring of 2017, the Town updated its Subdivision Regulations to incorporate the Massachusetts Stormwater Standards. In addition to this requirement and the Bourne Wetland and Natural Resources Protection By-law, the Planning Board requires a Stormwater Management Plan as part of its Site Plan and Special Permit Review. The Town continues to work on a comprehensive stormwater/erosion control bylaw that would be enforced by the Conservation Commission and Planning Board through review, inspection, and enforcement of local stormwater management permits under the new bylaw.

#### **4.7.4 Chronic Flooding**

Fourteen properties within the Town of Bourne constitute “repetitive loss” properties. Of these, 12 have made two flood insurance claims and two have made three claims.<sup>33</sup> Generally, development/re-development within flood zones is controlled by insurance rates and building code/zoning regulations.

#### **4.7.5 Development Impact**

##### **Industrial Facilities**

Bourne’s commercial and industrial uses include several manufacturers, warehouses, and sand and gravel operations. There is also a seafood packing plant within the Back River ACEC.

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<sup>33</sup> Repetitive Loss Properties Information provided by the Massachusetts Emergency Management Agency on January 14, 2004- from an email from Brendan Mullaney, Conservation Agent, Town of Bourne, received February 86, 2007.

### **Underground Storage Tanks**

An inventory of non-commercial underground storage tanks is maintained by the Barnstable County Department of Health & Environment. Bourne requires that underground storage tanks be registered, however there may be residential tanks present that were never registered, and so are not shown in this list. Although the Bourne Fire Department is responsible for issuing permits for commercial underground storage tanks, the Board of Selectmen issue licenses for these tanks. According to MassDEP,<sup>34</sup> there are 29 underground storage tanks within Bourne.

### **Pesticide and Fertilizer Application**

Utility easements, railroads, golf courses, and cranberry bogs are the most common sites where pesticides and fertilizers are applied; however residential lawns also contribute significant amounts of these pollutants to waterbodies as a result of over-application by homeowners. The majority of Bourne's ponds and estuaries, such as Buttermilk Bay, show varied levels of eutrophication due to nutrient loading, which are influenced by septic system leaching and fertilizer runoff.

The Town of Bourne does not have an educational/public outreach program regarding impacts from pesticide and fertilizer application; however, the Conservation Commission distributes a brochure produced by the Coalition for Buzzards Bay, outlining environmental problems caused by these pollutants.

### **Public Sanitary Sewer and Private Septic Systems**

Only two areas of Bourne are serviced by sanitary sewers: 1) downtown Buzzards Bay; and 2) Hideaway Village, off Head of the Bay Road. Wastewater from both areas are treated at the Wareham Water Pollution Control Facility.

Areas not serviced by sewer rely upon individual septic systems, which may be located proximate to sensitive natural resources. Both the Board of Health and the Conservation Commission have established replacement and installation criteria for systems in sensitive areas. The Buzzards Bay National Estuary Program awarded grant monies to Bourne in 1999 to purchase SepTrak, which is a software program that facilitates septic system inspection and maintenance by local officials.

## **4.7.6 Ground and Surface Water Pollution**

### **Surface Water Pollution**

Bourne has received a number of grants from the Buzzards Bay National Estuary Program to remediate stormwater discharges that were contributing to water quality decline and subsequent shellfish bed and swimming area closures. Specifically, grants were received for Hen Cove, Queen Sewell Pond, Taylor's Point Marina, Electric Avenue, Eel Pond, and Barlows Landing, as well as additional funding from MassDEP and the Massachusetts Office of Coastal Zone Management (CZM) for Buttermilk Bay, including the purchase of oil spill containment boom. Tidal flushing studies for the Pocasset River, Hen Cove, and Eel Pond were also undertaken to determine maximum nitrogen loadings in these waters. All of these projects have been completed.

The Town of Bourne also received a grant from CZM's Wetlands Restoration Program in 2007 to assess the feasibility of improving tidal flushing at Conservation Pond by installing a larger culvert under Circuit Avenue. Currently, restricted flows contribute to the accumulation of bacteria in the pond, which in turn

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<sup>34</sup> As of October 12, 2016.

causes the closure of about 17 acres of shellfish beds in Hen Cove. This grant award was an extension of a stormwater remediation project that was funded by CZM's Coastal Pollution Remediation Program.

Excessive pollution to surface waters is further prevented through the Town's General Regulations, which prohibit the feeding wild waterfowl and exclude pets from beaches. It is hoped that these measures will serve to reduce nitrogen inputs from feces of these animals.

### **Groundwater Contamination**

The JBCC Main Base Landfill (LF-1) groundwater contamination plume originated from pollutants leaching from the base's 100-acres of landfill, which was in operation between 1940 and 1984, as well as a chemical spill associated with a former motor pool operation. Various forms of industrial waste, including solvents (e.g. trichloroethylene and tetrachloroethylene) were disposed in the landfill and leached into the groundwater. According to State and Federal drinking water standards, subsequent levels of contaminants in the groundwater were determined to be unsafe. In response, three contributing disposal areas were therefore capped in 1995.<sup>35</sup> Underground migration of the contaminated plume caused the temporary closure of a well in Cataumet, although this closure was a result of the test for contamination pulling the contamination into the well. Since then, the plume has traveled to the Squeteague Harbor shoreline and the Red Brook area in Cataumet. Seep testing continues to be performed periodically.<sup>36</sup>

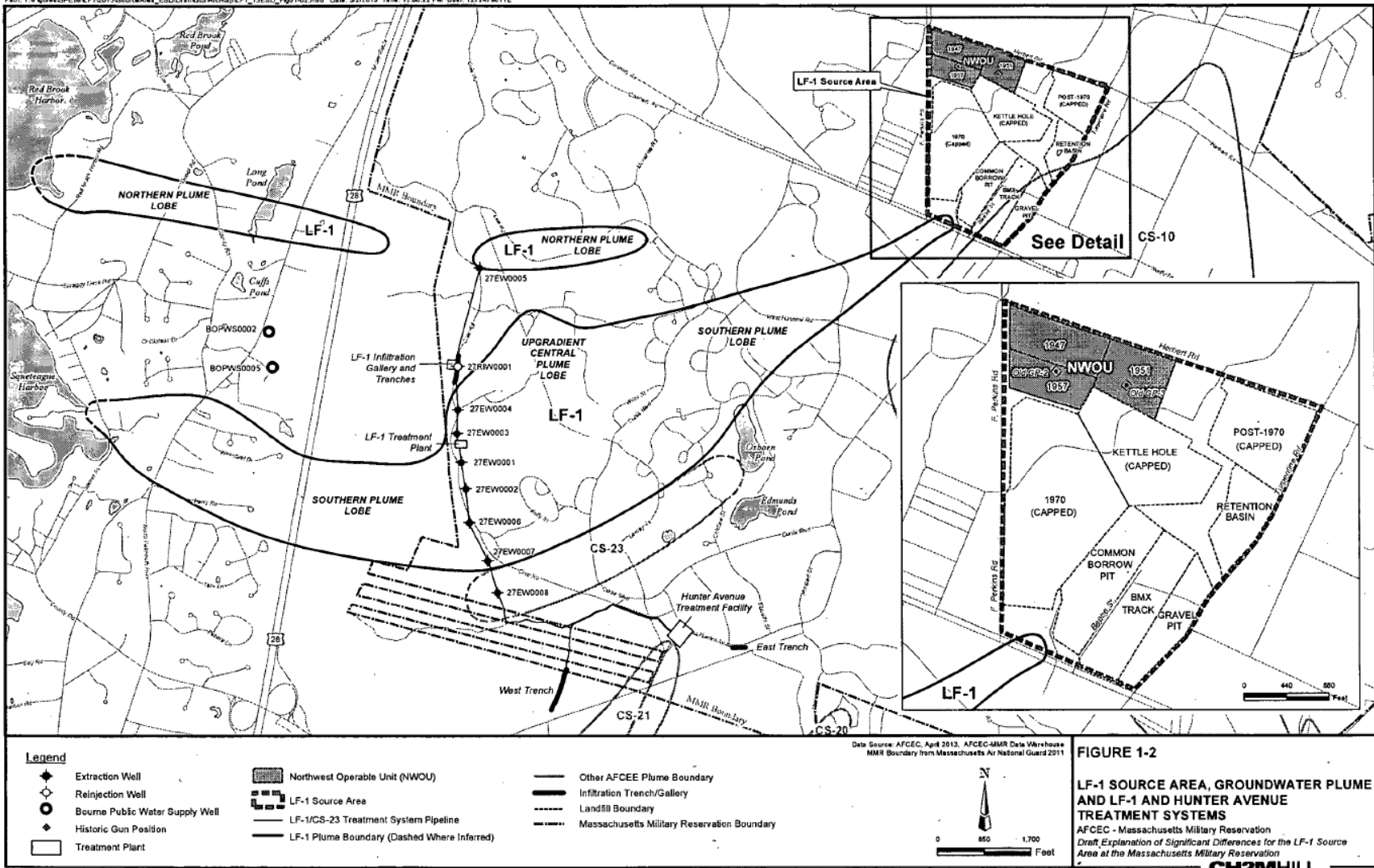
As part of the remediation effort, a groundwater extraction system was installed at the leading edge and along the northern lobe of the plume to intercept further migration. Cleaned water is then returned to the aquifer downgradient from the extraction wells. In addition to the five extraction wells originally installed, three more wells have been installed in recent years (Figure 5). These eight groundwater extraction wells clean the landfill plume as well as the Chemical Spill 23 plume, which is located adjacent to the southern portion of the landfill plume.<sup>37</sup>

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<sup>35</sup> Telephone conversation with Doug Karson, Community Involvement Specialist, Base Installation Program on March 1, 2007.

<sup>36</sup> Email from Cynthia Coffin, Town of Bourne Board of Health Agent, received February 26, 2007.

<sup>37</sup> Telephone conversation with Doug Karson, Community Involvement Specialist, Base Installation Program on March 1, 2007.



Source: Final Explanation of Significant Differences for the Landfill-1 (LF-1) Source Area at the Massachusetts Military Reservation, September 2013, Figure 1-2.

Figure 5. Plan Showing Source Area, Groundwater Plum, and Treatment Systems on JBCC.

## The 208 Plan

Water quality is not just a localized environmental challenge for Bourne. It is a regional issue for Cape Cod. Excessive nutrients, primarily nitrogen, from increasing residential densities and a three-fold summer population influx have degraded fresh and salt surface water as well as groundwater resources. According to the Cape Cod Area Wide Water Quality Management Plan Update (an update to the 1978 Section 208 Plan for Cape Cod, herein referred to as the “208 Plan”), 80% of the nitrogen entering Cape Cod waters is from septic systems.<sup>38</sup> Through the 208 Plan, the CCC has evaluated development trends and the existing regulatory and planning framework at the local, state, and federal levels to develop a regional approach to improve water quality. Many of the approaches outlined in the 208 Plan are those that Bourne would like to pursue and the plan provides a fitting platform to partner with CCC and neighboring towns to reach a common goal.

### 4.7.7 Impaired Waters

Under the Clean Water Act, MassDEP assesses the quality of its waterbodies and on even years reports its findings to the U.S. Environmental Protection Agency. If a waterbody is not meeting its designated uses (such as habitat for fish and wildlife, fish consumption, or recreational uses, among others), it is considered impaired and MassDEP must develop a plan to improve water quality. MassDEP is required to develop a total maximum daily load (TMDL), which is a pollution “budget” that calculates the maximum amount of a pollutant that can occur in a waterbody. A TMDL is a tool used by states to reduce pollutants by allocating a portion of the maximum amount allowed to the various sources of the pollutant.

According to the Massachusetts Year 2014 Integrated List of Waters,<sup>39</sup> 12 waterbodies in Bourne are impaired (Table 16). Sources of impairment include exceedences in fecal coliform and total nitrogen; mercury in fish tissue; estuarine bioassessments (when degradation is observed in an estuary ecosystem); and nutrient/eutrophication biological indicators (evidence of degradation to the waterbody as a result of excessive nutrients). Six waterbodies have TMDLs to improve water quality.

**Table 16. Impaired Waterbodies in Bourne**

Waterbody	Location of Impairment	Source of Impairment	TMDL Developed
Back River	Outlet of small unnamed pond downstream from Mill Pond to confluence with Phinney’s Harbor (excluding Eel Pond).	Fecal coliform	Yes
Buttermilk Bay	Bourne/Wareham	Fecal coliform, Nutrient/Eutrophication biological indicators, Estuarine bioassessment	No
Cape Cod Canal		Fecal coliform	Yes
Eel Pond		Fecal coliform	Yes
Great Herring Pond	Bourne/Plymouth	Mercury in fish tissue	Yes
Little Buttermilk Bay	Off of Buttermilk Bay	Estuarine bioassessments, Nutrient/Eutrophication biological indicators	No

<sup>38</sup> <http://www.capecodcommission.org/index.php?id=491&maincatid=76>. Obtained December 29, 2017.

<sup>39</sup> <http://www.mass.gov/eea/docs/dep/water/resources/07v5/14list2.pdf>. October 12, 2016.



Waterbody	Location of Impairment	Source of Impairment	TMDL Developed
Megansett Harbor	From the outlet of Squeteague Harbor, Falmouth to Buzzards Bay at a line from the western tip of Scraggy Neck, Bourne south to the tip of Nyes Neck, Falmouth.	Estuarine bioassessments, Nutrient/Eutrophication biological indicators	No
Phinney's Harbor	From the confluence with the Back River, to the mouth at Buzzards Bay	Fecal coliform; Total nitrogen	Yes
Pocasset Harbor	From the confluence with Red Brook Harbor near the northern portion of Bassetts Island and Patuisset to the mouth at Buzzards Bay between the western portion of Bassetts Island and Wings Neck	Estuarine bioassessments, Fecal coliform	No
Pocasset River	From the outlet of Mill Pond to the mouth at Buzzards Bay	Fecal coliform	Yes
Red Brook Harbor	From the confluence with Pocasset Harbor between the northern portion of Bassetts Island and Patuisset to the mouth at Buzzards Bay between the southern portion of Bassetts Island and Scraggy Neck (including Hen Cove)	Estuarine bioassessments, Fecal coliform, Nutrient/Eutrophication biological indicators	No
Squeteague Harbor	Waters landward of the confluence with Megansett Harbor, Bourne/Falmouth.	Nutrient/Eutrophication biological indicators	No

Source: Massachusetts Year 2014 Integrated List of Waters

#### 4.7.8 Invasive Species

Discussion of invasive species in the OSRP has primarily focused on plants; however, in 2016, Massachusetts and other New England states experienced an unprecedented outbreak of the gypsy moth (*Lymantria dispar*). According to the Center for Agriculture, Food, and the Environment at UMASS Amherst, the resurgence of the gypsy moth is “the most serious insect pest of shade trees in New England.”<sup>40</sup> On Cape Cod, existing infestations associated with the crypt gall wasp and winter moth<sup>41</sup> also stress local trees.

With the exception of development, invasive plant species are the most significant threat to biodiversity, and are of increasing concern on Cape Cod especially. The Massachusetts Invasive Plant Advisory Group (MIPAG) defines invasive plants as “non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self-sustaining populations and becoming dominant and/or disruptive to those systems.”<sup>42</sup> Due to their insidious and aggressive nature, the spread of invasive species is often extremely difficult to control, and complete eradication of existing populations can be nearly impossible. The sooner that action is taken against invasive species (preferably prior to the establishment of a large population), the greater is the likelihood of success is. MIPAG evaluated 85 plant species and developed a list of invasive, likely invasive, and potentially invasive species. In addition, the State implements a ban on the sale,

<sup>40</sup> <https://ag.umass.edu/news-events/highlights/gypsy-moth-outbreak-in-massachusetts-2016>. Obtained October 13, 2016.

<sup>41</sup> <https://ag.umass.edu/fact-sheets/winter-moth-overview>. Obtained October 13, 2016.

<sup>42</sup> <http://www.massnrc.org/mipag/>. Obtained October 13, 2016

trade, purchase, distribution, and related activities of over 140 invasive plants.<sup>43</sup> Existing invasive plant populations will likely continue to spread throughout the landscape if not controlled. Control/eradication options are species-specific, but often entail the use of herbicides, sometimes in addition to other control measures, including mowing, burning, covering with black plastic, and excavation. MIPAG has published recommendations to prevent, control, and where possible, eradicate invasive plant species in Massachusetts, including early detection and rapid response, public education, and inter-agency coordination.<sup>44</sup>

#### 4.7.9 Environmental Equity

Environmental equity for open space and recreation resources looks at their distribution throughout a community to identify areas that lack resources or have limited access. One of the primary objectives of the Recreation Department is to provide a neighborhood park in each of the Town's villages. Equally, as it upgrades these parks, it is looking for opportunities to incorporate inclusive pieces as a way to expand access, both for adults and children with disabilities. This is further discussed in the ADA Self-Evaluation completed as part of this OSRP (see Appendix F).

### 5.0 Inventory of Lands of Conservation and Recreational Interest

When we talk about "open space" we are referring to lands that do not have developed facilities, with the exception of parking in some instances, and provide opportunities for conservation and/or passive recreation like bird watching and hiking. Recreational amenities are developed sites and include more traditional parks, playgrounds, baseball or football fields, and paved walking and biking paths. The Town of Bourne has inventoried these properties as part of the OSRP.

#### 5.1 Why Protect Open Space and Recreation Resources?

Community investments that protect open space and provide recreational opportunities for residents have both public and private environmental, economic, and social benefits. In their report *The Return on Investment in Parks and Open Space in Massachusetts* (September 2013),<sup>45</sup> The Trust for Public Land studied the Commonwealth of Massachusetts and the investments made in land conservation. They had the following key findings:

- **Natural Goods and Services:** Protected parks and natural areas remove air pollutants, protect and enhance water quality (including drinking water), provide fish and game habitat, produce food, manage stormwater, and provide flood control and other necessary functions. Every \$1 invested in land conservation returned \$4 in natural goods and services to the Massachusetts economy.
- **Tourism and Outdoor Recreation:** Parks and natural areas are critical to the state and local tourism industries. At least 61% of Massachusetts residents participate in outdoor recreation each year. In Massachusetts, outdoor recreation generates \$10 billion in annual consumer spending. That spending benefits the state and municipalities through greater sales tax revenues. The tax revenue attributed to outdoor recreation spending equals \$739 million

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<sup>43</sup> <http://www.mass.gov/eea/agencies/agr/farm-products/plants/massachusetts-prohibited-plant-list.html>.

Obtained October 13, 2016

<sup>44</sup> [http://www.massnrc.org/mipag/docs/STRATEGIC\\_PLAN\\_FINAL\\_042005.pdf](http://www.massnrc.org/mipag/docs/STRATEGIC_PLAN_FINAL_042005.pdf). Obtained October 13, 2016.

<sup>45</sup> <http://www.massland.org/news/return-investment-parks-open-space-study-release-event-sept-4th>. Obtained January 7, 2017.

annually. Spending on outdoor recreation also helps local businesses that hire Massachusetts residents. Approximately 90,000 jobs in the state are supported by this spending, accounting for \$3.5 billion in wages and salaries. Much of that earned income is then spent in local communities, further magnifying the economic impact of outdoor recreation.

- **Economic Development:** Parks and open space contribute to the high quality of life in Massachusetts. According to Forbes and CNBC, quality of life is the Commonwealth's number one asset for business. In terms of maintaining a talented workforce, the availability of outdoor activities is the second most important factor for recent college graduates deciding whether to stay in the state or move elsewhere. Parks also boost property values and increase municipal revenues. Over \$724 million of property value in Boston is attributable to its park system.
- **Local jobs and economic impact:** Investment in existing city and community parks amplifies the economic benefits provided by these spaces through the improvement of their quality and through the creation of additional jobs and local economic activity. The Trust for Public Land analyzed the state's investment in Gateway City parks and found that it will create 492 jobs and \$26.5 million in local wages and salaries. That is, every \$1 million invested in Gateway City parks creates 13.7 jobs. The Trust for Public Land also analyzed the state's investment in public outdoor swimming pools and found that it will create 390 jobs and \$24.2 million in local wages and salaries. That is, every \$1 million invested in outdoor swimming pools creates 11.8 jobs. The rate of job creation for parks and pools compares favorably with that of other job-creating investments. For example, it is more robust than the rate of jobs generated by spending on pedestrian and bicycle infrastructure (including roads) in cities nationwide, which is 9 jobs created per \$1 million invested.
- **Health:** Access to parks and open space increases the physical activity and the health of residents and workers in Massachusetts. This reduces health care costs related to obesity, which amount to \$2 billion annually in the state. More than one in five adults in the state does not engage in any physical activity and well over half of residents are overweight or obese. Availability of parks and proximity to them increase the physical activity of children. Researchers have found that as the percentage of park area within a child's neighborhood increases, so does a child's physical activity.

Residents and businesses in Bourne already receive many of these benefits. It's important to the Town to maintain open space and recreation properties and their benefits for future generations. This is done through careful management and balancing of uses.

## 5.2 Types of Open Space and Recreation Land Protection

There are also different types of open space and recreation land based on its "level of protection," that is, the likelihood that the land will be developed in the future and the benefits of the open space or recreational use is lost. Land that is protected (or in perpetuity) is typically owned by a municipality through its Conservation Commission or Open Space Committee, a state conservation agency, or a nonprofit land trust. Some private property can also have a protected designation if it is indicated in the property deed, if the property has an Agricultural Preservation restriction or if the Department of Environmental Protection has placed a restriction on the property for wetland protection or conservation purposes. Land owned by other agencies is often times not protected. For example, many of the parks and playgrounds or baseball fields may not be permanently protected and in danger of development in the future.

More specifically, the types of programs below illustrate different types of protection that could be available to property in Bourne. Some of the programs are already in use such as Chapter 61.

**Article 97 Protection:** Article 97 protects publicly owned lands used for conservation or recreation purposes. In order for a property to be sold, transferred or converted to a different use, Article 97 requires a vote of the Town in which the land use would be changed (by Conservation Commission, Parks Department, other, whichever is appropriate), a 2/3 vote at Town Meeting or City Council in support of the disposition, a 2/3 vote of the legislature in support of the disposition, they must demonstrate compliance with applicable funding sources and the municipality must file an Environmental Notification Form (ENF) with the Massachusetts Environmental Policy Act (MEPA).

**Conservation Restriction:** A conservation restriction is an agreement that is bound legally between a landowner and a “holder” or grantee. The landowner would agree to limit the amount and/or use of a specific property in order to protect the unique or specific conservation values that are evident on the property or important to the landowner or “holder.” A specified amount of time for the conservation restriction can be noted, or the conservation restriction can be in perpetuity. A conservation restriction is recorded at the Registry of Deeds.

**Easements:** An easement is typically listed on a property deed and it allows permanent access to a property for a specific purpose. It is a right of use, not a right of possession.

**Chapter 61:** Chapter 61 encourages preservation of agricultural, recreation and forest land in Massachusetts. Landowners can ensure the long-term protection of their property by receiving a tax benefit if they agree to the terms of Chapter 61. If an owner wants to take property out of Chapter 61 designation, the Town can recover the tax benefits given and they have the right of first refusal to purchase the property if the land is sold for residential, commercial or industrial purposes.

### 5.3 Bourne Open Space and Recreation Inventory

Bourne’s open space and recreation inventory includes nearly 4,800 acres of land owned by the Town of Bourne, the Bourne Conservation Trust, the Wildlands Trust of Southeastern Massachusetts, the Water District, Federal government, Massachusetts Department of Conservation and Recreation, and land in some form of Chapter 61 designation (See Appendix G for properties participating in the Chapter 61 Program). The open space and recreation properties listed include details such as ownership, level of protection, acreage, whether or not there is public access, what type of facilities might be present and what condition the property is in.

The JBCC is the most significant land holding in Bourne. Most of the land is undeveloped and protected via a memorandum of understanding between the Commonwealth and Federal governments; however, public access is not allowed. According to the JBCC 2013 Land Use Study Update and Community-Military Partnerships Study (Cape Cod Commission), the northern 15,000 acres of the base, also called the Upper Cape Water Supply Reserve, where the majority of the Army National Guard training occurs, was protected through a Memorandum of Agreement (MOA) and Executive Order in 2001. The MOA was codified into law in 2002. As a result activities on JBCC are subject to environmental standards that ensure permanent protection of the drinking water supply and wildlife habitat in that area. The public does not have access to this land, and it is not anticipated that the circumstances will change and access will be allowed within the foreseeable future. As such, this land holding is not included as part of the public open space and recreation inventory for the Bourne OSRP.

Table 17, the Bourne open space and recreation inventory, provides the following information:

**Site Name:** Indicates the name of the site

**Owner/Manager:** Name of the owner of the property and the agency or department responsible for managing the property.

**Zoning:** Zoning district of the property.

**Current Use:** The current use of the property, specifically recreation (facility based activities), conservation (non-facility based activities), combination of recreation and conservation, historical and/or cultural, agriculture, or water supply protection. Note that this column only applied to town-owned properties.

**Condition:** The general condition of the property. Note that this column only applied to town-owned properties.

**Recreation Potential:** The recreation potential of the site, which will also list the specific recreational uses currently available. Note that this column only applied to town-owned properties.

**Public Access:** Notes whether or not the site is open to public use.

**Level of Protection:** Notes whether the site is by virtue of zoning, or by the receipt of state or federal funding, is protected from sale and building development. Mass GIS notes the following characteristics about level of protection:

In perpetuity – Legally protected in perpetuity and recorded in a property’s deed. Public land is in perpetuity if it is owned by the Conservation Commission, if there is a conservation restriction on the property, if it is owned by a State conservation agency, if it is owned by a non-profit land trust or if state or federal monies were used to purchase or improve the property. Private land is in perpetuity if it has a deed restriction in perpetuity, if there is an agriculture preservation restriction, or if there is a conservation restriction on the property. Land is considered “protected” if it falls under one of the following categories: 1. Federal land owned by a federal conservation agency (PL 88-578), 2. State owned land owned by a state conservation agency (Article 97), 3. Town land owned by or under the jurisdiction of the Conservation Commission or Water Department, 4. Private land if it is owned by a non-profit agency dedicated to land conservation, or if it is protected in perpetuity by a conservation deed restriction, or if it is protected by the Agricultural Restriction Program, or if it is protected by a conservation restriction under the DEP’s Wetland Restriction Program. Also, Division of Conservation “assisted sites,” that is municipal conservation or recreation areas that received assistance from the state’s Parkland Acquisitions and Renovations for Communities (PARC), Local Acquisitions for Natural Diversity (LAND), or federal Land and Water Conservation Fund (LWCF) are protected under Article 97 and, if federal funds were used, by P.L. 88-578.

Temporary – Legally protected for less than perpetuity (short term conservation restriction) or temporarily protected through a functional use. Example: water district lands are only temporarily protected while water resource protection is their primary use. There are not lands classified with “temporary” protection in Bourne.

Limited – Protected by legal mechanisms other than those listed above. Land might be protected by a requirement of a majority municipal vote for change in status or Chapter 61 land.

Unknown – Should be researched through the property deed to see if any protection level is listed.

None – Totally unprotected by legal or functional means. Land is usually privately owned. In addition, land is considered “unprotected” if it falls into one or more of the following categories: 1. Unrestricted federal land, 2. Unrestricted state land, 3. town land not owned by the Conservation Commission, Recreation Department or otherwise restricted or tax title parcels

**Acres:** Total number of acres or a close approximation. One acre equals 43,560 square feet.

**Grant Program and Reference Number:** Listing of any grants received to purchase the property or make improvements.

Map 8 and Map 9 show the locations of open space and recreation resources in the Town of Bourne.

**Table 17. Bourne Open Space and Recreation Inventory**

Site Name	Owner, Manager	Map/Lot/ Sublot	Zoning	Current Use	Condition (Town land only)	Recreation Potential (Town land only)	Public Access	Level of Protection	Acres	Grant Program	Reference Number
<b>Federal Lands</b>											
Cape Cod Canal Access	Army Corps of Engineers	16/13	R-40/ R-80	R	-	-	Yes	P	539.30		
Mashnee Island	Army Corps of Engineers	29/1	R-40	C	-	-	Unknown	P	58.53		
Massachusetts National Cemetery	US Dept. of Veterans Administration		R-40	H	-	-	Yes	L	766.18		
Scusset Beach State Reservation	Army Corps of Engineers, DCR - Division of State Parks and Recreation		R-80	B	-	-	Yes	P	0.22	LWCF	LWCF_00064
<b>Federal Lands Subtotal</b>									<b>1,364.23</b>		
<b>State Lands</b>											
Frances A. Crane WMA	Department of Fish and Game		R-40	C	-	-	Yes	P	6.75		DFW0430
Great Herring Pond Access	Department of Fish and Game	5/5	R-80	R	-	-	Yes	P	1.05		DFW1191
Mass Maritime Academy Recreational Fields	Commonwealth of Massachusetts, Department of Education	23.3/50/ Partial	R-40	R	-	-	Yes	L	10.47		
Scusset Beach State Reservation	DCR - Division of State Parks and Recreation	12/5/ Partial	R-80	B	-	-	Yes	P	71.60		DEM_BA230
Shawme-Crowell State Forest	DCR - Division of State Parks and Recreation		R-40	B	-	-	Yes	P	138.48		
Southeast District HQ	Department of Fish and Game		R-80	C	-	-	Yes	P	31.77		DFW1146
<b>State Lands Subtotal</b>									<b>260.13</b>		
<b>Town Lands</b>											
Arthur Avenue Beach	Town of Bourne Department of Public Works	30.4/25/1	R-40	R	Good	Beach, playground, courts	Yes	L	0.01		
Back River Conservation Area	Town of Bourne Conservation Commission	26/11	R-40	C	Fair	None	Yes	P	0.49		
Barlows Landing Beach	Town of Bourne Department of Public Works	43.1/53	R-40	R	Good	Beach, fishing, boating	Yes	L	1.16		
Barlows Landing Conservation Area	Town of Bourne Conservation Commission	43.3/17	R-40	C	Good	Trails	Yes	P	2.57		
Bassetts Island Landing	Town of Bourne Conservation Commission	46/3	R-40	C	Good	Beach, shellfishing	Yes	P	12.55	LAND	036_SH_1
Bay Vista Conservation Area	Town of Bourne	38.2/120	R-40	B	Good	Beach, trails	Yes	P	9.12	Land Bank	
Bourne (Elizabeth) Property	Town of Bourne	27/51/1	R-40	B	Good	None	Yes	P	3.78	CPA	
Bourne High School Recreational Fields	Town of Bourne, Town of Bourne School Department	24/31/ Partial	B-4	R	Good	Rec fields	Yes	L	48.66		
Bourne Memorial Community Bldg	Town of Bourne, Trustees of Mem Com	20.3/98	R-40	R	Good	Rec fields	Yes	X	5.93		
Bourne Pond Fishway	Town of Bourne Department of Public Works		R-40	O	Good	None	Yes	L	0.69		
Bourne Public Library Recreational Fields	Town of Bourne	24.3/17	R-40	R	Good	Rec fields	Yes	L	3.91		
Bourne Scenic Park	Town of Bourne Recreation Department	20/13	R-40	R	Good	Trails	Yes	P	6.28		
Burial Hill	Town of Bourne		R-80	H	Fair	None	Yes	L	1.96		
Burtonwood Conservation Area	Town of Bourne Conservation Commission	30.2/68	R-40	C	Good	Trails	Yes	P	1.02		
Butler Memorial Park	Town of Bourne	19.4/283	R-40	H	Good	Rec fields, courts, playground	Yes	L	0.27		
Buzzards Bay Beach	Town of Bourne	19.3/75/5	R-40	R	Good	Beach, trails, playground, boating	Yes	L	0.78		
Buzzards Bay Park	Town of Bourne	23/4	R-40	R	Good	Trails, picnicking	Yes	L	7.23		
Canal Crossings	Town of Bourne, Board of Selectmen/Open Space Committee	23.2/122	DTC	B	Good	Trails, playground	Yes	P	5.05	Land Bank	
Cape Cod Land Bank Acquisition (Map 15, Lots 10 & 15; Map 10, Lots 6 & 140-147)	Town of Bourne Conservation Commission	Various	R-80	C	Good	None	Yes	P	95.69	Land Bank	
Carlson Woods	Town of Bourne, Board of Selectmen/Open Space Committee	34/57	R-40	B	Good	Trails	Yes	P	9.20	CPA	
Carlson Woods	Town of Bourne, Board of Selectmen/Open Space Committee	34.2/65	R-40	B	Good	Parking	Yes	P	0.31	CPA	
Carter Beal Conservation Area	Town of Bourne Conservation Commission	10/70	R-80	C	Good	Trails	Yes	P	48.77		
Cataumet Grammer School Lot	Town of Bourne, Town of Bourne School Department	51.2/25	R-40	R	Good	Court	Yes	X	0.79		
Chester Park	Town of Bourne Department of Public Works	30.4/25	R-40	R	Good	Beach, playground, courts	Yes	L	1.20		
Circuit Avenue Conservation Area	Town of Bourne Conservation Commission	43.3/127	R-40	C	Fair	None	Yes	P	0.68		
Clark Field	Town of Bourne	4.3/131	R-40	R	Good	Rec fields, courts, playground	Yes	L	16.23		
Clark Pond	Town of Bourne Conservation Commission	7.1/6	R-40	C	Good	Trails	Yes	P	1.75		
Clay Pond Conservation Area	Town of Bourne Conservation Commission	31.4/9	R-40	C	Fair	None	Yes	P	1.76		
Clifton Boyer Conservation Area	Town of Bourne Conservation Commission	51.2/15	R-40	C	Good	Trails	Yes	P	13.18		
Coady Jr High School Recreational Fields	Town of Bourne, Town of Bourne School Department	24.3/28	R-40	R	Good	Rec fields	Yes	L	5.14		
Conservation Area	Town of Bourne	5/13	R-80	C	Good	Trails	Yes	P	26.46		
County Road Conservation Area	Town of Bourne Conservation Commission	31/3	R-40	C	Good	Parking	Yes	P	0.17		
Eel Pond Beachway	Town of Bourne Department of Public Works	30.2/171.0	R-40	R	Good	Canoeing/kayaking	Yes	L	0.25		
Eel Pond Conservation Area	Town of Bourne Conservation Commission	30.2/188/1	R-40	C	Fair	None	Yes	P	0.12		
Eel Pond Road Conservation Area	Town of Bourne Conservation Commission	38.3/199	R-40	C	Good	Trails	Yes	P	1.41		

\* TOWN PROPERTIES ONLY

PRIMARY PURPOSE: R - Recreation (facility based activities); C - Conservation (non-facility based activities); B - Recreation & Conservation; H - Historical/Cultural; A - Agriculture; W - Water Supply Protection; O - Other  
 GRANT PROGRAMS: ALA - Aquifer Lands Acquisition; LAND - Local Acquisitions for Natural Diversity (former Self Help grant); CPA - Community Preservation Act; LWCF - Land and Water Conservation Fund

LEVEL OF PROTECTION: P - In perpetuity; T - Term limited; L - Limited; N - None; X - Unknown

Site Name	Owner, Manager	Map/Lot/ Sublot	Zoning	Current Use	Condition (Town land only)	Recreation Potential (Town land only)	Public Access	Level of Protection	Acres	Grant Program	Reference Number
Eldridge Memorial Park	Town of Bourne	19.4/200	R-40	R	Good	Rec fields, courts, playground	Yes	L	8.03		
Electric Avenue Boat Launch Area	Town of Bourne	23.1/152/5	R-40	R	Good	Boating	Yes	L	0.35		
Fenton Property	Town of Bourne Conservation Commission	5/48	R-80	B	Good	River Access	Yes	P	2.58		
Flax Pond Conservation Area	Town of Bourne Conservation Commission	44.3/16	R-40	C	Good	Fishing	Yes	P	3.96		
Four Ponds Conservation Area	Town of Bourne Conservation Commission	39/11	R-40	B	Good	Trails	Yes	P	125.44	LAND	036_SH_7
Gagner Property	Town of Bourne Conservation Commission	7/50	R-40	B	Fair	None	Yes	P	8.03		
Gray Gable Park Conservation Area	Town of Bourne Conservation Commission	26.3/23	R-40	C	Good	Trails, fishing, shellfishing, boating	Yes	P	0.59		
Gray Gables Beach	Town of Bourne Department of Public Works	26.1/185	R-40	R	Good	Beach	Yes	L	3.29		
Harding Property	Town of Bourne	5/13		C	Good	Trails	Yes	P	26.00	Land Bank	
Harlow Farms Purchase	Town of Bourne Conservation Commission	16/5	R-40	B	Good	Trails	Yes	P	27.84		
Hen Cove Beach	Town of Bourne Department of Public Works	43.3/265	R-40	R	Good	Beach	Yes	L	2.38		
Hen Cove Run Landing	Town of Bourne	43.3/267	R-40	R	Good	Fishing, shellfishing, boating	Yes	X	1.57		
Herring Run	Town of Bourne		R-80	C	Good	None	Yes	P	1.57	LAND	036_SH_5
Hope Springs Conservation Area	Town of Bourne Conservation Commission	54/26	R-40	C	Fair	None	Yes	P	0.50		
Hopwood Property	Town of Bourne	10/27	R-80	C	Good	Trails, Parking Fishing	Yes	P	2.02	LAND	036_SH_6
Hostetter / Largay Property	Town of Bourne Conservation Commission	27/40	R-40	C	Good	Trails	Yes	P	9.42	LAND	036_SH_2
Hoxie Elementary School Playground	Town of Bourne, Town of Bourne School Department	12.1/80	R-40	R	Good	Playground	Yes	L	2.50		
Hunters Ridge Lots	Town of Bourne Conservation Commission	7.2/49	R-40	B	Poor	None	Yes	P	3.03		
Irwin Property	Town of Bourne, Board of Selectmen/Open Space Committee	52/40	R-40	C	Good	None	No	P	17.13	Land Bank	
Island Drive	Town of Bourne Conservation Commission	43.3/41	R-40	C	Fair	None	Yes	P	1.54		
Jackson Purchase	Town of Bourne, Board of Selectmen/Open Space Committee	28/6	B-3	B	Good	None	Yes	P	12.50	Land Bank	
John F Stackpole Memorial Park	Town of Bourne Department of Public Works	26.2/63	R-40	R	Fair	None	Yes	L	0.54		
Keene St Parcel	Town of Bourne Conservation Commission	24.1/49	R-40	C	Unkown	Unknown	Yes	P	1.03		
Keith Field	Town of Bourne	11.4/10	R-40	R	Good	Rec field, courts	Yes	L	2.88		
King (Margaret Nye) Property	Town of Bourne, Board of Selectmen/Open Space Committee	5/4	R-80	C	Fair	River Access	Yes	P	2.20	CPA	
Landing At Circuit Ave	Town of Bourne	43.3/276	R-40	R	Good	Water Access	Yes	L	0.12		
Leary Property	Town of Bourne Conservation Commission	31/3	R-40	B	Good	Trails	Yes	P	25.18		
Lily Pond Access	Town of Bourne Department of Public Works	44.1/144	R-40	R	Fair	Water Access	Yes	L	0.67		
Little Buttermilk Bay	Town of Bourne Conservation Commission	15.3/11	R-40	C	Fair	None	Yes	P	0.53		
Little Buttermilk Bay #2	Town of Bourne Conservation Commission	19.2/3	R-40	C	Fair	None	Yes	P	0.08		
Little Buttermilk Bay Woods	Town of Bourne, Board of Selectmen/Open Space Committee	15/6 & 7	R-80	C	Fair	None	Yes	L	10.86	CPA	
Lyons / Aptucxet Property	Town of Bourne, Board of Selectmen/Open Space Committee	24.3/6		C	Good	Scenic Overlook	Yes	P	2.77	CPA	
Major General Leonard Wood Park	Town of Bourne Department of Public Works	51.4/86	R-40	R	Fair	None	Yes	L	4.00		
Mashnee Road Conservation Area	Town of Bourne Conservation Commission	26.3/32	R-40	C	Fair	None	Yes	P	1.26		
Mashnee Road Property	Town of Bourne Conservation Commission		R-40	C	Unknown	Unknown	Yes	P	0.04		
Massasoit Avenue Landing	Town of Bourne Department of Public Works		R-40	R	Fair	None	Yes	L	0.03		
Monks Marine Park	Town of Bourne Conservation Commission	38/1	R-40	C	Good	Trails, beach, boating, shellfishing	Yes	P	5.04		
Monument Beach Marina	Town of Bourne	34/53	R-40	R	Good	Beach, boating, shellfishing	Yes	L	2.09		
Nightingale Pond Conservation Area	Town of Bourne Conservation Commission	20/54	R-40	C	Fair	Trails	Yes	P	23.00		
North Shore Beach	Town of Bourne Department of Public Works	38.3/374	R-40	R	Good	Beach	Yes	L	0.36		
Perry Marsh	Town of Bourne Conservation Commission	27/41	R-40	C	Fair	None	Yes	P	4.18	LAND	036_SH_2
Perry Property	Town of Bourne Conservation Commission	31.1/36	R-40	C	Fair	None	Yes	P	1.88		
Perry Woods	Town of Bourne, Board of Selectmen/Open Space Committee	31/7	R-40	B	Fair	None	Yes	P	5.46	CPA	
Picture Lake Access	Town of Bourne Conservation Commission		R-40	R	Good	Beach	Yes	L	1.25		
Picture Lake Park	Town of Bourne Department of Public Works	44.2/134	R-40	R	Good	Beach	Yes	L	3.61		
Pine Ridge Landing	Town of Bourne Department of Public Works	14/54	R-40	R	Fair	Beach Access	Yes	L	0.10		
Pinnacle Road Conservation Area	Town of Bourne		R-40	C	Fair	Trails	Yes	L	5.76		
Plymouth Lane Property	Town of Bourne	9/14	R-80	C	Good	Trails	Yes	P	34.50	CPA	

\* TOWN PROPERITES ONLY

PRIMARY PURPOSE: R - Recreation (facility based activities); C - Conservation (non-facility based activities); B - Recreation & Conservation; H - Historical/Cultural; A - Agriculture; W - Water Supply Protection; O - Other  
GRANT PROGRAMS: ALA - Aquifer Lands Acquisition; LAND - Local Acquisitions for Natural Diversity (former Self Help grant); CPA - Community Preservation Act; LWCF - Land and Water Conservation Fund

LEVEL OF PROTECTION: P - In perpetuity; T - Term limited; L - Limited; N - None; X - Unknown



Site Name	Owner, Manager	Map/Lot/ Sublot	Zoning	Current Use	Condition (Town land only)	Recreation Potential (Town land only)	Public Access	Level of Protection	Acres	Grant Program	Reference Number
Pocasset Heights Conservation Area	Town of Bourne Conservation Commission	42.4/15	R-40	C	Good	Trails	Yes	P	1.29		
Pocasset River Conservation Area	Town of Bourne Conservation Commission	38/15	R-40	C	Good	Trails, fishing	Yes	P	24.98	LAND	036_SH_7
Post Office Playground	Town of Bourne Department of Public Works	51.2/9.01	R-40	R	Good	Playground	Yes	L	0.30		
Puritan Road Conservation Area	Town of Bourne Conservation Commission	20/1	R-40	C	Fair	Trails?	Yes	P	23.75	Land Bank	
Queen Sewell Access	Town of Bourne Department of Public Works	19.2/137	R-40	R	Good	Trails, fishing	Limited	L	0.12		
Queen Sewell Cove	Town of Bourne Department of Public Works	20.1/55	R-40	R	Good	Trails, fishing	Limited	L	0.52		
Queen Sewell Park	Town of Bourne Department of Public Works	19.2/135	R-40	R	Good	Trails, fishing	Yes	L	0.69		
Queen Sewell Park	Town of Bourne Department of Public Works	19.2/170	R-40	R	Good	Trails, fishing	Yes	L	0.66		
Red Brook Herring Run	Town of Bourne Department of Public Works	47.2/54.01	R-40	C	Fair	Fishing	No	L	0.09		
Robinson Conservation Area	Town of Bourne Conservation Commission	51.2/69	R-40	B	Good	Trails	Yes	P	18.84		
Ryan / Main Street Property	Town of Bourne	23.2/123/2	DTC	C	Fair	None	Yes	P	2.00	CPA	
Sacrifice Rock Woods Conservation Area	Town of Bourne Conservation Commission	10/5	R-80	C	Good	Trails	Yes	P	82.95	LAND	036_SH_11
Sagamore Highlands	Town of Bourne Conservation Commission	2.1/1/1	R-40	B	Good	Trails	Yes	P	5.35		
Sand Spit Conservation Area	Town of Bourne Conservation Commission	47.1/19	R-40	C	Good	Beach, shellfishing, boating, fishing	Yes	P	1.33		
Sandwich Road Conservation Area	Town of Bourne Conservation Commission	24/11	R-40	C	Good	None	Yes	P	15.11		
Sandy Pond CR	Town of Bourne	5/49	R-80	C	Good	Water Access	Yes	P	19.28	CPA	036_CR_20
School at Otis Air Force Base	Town of Bourne		GD	R	Unkown	None	Yes	X	33.11		
Scraggy Neck Road Conservation Area	Town of Bourne Conservation Commission	51/32	R-40	C	Fair	None	Yes	P	0.25		
Scusset Beach Road Conservation Area	Town of Bourne Conservation Commission	12.2/5	R-40	C	Poor	None	Yes	P	4.17		
Shore Road Ballfield and Conservation Area	Town of Bourne Conservation Commission	34/31	R-40	B	Good	Rec field, playground	Yes	P	39.51		
Shore Road Conservation Area	Town of Bourne Conservation Commission	38.3/360	R-40	C	Good	Trails	Yes	P	0.23		
Simpson Property	Town of Bourne Conservation Commission	7.4/59	R-40	B	Poor	None	Yes	P	1.52		
Squeateague Harbor Beach	Town of Bourne Conservation Commission	51.3/62	R-40	R	Good	Beach, boating, shellfishing, fishing	Limited	L	1.71		
Sullivan Property	Town of Bourne Conservation Commission	26.2/142	R-40	B	Fair	None	Yes	P	2.62		
Taylor's Point Park	Town of Bourne	23.1/147	R-40	H	Good	None	Yes	L	7.50		
The Strand (Sagamore Beach)	Town of Bourne	4/14	R-40	R	Good	Beach, fishing	Yes	L	28.20		
Town Forest	Town of Bourne Town Forest Committee	35/9	R-40	C	Good	Trails	Yes	P	146.63		
Town of Bourne (Map 19.3, Lot 122)	Town of Bourne	19.3/122	R-40	C	Fair	None	Yes	N	0.24		
Town of Bourne (Map 19.3, Lot 123)	Town of Bourne	19.3/123	R-40	C	Fair	None	Yes	N	0.23		
Town of Bourne (Map 25, Lot 7)	Town of Bourne Recreation Department	25/7	R-40	R	Good	None	Yes	L	0.51		
Town of Bourne (Map 31, Lot 24)	Town of Bourne Conservation Commission	31/24	R-40	C	Good	None	Yes	P	1.09		
Town of Bourne (Map 44.1, Lot 145)	Town of Bourne Department of Public Works	44.1/145	R-40	B	Fair	None	Yes	L	0.27		
Town of Bourne (Map 52, Lot 42)	Town of Bourne Conservation Commission	52/42	R-40	C	Good	None	Yes	P	20.02		
Town of Bourne (Map 52, Lot 43)	Town of Bourne Conservation Commission	52/43	R-40	C	Good	None	Yes	P	57.08		
Town of Bourne (Map 55, Lot 4)	Town of Bourne Conservation Commission	55/4	R-40	C	Good	None	Yes	P	72.97		
Town of Bourne (Map 55, Lot 6)	Town of Bourne Conservation Commission	55/6	R-40	C	Good	None	Yes	P	65.97		
Town Way / Wenaumet Bluff Dr	Town of Bourne		R-40	R	Good	Boat Ramp	Yes	L	0.15		
Town Way To Pocasset River	Town of Bourne Department of Public Works		R-40	R	Unkown	Unknown	Yes	L	0.05		
Veteran Memorial Park/Town Hal	Town of Bourne	24.1/10	R-40	H	Good	Courts, picnicking	Yes	L	4.09		
Walsh / Little Property	Town of Bourne Conservation Commission	26.4/33	R-40	C	Good	None	Yes	P	19.28		
Wasque RT Purchase	Town of Bourne	6/5	R-40/ R-80	C	Fair	None	Yes	P	138.61	Land Bank	
Waterhouse Rd Parcel	Town of Bourne Conservation Commission	27/76	R-40	C	Fair	None	Yes	P	0.58		
Whitmore Playground	Town of Bourne Department of Public Works	43.2/7	R-40	R	Good	Playground	Yes	L	3.78		
Willett Circle Conservation Area	Town of Bourne Conservation Commission	51.4/118	R-40	C	Fair	None	Yes	P	1.58		
Wings Neck Conservation Area	Town of Bourne Conservation Commission	42.2/1	R-40	C	Good	Trails	Yes	P	6.00		
Winsor Road Landing	Town of Bourne		R-40	B	Good	Water Access	Yes	P	0.05		
<b>Town Lands Subtotal</b>									<b>1,589.50</b>		
<b>Town Lands - Water Districts</b>											
Bourne Water District (Map 25, Lot 5)	Town of Bourne, Bourne Water District	25/5	R-40	W	-	None	No	P	1.46		
Bourne Water District (Map 34, Lot 51)	Town of Bourne, Bourne Water District	34/51	R-40	W	-	None	Limited	P	11.56		
Bourne Water District (Map 35, Lot 12.1)	Town of Bourne, Bourne Water District	35/12.1	R-40	W	-	None	Yes	P	10.22		

\* TOWN PROPERTIES ONLY

PRIMARY PURPOSE: R - Recreation (facility based activities); C - Conservation (non-facility based activities); B - Recreation & Conservation; H - Historical/Cultural; A - Agriculture; W - Water Supply Protection; O - Other  
GRANT PROGRAMS: ALA - Aquifer Lands Acquisition; LAND - Local Acquisitions for Natural Diversity (former Self Help grant); CPA - Community Preservation Act; LWCF - Land and Water Conservation Fund

LEVEL OF PROTECTION: P - In perpetuity; T - Term limited; L - Limited; N - None; X - Unknown

Site Name	Owner, Manager	Map/Lot/ Sublot	Zoning	Current Use	Condition (Town land only)	Recreation Potential (Town land only)	Public Access	Level of Protection	Acres	Grant Program	Reference Number
Bourne Water District (Map 35, Lot 18.1)	Town of Bourne, Bourne Water District	35/18/1	R-40	W	-	None	Limited	P	11.54		
Bourne Water District (Map 35, Lot 18)	Town of Bourne, Bourne Water District	35/18	R-40	W	-	None	Limited	P	5.54		
Bourne Water District (Map 35, Lot 19)	Town of Bourne, Bourne Water District	35/19	R-40	W	-	None	Yes	P	13.82		
Bourne Water District (Map 35, Lot 19.01)	Town of Bourne, Bourne Water District	35/19.01	R-40	W	-	None	No	P	5.03		
Bourne Water District (Map 35, Lot 20)	Town of Bourne, Bourne Water District	35/20	R-40	W	-	None	Limited	P	2.43		
Bourne Water District (Map 35, Lot 21)	Town of Bourne, Bourne Water District	35/21	R-40	W	-	None	Limited	P	0.41		
Bourne Water District (Map 35, Lot 6.4)	Town of Bourne, Bourne Water District	35/6/4	R-40	W	-	None	Limited	P	8.79		
Bourne Water District (Map 35, Lot 6.2)	Town of Bourne, Bourne Water District	35/6/2	R-40	W	-	None	Limited	P	1.42		
Bourne Water District (Map 35, Lot 6.3)	Town of Bourne, Bourne Water District	35/6/3	R-40	W	-	None	Limited	P	1.98		
Bourne Water District (Map 35.1, Lot 144)	Town of Bourne, Bourne Water District	35.1/144	R-40	W	-	None	Limited	P	8.97		
Bourne Water District (Map 35, Lot 6.1)	Town of Bourne, Bourne Water District	36/6.1	R-40	W	-	None	Unknown	P	67.85	ALA	ALA-03602
Bourne Water District (Map 38, Lot 28)	Town of Bourne, Bourne Water District	38/28	R-40	W	-	None	Limited	P	1.14		
Bourne Water District (Map 38, Lot 33)	Town of Bourne, Bourne Water District	38/33	R-40	W	-	None	Limited	P	1.05		
Bourne Water District (Map 38, Lot 8)	Town of Bourne, Bourne Water District	38/8	R-40	W	-	None	Unknown	P	32.24		
Bourne Water District (Map 38.2, Lot 19)	Town of Bourne, Bourne Water District	38.2/19	R-40	W	-	None	Limited	P	0.27		
Bourne Water District (Map 38.2, Lot 20)	Town of Bourne, Bourne Water District	38.2/20	R-40	W	-	None	Limited	P	0.26		
Bourne Water District (Map 38.2, Lot 21)	Town of Bourne, Bourne Water District	38.2/21	R-40	W	-	None	Limited	P	0.26		
Bourne Water District (Map 52, Lot 31)	Town of Bourne, Bourne Water District	52/31	R-40	W	-	None	Yes	P	13.01		
Bourne Water District (Map 52, Lot 32)	Town of Bourne, Bourne Water District	52/32	R-40	W	-	None	Yes	P	8.26		
Bourne Water District (Map 52, Lot 44)	Town of Bourne, Bourne Water District	52/44	R-40	W	-	None	Yes	P	24.93		
Bourne Water District: Tuttle ALA Land	Town of Bourne, Bourne Water District	38/5	R-40	W	-	None	Unknown	P	5.98	ALA	ALA-03601
Buzzards Bay Water District (Map 10, Lot 51)	Town of Bourne, Buzzards Bay Water District	10/51	R-80	W	-	None	Limited	P	4.39		
Buzzards Bay Water District (Map 10, Lot 52)	Town of Bourne, Buzzards Bay Water District	10/52	R-80	W	-	None	Limited	P	38.88		
Buzzards Bay Water District (Map 20, Lot 2)	Town of Bourne, Buzzards Bay Water District	20/2	B-2	W	-	None	Limited	P	9.48		
Buzzards Bay Water District (Map 20, Lot 3)	Town of Bourne, Buzzards Bay Water District	20/3	B-2	W	-	None	Limited	P	2.82		
Buzzards Bay Water District (Map 20.3, Lot 161)	Town of Bourne, Buzzards Bay Water District	20.3/161	R-40	W	-	None	Limited	P	0.68		
Buzzards Bay Water District (Map 20.3, Lot 76)	Town of Bourne, Buzzards Bay Water District	20.3/76	R-40	W	-	None	Limited	P	0.36		
Buzzards Bay Water District (Map 20.3, Lot 77)	Town of Bourne, Buzzards Bay Water District	20.3/77	R-40	W	-	None	Limited	P	0.13		
Buzzards Bay Water District (Map 20.3, Lot 78)	Town of Bourne, Buzzards Bay Water District	20.3/78	R-40	W	-	None	Limited	P	0.33		
Buzzards Bay Water District (Map 21, Lot 2)	Town of Bourne, Buzzards Bay Water District	21/2	SDD	W	-	None	No	P	1.51		
Buzzards Bay Water District (Map 23.2, Lot 55)	Town of Bourne, Buzzards Bay Water District	23.2/55	R-40	W	-	None	No	P	0.33		
Buzzards Bay Water District (Map 9, Lot 10)	Town of Bourne, Buzzards Bay Water District	9/10	R-80	W	-	None	Limited	P	17.97		
Buzzards Bay Water District (Map 9, Lot 11)	Town of Bourne, Buzzards Bay Water District	9/11	R-80	W	-	None	Limited	P	2.17		
North Sagamore Water District (Map 11, Lot 17)	Town of Bourne, North Sagamore Water District	11/17	R-40	W	-	None	Limited	P	14.00		
North Sagamore Water District (Map 3, Lot 1)	Town of Bourne, North Sagamore Water District	3/1	R-80	W	-	None	Limited	P	5.45		
North Sagamore Water District (Map 3, Lot 27)	Town of Bourne, North Sagamore Water District	3/27	R-80	W	-	None	Limited	P	10.10		
North Sagamore Water District (Map 3, Lot 3)	Town of Bourne, North Sagamore Water District	3/3 & 28	R-40	W	-	None	Limited	P	38.54		
North Sagamore Water District (Map 3, Lot 28)	Town of Bourne, North Sagamore Water District	3/3 & 28	R-80	W	-	None	Limited	P	13.76		
North Sagamore Water District (Map 3, Lot 4)	Town of Bourne, North Sagamore Water District	3/4	R-40	W	-	None	Limited	P	0.58		
North Sagamore Water District (Map 3, Lot 5)	Town of Bourne, North Sagamore Water District	3/5	R-40	W	-	None	Limited	P	2.37		
North Sagamore Water District (Map 4.1, Lot 159)	Town of Bourne, North Sagamore Water District	4.1/159	R-40	W	-	None	No	P	0.15		
North Sagamore Water District (Map 4.3, Lot 140)	Town of Bourne, North Sagamore Water District	4.3/140	R-40	W	-	None	No	P	0.27		
North Sagamore Water District (Map 4.4, Lot 111)	Town of Bourne, North Sagamore Water District	4.4/111	R-40	W	-	None	Limited	P	0.14		
North Sagamore Water District (Map 4.4, Lot 118.2)	Town of Bourne, North Sagamore Water District	4.4/118/2	R-40	W	-	None	Limited	P	0.91		
North Sagamore Water District (Map 4.4, Lot 118.1)	Town of Bourne, North Sagamore Water District	4.4/118/1	R-40	W	-	None	Limited	P	5.50		
North Sagamore Water District (Map 4.4, Lot 118)	Town of Bourne, North Sagamore Water District	4.4/118	R-40	W	-	None	Limited	P	2.86		
North Sagamore Water District (Map 6, Lot 1)	Town of Bourne, North Sagamore Water District	6/1	R-80	W	-	None	Limited	P	17.74		
North Sagamore Water District (Map 6, Lot 14)	Town of Bourne, North Sagamore Water District	6/14	R-40	W	-	None	Limited	P	10.28		
North Sagamore Water District (Map 6, Lot 15)	Town of Bourne, North Sagamore Water District	6/15	R-80	W	-	None	No	P	33.16		
North Sagamore Water District (Map 6, Lot 2)	Town of Bourne, North Sagamore Water District	6/2	R-80	W	-	None	Limited	P	10.24		

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GRANT PROGRAMS: ALA - Aquifer Lands Acquisition; LAND - Local Acquisitions for Natural Diversity (former Self Help grant); CPA - Community Preservation Act; LWCF - Land and Water Conservation Fund

LEVEL OF PROTECTION: P - In perpetuity; T - Term limited; L - Limited; N - None; X - Unknown

Site Name	Owner, Manager	Map/Lot/ Sublot	Zoning	Current Use	Condition (Town land only)	Recreation Potential (Town land only)	Public Access	Level of Protection	Acres	Grant Program	Reference Number
North Sagamore Water District (Map 6, Lot 20)	Town of Bourne, North Sagamore Water District	6/20	R-40	W	-	None	Limited	P	26.44		
North Sagamore Water District (Map 6, Lot 9)	Town of Bourne, North Sagamore Water District	6/9	R-80	W	-	None	Limited	P	37.67		
North Sagamore Water District (Map 4, Lot 2)	Town of Bourne, North Sagamore Water District	4/2	R-40	W	-	None	No	P	0.33		
North Sagamore Water District (Map 6, Lot 24)	Town of Bourne, North Sagamore Water District	6/24		W	-	None		P			
South Sagamore Water District (Map 12.4, Lot 24)	Town of Bourne, South Sagamore Water District	12.4/24	R-40	W	-	None	Limited	P	11.83		
South Sagamore Water District (Map 18, Lot 2)	Town of Bourne, South Sagamore Water District	18/2	R-40	W	-	None	Limited	P	1.90		
<b>Town Lands - Water Districts Subtotal</b>									<b>561.69</b>		
<b>Town Lands - Other Communities</b>											
Town of Sandwich	Town of Sandwich Conservation Commission	7/55	R-40	C	-	-	Yes	P	0.89		
<b>Town Lands - Other Communities Subtotal</b>									<b>0.89</b>		
<b>County Lands</b>											
Barnstable County Hospital CR	Barnstable County, Town of Bourne Conservation Commission	44/23/5	R-40	C	-	-	Yes	P	50.41		036_CR_17A 1; 036_CR_17
<b>County Lands Subtotal</b>									<b>50.41</b>		
<b>Conservation Organization Lands</b>											
Sally Swift			R-40	C	-	-	Unknown	X	3.19		
<b>Conservation Organization Lands Subtotal</b>									<b>3.19</b>		
<b>Land Trust Lands</b>											
Agawam Point	Bourne Conservation Trust	26/5	R-40	B	-	-	Yes	P	4.91		
Bourne Sisters Woodland	Bourne Conservation Trust	27/47	R-40	B	-	-	Yes	P	23.39		
Cataumet Garden Center Conservation Area	Bourne Conservation Trust	55/33	R-40	C	-	-	Yes	P	8.80		
Cobb Corner Conservation Area	Bourne Conservation Trust	51.4/129	R-40	C	-	-	Unknown	P	0.57		
Conservation Area	Compact of Cape Cod Conservation Trusts			C	-	-	Limited	P	5.10		036_CLTC_0 006
Conservation Area (Map 27, Lot 75)	Bourne Conservation Trust	27/75	R-40	C	-	-	Yes	P	0.52		
Conservation Area (Map 42, Lot 64)	Bourne Conservation Trust	42/64	R-80	C	-	-	No	P/CR	2.68		036_CR_13
Conservation Area (Map 42, Lot 67, Sublot 1)	Bourne Conservation Trust	42/67/1	R-80	C	-	-	No	P/CR	2.50		036_CR_15
Conservation Area (Map 43.1, Lot 255)	Bourne Conservation Trust	43.1/255	R-40	C	-	-	Yes	P	0.94		
Conservation Area (Map 45, Lot 27)	Bourne Conservation Trust	45/27	R-80	C	-	-	No	P/CR	3.39		036_CR_13
Conservation Area (Map 52, Lot 3)	Bourne Conservation Trust	52/3	B-2	C	-	-	Unknown	P	2.96		
Conservation Area (Map 54, Lot 54)	Bourne Conservation Trust	54/54	R-40	C	-	-	Yes	P	1.17		
Denormandie Woods	Bourne Conservation Trust	47.4/10	R-40	C	-	-	Yes	P	11.99		
Dimmock Waterfront	Bourne Conservation Trust	51.2/3	R-40	C	-	-	Yes	P	2.77		
Freeman Farm	Bourne Conservation Trust	18.2/10/1	R-40	C	-	-	Yes	P	13.34		
John Handy Conservation Area	Bourne Conservation Trust	51.2/32/1	R-40	C	-	-	Yes	P	3.89		
Joyce Path	Bourne Conservation Trust	51.2/71	R-40	C	-	-	Yes	P	1.52		
Korff Conservation Land	Bourne Conservation Trust	28/3	B-3	C	-	-	Yes	P	6.60		
Lawrence Island	Bourne Conservation Trust	54/65	R-40	C	-	-	Yes	P	5.91		
Little Bay Conservation Area	Bourne Conservation Trust	34/28	R-40	C	-	-	Yes	P	21.33		
Nickerson Conservation Area	Bourne Conservation Trust	23.4/24	R-40	B	-	-	Yes	P	7.96		
Old Field Pond Preserve	Wildlands Trust	9/19/5	R-80	C	-	-	Limited	P	82.26		
Old North Road Parcel	Bourne Conservation Trust	42/19	R-40	C	-	-	Yes	P	0.60		
Paulinda Rd Parcel	Bourne Conservation Trust	38.2/96	R-40	C	-	-	Yes	P	0.61		
Post Office View	Bourne Conservation Trust	51.2/9	R-40	C	-	-	Yes	P	0.85		
Read Conservation Land	Bourne Conservation Trust	51.4/29	R-40	C	-	-	Unknown	P	2.41		
Red Brook Conservation Area	The Trustees of Reservations	13/1/2	R-80	C	-	-	Unknown	P/CR	19.12		036_CR_5
Red Brook Pond Conservation Area	Bourne Conservation Trust		R-40	C	-	-	Yes	P	44.35		
Robinson Conservation Area	Bourne Conservation Trust	51.1/37	B-1	B	-	-	Yes	P	12.06		
Spring Hill Farm Conservation Area	Bourne Conservation Trust	48/59/2	R-40	C	-	-	Unknown	P	3.60		
Walsh Conservation Land	Bourne Conservation Trust	28/2	B-3	C	-	-	Yes	P	7.92		
Wings Neck Conservation Area	Bourne Conservation Trust	41/22	R-80	C	-	-	No	P/CR	4.05		036_CR_13
Wings Neck Conservation Area	Wings Neck Conservation Foundation	42/55	R-80	C	-	-	No	T	63.72		036_CR_3
<b>Land Trust Lands Subtotal</b>									<b>373.79</b>		
<b>Private Nonprofit Lands</b>											
Aptuxcet Trading Post	Bourne Historical Society	23.4	R-40	H	-	-	Yes	X	11.58		
Cataumet Cemetery	Cataumet Cemetery Association		R-40	H	-	-	Unknown	L	3.92		
McDermott Property	Society for Historic Preservation	24.3/27.01	R-40	H	-	-	Yes	P	4.86		
Wampanoag Indian Burial Ground	Herring Pond Wampanoag Tribe	5/31	R-80	H	-	-	Unknown	L	1.17		
<b>Private Nonprofit Lands Subtotal</b>									<b>21.53</b>		
<b>Private for Profit Lands</b>											
Angus CR	Angus Donald H And Ralph G	1/6	R-40	C	-	-	Yes	P/CR	16.63		036_CR_14
Back River Farm CR	Spilhaus Karl H		R-40	C	-	-	Limited	P	5.26		036_CLTC_0 041
Bay Head Shores Beach	Buttermilk Bay Committee	14/31	R-40	R	-	-	Limited	L	1.62		
Brookside Golf Club	Brookside Golf Association Inc	27/156	R-40	R	-	-	Limited	N	109.02		
Canal Sportsmans Club	Canal Sportsmans Club	20.4/7	DNT	R	-	-	Limited	N	2.80		
Cataumet Club	Cataumet Club Inc	51.3/32	R-40	R	-	-	Limited	L	1.56		

\* TOWN PROPERTIES ONLY

PRIMARY PURPOSE: R - Recreation (facility based activities); C - Conservation (non-facility based activities); B - Recreation & Conservation; H - Historical/Cultural; A - Agriculture; W - Water Supply Protection; O - Other  
GRANT PROGRAMS: ALA - Aquifer Lands Acquisition; LAND - Local Acquisitions for Natural Diversity (former Self Help grant); CPA - Community Preservation Act; LWCF - Land and Water Conservation Fund

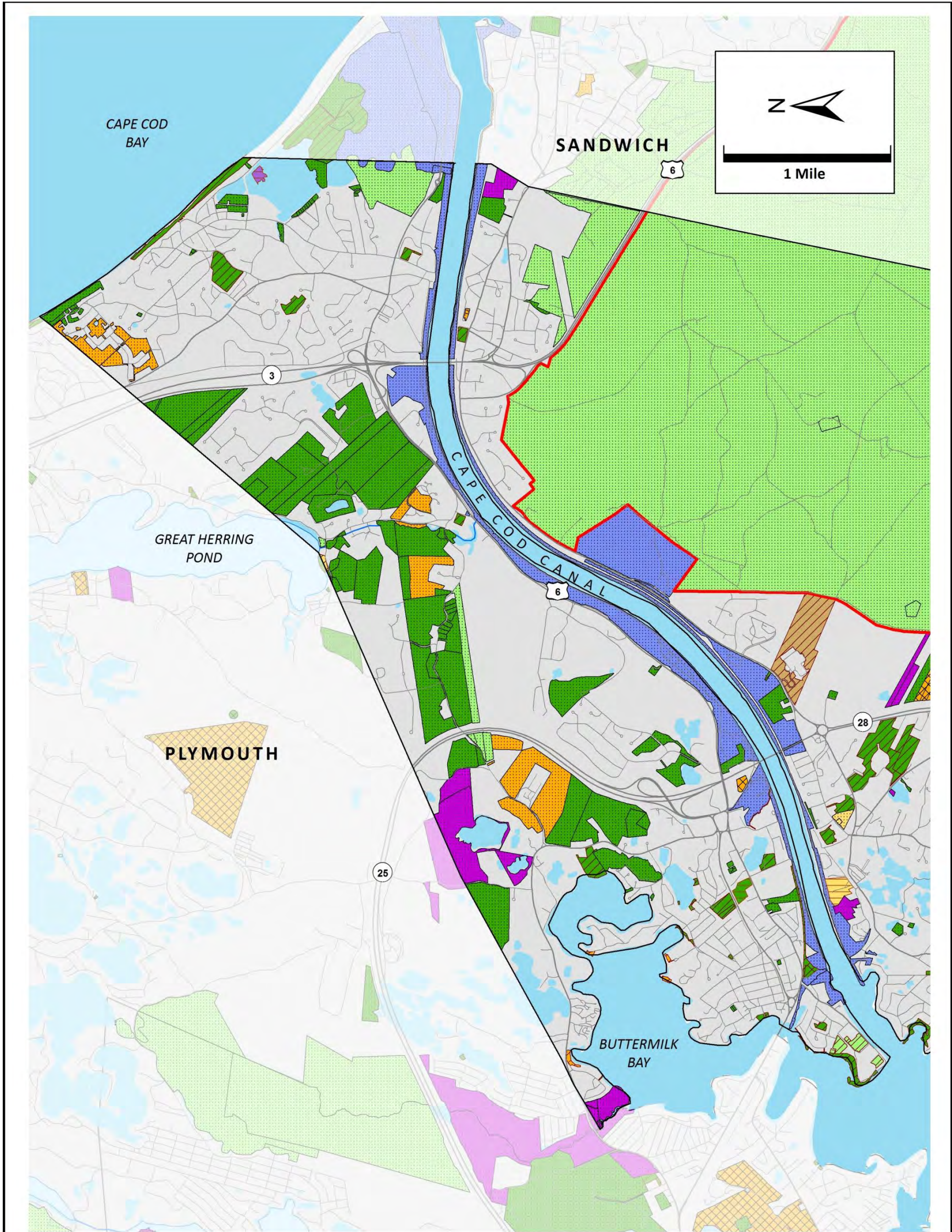
LEVEL OF PROTECTION: P - In perpetuity; T - Term limited; L - Limited; N - None; X - Unknown

Site Name	Owner, Manager	Map/Lot/ Sublot	Zoning	Current Use	Condition (Town land only)	Recreation Potential (Town land only)	Public Access	Level of Protection	Acres	Grant Program	Reference Number
Cedar Point Beach	Unknown	47.1/125	R-40	R	-	-	Limited	N	0.20		
Cliffside Estates CR	Daly Susan Tr	1.4/28/2	R-40	C	-	-	No	P/CR	23.55		036_CR_11
Dimmick CR	Dimmick David H	47/43/1	R-40	C	-	-	Yes	P/CR	4.56		036_CR_8
Elgin Rd Beach	Handy Point Association	47.1/118	R-40	R	-	-	Limited	L	0.32		
Forbes CR	SINGER M FORBES	42/72	R-80	C	-	-	No	P/CR	2.05		036_CR_16
Gainsboro Drive Beach	Jacoubs Edward L G Et Als	19.2/138	R-40	R	-	-	Limited	L	0.62		
Grazing Fields Farm PAR	Fletcher Kathryn and Michael	15/181/2	R-80	A	-	-	Limited	P	62.20		
Herring Run Condominium Subdivision Open Space	Herring Run Corporation	11/16/ Partial	R-80/ SDD	C	-	-	No	P	15.57		
Ingersoll CR	Ingersoll Realty Trust	9/78.2/2	R-80	C	-	-	No	P/CR	23.45		036_CR_10
Lewis Point Beach	Lewis Point Association	14.4/24	R-40	R	-	-	Limited	L	0.49		
Mashnee Village Beach	Mashnee Village Inc	29.4/98/ Partial	B-2	R	-	-	Limited	L	2.81		
Megansett Ridge CR	Quinn Donald P	10/67	R-40	C	-	-	Limited	P/CR	26.32		036_CR_12
Monument Beach Sportsmans Club	Monument Beach Sportsmans Club Inc	28/9	B-3/ R- 40	R	-	-	Limited	N	61.37		
Nagog Realty Trust	Nagog Realty Trust	12.3/129/ Partial	R-40	C	-	-	No	P/CR	0.98		036_CR_7
Pocasset Golf Club	Pocasset Golf Club	43/5	R-40	R	-	-	Limited	N	115.68		
Quamhasset Road Beach	New Quamhasset Homeowners	19.2/115	R-40	R	-	-	Limited	L	0.59		
Scraggy Neck Shoreline Res	Scraggy Neck Recreation Association	50/53	R-40	C	-	-	Limited	L	5.18		
Tahanto Beach	Tahanto Associates, Inc.	38.1/58	R-40	R	-	-	Limited	N	4.70		
Toby Island CR	Legg Kenneth D and Ardelle F		R-40	C	-	-	Unknown	P/CR	22.67		036_CR_19
<b>Private for Profit Lands Subtotal</b>									<b>510.20</b>		
<b>Other Lands</b>											
Upper Cape Cod Regional Vocational Technical Athletic Fields	Upper Cape Cod Regional Vocational Technical HS	25/1		R	-	-	Yes	L	61.32		
<b>Other Lands Subtotal</b>									<b>61.32</b>		
<b>TOTAL ACRES</b>									<b>4,796.87</b>		

\* TOWN PROPERTIES ONLY

PRIMARY PURPOSE: R - Recreation (facility based activities); C - Conservation (non-facility based activities); B - Recreation & Conservation; H - Historical/Cultural; A - Agriculture; W - Water Supply Protection; O - Other  
GRANT PROGRAMS: ALA - Aquifer Lands Acquisition; LAND - Local Acquisitions for Natural Diversity (former Self Help grant); CPA - Community Preservation Act; LWCF - Land and Water Conservation Fund

LEVEL OF PROTECTION: P - In perpetuity; T - Term limited; L - Limited; N - None; X - Unknown

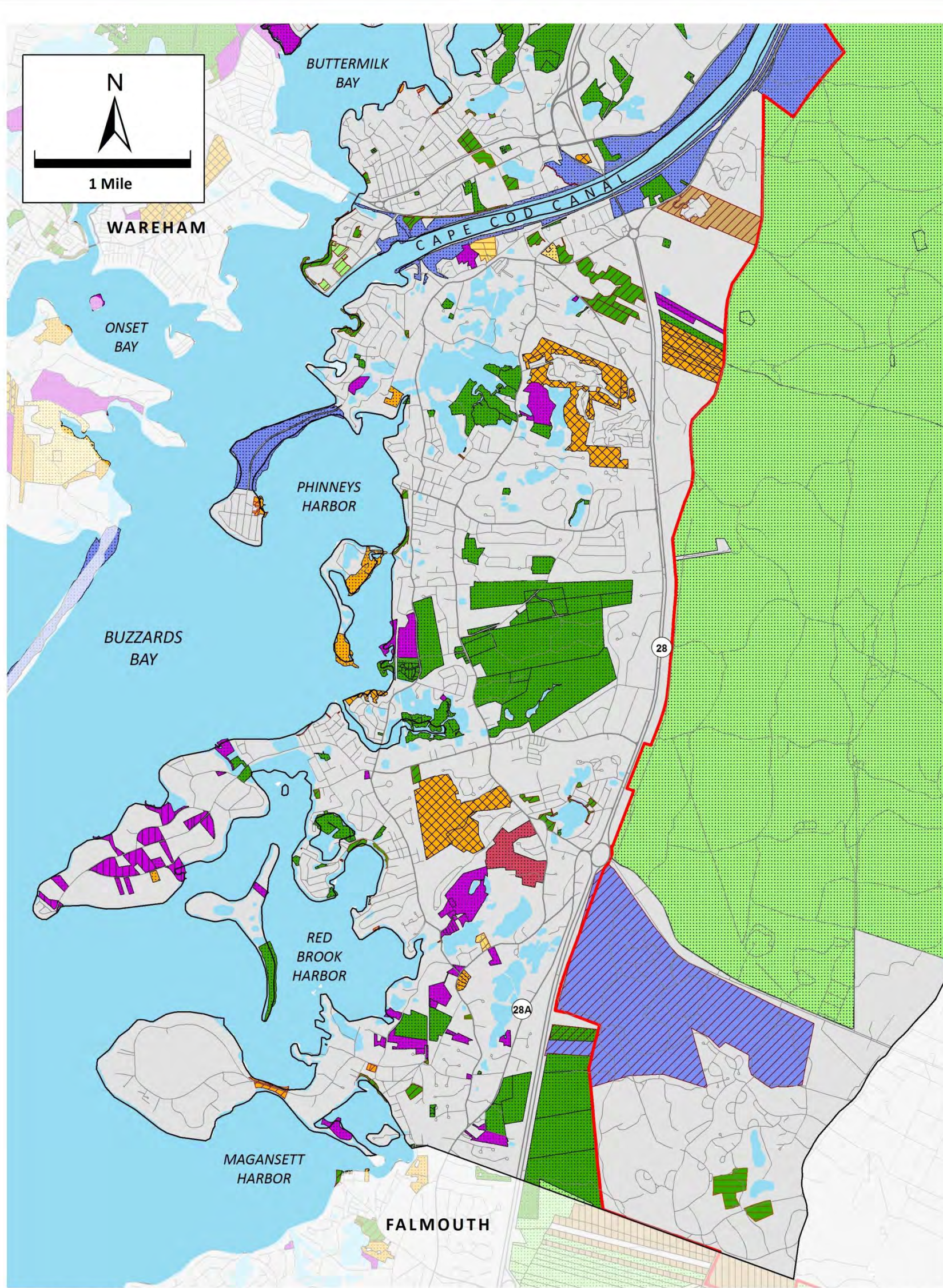


\*GIS Data - MassGIS (Open Space & Rec Properties, Sept. 2016)

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<p><b>Legend</b></p> <p> Town of Bourne      Roads</p> <p> Joint Base Cape Cod</p> <p><b>Level of Protection</b></p> <p> In Perpetuity      Unknown</p> <p> Temporary      None</p> <p> Limited</p>		<p><b>Ownership</b></p> <p> Federal</p> <p> State</p> <p> County</p> <p> Municipal</p> <p> Land Trust</p> <p> Conservation Organization</p> <p> Private</p> <p> Private Non-Profit</p> <p> Other</p>		<p><b>Horsley Witten Group</b> Sustainable Environmental Solutions 90 Route 6A • Unit 1 • Sandwich, MA 02563 508-833-6600 • horsleywitten.com</p>
<p><b>DRAFT Open Space &amp; Recreation Resources (A)</b> <b>Bourne Open Space and Recreation Plan</b></p>				
Date: 8/11/2017		Map 8		

Map 8. Open Space and Recreation Resources (A)



\*GIS Data - MassGIS (Open Space & Rec Properties, Sept. 2016)

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**Legend**

- Town of Bourne
- Roads
- Joint Base Cape Cod
- Level of Protection**
- In Perpetuity
- Temporary
- Limited
- Unknown
- None

**Ownership**

- Federal
- State
- County
- Municipal
- Land Trust
- Private
- Non-Profit
- Other

Horsley Witten Group

Sustainable Environmental Solutions  
90 Route 6A • Unit 1 • Sandwich, MA 02563  
508-833-6600 • horsleywitten.com



DRAFT Open Space & Recreation Resources (B)  
Bourne Open Space and Recreation Plan

Date: 8/11/2017

Map 9

Map 9. Open Space and Recreation Resources (B)

### **5.3.1 Bourne Existing Recreation Facilities and Programs**

In addition to protecting open space for natural resource protection and passive recreation (without facilities) and programming provide active recreational opportunities. Participation in local sports and local recreational programming is excellent in the Town of Bourne. The Recreation Department is responsible for overseeing the summer and school vacation programming for the Town and there is coordination with the DPW regarding maintenance of recreational amenities like fields and playgrounds. Programming provided by the Recreation Department includes:

- Musical Theatre Productions
- Tae-Kwon Do
- Swimming Lessons (not run by the Recreation Department separate entity within the Town)
- Tennis Lessons
- Volleyball Clinic

Sports that are available for Bourne youth during the various sports seasons include:

- Bourne Youth Baseball
- Bourne Babe Ruth
- Bourne Pop Warner
- Bourne Girls Youth Softball Bourne Youth Soccer
- Canal Youth Hockey, Boys and Girls Bourne Skating Club
- Cheerleading for Pop Warner Cape Cod Swim Club Bourne Youth Lacrosse Bourne Youth Hockey Bourne Swish Basketball

The Recreation Director tries to collaborate as much as possible with other organizations or individuals in the community to provide outstanding programming. For example, at the fall Volleyball Clinic, she utilizes the Bourne High School Volleyball Coach and Varsity Volleyball players to help teach participants. Information about programming is distributed by flyers that are sent out through the local schools and advertising in the local newspaper and on the town website. Participants in these programs are mostly children in grades K-8; however a number of the events are family focused such as the annual trip to Boston to attend a Red Sox game. Finding facility space for programming can often be a challenge, the Recreation Director utilizes the local school facilities as much as possible in addition to the Bourne Veterans Memorial Community Center (when it is not being used by the Council on Aging).

There are a number of local organizations that have taken on their own responsibility for organizing and maintaining some of the baseball fields. The Town of Bourne does not charge user fees for fields and these separate organizations often pay for their own utilities (night-time lighting, electricity for score boards).

### **5.3.2 Bourne Council on Aging (COA)**

Recreational programming in Bourne is available for not only the local youth, but for the older population as well thanks in part to the Bourne Council on Aging. The COA is located in the Bourne Veterans Memorial Community Center located on Main Street in Buzzards Bay. The COA annually serves approximately 5,000 Bourne residents. The Friends of Bourne Council on Aging is a nonprofit organization that was founded in 1979 to enhance the programs and services provided by the Council on Aging. The Friends do a tremendous amount of fundraising for the COA like the annual Holiday Fair.

Programming at the COA changes from month to month and ranges from physical activity programming (Zumba Gold, Yoga, Aerobics, Sit and Be Fit) to clinics (blood pressure, health screening, tax preparation) to mystery rides (bus driver takes a group out for an afternoon) to educational programs. Additional programs include computer classes, crafts, quilting, knitting, woodcarving, line dancing, and support groups for diabetes and grieving. Some of the most popular programs are the exercise programs, art class, current events discussions, and the TRIAD program. TRIAD is a commitment shared by chiefs of police, the sheriff, senior leaders and affiliated organizations. Working together, they reduce elder victimization and increase law enforcement services to older persons. In Bourne, seniors work with the Department of Public Works and COA to help define things about daily life that Bourne seniors perceive to be a problem. For example, TRIAD volunteers worked with the local Fire Department to educate seniors about smoke detectors and they worked with DPW to put in crosswalks at key locations around town.

Many seniors in Bourne participate in activities outside of the Senior Center as well such as shellfishing at local beaches, walking, attending concerts and functions at the park on Main Street. The Bay Area Senior Cyclists and Walkers also provides more moderate exercise opportunities on a regular schedule. The group meets weekly between April and November for two-hour bike or hike excursions in the area.



## 6.0 Community Vision

### 6.1 Public Input Process

As mentioned in Section 2, the Town used several tools to engage the public and municipal staff in understanding community needs, including interviews, a community survey, and public workshops. All Open Space Committee meetings are open to the public and during discussions of the OSRP, input was requested and recorded.

Municipal staff were interviewed to learn about changes since the prior OSRP was adopted and future needs of their respective departments. Staff was also asked to review draft material for accuracy and any missing information.

The Recreation Committee was specifically targeted to assist in developing the OSRP. It provided input and comments on draft materials, specifically community needs, management needs, and the Action Plan.

The Bourne Open Space and Recreation Plan Community Survey was administered as part of the Town's OSRP update process. It was available online from October 31 to November 25, 2016. Hardcopies were also available at the Town Clerk's Office, Library, and Community Center. The survey link was posted on the Town's website. The link was also emailed to a various groups asking them to send the link to their membership or post on their Facebook pages. These included Library, Recreation Department, and Police Department. Flyers promoting the survey were posted on the community bulletin boards in Sagamore, Sagamore Beach, Buzzards Bay, Bourne Village, Monument Beach, Pocasset and Cataumet. The survey was also included in the advertisements (*Bourne Enterprise*) and promotional materials for the Public Workshop held on November 16, 2016.

Fifty (50) responses were received, both online and hardcopy. The survey was reopened from March 31 to April 14, 2017 and an additional 59 responses were received. While this is a very small sample compared to the Town's population, responses were viewed in conjunction with input from the first and anticipated second public workshops, municipal staff, and town committees to gauge the weight of the issues and needs expressed by respondents.

The Town also held two public workshops. The first was held on November 16, 2016 in the Media Center of the Bourne Middle School, from 7 pm to 9 pm. Approximately 19 residents participated. The focus of this workshop was to understand community needs. Participants were asked what is working well, what could be better, and what is missing with regards to open space protection and recreational opportunity provided by the town. A summary is provided in Section 2.3.4. Details of the public workshop are provided in Appendix C.

The second workshop was held on March 29, 2017 in the Media Center of the Bourne Middle School, from 7 pm to 9 pm. The focus of this workshop was to review the proposed Action Plan. Participants were asked to review action items to see if they would meet the needs identified in the first workshop. A summary is provided in Section 2.3.4. Details of the public workshop are provided in Appendix C.

Public input is provided throughout the discussion of needs in Section 7.

## 6.2 Statement of Open Space and Recreation Goals

The primary goals of the OSRP are to:

- Protect unique and sensitive community resources and acquire or otherwise ensure the protection of key parcels
- Provide multiple-use, accessible facilities to all user groups, residents, and visitors
- Continue to educate and increase awareness of Bourne residents regarding conservation, land protection, natural resources and pollution of water supply
- Work with neighboring towns, Cape Cod Commission, local and regional land trusts and conservation organizations, and the Commonwealth to further regional open space and recreation goals and projects

These goals are carried forward from the prior OSRP. After review by the Open Space Committee and analyzing feedback from the public described above, they are still deemed relevant.

## 7.0 Analysis of Needs

The analysis of needs considered findings from the public workshops, community survey, and municipal department interviews. The Statewide Comprehensive Outdoor Recreation Plan (SCORP)<sup>46</sup> also provided input on gaps missing from the outreach efforts. The SCORP (2012) is a planning document that assesses recreational resources and needs on a statewide level. The document is used to distribute Land and Water Conservation Funds in the form of grants to local communities, which can be used to acquire conservation land, develop new parks, or renovate existing parks. It was useful to confirm town-wide needs if residents may not have participated in public input opportunities.

### 7.1 Resource Protection Needs

Like the Cape Cod region, the Town's location, recreational and open space amenities, and sensitive natural resources have a great impact on residents' quality of life, socially and economically. The community is not only home to over 21,000 residents, but welcomes hundreds of thousands of visitors every summer to Cape Cod. Bourne has an opportunity to continue acquiring additional properties (in addition to managing existing ones) that would add to the open space and recreation inventory as well as increase and enhance recreational programming and facilities. Local residents are proud of the numerous sensitive natural resources, for example the designated ACECs as well as the larger more obvious attractions in town such as the Cape Cod Canal.

Resource protection focuses on the important functions the natural environment contributes to a healthy and viable community. Based on the environmental conditions inventory and the public input process, needs focus around six themes:

- Confirm and address threats to drinking water supplies
- Implement wastewater management strategies to reduce impacts to groundwater
- Minimize impacts of invasive species
- Restore and maintain coastal habitats
- Acquire land to meet diverse objectives, such as protecting critical habitats, building wildlife corridors, and maintaining water quality

#### 7.1.1 Water Supply and Groundwater Protection

Bourne's water supplies are derived from groundwater sources that are highly vulnerable to contamination due to permeable soils and the absence of hydrogeologic barriers that can prevent movement of contaminants into aquifer recharge areas. Non-point source pollution from septic systems, businesses, hazardous waste, and improper disposal of chemical products are also threats to Bourne's water supplies.

Potential contaminate sources for the Buzzards Bay Water District, North Sagamore Water District and Bourne Water District are identified in Section 4.0 of the report. Bourne will need to continue to monitor these contaminants and the groundwater in these areas and work with the DEP to further improve water quality and prevent degradation.

The Town of Bourne continues to remediate stormwater discharges, which contribute to poor water quality and closures of shellfish grounds and swimming areas. Thus, surface water quality should

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<sup>46</sup> <http://www.mass.gov/eea/docs/eea/dcs/scorp-2012-final.pdf>. Obtained January 3, 2017.

continue to be protected and monitored. In addition, monitoring of groundwater contamination from the JBCC Landfill Groundwater Plume should be continued and further technology utilized (such as the groundwater extraction system that was installed) to continue groundwater remediation efforts.

### 7.1.2 Wastewater Management

The report entitled *Wastewater Management Planning for Bourne's Downtown* (2012) provided an analysis of wastewater management needs and several recommendations to meet those needs. Wastewater is collected from Buzzards Bay and Hideaway Village and sent to the Wareham Wastewater Treatment Plant. Maximum wastewater flows to Wareham are limited by an Inter-Municipal Agreement (IMA) to an annual average of 200,000 gallons per day (GPD). Buzzards Bay build-out projections show that wastewater capacity will be exceeded with even under modest growth or redevelopment scenarios. To meet projected build-out needs, the report evaluated alternative locations for a wastewater treatment facility and subsurface disposal system near the downtown Buzzards Bay. Key actions were identified as part of a phased approach for increasing wastewater treatment capacity. They include:

- Continue the services of the Bourne Wastewater Advisory Committee to assist in refining the wastewater option for Downtown Bourne
- Implement a phased approach that will allow for growth utilizing the remaining IMA allocation (Phase 1 of Growth Incentive Zone (GIZ)), while planning for infrastructure needed to develop the additional wastewater capacity needed for Phases 2 and 3 of the GIZ
- Engage the public in the wastewater planning process
- Engage the Massachusetts Department of Environmental Protection (DEP) to review and comment on the wastewater plan for Buzzards Bay with the goal of DEP plan approval
- Continue discussions with private-sector parties on commercial development plans and private financing options
- Work with the Massachusetts Water Pollution Abatement Trust and DEP to develop public financing options to supplement private investment
- Conduct preliminary hydrogeological studies at preferred disposal sites

### 7.1.3 Invasive Species

As noted in Section 4.7.8, Massachusetts Invasive Plant Advisory Group (MIPAG) evaluated 85 plant species and developed a list of invasive, likely invasive, and potentially invasive species. In addition, the Commonwealth implements a ban on the sale, trade, purchase, distribution, and related activities of over 140 invasive plants. Existing invasive plant populations will likely continue to spread throughout the landscape if not controlled. Control/eradication options are species-specific, but often entail the use of herbicides sometimes in addition to other control measures, including mowing, burning, covering with black plastic, and excavation. MIPAG has published recommendations to prevent, control, and where possible, eradicate invasive plant species in Massachusetts, including early detection and rapid response, public education, and inter-agency coordination.<sup>47</sup> The Town can consider some of these strategies, targeting the more low-cost approaches, including targeted public awareness and education to landowners, nursery and landscape professionals, and non-profit/conservation organizations. The SCORP's survey of land trusts indicated that invasive species management was one of their top priorities and may provide opportunities for public-private partnerships to eradicate and control invasives.

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<sup>47</sup> [http://www.massnrc.org/mipag/docs/STRATEGIC\\_PLAN\\_FINAL\\_042005.pdf](http://www.massnrc.org/mipag/docs/STRATEGIC_PLAN_FINAL_042005.pdf). Obtained October 13, 2016.

Discussion of invasive species in the OSRP has primarily focused on invasive plants; however, in 2016, Massachusetts and other New England states experienced an unprecedented outbreak of the gypsy moth (*Lymantria dispar*). According to the Center for Agriculture, Food, and the Environment at UMASS Amherst, the resurgence of the gypsy moth is “the most serious insect pest of shade trees in New England.”<sup>48</sup> On Cape Cod, existing infestations associated with the crypt gall wasp and winter moth<sup>49</sup> also stress local trees. The latter typically is the Cape’s biggest invasive insect problem on a yearly basis. Management of these pests is needed.

#### 7.1.4 Coastal and Inland Habitat Protection

According to NHESP, Bourne has both coastal and inland natural resource. Coastal resources include dune systems, barrier beaches and salt marshes and inland resources, including Atlantic white cedar swamps and vernal pools. Coastal Plain Pondshores, Sandplain Heathlands and Scrub Oak Shrublands are found on JBCC. A Sandplain Heathland community is found just south of the Cape Cod Canal. These and other rare natural communities occurring in Bourne should be priority areas for conservation.

Bourne should continue to work with the Massachusetts Estuaries Project (MEP)<sup>50</sup> in managing nitrogen to coastal embayments. The addition of excessive amount of nitrogen to coastal waters from human sources is one of the most serious long-term problems threatening Buzzards Bay. The areas of Buzzards Bay most affected are poorly flushed coastal embayments, particularly those areas with significant potential for new development. Currently, MEP is evaluating the Pocasset River and Pocasset Harbor/Hen Cove/Red Brook Harbor to determine the specific nutrient problems affecting the embayments. Excessive nutrients (nutrification) cause an increase in algal growth, which consumes oxygen when they decompose, and in turn causes fish kills and beach closures. Some algal species contain toxins that concentrate in shellfish, which requires closures of shellfish beds. Runoff of feces from land also leads to shellfish bed closures when fecal coliform reach detectable concentrations. All of these reductions in water quality create aesthetically displeasing waters that adversely affect tourism and coastal property values. Therefore, the Town should continue to work with MEP, monitor the water quality, and whenever possible, implement MEP recommendations.

Bourne should also continue to work with the Cape Cod Commission and other communities in the implementation of the 208 Plan. The 208 Plan works at the watershed level to identify solutions for managing impacts of excess nitrogen coming from septic systems, fertilizer, and stormwater. Working with neighboring towns in the same watershed can help achieve common water quality goals. See Section 4.7.6 Ground and Surface Water Pollution for additional discussion on the 208 Plan.

#### 7.1.5 Land Acquisition

Protected lands provide a wide range of functions, from preservation of environmentally and culturally sensitive resources to buffering developed areas and providing opportunities for recreation. As the community grows, demands for these areas will increase and overuse at the Town’s most popular areas (Four Ponds, Leary and Carter Beal) may lead to their degradation without implementation of management strategies and regular maintenance. Town-wide development can also affect both protected and unprotected open space resources, resulting in traffic congestion, degradation of water

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<sup>48</sup> <https://ag.umass.edu/news-events/highlights/gypsy-moth-outbreak-in-massachusetts-2016>. Obtained October 13, 2016.

<sup>49</sup> <https://ag.umass.edu/fact-sheets/winter-moth-overview>. Obtained October 13, 2016.

<sup>50</sup> <http://www.oceanscience.net/estuaries/>. Obtained December 27, 2016.

quality, loss and/or fragmentation of critical habitat areas, loss of community character and increased demand for municipal services.

The public supports acquiring land for protecting natural resource and for passive and active recreational uses. Most respondents to the community survey thought it was very important or important to preserve or acquire open space to meet water and conservation needs.

The SCORP’s survey of land trusts state-wide also indicated that acquiring new land was their top priority, along with trail maintenance, obtaining conservation restrictions, and funding.

The Open Space Committee maintains a list of open space parcels prioritized for acquisition should they become available. They are prioritized to ensure that lands acquired by the Town meet identified natural resource, open space and recreational needs. Criteria and ranking system are listed in Table 18.

**Table 18. Bourne Land Acquisition Prioritization Criteria and Ranking System**

Criteria	High	Medium	Low
Water Supply	Within 1,000 feet of public well or well site (30 pts)	In watershed protection zone (20 pts)	Within recharge zone (10 pts)
Flood Plain	Velocity zone (20 pts)	Zone A (10 pts)	Zone X (5 pts)
Agricultural	Operating farm (20 pts)	Chapter Lands, 61, 61A, 61B (10 pts)	Other (5 pts)
Linkage	Current linkage to waterfront, conservation, or protected land (20 pts)	Potential linkage to waterfront or conservation land (10 pts)	Other (5 pts)
Recreation	Strong need, land appropriate (10 pts)	Suitable if modified (5 pts)	Not suitable (0 pts)
Urban Green Space	Open land in densely settled area, suitable for pocket park (20 pts)	Not densely settled area, suitable for pocket park (10 pts)	Not likely (0 pts)
Coastal Access	Yes (20 pts)	No (0 pts)	No (0 pts)
Wildlife Habitat	Endangers or rare species (20 pts)	Part of wildlife corridor (10 pts)	Other (5 pts)
Wetlands	Yes, upland buffer greater than 50 feet (20 pts)	Yes, upland buffer less than 50 feet (10 pts)	No (5 pts)
Development Potential	High (20 pts)	Medium (10 pts)	Low (5 pts)
Scenic Value	High (20 pts)	Medium (10 pts)	Low (5 pts)
Local Preference	High (20 pts)	Medium (10 pts)	Low (5 pts)
Buildings Present	No buildings (20 pts)	Few buildings (10 pts)	Several buildings(5 pts)
Unique, Townwide, Historic, or Public Value	High (20 pts)	Medium (10 pts)	Low (5 pts)

*High Priority Land Acquisition Total Score: Range of 200 to 136*  
*Medium Priority Land Acquisition Total Score: Range of 135-56*  
*Low Priority Land Acquisition Total Score: Range 56 or less*

The Open Space Committee also considers other property characteristics when looking at property for acquisition. These include:

- If the property is in or adjacent to an Area of Critical Environmental Concern (ACEC)
- In addition to the Wildlife Habitat criterion, if the property is in a specifically identified National Heritage and Endangered Species Program (NHESP) priority or estimated habitat area
- If the property contains wetlands or lands subject to the Wetlands Protection Act or Rivers Protection Act
- If the property contains a vernal pool
- If the property provides a buffer to minimize the disruption of ecological processes on it or on abutting lands
- If the property will provide accessibility with ADA standards
- If the property adjoins private open space land trust property (e.g., Bourne Conservation Trust)
- If the property already contains trails or linkages to other open space areas
- If the property is near to densely populated neighborhoods and could serve as a pocket park.
- If the property will be available for public use for active (e.g., ball field) or passive recreation (e.g., walking trails)
- If the property contains significant archaeological or historic resources based upon the State or National Register of Historic Places or the Massachusetts Historical Commission's inventory
- If a property has cultural or tribal significance to Native Americans in the region
- If the property maintains a sense of agricultural tradition or rural character
- If the property provides a sense of openness or scenic view, if it is isolated from roads/structures and serves as a buffer to other land uses or if the property would enhance the scenic aspect of an existing open space parcel

## 7.2 Community Needs

Enhancing, maintaining and preserving recreation and open space amenities is an important goal of this OSRP update. Each village in Bourne has some type of recreational amenity, whether it is a baseball field, playground or local beach, and they serve the local neighborhoods. Like the assessment of resource needs, the increase in users during the tourism season impacts resources and their ability to meet community needs.

Overall, community needs in Bourne focused around four major themes:

- Recognize changing demographics and build programs and resources around changing needs
- Improve accessibility to open space and recreation sites
- Increase communication and awareness of recreation and open space resources and their usage
- Consider new and expanded opportunities to build resource networks

### 7.2.1 Changing Demographics

Over the past two decades, residents of Bourne, along with the Cape Cod region, have gotten older. As discussed in Section 3.1.4, from 2000 to 2014, the median age of Bourne residents increased by 8.5 years, from 39.2 to 47.7. More significant is that in last five of those 14 years (2009 to 2014), the median age increased by nearly six years. This is also reflective in the community survey. While a small sample, many respondents were reluctant to comment on programming offered to youth and young children because they do not have those age groups in their homes.

The SCORP also points out that the 2010 Census showed that 41.5% of the Commonwealth's population was over the age of 45. It notes that addressing the recreational needs of older residents may mean the

development of more passive recreational opportunities, such as walking trail. Its public participation process showed a high demand for walking trails.

Addressing the recreational needs of seniors requires the assessment of all aspects of a community, including access to housing, transportation, and social services. The Bourne COA and the Senior Center are the focal point to help older residents find the resources they needs. Recreational opportunities also exist at the Senior Center and throughout the community at all levels of mobility (See Section 5.2). Planning recreational opportunities for older residents should consider accessibility design, proximity to where seniors live, and transportation needs to get to these opportunities: Does a design consider those with limited mobility? Is the location close enough to walk to from home? What is the condition of sidewalks and/or walking paths? Are there benches along the way to rest? Is public transportation needed and is it available?

### 7.2.2 Accessibility

A priority of the Town is meeting the needs of residents with disabilities of all ages. In 2016, the Town approved and began installation of an inclusive park, which includes play areas for children as well as a workout area with stationary equipment for adults. It is along an existing walking trail accessing the Canal, which begins next to an assisted living center for seniors.

Through the self-assessment, town-owned properties were evaluated for accessibility under the Americans with Disabilities Act (ADA). [Summary to be provided; Appendix G placeholder]

### 7.2.3 Increased Communication

“Communication” encompasses two sub-themes: promoting and communicating about town resources to the public, and communicating about resources onsite to visitors.

#### Promotion and Communication

Residents and town staff were in agreement that the Town needs to do a better job at increased public awareness of open space and recreation opportunities. Bourne’s community survey (Figure 6) indicated that most respondents received information about parks, recreation and open space areas and programs by word of mouth or the newspaper. Slightly more respondents went to social media (Facebook, Twitter) than the Town’s website for information. Comments suggested that more advertising was needed.

How do you receive your information about parks, recreation and open space areas and programs?

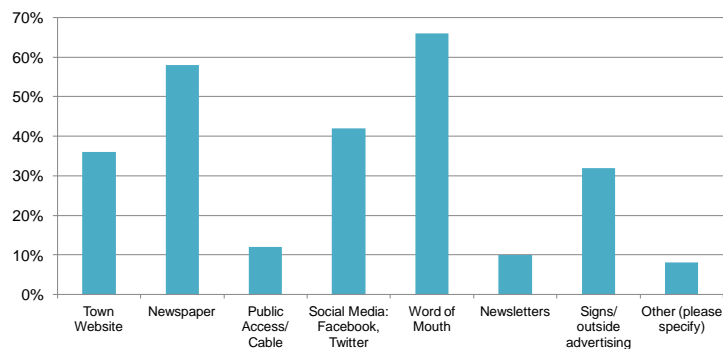


Figure 6. Community Survey: How do you receive your information about parks, recreation and open space areas and programs?(50 responses)



The SCORP's public meetings also revealed that users wanted more websites, apps, etc. to help find recreation areas.<sup>51</sup> Specifically, people are looking to technology to find water access points, long distance trails, and campgrounds.

Communication techniques in Bourne should focus on resources available online as well as those in print. Specific topics for future communication could be to clearly identify which open space resources are open to the public and which are not (for both the visitor and neighboring property owners) and better position information about open space and recreational resources online.

### **Onsite Communication**

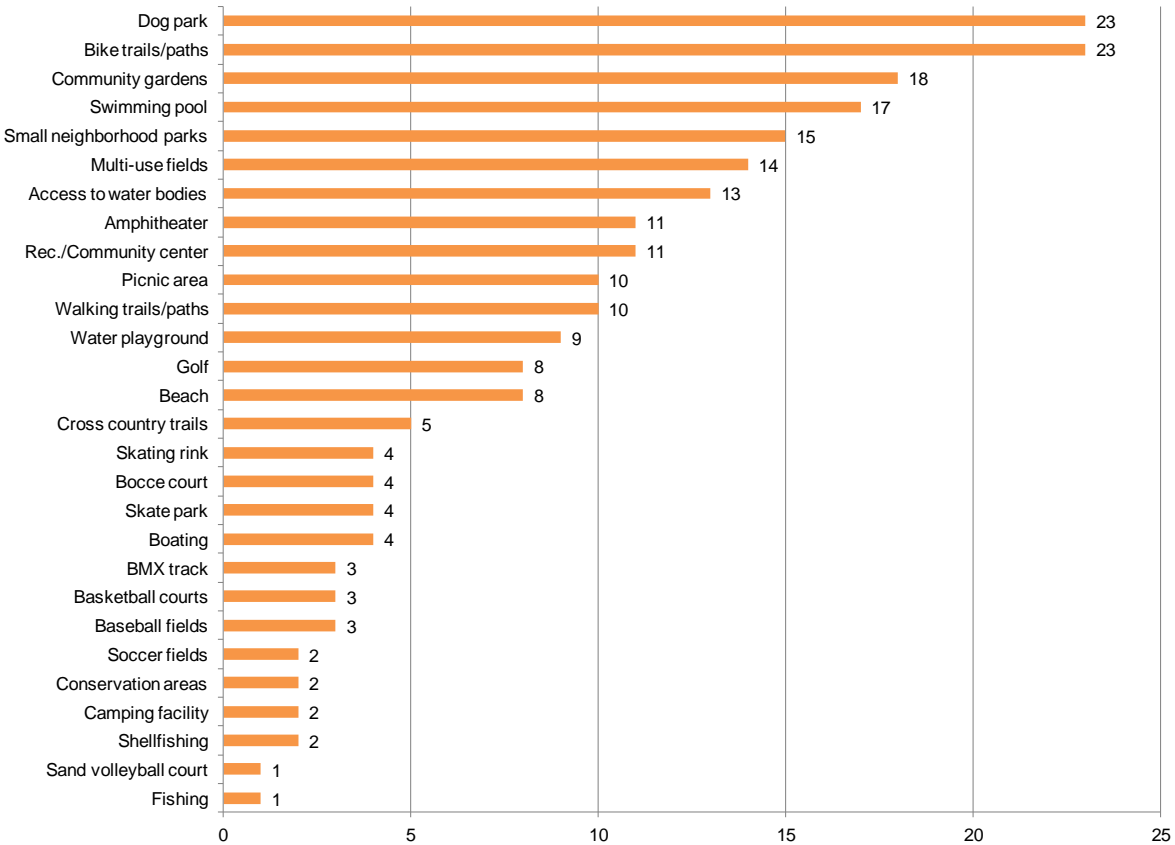
Bourne residents felt that more could be done to improve a visitor's experience at a town recreation or open space area. Improvements to consider are better wayfinding signs to a site and access points. Those that are unfamiliar with parking areas, trailheads, and property boundaries could benefit from these types of communications. Kiosks within a site offer the opportunity for public education, particularly if an open space has a very specific conservation value, such as wetlands/flood storage, agriculture preservation, or habitat protection of native species.

### **7.2.4 New and Expanded Opportunities**

Both in the Bourne community survey and during the public workshop, Bourne residents were asked to identify needs that are not being met and suggest new open space and recreation opportunities for the Town. While the sample size was small, nearly half of respondents to the community survey identified bike paths/trails as not being sufficiently provided (Figure 7). This was echoed at the public workshop. Suggestions for new facilities included a dog park and various indoor facilities such as a public swimming pool and basketball courts. Further discussion is provided below.

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<sup>51</sup> It should be noted that LWCF funds are not eligible for these types of projects.



**Figure 7. Community Survey Question: Please check 5 activities or facilities you feel are NOT provided sufficiently (49 responses).**

**Walking and Biking**

The SCORP’s survey of public officials showed high rankings for trails. Its public meetings also showed the need for more localized trails, closer to where people live and having “car-free” recreational opportunities (not having to have to drive to the recreational area). There was also a strong desire for trail systems that were town-wide and looped with longer-distance trail networks. Rail-trails were also popular as well as more bike-friendly roadways.

Bourne residents also voiced a high need for more walking and biking amenities. Residents would like to see improvements to existing trails and the development of more walking and mountain biking trails within conservation areas. Biking networks on and off-road were also cited. There was support for connecting trails to create a network within Bourne and into neighboring communities. The proposed Bourne Rail Trail was cited as an example to connect the Canal Bikeway to the Shining Sea Bikeway in Falmouth.

Residents also discussed the need for increased bike safety. Biking safety can be met with on-road amenities that can help delineate space for both the driver and cyclist and alert users, such as providing striped bike lanes and signs. Pedestrian safety can be addressed with new sidewalks that connect neighborhoods to open space and recreation resources, or connecting resources to each other.

These types of biking and walking networks also create many opportunities to make connections within the community. Making it easier to walk or bike to commercial areas to do daily activities can take cars off the road, improve air quality, promote healthier lifestyles, and improve quality of life.

### **New Spaces and Resources**

Residents showed interest in new types of recreation opportunities in Bourne, including a new dog park (which at the time of the 2017 update was being considered if an appropriate location could be found to allow that type of use) and indoor facilities for a swimming pool and/or basketball courts. The swimming pool at the Massachusetts Maritime Academy is no longer available to Bourne residents. Seniors particularly highlighted a need to replace access to this type of amenity.

A single outdoor complex was also suggested that included a multi-use field with walking trails, exercise equipment, and playground to meet the needs of many age groups and activities. Lighting was also proposed to extend usage after dark. This could also meet the need for additional soccer fields.

For all of these new spaces and resources, the Town must also consider operation and maintenance needs when adding new facilities.

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

Managing the Town's open space and recreation resources is the responsibility of four primary departments and several volunteer boards and committees. Town resources, including administration and staffing, dedicated to management and operations of these resources are the Department of Natural Resources, Recreation Department, Planning Department, and Public Works Department.

### *Department Natural Resources*

The Town of Bourne's Department of Natural Resources was established in 1972 to enforce Federal, State and Town laws, bylaws, rules and regulations pertaining to conservation, boats, dogs, fish & game, herring, shellfish, waterways and wetlands; and to manage, protect, enhance, and educate the public regarding them. Additional functions include assisting boaters in distress and responding to other maritime emergencies, maintaining Town navigational aids, operation of the Monument Beach, Taylor Point and Pocasset River Marinas, operation of the Pumpout Boat Program, maintaining the mooring registration system, maintaining the beach sticker system, maintaining the shellfish permit system, and the management and propagation of the shellfish beds.

### *Recreation Department*

The Town of Bourne employs a full time Recreation Director and an active volunteer Recreation Committee. The Recreation Director manages the department with oversight of the Recreation Committee.

According to the Town Bylaws Section 1.7.3 the Recreation Committee has numerous responsibilities, some include:

- Reviews all requests from private organization for town funding of athletic and recreation programs
- Transmits its recommendations therefore to the Selectmen and finance committee in the form of its annual budget submission

- May develop town sponsored athletic and recreation programs
- Develops, and regularly updates, a written master plan for development and coordination of recreation programs and utilization of recreation facilities for all age groups in the town

In addition, the Recreation Committee also:

- Votes on actions to be undertaken by the Recreation Director
- Discusses local organizations and volunteer groups that pertain to recreation,
- Permits field use
- Develops guidelines for volunteer organizations to follow if groups want to obtain a field permit

#### *Planning Department*

The Planning Department oversees the local regulatory process for land development. It works closely with the DNR to ensure that growth meets the goals and objectives outlined in the Town's Local Comprehensive Plan (2009).<sup>52</sup> The Town Planner oversees the department staff and provides technical support to the Planning Board. According to Section 1.4 of the Town Bylaw, the Planning Board consists of nine elected members with 3-year terms and two appointed alternate members. The Board is responsible for reviewing commercial projects, subdivisions of land, and updating the Zoning Bylaws and Subdivision Regulations. It is also responsible for recommendations to the Board of Selectmen pertaining to the dedication of land for public use, and the location and placement of public buildings and roads.

#### *Department of Public Works*

The Department of Public Works (DPW) is managed by the Superintendent, who oversees the Sanitation and Recycling Department, Vehicle Maintenance Department, and Highway Department, and sits on the Recreation Committee. DPW is responsible for managing the Town's roadways, solid waste management, and snow removal, as well as maintenance of municipal buildings, vehicles, and equipment. It is also responsible for maintenance of recreation facilities, including ball fields, parks, and playgrounds.

Management needs of these departments and local committees and boards are focused in three areas:

- Increase staffing, administration and financial resources for operations and maintenance
- Consider new regulations and policies to help protect natural resources and create open space and recreation opportunities
- Increase public awareness of environmental stewardship to protect the natural areas

### **7.3.1 Staffing and Administrative Needs**

The ability of the Town to maintain high quality open space and recreation opportunities depends on staffing, technical resources, and funding. Even with the Town's dedicated staff, meeting maintenance and operational needs on a daily basis can be a difficult with limited resources.

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<sup>52</sup> [http://www.townofbourne.com/sites/bournema/files/file/file/lcp\\_final\\_for\\_website\\_0.pdf](http://www.townofbourne.com/sites/bournema/files/file/file/lcp_final_for_website_0.pdf).

### **Improvements and General Maintenance**

General maintenance and upkeep of open space and recreational facilities covers a broad section of activities, including turf management, mowing and landscape maintenance at parks, trail maintenance, cleaning litter and debris, and addressing damaged equipment that might not necessarily require replacement. With limited staff and resources, personnel are spread thinly and have difficulty keeping up with maintenance needs. This is compounded with the impact on resources during the summer months, when usage increases with the increased summer population.

Upgrades and improvements to older facilities are also a concern. These activities include developing new turf management approaches for older ball fields, purchasing new equipment for both indoor and outdoor programming, and replacing structures in parks and playgrounds. It also encompasses building maintenance, like replacement of heating systems, roofs, and windows in older buildings to be more energy efficient. Upgrading facilities also needs to address ADA requirements. This is discussed in Section 7.2.2.

Some ways to approach needs at conservation and open space areas is to entrust volunteers. There are several local nonprofit organizations that use volunteers to help with trail maintenance and upkeep. The Town currently works closely with the Bourne Conservation Trust Collaborative. With similar goals to maintain open space, other partnerships may present themselves. Several communities have established “Friends of...” to organize users around stewardship of a property. Resources that are popular and heavily used are good candidates for these types of groups because they provide a large pool of potential volunteers. Identifying a local champion can help lead the effort.

For recreation facilities, it may require a restructuring of responsibility among the municipal departments to meet maintenance needs. Currently the DPW handles all maintenance for recreational areas in addition to other town-wide infrastructure needs. One option to consider is reestablishing the Parks and Grounds Department. Shifting the responsibility can be more efficient with dedicated staff and budget.

### **Program Staffing**

Like staffing for maintenance, staffing for recreation programming is also needed. High usage can overwhelm facilities and staff if not sufficiently supported. Of particular concern is public safety and ensuring that staff are trained and numbers are sufficient to accommodate the number of users.

### **7.3.2 Regulatory and Policy Needs**

Regulatory and policy needs for open space and recreation in general focus on those that lead to the protection of natural resources and increasing public access to recreational opportunities. Current regulations in Bourne are strong and seem to adequately protect natural resources. Interviews with town staff did not reveal the desire to make any major regulatory revisions at this time.

It was observed, however, through the public input process and by listening to community needs, the Town has an opportunity to more comprehensively examine open space and recreation resources and their link to public health and economic development. Considering that new policies could guide decision-making that could meet community needs, two areas were identified as requiring more focus:

- Take a more comprehensive look at walking and biking opportunities
- Integrate open space and recreation into economic development plans

## **Complete Streets**

Through the community survey and public workshops, residents overwhelmingly support increased opportunities to walk and bike in town. Safety was a concern, noting the absence of sidewalks and roadways that were difficult for biking. Connections are also missing between open space and recreation areas and between these areas and neighborhoods. Further, residents were also looking for walking and biking links between neighborhoods and commercial areas. By providing these connections, the Town can promote alternative ways to do daily activities, which increases physical activity and public health, and reduces congestion on local roads from these short car trips.

Developing and adopting Complete Streets principles into a town policy is one way the Town could increase walking and biking amenities. The Complete Streets principles consider all modes of transportation (walking, biking, driving, and public transportation) in a development project and integrate these modes into a larger town-wide network. Adopting these principles creates a safer way to travel through town for people of all ages and abilities. Implementing Complete Streets principles are shown to have safety, environmental, economic, and public health benefits.<sup>53</sup> Through their Complete Streets Program, the Massachusetts Department of Transportation (MassDOT)<sup>54</sup> has a variety of technical resources and funding opportunities to assist communities in developing local Complete Streets priorities and implementation. There is a three-tiered process that must be met to be eligible for funding. The Town has already begun this process and has met the responsibilities of Tier 1 by officially adopting a Complete Streets policy. For Tier 2, the Town must assess the needs, safety, and network gaps in its transportation network and prioritize projects for funding (Tier 3). Safety and network gaps between residential areas and open space and recreation resources should be part of that assessment.

## **Linking with Economic Development**

Many communities recognize the economic benefits of open space and recreation resources. They positively affect property values, add to municipal revenues, and attract businesses and new residents.<sup>55</sup> Residents have praised the Town as having done a great job in acquiring open space and recreation land to protect the natural environment and offer public access. These resources are also a popular draw to seasonal visitors and residents of nearby towns.

Resources are also especially important in contributing to growth and development in Buzzards Bay, Bourne's downtown area. With the implementation of new development tools (Growth Incentive Zone, Downtown District Zoning Bylaw, and architectural and sign guidelines), Buzzards Bay is poised for new investment. The Bourne Financial Development Corporation, Inc. (BFDC)<sup>56</sup> along with the Main Street Steering Committee are leading the redevelopment and revitalization of Buzzards Bay, and recognize the importance of parks and open space as attractive features that draw businesses and residents to the area. Projects such as the restoration of the Main Street Buzzards Bay Park can be an example of improving recreational opportunities for residents while providing assets that businesses find attractive and want to be near. Making walking and biking connections between Buzzards Bay Park and existing open space and recreational resources will create a loop that draws people into the downtown area.

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<sup>53</sup> <https://smartgrowthamerica.org/program/national-complete-streets-coalition/what-are-complete-streets/>.

Obtained January 6, 2017.

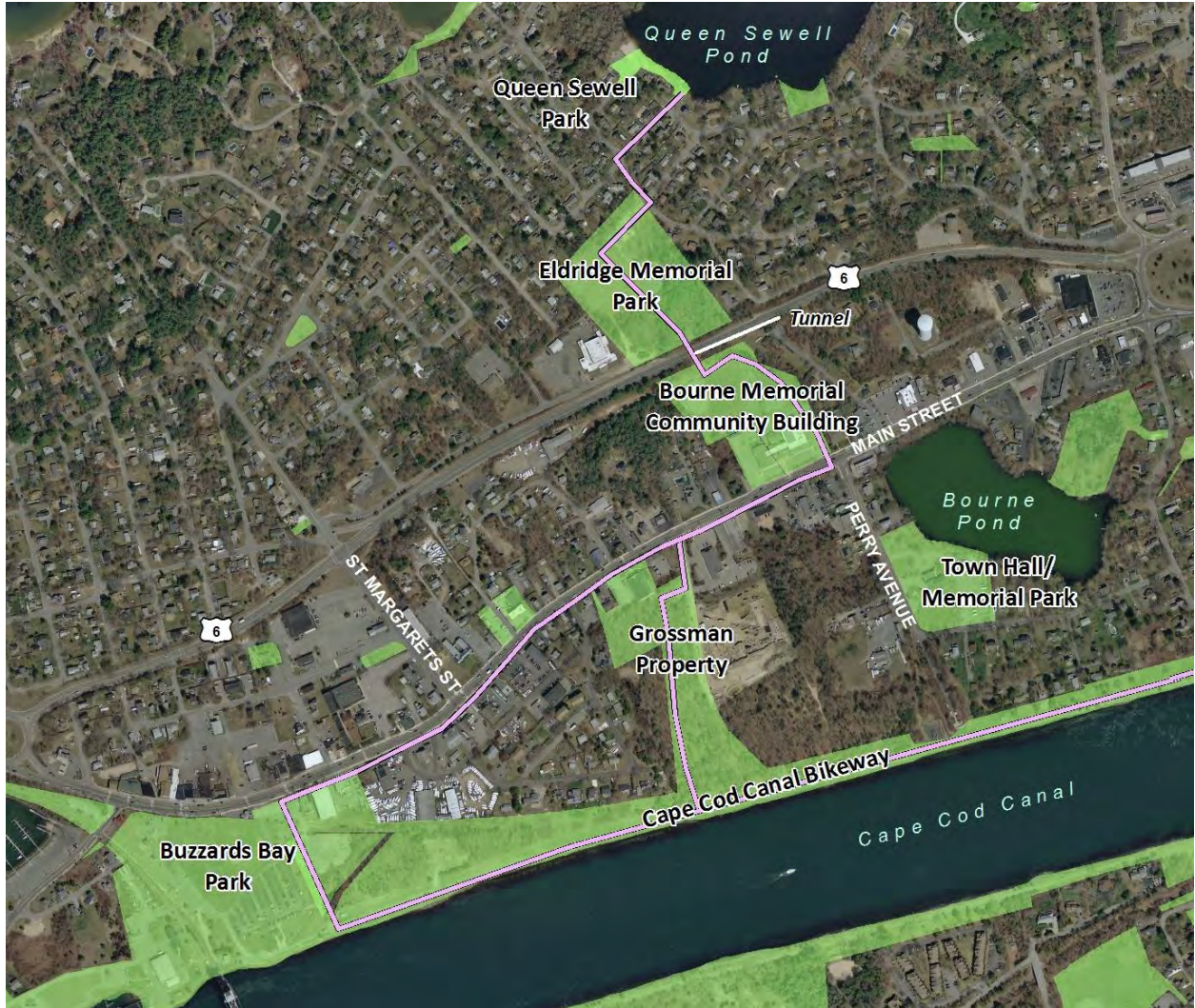
<sup>54</sup> <http://www.massdot.state.ma.us/highway/DoingBusinessWithUs/LocalAidPrograms/CompleteStreets.aspx>.

Obtained January 6, 2017.

<sup>55</sup> <https://www.planning.org/cityparks/briefingpapers/economicdevelopment.htm>. Obtained January 6, 2017.

<sup>56</sup> <http://bfdconline.org/bourne-development/>. Obtained January 6, 2017.

The loop could extend from the Cape Cod Canal Bikeway into Buzzards Bay Park or the Grossman Property (where walking trails existing and an inclusive park is being installed) and continue through to the Community Building property to Eldridge Memorial Park and Queen Sewell Park via the tunnel under Route 6.



*Possible connections between open space and recreational resources in Buzzards Bay*

The new Buzzards Bay Park can also be a revenue-generator. The Town is considering rental fees for private events at the park.

### **7.3.3 Public Awareness of Local Opportunities to Contribute**

The Town feels there is a great opportunity to educate local residents on how small actions contribute to the larger goal of protecting the natural environment and contributing to the local quality of life in Bourne. Specific areas they saw the greatest opportunities were:

### **Property Owner Tax Programs**

The community survey showed that less than half of respondents would donate or sell land (12 and 13 respondents respectively) to the Town for conservation and recreation purposes to receive possible tax credits. While this number is small, the Town still feels there may be an opportunity to educate property owners about the benefits of donating or selling their property to the Town. Possible reasons why owners may be reluctant to donate or sell may be the lack of knowledge of tax incentive programs, assume property is too small to be used for conservation and recreation purposes, or an apprehension to making into a major financial decision.

Developing a campaign that targets specific property owners with information can be a first step. Properties that are adjacent to existing resources and those that build networks can be prioritized. Education materials can focus on a property owner's rights, options for donating or selling property out-right, and for providing conservation easements.

### **Environmental Stewardship**

Environmental stewardship is the responsible use of the natural environment through conservation and sustainable practices. By showing residents how individual actions at work and at home can benefit the community at large, the Town could meet many of the OSRP objectives. Partnerships are the best approach to reaching a broad audience and can include working with neighborhood associations, schools, and environmental organizations. Topics most relevant to the Town of Bourne are:

- Emphasize "Carry in, carry out" policies at conservation and recreation areas to reduce litter
- Encourage more regular onsite septic system maintenance to minimize system failures
- Build a volunteer base to help with maintenance and programming at conservation and recreation areas
- Coordinate with DPW and volunteers to encourage recycling with receptacles at open space and recreational areas
- Educate residents about the adverse impacts of using pesticides and fertilizers, particularly on habitat, wildlife, and water quality
- Increase local knowledge of invasive species and promote use of native species with local landscaping and home center businesses
- Encourage boaters to use the Town's free pump-out facilities

Developing printed and electronic materials and incorporating topics into existing programming can help promote environmental stewardship of residents and visitors.



## 8.0 Goals and Objectives

Goals and objectives for the OSRP update were developed from evaluating a number of resources and from input at the public workshop, community survey, the Bourne Open Space Committee, and Bourne Recreation Committee. For the purposes of this project, goals were formed around a general vision or concept and objectives are more concrete ideas for accomplishing the stated goals. The action items in Section 9.0 are specific activities that make achieving the goals and objectives realistic.

### MANAGEMENT

#### **GOAL 1: Formally designate and entity or individual to help monitor and orchestrate implementation of the 2017 Open Space and Recreation Plan with approval of the Board of Selectmen and Town Administrator.**

- Have the Open Space Committee and Recreation Committees work together on the OSRP implementation initiative.
- Continue to recruit new members of the Open Space Committee who can maintain a high level of commitment to the other members and the task.
- Inform other local Boards and Committees (Conservation Commission, Planning Board, DPW, Board of Health, Department of Natural Resources, Historic Commission) of the formal designation and work with Town staff to ensure proper procedures are followed and ask for their input and assistance in implementing the plan.
- Designate two members of each committee to work with the Town Planner or Recreation Director to thoroughly research and monitor the types of grant funding listed in the body of the OSRP update so as to better target specific projects and maximize the potential to apply for and receive grant funding.

#### **GOAL 2: Improve the management of town-owned open space and recreational areas.**

- Strengthen (adequately fund and staff) the existing park functions of the DPW by taking more active role in improving maintenance of existing recreational playing fields, courts and outdoor facilities.
- Continue to coordinate town-sponsored recreational activities with the School Department's Recreation Programs.
- Consult with other management entities like the Bourne Conservation Trust for information on how they manage their land.
- Continue the Town's efforts to upgrade its mapping resources and technology to produce maps of its existing and planned resource management efforts.

### RECREATION

#### **GOAL 3: Enhance, maintain and preserve passive and active recreational opportunities for Bourne residents and visitors of all ages, abilities and interests.**

- Maintain an accurate inventory of all of the recreational facilities (playing fields, courts, playgrounds etc.) and conservation areas in Bourne.
- Maintain an accurate inventory of all the recreational programming provided in the Town of Bourne.

- Improve pedestrian access to Bourne’s open space and recreational assets, including working with the ACOE to provide additional entry points to the Cape Cod Canal, and improved signage and markings for historical buildings and features such as herring runs.
- Use the ADA section of this plan to address needs of special user groups including handicapped and elderly and provide additional facilities and programs adequate to meet the identified needs.
- Inventory available parking at all town-owned conservation/ recreation areas and add parking where needed/appropriate.
- Research and apply for additional funding sources for the maintenance and upgrading of Bourne’s parks and playgrounds.
- Address recreational needs identified in the Statewide Comprehensive Outdoor Recreation Plan. Needs include more swimming, road biking, walking, playground and tennis facilities (See Section 7.0 for more information).
- Renew the effort to work on developing a north-south bikeway to the Falmouth/Bourne boundary.

**GOAL 4: Improve public awareness and public access regarding Bourne’s Open Space and Recreation assets.**

- Improve access to information on the Town of Bourne’s website regarding the Recreation Department and programming. The website should be updated regularly and better utilized to communicate information regarding available programming, program and field scheduling and to increase the effective use of existing facilities.
- Consider creating an Open Space Committee webpage, including a point of contact. Also consider adding a map to the webpage showing trails, shellfish locations and open space.
- Consider adding seasonal beach shuttles between facilities and public parking areas.
- Complete the water access mapping effort that details water access points in Bourne for shellfishing, boat ramps and beach goers. In addition, create a brochure that also highlights parking and amenities.
- Maintain, increase and protect public access that exists for recreation to both freshwater and saltwater bodies.
- Develop an inventory of existing recreation and cultural service providers that are associated with area organizations.

**COMMUNITY CHARACTER**

**GOAL 5: Protect existing cultural and landscape assets. Such features are critical to Bourne’s self-understanding and sense of community. They provide linkages between the history and the present and help shape the Town’s unique character.**

- Continue to implement projects, which heighten public awareness of Bourne’s unique natural and cultural resources.
- Develop an approach to enhance and improve signage and landscaping at gateway locations throughout the community.
- Continue to support the Town’s guidelines for Scenic Roads. Scenic Roads are now regulated, but without clarity regarding process or intentions.
- Continue to support the local Demolition of Historic Structures regulation within the Town Bylaw Article 3.14.

**GOAL 6: Protect coastal areas and resources from adverse impacts and improve appropriate types of access.**

- Promote donation of land or easements over land in coastal areas and convey those interests to the Conservation Commission or other appropriate organizations.
- Formally designate and/or reestablish traditional rights of way to the shore.
- Aggressively seek grants and contributions through which coastal access and use of the shore can be provided and enhanced and maintain a list of specific desired projects
- The Town should continue implementing dredging projects to a point where future work will be maintenance related and therefore generally smaller in scope.

**GOAL 7: Consistently collaborate and communicate with other organizations, committees and towns regarding open space and recreation initiatives.**

- Revive the Cape Cod Commission's Greenbelt Pathways Program in Bourne and actively protect areas that are suggested components of the Cape-wide open space/greenbelt network.
- Communicate with the Plymouth, Sandwich, Mashpee and Falmouth Open Space Committees to collaborate where possible and share goals and ideas.
- Continue to work with Bourne Conservation Trust, Southeastern Wildlands Trust, Recreation Committee the Community Preservation Committee and others on projects whenever possible and to identify, acquire and manage open space to meet projected community needs. Offer support to each other on initiatives that organizations take on separately.
- Establish/foster a relationship with the ACOE and the Buzzards Bay Vitalization Association regarding establishment of the Greenbelt Pathway in Buzzards Bay using town owned property.

**OPEN SPACE AND NATURAL RESOURCES**

**GOAL 8: Continue to work with the appropriate boards and committees to implement projects which heighten public awareness of Bourne's unique natural and cultural resources.**

- Support the Conservation Commission and Town Planner to develop Resource Management Plans for Bourne's ACEC areas that are consistent with the ACEC Resource Management Plan Guidelines, June 2004 available from the MA Department of Conservation and Recreation.
- Educate Bourne residents and visitors about local open space and recreation. Educate Bourne residents and visitors about conservation and land protection, why it is important and different tools and techniques that can be used.
- Introduce Bourne's children to the Town's natural resources through school programming.
- Encourage the use of Town-owned lands for environmental education (nature walks, annual litter clean up events, etc.).
- Prepare a Coastal Resource Management Plan that includes components on shellfish habitat, navigation, public recreation and details regarding harbor areas.

**GOAL 9: Be proactive regarding sensitive environmental issues in the community.**

- Continue to monitor and participate with other communities the JBCC pollution cleanup.
- Work with the Integrated Solid Waste Management advisory committee to help monitor environmental issues that exist or arise in the future.
- Continue to seek funding for support for remediation efforts at impaired coastal embayments. For each location, studies could be undertaken to explore alternative options, including upgrading of existing on-site disposal systems, small community systems using alternative treatment technology, and further drainage system improvements.

- Work with the Pollution Task Force formed by the Board of Selectmen on their initiatives.
- Support the Town's efforts towards resolving local wastewater issues.
- Work with neighboring communities where coastal pollution involves two- town resources.
- Develop a comprehensive inventory of wetland restoration sites currently being adversely impacted and those areas that have the potential to be impacted. Circulate the inventory to all local boards and committees for their information and help in implementation.
- Encourage measures to restore altered or degraded wetlands including non- structural bank stabilization, re-vegetation, pond restoration and salt marsh restoration.
- Implement strategies to control invasive species on publicly owned land, including volunteer days to remove specific stands. Monitor conservation land, and remove non-native species before they become a problem and impact native species.
- Reduce the human/species conflicts by focusing land protection for those specialized species, particularly birds and plants noted by NHESP.

**GOAL 10: Continue to acquire additional open space, and as noted in the local LCP, preserve at least half of the remaining undeveloped land as open space for recreation, resource protection, wildlife habitat and groundwater recharge; to maintain the esthetic beauty and character of the community; and to limit the visual and fiscal impacts of over-development.**

- Give priority to those open space acquisitions within identified ACEC, Water Resource Districts, NHESP habitat areas and parcels adjacent to existing protected open space.
- If a property is already designated as open space, but does not have permanent protection work to protect the parcels in perpetuity.
- Acquire tax title lands for community purposes, including open space, recreation, affordable housing, or municipal services.

**GOAL 11: Encourage sustainable growth and development consistent with the carrying capacity of Bourne's natural environment.**

- Preserve significant natural and fragile resource areas during the design/permitting stage of developments. At the pre-application meeting discuss these resources in terms of the project. Such resources include critical wildlife and plant habitats, water resources (lakes, rivers, aquifers, shorelines, wetlands, etc...) and historical, cultural and archaeological areas, scenic roads and views, and significant landforms.
- Periodically review provisions to Bourne's regulations to ensure development is consistent with Town character and move them further to help promote good design.
- Strengthen coastal zoning to better protect sensitive features by improving buffer areas.
- Work with developers that propose developments that adjacent to land that is protected open space to prevent adverse impacts and to maximize contiguous open space.

**GOAL 12: Enhance public access to and appropriate use of existing conservation lands; establish green corridors/connections.**

- Inventory natural resources present on conservation lands, and identify the appropriate level and type of public access by developing and maintaining:
  - Data base of conservation lands and degree of public access,
  - Management plans to allow public access without harming environmentally sensitive areas, and
  - Rules and regulations pertaining to the use of public lands.

- Identify additional potential greenbelts connecting existing private/undeveloped and conservation parcels to maintain wildlife areas. Such corridors may also be used as walking/bicycling trails that are also being discussed for the Greenbelt Pathways program and the North/South bike trail, if appropriate:
  - Identify landowners of affected parcels and investigate methods of protection/public access, especially during review of land development plans
  - Involve town residents and officials in the implementation of a greenway program.
  - Contact UTILITIES regarding opportunities to utilize their rights-of-way for recreational/trail/corridor purposes.
- Regularly maintain public access to conservation parcels.
  - Establish a group of volunteers responsible for creating and maintaining trails. This group should include a member of the Conservation Commission, or at a minimum, review placement of new trails in order to avoid impacts to important natural resources, including wetlands and rare species.

**GOAL 13: Provide long-range protection of public drinking water supplies.**

- Target vacant lands within the zones of contribution of public drinking water supplies for acquisition.
- Coordinate recreation and conservation land acquisition between the Water Districts and other Town entities as much as possible to provide additional water resource protection.
- Establish a more formal community education and outreach program regarding public drinking water by partnering with Water Districts to educate households and businesses located within the zones of contribution of public drinking water supplies about household contaminants, septic systems, and other threats to water quality.
- Encourage use of environmentally friendly products.
- Enforce the provisions and performance standards of the Water Resources District overlay zoning.

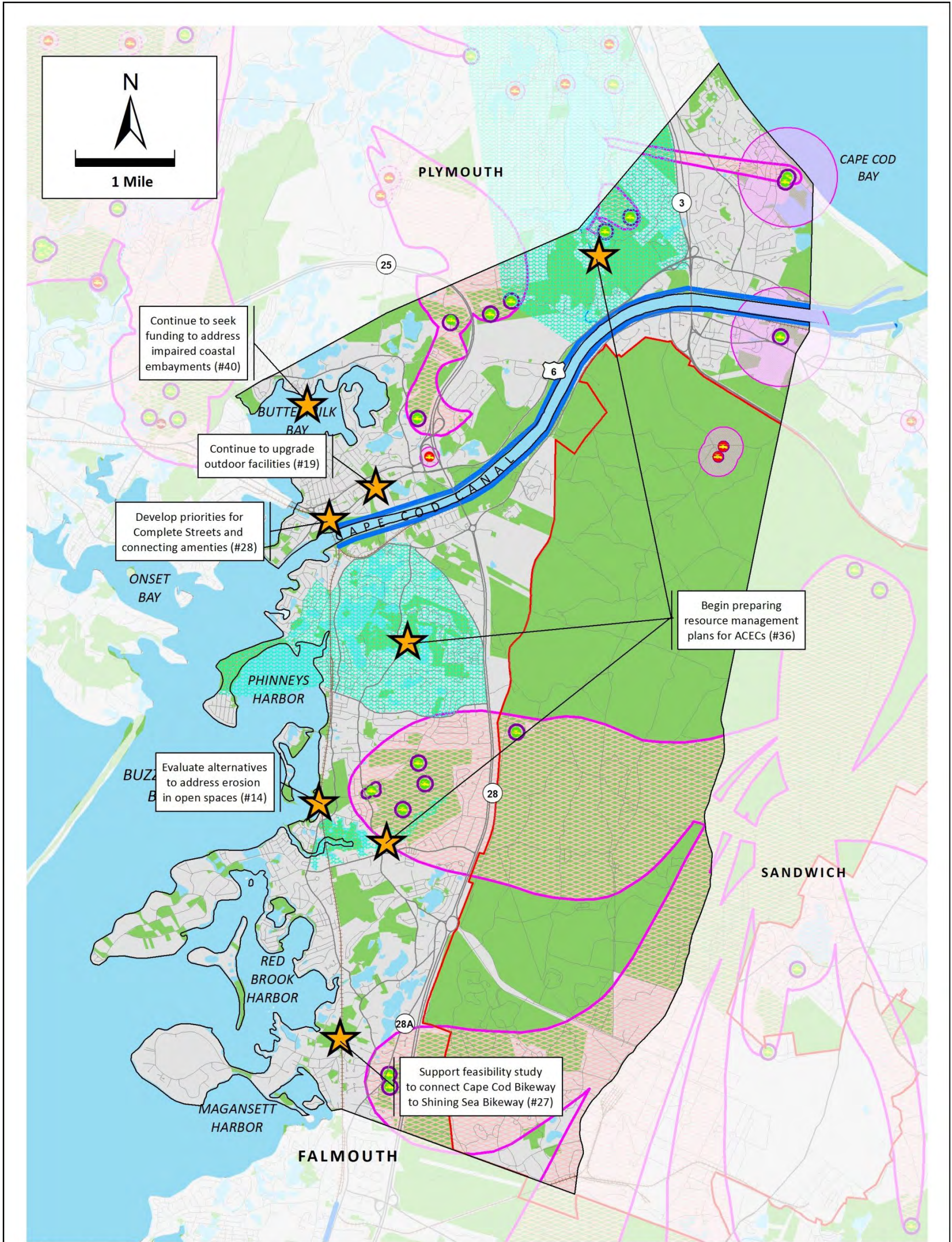
## 9.0 7-Year Action Plan

The 7-Year Action Plan is intended to guide future planning efforts to protect natural resources, acquire open space, and improve recreational opportunities for the town. The following plan is designed to implement the goals and objectives outlined in Section 8 and to address the needs identified in Section 7. The Action Plan is also intended to be consistent with other local plans, such as the town's Local Comprehensive Plan, Integrated Water Resource Management Plan, and Hazard Mitigation Plan as well as, to the extent practical, the Cape Cod Commission Regional Policy Plan. Map 10 geographically depicts the desired outcome of the proposed Action Plan.

The accomplishment of the action items identified herein require the support of numerous town departments, boards and committees, as well as private and non-profit stakeholders, and regional, state and federal agencies. The Open Space Committee will be responsible for overseeing the management and implementation of the Action Plan.

The action items are organized by year and include the responsible parties, highlighting in bold the party that will take the lead with the others playing a supporting role. A funding source has also been identified for each action item. Funding sources are further defined as follows:

- **Committee/Town Department:** the action item will be funded as part of a budgeted work program for one or more town departments or committees
- **CPA/Town Meeting:** the action item will need to be funded CPA funds via Town Meeting vote
- **Grant:** grant funding will be sought to complete the action item. Where known, specific grant resources are provided
- **N/A:** Additional funding is not needed because action item can be accomplished under existing capacity of town departments or committee.



\*GIS Data - MassGIS (Open Space & Rec Properties, Sept. 2016)

Document Path: H:\Projects\2016\16069 Town of Bourne OSRP\GIS\Maps\Map 10 ActionPlan.mxd

<b>Legend</b> Town of Bourne Joint Base Cape Cod Roads Bike Paths Railroads		ACECs <b>Public Water Suppliers</b> Community Groundwater Source Surface Water Intake Non-Community Groundwater Source Emergency Surface Water		Public & Private Open Space <b>Wellhead Protection Areas</b> DEP Approved Zone I DEP Approved Zone II IWPA		<p>Horsley Witten Group Sustainable Environmental Solutions 90 Route 6A • Unit 1 • Sandwich, MA 02563 508-833-8600 • horsleywitten.com</p>
<b>DRAFT Action Plan Bourne Open Space and Recreation Plan</b>						
Date: 8/14/2017				Map 10		

Map 10. Action Plan

Responsible Parties in **BOLD** are considered the lead in implementation, others are supporting.

## Ongoing

These actions occur on an ongoing basis, as opportunities arise.

	Action	Responsible Parties	Potential Funding Source
<b>1</b>	Propose projects to the annual Capital Improvement Program for facilities upkeep and maintenance.	<b>Recreation Department, Town Planner</b>	N/A
<b>2</b>	Continue meeting with the Bourne Conservation Trust and other management to maintain a dialog on managing land. Consider establishing an annual meeting.	<b>Open Space Committee, Community Preservation Committee, Town Planner, Conservation Commission</b>	N/A
<b>3</b>	Continue to upgrade all outdoor recreation facilities.	<b>Recreation Department, Department of Public Works, Town Administrator, Town Planner</b>	Committee/Town Department
<b>4</b>	Continue periodical review and update where needed of the recreational facilities inventory (playing fields, courts, playgrounds), recreational programming, and conservation areas in Bourne.	<b>Recreation Department, Town Planner, Open Space Committee, Conservation Commission</b>	N/A
<b>5</b>	Utilizing the ADA Self Evaluation and transition plan, develop a priority list for the next seven years of accessibility improvements to recreational and conservation areas. Forward this recommended list to the Town Planner and Community Preservation Committee and develop a plan regarding how to fund projects. Set up a schedule to review regularly.	<b>Recreation Department, Open Space Committee, Town Planner, ADA Coordinator, Commission on Disabilities</b>	N/A
<b>6</b>	Research and apply for additional funding sources for the maintenance and upgrading of Bourne’s parks and playgrounds.	<b>Recreation Director, Recreation Committee</b>	Committee/Town Department
<b>7</b>	Continue to support the Greenbelt Pathways Program in Bourne. Work to help the Cape Cod Commission, Buzzards Bay Beautification Committee, ACOE, and other organizations. Use town-owned properties and actively target areas that make sense to consider for the Cape-wide open space/greenbelt network (Greenbelt Pathway).	<b>Recreation Department, Town Planner, Open Space Committee, Main Street Committee, Recreation Committee</b>	Committee/Town Department
<b>8</b>	Continue to work with Bourne Conservation Trust, Southeastern Wildlands Trust, the Community Preservation Committee and others on projects whenever possible and to identify, acquire and manage open space to meet projected community needs. Offer support to each other on initiatives that organizations take on separately.	<b>Open Space Committee, Recreation Committee, Recreation Director, Town Planner</b>	Committee/Town Department



Action	Responsible Parties	Potential Funding Source
<p><b>9</b> Continue to seek funding for support for remediation efforts at impaired coastal embayments. For each location, studies could be undertaken to explore alternative options, including upgrading of existing on-site disposal systems, small community systems using alternative treatment technology, and drainage system improvements.</p>	<p><b>Board of Health</b>, Conservation Commission, Pollution Task Force, Wastewater Advisory Committee</p>	<p>MA Clean Water State Revolving Fund</p>
<p><b>10</b> For properties that are already designated as open space, but do not have permanent protection (temporary and limited designations), work to protect the parcels in perpetuity. This may include doing deed research or educating land owners or the Town about more permanent land protection methods.</p>	<p><b>Conservation Agent, Town Planner</b></p>	<p>Committee/Town Department</p>
<p><b>11</b> Preserve significant natural and fragile resource areas during the design/permitting stage of developments. At the pre-application meeting discuss these resources in terms of the project. Such resources include critical wildlife and plant habitats, water resources (lakes, rivers, aquifers, shorelines, wetlands, etc.) and historical, cultural and archaeological areas, scenic roads and views, and significant landforms.</p>	<p><b>Town Planner</b>, Conservation Commission, Planning Board</p>	<p>Committee/Town Department, Grants from MA Department of Conservation Resources, CPA/Town Meeting</p>
<p><b>12</b> Developments that are proposed adjacent to land that is protected open space should be configured to prevent adverse impacts and to maximize contiguous open space. Continue to utilize and improve Bourne's Cluster Development Bylaw.</p>	<p><b>Town Planner</b>, Planning Board</p>	<p>N/A</p>
<p><b>13</b> Continue to address recreational needs, which reflect those identified in the Statewide Comprehensive Outdoor Recreation Plan (SCORP). Needs include more access to launch small vessels (e.g. kayaks), swimming, road biking, walking, playground and tennis facilities.</p>	<p><b>Recreation Director</b>, Recreation Committee</p>	<p>Committee/Town Department, CPA/Town Meeting, MA Division of Conservation Services Grants</p>
<p><b>14</b> Continue to educate households and businesses located within the zones of contribution of public drinking water supplies about household contaminants, septic systems and other threats to water quality. Encourage the use of environmentally friendly products.</p>	<p><b>Board of Health</b>, Water Districts</p>	<p>Committee/Town Department</p>
<p><b>15</b> Review the potential land acquisition worksheet and evaluate if there are any vacant lands within the zones of contribution of public drinking water supplies that should be acquired. Coordinate land acquisitions with the water districts to see how further water resource protection could be undertaken. This is an ongoing action item.</p>	<p><b>Open Space Committee</b>, Town Planner</p>	<p>Committee/Town Department, MA Department of Conservation and Recreation, MA Division of Conservation Services, CPA/Town Meeting</p>

## Year 1

	<b>Action</b>	<b>Responsible Parties</b>	<b>Potential Funding Source</b>
<b>16</b>	The Open Space Committee and Recreation Committee should meet with the Board of Selectmen and Town Administrator to discuss the 2017 OSRP and its implementation.	<b>Open Space Committee</b> Recreation Committee, Board of Selectmen, Town Administrator, Town Planner, Recreation Director	N/A
<b>17</b>	The Board of Selectmen will designate parties responsible for reporting annually on the status of their respective actions in the Action Plan to the Open Space Committee.	<b>Board of Selectmen</b>	N/A
<b>18</b>	The Open Space Committee and Recreation Committee should develop a checklist of action items to accomplish that will also identify each committee's goals and organizational responsibilities for the OSRP. This checklist should be circulated annually to all entities involved in implementing action items of the OSRP to provide update on progress and any difficulties meeting objectives.	<b>Open Space Committee, Recreation Committee,</b> assistance from Town Planner and Recreation Director	N/A
<b>19</b>	Confirm that all commissions, committees, boards and pertinent town staff mentioned in this plan receive a copy of it (electronically, hard copy by request) and understand their role in its implementation.	<b>Town Planner, Recreation Director, Open Space Committee, Recreation Committee</b>	N/A
<b>20</b>	Continue to coordinate town-sponsored recreational activities with the School Department's Recreation Programs. Investigate potential sites for a designated recreational programming facility.	<b>Recreation Director, Recreation Committee, School Department</b>	N/A
<b>21</b>	Review the websites of the Town and Recreation Department and consider improvements to increase visibility and access to information about open space and recreational resources and programming.	<b>Recreation Director, Open Space Committee, Recreation Committee, Data Processing Department</b>	N/A

	Action	Responsible Parties	Potential Funding Source
22	<p>Establish a schedule with the local newspapers that serve the Town of Bourne to do a regular series (two to four a year) on Bourne open space and recreational resources. The Recreation Committee and Open Space Committee may have different schedules. Make a list of places that residents should be informed about and work with a reporter to profile a different park, playground, recreation area, beach or open space area every week. Include photos, location, how to get there and who to contact for more information.</p> <p>Use the above mentioned final list and published pieces to prepare Bourne open space and recreation amenity profile sheets. Place them all on the Town's website so people can access the information. Consider publishing them as a single document and having it available at Town Hall and the public library.</p>	<p><b>Open Space Committee, Recreation Committee,</b> Recreation Director, Conservation Commission, Town Planner, Board of Selectmen</p>	N/A
23	<p>Expand approach to improvements around signage and landscaping at gateway locations throughout the community by working with other municipal departments and committees. (May include making phone calls to key stakeholders, reviewing signage/landscaping that is appealing in other communities and starting a photo library etc.).</p>	<p><b>Open Space Committee,</b> Recreation Department, Town Planner</p>	Committee/Town Department
24	<p>Thoroughly read and review Bourne's guidelines for Scenic Roads and the Demolition of Historic Structures (Article 3.14) regulations. Meet with the Town Planner if necessary for additional explanation and suggestions regarding how the Open Space Committee and Recreation Committee can help support the Town's guidelines.</p>	<p><b>Open Space Committee,</b> Town Planner, Historic Commission, Planning Board</p>	N/A
25	<p>Promote the donation of land and conservation easements over land in coastal areas and convey those interests to the Conservation Commission or other appropriate organizations. Prioritize properties containing or adjacent to important coastal and inland natural resource habitats, starting with those identified by NHESP. Once properties are prioritized, conduct targeted outreach to property owners. This should be an ongoing action with a regular schedule.</p>	<p><b>Open Space Committee,</b> <b>Town Planner,</b> Recreation Committee, Conservation Commission</p>	N/A
26	<p>Aggressively seek grants and contributions through which coastal access and use of the shore can be provided and enhanced and develop/maintain a list of specific desired projects. Should funds become available, consider using a dedicated grant writer.</p>	<p><b>Open Space Committee,</b> Recreation Committee, Town Planner</p>	N/A

	<b>Action</b>	<b>Responsible Parties</b>	<b>Potential Funding Source</b>
<b>27</b>	Identify and prioritize town-owned properties that could benefit from ecological restoration. Seek grants to support these projects.	<b>Town Planner</b> , Conservation Commission	N/A
<b>28</b>	Evaluate alternatives to address erosion problems in open space areas and implement preferred alternative, prioritizing Monk's Park.	<b>Department of Public Works, Shore and Harbor Committee</b> , Town Planner, Community Preservation Committee, Conservation Agent, Open Space Committee	CPA/Town Meeting
<b>29</b>	Support the Bourne Transportation Advisory Committee and Cape Cod Commission and their feasibility study looking at a north/south bikeway from the Cape Cod Canal Bike Path to the Shining Sea Bikeway in Falmouth. Meet with Friends of the Bourne Rail Trail and the appropriate Falmouth and state representatives as needed.	<b>Town Planner, Recreation Director</b> , Open Space Committee, Recreation Committee	N/A
<b>30</b>	Create web pages for the Open Space Committee and Community Preservation Committee as part of the Town of Bourne's website. Use this platform to provide information about open space and recreational opportunities, such as trail maps, shellfish locations (including closures and open season information), and other open space and recreational amenities. Develop a schedule for upkeep.	<b>Community Preservation Committee, Open Space Committee</b> , Town IT Staff	Committee/Town Department
<b>31</b>	Prioritize open space areas that could benefit from trail maps, better internal wayfinding, including educational kiosks and trail markings. Research potential funding sources, including the use of "Friends of" volunteers and fundraising.	<b>Open Space Committee</b> , Town Planner	N/A

## Year 2

	<b>Action</b>	<b>Responsible Parties</b>	<b>Potential Funding Source</b>
<b>32</b>	Report on the status of responsible action items completed in Year 1 to the Open Space Committee. If action items were not completed, indicate why the action was not complete and if it should be carried into Year 2 or subsequent year. Include a review of the action items for Year 2 to identify any anticipated changes and note why.	<b>Open Space Committee, Department of Public Works, Town Planner, Community Preservation Committee, Conservation Agent, Recreation Committee, Recreation Department, Conservation Commission, Department of Natural Resources</b>	N/A

Action	Responsible Parties	Potential Funding Source
<p><b>33</b> Upgrade and improve mapping resources and technology to produce maps of its existing and planned resource management efforts through equipment and software upgrades. Contact the Cape Cod Commission and state resources to determine technical or financial resources that may be available to Bourne. Develop a schedule to update data on a regular basis.</p>	<p><b>Town Planner,</b> Conservation Commission</p>	<p>Committee/Town Department</p>
<p><b>34</b> Investigate the potential of adding lights to field used for sports to enhance their use after daylight hours have passed as well the use of synthetic turf. Include what specific fields have been evaluated and an estimated cost for lighting and turf.</p>	<p><b>Recreation Director,</b> <b>Recreation Committee,</b> <b>Department of Public Works,</b></p>	<p>Committee/Town Department</p>
<p><b>35</b> Utilizing a base map created by the Planning Department, prepare a map that illustrates where pedestrian access to Bourne’s open space and recreational assets (including additional entry points to the Cape Cod Canal) should be improved. Include points where additional signage and markings for historical buildings and features like herring runs should be added.</p>	<p><b>Town Planner,</b> Recreation Committee, Open Space Committee, Conservation Commission, Historical Commission</p>	<p>Committee/Town Department</p>
<p><b>36</b> Contact school officials and start a dialogue about what types of additional programming may be appropriate to further introduce Bourne’s children to the Town’s natural resources. Promote the use of town lands to promote environmental education and stewardship (nature walks, annual litter clean up events, etc.). If there is interest, consider costs for field trips. Work with local conservation groups and volunteers as guides.</p>	<p><b>Recreation Director,</b> Recreation Committee, Conservation Commission, School Committee, School Department</p>	<p>N/A</p>
<p><b>37</b> Begin to prepare a Coastal Resource Management Plan that includes components on shellfish habitat, navigation, public recreation, and details regarding harbor areas. Consider coastal resiliency and evaluating the impacts of climate change.</p>	<p><b>Department of Natural Resources,</b> Shore and Harbor Committee, Town Planner, Conservation Agent</p>	<p>Committee/Town Department, MA Coastal Resilience Grant Program</p>
<p><b>38</b> Develop a comprehensive inventory of wetland restoration sites currently being adversely impacted and those areas that have the potential to be impacted. Circulate the inventory to all local boards and committees for their information and help in implementation. Develop a schedule to update inventory on a regular basis.</p>	<p><b>Conservation Agent,</b> Conservation Commission</p>	<p>Committee/Town Department</p>
<p><b>39</b> Develop strategies and associated costs to control invasive species on publicly owned land, including volunteer days to remove specific stands. Prioritize conservation land remove non-native species before they become a problem and impact native species. Develop a schedule of implementation and monitoring.</p>	<p><b>Conservation Agent,</b> Conservation Commission</p>	<p>Committee/Town Department</p>

<b>Action</b>	<b>Responsible Parties</b>	<b>Potential Funding Source</b>
<b>40</b> Working with the Bourne Conservation Trust, establish a group of volunteers responsible for creating and maintaining trails. This group should include a member of the Conservation Commission, or at a minimum, review placement of new trails in order to avoid impacts to important natural resources, including wetlands and rare species.	<b>Conservation Commission,</b> Conservation Agent, Open Space Committee	N/A

### Year 3

<b>Action</b>	<b>Responsible Parties</b>	<b>Potential Funding Source</b>
<b>41</b> Report on the status of responsible action items completed in Year 2 to the Open Space Committee. If action items were not completed, indicate why the action was not complete and if it should be carried into Year 3 or subsequent year. Include a review of the action items for Year 3 to identify any anticipated changes and note why.	<b>Open Space Committee,</b> <b>Department of Public Works,</b> <b>Town Planner, Community Preservation Committee,</b> <b>Conservation Agent,</b> <b>Recreation Committee,</b> <b>Recreation Department,</b> <b>Conservation Commission,</b> <b>Department of Natural Resources</b>	N/A
<b>42</b> Inventory available parking at all town-owned conservation/recreation areas. Where actual spaces are not specified, estimate the number of cars that can be parked in a lot and note whether or not the lot is ever overflowed. Make a note of where additional parking may be needed. Consider the need to revise zoning regulations to meet need.	<b>Recreation Department,</b> <b>Town Planner,</b> Open Space Committee, Recreation Committee, Conservation Commission, Conservation Agent, Department of Public Works	Committee/Town Department
<b>43</b> Work towards developing a Complete Streets policy that will help build safety walking and biking connections between open space and recreation areas from neighborhoods (Tier 1 of Massachusetts Department of Transportation (MassDOT) Complete Street Funding Program). Continue to move forward towards developing a prioritization plan (Tier 2).	<b>Town Planner,</b> Department of Public Works	Committee/Town Department, MassDOT Complete Streets Funding Program
<b>44</b> Meet with the Plymouth, Sandwich, Mashpee and Falmouth Open Space Committees to discuss potential projects and share goals and ideas. Determine how often the committees should meet.	<b>Open Space Committee</b>	N/A

## Year 4

	Action	Responsible Parties	Potential Funding Source
45	Report on the status of responsible action items completed in Year 3 to the Open Space Committee. If action items were not completed, indicate why the action was not complete and if it should be carried into Year 4 or subsequent year. Include a review of the action items for Year 4 to identify any anticipated changes and note why.	<b>Open Space Committee, Department of Public Works, Town Planner, Community Preservation Committee, Conservation Agent, Recreation Committee, Recreation Department, Conservation Commission, Department of Natural Resources</b>	N/A
46	Begin to develop Resource Management Plans for Bourne's ACEC areas that are consistent with the ACEC Resource Management Plan Guidelines, June 2004, available from the MA Department of Conservation and Recreation.	<b>Conservation Commission, Conservation Agent, Town Planner, Open Space Committee</b>	Committee/Town Department
47	Develop strategies for educating Bourne residents and visitors about local open space and recreation areas. Work with local conservation organizations and civic groups and piggy-back existing lecture programming and events. Include topics such as why land protection is important and the different tools and techniques that can be used to protect land, such as easements and the benefits of selling and donating property to the town.	<b>Recreation Department, Recreation Commission, Open Space Committee</b>	Committee/Town Department
48	Prioritize and update potential open space acquisitions within identified ACEC, Water Resource Districts, NHESP habitat areas, and parcels adjacent to existing protected open space. Re-evaluate on an annual basis and communicate with the Community Preservation Committee and Town Planner regarding potential funding sources to assist with acquisition. This is an ongoing action item.	<b>Open Space Committee, Recreation Department, Town Planner</b>	Committee/Town Department, Grants from MA Department of Conservation Resources, CPA/Town Meeting
49	Based on the Downtown District Zoning and Architectural Guidelines, consider other areas of the Town that could benefit from such regulations as a way to ensure development is consistent with Town character and move them further to help promote good design. For example, investigate if a Transfer of Development Rights Bylaw may be appropriate.	<b>Town Planner, Planning Board</b>	N/A

## Year 5

	Action	Responsible Parties	Potential Funding Source
50	Report on the status of responsible action items completed in Year 4 to the Open Space Committee. If action items were not completed, indicate why the action was not complete and if it should be carried into Year 5 or subsequent year. Include a review of the action items for Year 5 to identify any anticipated changes and note why.	<b>Open Space Committee, Department of Public Works, Town Planner, Community Preservation Committee, Conservation Agent, Recreation Committee, Recreation Department, Conservation Commission, Department of Natural Resources</b>	N/A
51	Begin to inventory natural resources present on conservation lands, and identify the appropriate level and type of public access by developing and maintaining: <ul style="list-style-type: none"> <li>• Data base of conservation lands and degree of public access,</li> <li>• Management plans to allow public access without harming environmentally sensitive areas, and</li> <li>• Rules and regulations pertaining to the use of public lands.</li> </ul>	<b>Conservation Commission, Conservation Agent, Town Planner, Open Space Committee</b>	Committee/Town Department
52	Identify and map additional potential greenbelts connecting existing private/undeveloped and conservation parcels to maintain wildlife areas. Such corridors may also be used as walking/ bicycling trails that are also being discussed for the Greenbelt Pathways program and the Bourne Rail Trail, if appropriate: <ul style="list-style-type: none"> <li>• Indicate landowners of affected parcels and investigate methods of protection/public access, especially during review of land development plans</li> <li>• Involve town residents and officials in the implementation of a greenway program.</li> </ul>	<b>Town Planner, Conservation Commission, Conservation Agent</b>	Committee/Town Department
53	In coordination with Action Item #4 and #12, continue to coordinate town-sponsored recreational activities with the School Department's Recreation Programs. If the investigation of potential sites for a designated recreational programming facility is complete, make a recommendation to the Board of Selectmen and provide evidence.	<b>Recreation Director, Recreation Committee, Board of Selectmen</b>	Committee/Town Department
54	Based on mapping efforts in #21 and the Complete Streets Policy developed (or being developed) under #26, develop priorities for pedestrian and bike linkages between open space and recreation assets. Maintain list as funding becomes available for implementation.	<b>Town Planner, Recreation Director, Conservation Commission</b>	



## Year 6

	Action	Responsible Parties	Potential Funding Source
55	Report on the status of responsible action items completed in Year 5 to the Open Space Committee. If action items were not completed, indicate why the action was not complete and if it should be carried into Year 6 or subsequent year. Include a review of the action items for Year 6 to identify any anticipated changes and why.	<b>Open Space Committee, Department of Public Works, Town Planner, Community Preservation Committee, Conservation Agent, Recreation Committee, Recreation Department, Conservation Commission, Department of Natural Resources</b>	N/A
56	Review the provisions and performance standards of the Water Resource District overlay zoning and strengthen if needed.	<b>Town Planner, Water Districts, Board of Health</b>	Committee/Town Department
57	Secure funding and contract with a consultant to update the 2017 OSRP in Year 7.	<b>Open Space Committee, Town Planner</b>	Committee/Town Department
58	Begin the process of the OSRP update before the current one expires so that ideally, the plans will overlap and there will be no gap in a valid, state approved plan. <ul style="list-style-type: none"> <li>• Take stock of the seven years in which this plan will be active and note what worked well and what did not during implementation, and make note of what to do differently.</li> </ul>	<b>Open Space Committee, Town Planner</b>	

## Year 7

	Action	Responsible Parties	Potential Funding Source
59	Review annual reporting for Years 1 through 6 with assistance from lead responsible parties and determine what has and has not been done. Evaluate how complete each action item is and take the necessary steps to plan for how to go about specifically addressing the action item.	<b>Open Space Committee, Lead Responsible Parties</b>	
60	Continue to work on the action items that have not been completed yet or where there is still more work to do	<b>Open Space Committee, Lead Responsible Parties</b>	
61	With the assistance of a contracted consultant, begin the OSRP update process.	<b>Open Space Committee</b>	

## 10.0 Public Comments

The following comments and letters of support were provided from:

- Executive Office of Energy and Environmental Affairs Division of Conservation Services
- Bourne Board of Selectmen
- Bourne Planning Board
- Cape Cod Commission

Public input is provided in Appendices B and C.



*The Commonwealth of Massachusetts*  
*Executive Office of Energy and Environmental Affairs*  
*100 Cambridge Street, Suite 900*  
*Boston, MA 02114*

Charles D. Baker  
GOVERNOR

Karyn E. Polito  
LIEUTENANT GOVERNOR

Matthew A. Beaton  
SECRETARY

Tel: (617) 626-1000  
Fax: (617) 626-1181  
<http://www.mass.gov/eea>

December 12, 2017

Krista Moravec  
Horsley Witten Group  
55 Dorrance Street, Suite 403  
Providence, RI 02903

Re: Open Space and Recreation Plan

Dear Ms. Moravec:

Thank you for submitting the draft Open Space and Recreation Plan for Bourne to this office for review and compliance with the current Open Space and Recreation Plan Requirements. This plan was particularly thorough and has been conditionally approved through December 2024. Conditional approval will allow the town to participate in DCS grant rounds through December 2024, and a grant award may be offered to the town. However, no final grant payments will be made until the plan is completed.

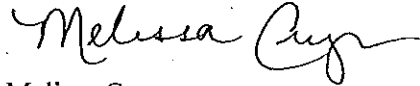
When the following issues are addressed, the plan will receive final approval:

1. Population Characteristics – please include information on the town’s population density.
2. Water Resources – the section on wetlands should discuss where they are in the town.
3. Vegetation – the public shade trees section is missing. Please add it.
4. Scenic Resources and Unique Environments – this section is missing the unusual geologic features section.
5. Environmental Challenges – sections on sedimentation and environmental equity must be added. Environmental equity refers to looking at the distribution of open space resources in the community and identifying any areas that are missing them.
6. Section 5 – please note that Self-Help and Urban Self-Help are now LAND and PARC, respectively. Also, zoning itself does not permanently protect land. The table that lists of town-owned recreation and conservation lands must be expanded to include columns on ownership, management agency, current use, condition, and recreation potential. Any Chapter 61 land, Conservation Restrictions, and Agricultural Preservation Restrictions in town should be included in this section.
7. ADA – this section is missing. Please see the OSRP Planner’s Workbook Appendix G for more information.
8. Maps – the Unique Features map is missing unusual geologic features.

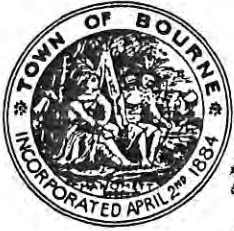
9. Public Comments – letters of review from the regional planning agency, planning board, and chief municipal officer are missing. Please send them in.

Please contact me at (617) 626-1171 or [melissa.cryan@state.ma.us](mailto:melissa.cryan@state.ma.us) if you have any questions or concerns, and I look forward to reviewing your final plan.

Sincerely,

A handwritten signature in cursive script that reads "Melissa Cryan". The signature is written in black ink and is positioned above the printed name.

Melissa Cryan  
Grant Programs Supervisor



**TOWN OF BOURNE  
BOARD OF SELECTMEN**

24 Perry Avenue  
Buzzards Bay, MA 02532

Phone 508-759-0600 ext. 1503 – Fax 508-759-0620



RECEIVED

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TOWN CLERK BOURNE

February 6, 2018

Melissa Cryan  
Division of Conservation Services  
Executive Office of Energy and Environmental Affairs  
100 Cambridge Street, 9<sup>th</sup> Floor  
Boston, MA 02114

Dear Ms. Cryan:

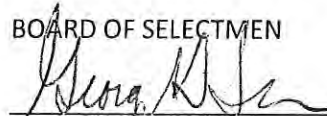
The Board of Selectmen is pleased to endorse the updated 2018 Open Space and Recreation Plan, as presented by the Open Space Committee.

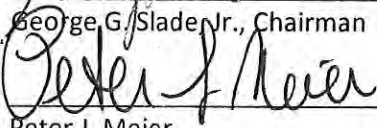
We support the goals and action items within the plan and understand that the development and implementation of the Open Space and Recreation Plan is an important step in preserving the character and quality of life in the Town of Bourne.

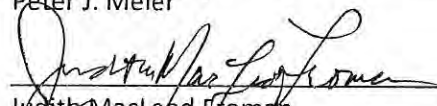
We look forward to participating in the implementation of this plan.

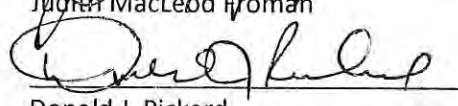
Sincerely,


BOARD OF SELECTMEN

  
George G. Slade Jr., Chairman

  
Peter J. Meier

  
Judith MacLeod Froman

  
Donald J. Pickard

  
Michael A. Blanton



# TOWN OF BOURNE

## Planning Board

Bourne Town Hall  
24 Perry Avenue  
Buzzards Bay, MA 02532  
Phone: (508) 759-0600 ex. 1335



December 18, 2017

Melissa Cryan  
Division of Conservation Services  
Executive Office of Energy and Environmental Affairs  
100 Cambridge Street, 9<sup>th</sup> floor  
Boston, MA 02114

Dear Ms. Cryan,

The Bourne Planning Board fully supports this update of the Open Space and Recreation plan. We appreciate all the hard work the Open Space Committee and Horsley Witten have put into this document. We are looking forward to implementing this plan and having it help with the update of the LCP.

Sincerely,

  
Elmer Clegg  
Chairman

atg

3225 MAIN STREET • P.O. BOX 226  
BARNSTABLE, MASSACHUSETTS 02630



CAPE COD  
COMMISSION

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(508) 362-3828 • Fax (508) 362-3136 • [www.capecodcommission.org](http://www.capecodcommission.org)

November 2, 2017

Melissa Cryan  
Executive Office of Environmental Affairs  
Division of Conservation Services  
100 Cambridge Street, Suite 900  
Boston, MA 02114

Re: Bourne Open Space and Recreation Plan

Dear Ms. Cryan:

The Cape Cod Commission staff has reviewed Bourne's Open Space and Recreation Plan and would like to recommend its approval by the Division of Conservation Services.

The plan provides a comprehensive assessment of the town's open space and recreational needs and establishes an important framework for addressing the community's goals through clear statements of land protection priorities. The plan's inventory of natural resource and recreational assets provides both a reference document and memorializes the current status of these important resources.

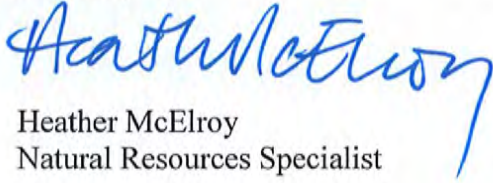
Through goals and objectives addressing natural resource and community character protection, habitat preservation, and a focus on improved land maintenance, among others, the Bourne plan promotes local goals consistent with the Regional Policy Plan (RPP). In addition, the Bourne plan includes an excellent agenda of action items with sufficient detail to guide implementation by responsible town departments and committees.

One important addition we recommend the town consider is reference to the Cape Cod Area Wide Water Quality Management Plan Update ("208 Plan"). The 208 Plan is a county plan that works at the watershed level to identify solutions for managing the impacts of excess nitrogen coming from septic systems, fertilizer, and stormwater. Towns will have to work within their own communities, and with neighboring communities where they share the watershed to an embayment, to identify solutions to improve water quality. Some of the alternative solutions identified in the 208 Plan include approaches that complement the goals in the Bourne OSRP, including implementation of green infrastructure, acquisition of open space, and growth management.



The Bourne OSRP is a comprehensive document that will serve the town well in guiding open space and recreation management and decision-making. We recommend your support of this plan, and appreciate the opportunity to comment.

Sincerely,



Heather McElroy  
Natural Resources Specialist

Cc: Richard Conron, Bourne representative to the Cape Cod Commission



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CAPE COD  
COMMISSION

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To Krista Moravec, Horsley Witten Group  
From Cape Cod Commission Staff   
Date November 2, 2017  
Re Bourne Open Space and Recreation Plan draft, 2017

Cape Cod Commission staff have reviewed the OSRP, and find it to be a well prepared, comprehensive document, and consistent with the Regional Policy Plan. We hope the Open Space Committee finds the following notes helpful in clarifying and/or correcting certain parts of the plan. We'd be happy to answer any questions that you or the committee may have.

Pg. 12, JBCC: last sentence of first paragraph on JBCC - "Sagamore Lens" does not refer to the entire aquifer. The Sagamore Lens of the Cape Cod Aquifer is a valuable water supply to the Upper Cape.

Pg. 23, CC RPP: second bullet under natural resources - How are discharge areas considered resources? Consider saying "Groundwater defined watersheds that discharge to coastal embayments."

Pg. 24, DCPCs: might note that a DCPC is a tool available to towns to provide a time-out to conduct planning and analysis, and adopt appropriate regulations for a district in one or more towns. Most of the DCPCs on Cape Cod, including the Bournedale DCPC, were nominated by the community, and not by the CCC. Your draft is accurate in noting that the DCPC must be established by county ordinance through a vote of the Assembly of Delegates.

Pg. 24, Regional Open Space: first bullet, consider rephrasing, e.g.: "Seek to protect Significant Natural Resource Areas (SNRA) through local bylaw mechanisms like mandatory clustering, increased lot sizes and overlay districts, where appropriate. SNRAs are areas identified by the CCC, that presently provide a system of wildlife habitats and corridors across the Cape. Areas are shown on the Cape Cod SNRA Map in the Regional Policy Plan and include wellhead protection areas, rare species habitat, priority natural communities, critical upland areas, among others."

Pg. 25, Cluster bylaws: consider clarifying the text here, as it could be read to imply that the RPP supports perimeter buffer strips as part of the open space. The RPP encourages clustering lots outside of the most sensitive resource areas, and providing open space in a more meaningfully-sized patch, with a shared access.

Pg. 37, Water and Sewer: References to "sewer" do not specify between sanitary sewer or storm sewers. Consider specifying throughout.



Pg. 41, Regulatory Tools: second bullet, Water Resource Overlay District - There are no surface water sources for public water supply in the Town of Bourne. Consider adding "preventing contamination of surface waters" as a separate thought/goal of the District.

Pg. 50, Ponds and Lakes: first paragraph – Define "Great Pond" - not defined elsewhere in the document, and (second paragraph) define Interim wellhead protection area (defined on page 57). Consider a table or map with the named ponds.

Pg. 51, first paragraph – define "good" shellfish beds (fit for consumption, productive?). second paragraph – change MDF to DMF (Division of Marine Fisheries). Last sentence "increased year-round residents" - the report earlier describes a downward population trend in Bourne. Is it that the full-time/seasonal ratio has been rising?

Pg. 55, Water supply, first paragraph - There is no mention of MassDEP's Source Water Assessment & Protection Program. The SWAPs appear as sources in this document's Bibliography, but it might be worth mentioning within the document itself. Does "potential yield" mean "safe yield"? And, since you identify the yield of the Plymouth Carver aquifer, can you do the same for the Sagamore lens? And, last paragraph, does "water contribution areas" mean "zones of contribution"?

Pg. 58, Bourne Water District - Elaborate on Upper Cape Regional Water Supply Cooperative (not mentioned elsewhere in the document).

Pg. 60, Wetlands: Consider cranberry bogs – are bogs cultivated or lying fallow, is there upland associated with bogs that may be vulnerable with changes in the cranberry industry, can you map cranberry bogs?

Pg. 59, Flood Hazard Areas: Consider adding reference to the recently completed Hazard Mitigation plan. Also, consider making the link between open space and removing development from hazardous coastal areas where opportunities arise.

Pg. 79, Pesticide and Fert application: first paragraph - septic system "overflow" implies septic system failures – consider changing to general septic system leaching. And in the last paragraph in this section, change disposal systems to septic systems.

Pg. 80, Groundwater Contamination: First sentence in this paragraph doesn't make sense and should be reworded.

Pg. 97, Public Input process: first paragraph is incomplete. The third paragraph may need to be updated to reflect the public input at the two workshops described in the following paragraphs. Also, consider adding, either here or under the next section, how the goals were identified – public comment and survey results reviewed and considered by the open space committee? Others?

Last bullet on this page, goal is to work with neighboring towns, *Cape Cod*, etc. Do you mean Barnstable County government, or CCC? Or with the network of town and regional conservation trusts?

Pg. 100, Coastal and Inland Habitat protection: In the second paragraph, you describe the work of the MEP and the need for the town to address water quality in its coastal embayments. It would be appropriate to mention here, or elsewhere in the document where it might fit, the Cape Cod Commission's effort to address coastal water quality impairment through the 208 Plan.

<http://www.capecodcommission.org/index.php?id=491&maincatid=76>

The 208 Plan works at the watershed level to identify solutions for managing the impacts of excess nitrogen coming from septic systems, fertilizer, and stormwater. Towns will have to work within their own communities, and with neighboring communities where they share the watershed to an

embayment, to identify solutions to improve water quality. Some of the alternative solutions identified in the 208 Plan include approaches that complement the goals in the OSRP, including implementation of green infrastructure, acquisition of open space, and growth management.

Pg. 101, Table 18, first criteria: define watershed protection zone and recharge zone – are these Zones I and II? And the Buildings Present criteria, is the presence of buildings on a parcel a high priority or a low priority? Undevelopment is certainly an important consideration, but just checking that weighting here is as intended. And maybe related, the weighting for “Unique, Townwide, Historic, or Public Value” seems to be the reverse of what one would expect.

Pg. 117, Goal 13, next to last bullet: this item suggests removing unauthorized and/or non-water supply related uses within the various zones of contribution... what is the mechanism for doing this? Undevelopment as opportunities arise? And Zone IIs are very large areas...

Pg. 128, Action 55: suggest relocating this to the “ongoing actions” table.

**From:** Heather McElroy [hmcclroy@capecodcommission.org]  
**Sent:** Wednesday, October 18, 2017 8:58 AM  
**To:** Krista Moravec  
**Subject:** FW: Bourne OSRP

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Hi Krista,

I thought I would forward on these comments from our historic preservation specialist now, to give you time to consider and make changes. I have not yet conducted my review, and am also waiting on comments from our water resources department. Will forward those on when ready.

Thanks,

Heather

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**From:** Sarah Korjeff  
**Sent:** Tuesday, October 17, 2017 2:43 PM  
**To:** Heather McElroy <[hmcclroy@capecodcommission.org](mailto:hmcclroy@capecodcommission.org)>  
**Subject:** RE: Bourne OSRP

Hi Heather,

Here are my comments (see below) on Bourne's draft Open Space and Recreation Plan. There is some mis-information in the sections on historic resources that should be fixed. My other comments are suggestions.  
 Sarah

Sarah Korjeff  
 Preservation Specialist/Planner  
 Cape Cod Commission  
 3225 Main Street  
 Barnstable, MA 02630  
 508-362-3828

#### Bourne Open Space and Recreation Plan -- comments related to Historic Resources

Section 3.1.2 Bourne – A town of Villages: This section could be made clearer by describing both the past history of the villages and also how they look today. It may be helpful to use some of the historical descriptions from MACRIS area forms (completed by PAL circa 2000 and available on-line), including Bournedale, Sagamore Beach, and Sagamore. The references to Cataumet should be made consistent – the first bullet point says “used to be called South Pocasset”, but the next paragraph says “now known as South Pocasset.”

Section 3.1.3 National and State Register of Historic Places: While the map of historic resources (Map 7, Unique Features) on page 74 is correct, the narrative in this section has several errors. Bourne currently has 6 properties on the National Register of Historic Places – Wing's Neck Light, George Briggs House, Town Hall, Jonathon Bourne Library, Bournedale School, and Bourne High School. Cleveland Ledge Light is located in Falmouth, so should not be included. In addition to National Register buildings, the State Register of Historic Places lists the Swift Memorial Methodist Episcopal Church at 10 Williston Road in Sagamore, which is protected by a Preservation Restriction.

Section 4.6.1 Archaeological and Historic Resources: As noted for Section 3.1.3 above, the narrative is incorrect and should be changed. It is appropriate to reference the large number of historic properties that have been inventoried and are on file with MACRIS (Massachusetts Cultural Resource Information System), but also worthwhile to note that

there are no local or National Register historic districts in Bourne. The only protection offered to most properties is through the town's Demolition Delay bylaw.

Section 4.6.2 Cultural Resources: In the section on Route 6A, it would be useful to describe the portion of Route 6A that passes through Sagamore Village in addition to the general description of areas outside of Bourne. A Route 6A Corridor Management Plan Update was issued in June 2010. Both the original report and the update note the significance of the Keith Mansion and cultural landscape in the village of Sagamore.

In the section on the Bourne Railroad Bridge, also note the other Canal bridges. The Massachusetts Historical Commission has formally declared the Bourne Bridge and the Sagamore Bridge are eligible for listing on the National Register of Historic Places (finding is available on MACRIS).

In Table 18, Bourne Land Acquisition Prioritization Criteria – the points seem to be reversed for properties with Unique/Townwide/Historic/Public Value, where High value gets 5 points, while Low value gets 20 points. This should be checked.

Action item 23 supports the town's goals of protecting Scenic Roads and Historic Structures. The town should consider expanding this recommendation to identify properties on scenic roads and in historic areas where preservation of open space would also preserve significant scenic and historic resources.

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