



# Cape Cod National Seashore Integrated Parking & Transit Study: *Existing Conditions Report*



DRAFT March 2009

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# 1 Project Overview

Maintaining access and visitor services in light of projected coastal erosion is a key element of the General Management Plan of the Cape Cod National Seashore (the Seashore) and also a concern of towns in the Lower/Outer Cape. In 1978, the Seashore's Coast Guard Beach experienced a significant erosion event in which its parking area was lost in a powerful storm. To maintain access, the Seashore looked inland to develop the Little Creek Parking Area and provide shuttle service to the beach. The shuttle initially was unsuccessful due to slow service but has managed to achieve an efficient, convenient schedule and is now well received by visitors. Other NPS beaches have also been made accessible by alternative transportation; Race Point and Herring Cove in Provincetown are accessible by the Provincetown-Truro Shuttle and the Provincelands bicycle trails. However, further access improvements could benefit visitors and help protect resources, and there are future threats to access in terms of coastal processes. Under current conditions, the Seashore expects to lose a significant portion of the parking area at the Nauset Light Beach within 15-20 years. Furthermore, the Seashore recognizes that many of the Lower/Outer Cape towns are experiencing similar problems are occurring elsewhere on the Lower/Outer Cape beyond the park's boundaries.

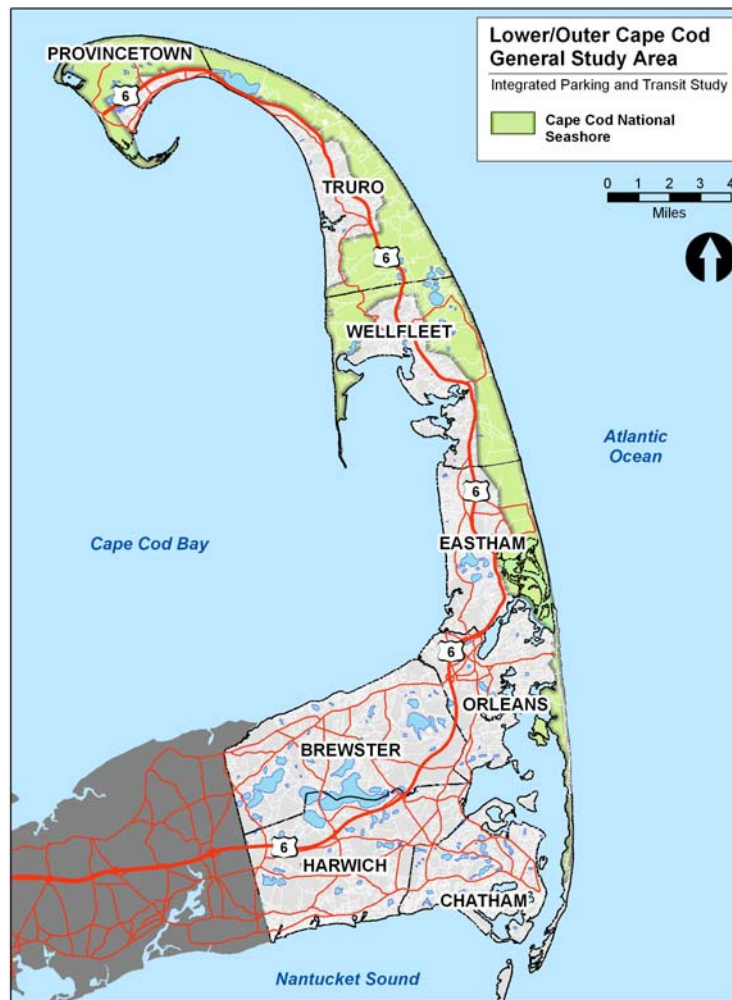
In response to these concerns, the National Park Service (NPS) has hired the U.S. Department of Transportation's Volpe National Transportation Systems Center (the Volpe Center), located in Cambridge, MA, to conduct a study. The study will assess current and future beach access conditions, including visitor demand and erosion potential, on the Lower/Outer Cape over a 25-year period, and identify potential ways to maintain and improve access. The study will include consideration of park-and-ride facilities, replacement Seashore and town beach parking, and expanded or new shuttle services as needed. The final product will be recommendations for how the Seashore and its partners can move forward with a feasible, integrated parking and public transportation program.

This report is a draft of the Existing Conditions chapter for the final report. The chapter is organized into three sections. The first section introduces the Lower/Outer Cape and the Seashore and defines relevant characteristics and factors that will be important to the study, such as coastal processes, tourism and visitation, and resource management. The second and third sections cover the main two components of the study. The second section assesses the demand for and erosion risk of beach parking areas. The third section provides an overview of the existing road network, transit systems, and non-motorized transportation networks. This will provide the transportation context for evaluating and improving access to beaches by transit and other alternative transportation. Some data collection efforts are still ongoing so information in some areas is incomplete.

## 2 Study Area

This study involves the National Park Service’s Cape Cod National Seashore (the Seashore) and eight incorporated towns of Barnstable County, comprising what will be referred to as the “Lower/Outer Cape”. Portions of six of these towns – Chatham, Orleans, Eastham, Wellfleet, Truro, and Provincetown (from south to north) – are encompassed within Cape Cod National Seashore. Two additional towns – Harwich and Brewster – do not have any land or waters within the park’s boundaries. Harwich and Brewster do, however, act as a gateway to the Seashore and the other towns, as they are located on U.S. Highway 6, the major thoroughfare for the peninsula, and are connected by bus transit to the north. Each of these eight towns manages a number of beaches and is strategically significant with regard to accessing the Cape Cod National Seashore and providing additional amenities for residents and visitors.

**Figure 1**  
General Study Area



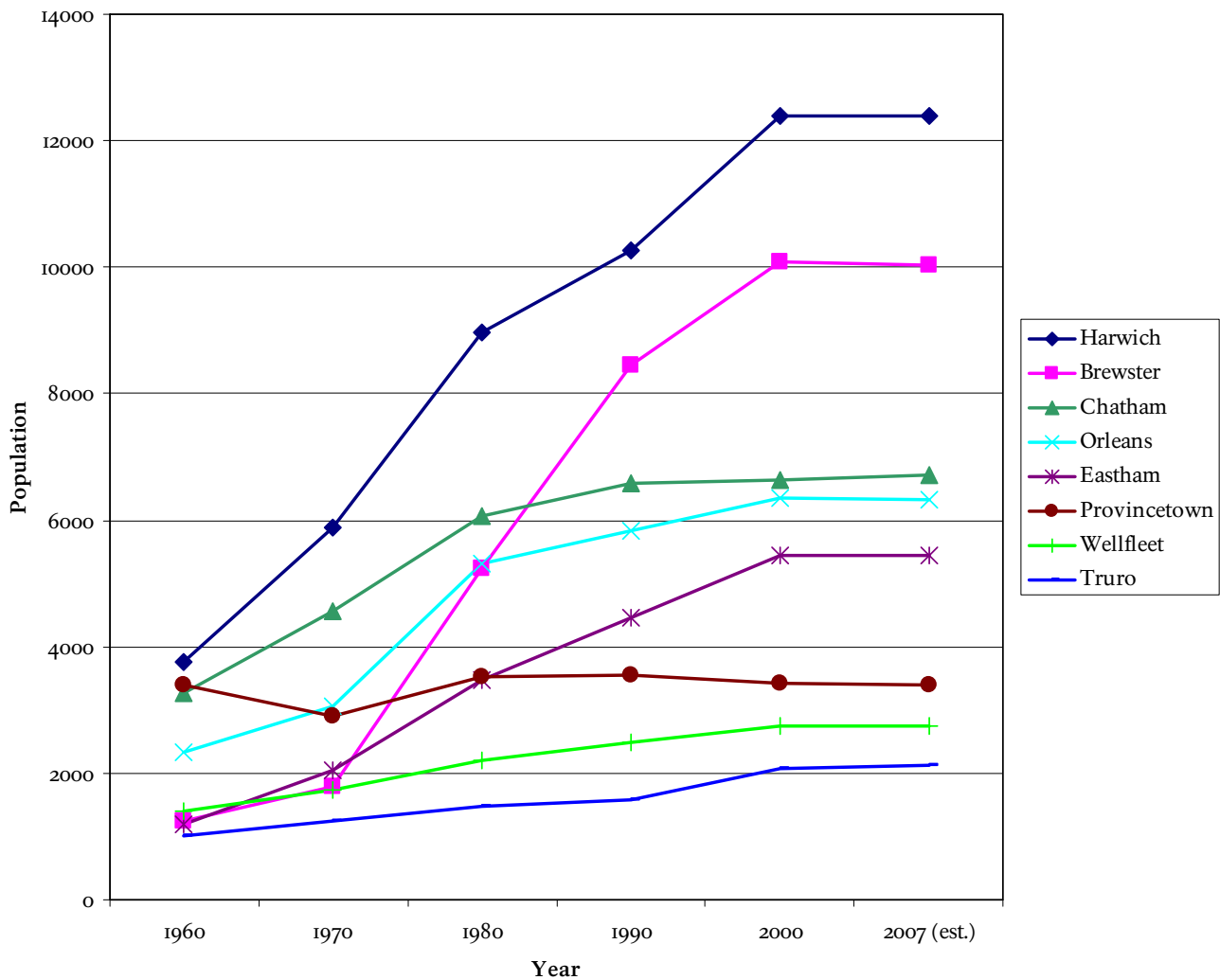
### 3 Context

#### 3.1 Lower/Outer Cape Towns

Chart 1 highlights the populations of each of these towns since 1960 as estimated by the U.S. Census. While estimates suggest that the current decade has seen a slowdown in population growth on the Lower/Outer Cape, it is clear that since 1960, each town has experienced significant growth of its permanent population. An increase in the number of permanent residents has placed increased demand on the transportation networks and services and on the beaches.

**Chart 1**  
**Lower/Outer Cape Town Populations**

Source: U.S. Census



While each town has a unique set of characteristics that distinguishes it from the others, there are several common themes throughout the Lower/Outer Cape.

## **Beaches**

Every Lower/Outer Cape town has at least one beach within its limits, and most beaches are visited heavily throughout the summer months. In addition to the tourism economy that beaches support, beach parking fees provide a source of revenue to the towns and enable towns to provide lifeguards, facilities, and facility maintenance. Towns determine which beaches are accessible to whom (residents, in-town visitors, out-of-town visitors) and which beaches have parking fees. These decisions impact visitor choices and traffic patterns throughout the Lower/Outer Cape.

## **Tourism**

Cape Cod is vacationland. In addition to a large number of second homes, the Cape welcomes visitors with numerous rental homes, hotels, bed and breakfasts, campgrounds, restaurants, shopping districts, recreational facilities, and other tourist amenities. Tourism is the largest industry on the Cape, and each town relies heavily on the income generated by out-of-town visitors. The towns and the Cape Cod National Seashore depend on each other for sustaining tourism, with the Seashore providing natural amenities and activities, and the towns providing their own natural amenities as well as lodging and other conveniences and attractions.

## **Seasonality**

While a relatively small percentage of residents remain on the Cape year-round, the influence of tourism results in a dramatic difference in summer population versus winter population. Visitation estimates vary and are based on a variety of measures – from traffic counts to lodging occupancy. However, a 2000 Cape Cod Commission report, estimated that over five million tourists visit Cape Cod each year and nearly two thirds (65 percent) of all visitors arrive in the summer and early fall. Over the past decade, the Cape Cod National Seashore has averaged between four and five million visits annually, with 60 percent of those visits coming during the peak season of June through September. Ninety percent of housing units on the Lower/Outer Cape were categorized as seasonal, recreational, or occasional use by the 2000 Census. These units include beach cottages and interval ownership units, sometimes called shared-ownership or time-sharing condominiums. The combination of seasonal residents and visitors can result in significant increases in populations for the towns. The Cape Cod Times estimates that the towns of the Lower/Outer Cape increase in size by two to ten times the year-round population. The increased population in the summer, by seasonal residents and summertime visitors, significantly strains infrastructure, while many of the same issues are virtually non-existent during the off-season.

## **Erosion and Coastal Processes**

Due to its geological formation and its maritime characteristics, Cape Cod's coastline is ever-changing. Like all coastal areas, it is highly susceptible to strong wind and wave action. Each town and the Seashore are experiencing effects of these coastal processes.

## **Protected Lands**

A large portion of the land on Cape Cod is under the jurisdiction of town, state, county, or federal government or private trust, primarily for the protection and preservation of natural

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\* NPS Public Use Statistics Office, <http://www.nature.nps.gov/stats/>

resources for the enjoyment of such land by residents and visitors today and in the future. These lands are often considered amenities, but their regulation also places constraints on growth and land development; a tension exists between land management goals and development rights. Within the Seashore boundaries, in particular, there are complex property issues due to the presence of private residences within the Seashore's boundaries.

#### **Limited Water**

In addition to the constraints created by protected lands, growth on Cape Cod is also determined by its sole source aquifer and the resulting limited availability of fresh water. Consequently, groundwater and run-off issues are essential considerations in any development proposal.

#### **Congestion and Limited Access**

U.S. Highway 6 is the only continuous north-south route serving the Lower/Outer Cape and is also the only access route from the Upper Cape. Consequently, it bears the load of almost all intra-town travel. During the summer, due to the influx of out-of-town visitors, Cape Cod's roads and highways experience infamous congestion.

### *3.2 Geology<sup>\*†</sup>*

Cape Cod, the world's largest glacial peninsula, is largely composed of materials deposited by retreating glaciers approximately 15,000 years ago. The resulting dynamic landform consists of windswept beaches and forested uplands, sheer bluffs and rolling dunes, freshwater ponds and saltwater marshes. For its entire existence, Cape Cod's coastline has experienced significant physical change, a result of inevitable coastal processes shaped by winds, waves, tides and currents. In recent times, it has been recognized that human efforts to minimize coastal change have proven ineffective and may even create or exacerbate problems elsewhere along the coast. Sea-level rise is another issue that will likely impact the Cape's low-lying areas, but the relative rise in sea level will depend on subsidence and other coastal processes. Scientists do not yet know the impact that climate change will have on storm frequency or severity.

Much of the Lower/Outer Cape's coastline is defined by bluffs and dunes. Bluffs, also known as sea cliffs, are glacial escarpments that are stable on the surface but prone to erosion and undermining. Dunes are sensitive sand hills whose stability relies on fragile vegetative systems. Dunes often act as a buffer for marshes and lowlands, but when stability is compromised, they migrate, leaving some areas unprotected and other areas covered in sand.

The Cape Cod bluff runs nearly continuously along the eastern coast from the NPS Coast Guard beach to Head of the Meadow. Cape Cod's erosion experts state that the oceanside bluff loses approximately 8/10 of a meter (or roughly three feet) of land to erosion annually. In some cases, the bluff may lose much more than three feet at a time, but after a significant erosive event, the land may stabilize for many years before becoming vulnerable to erosion again.

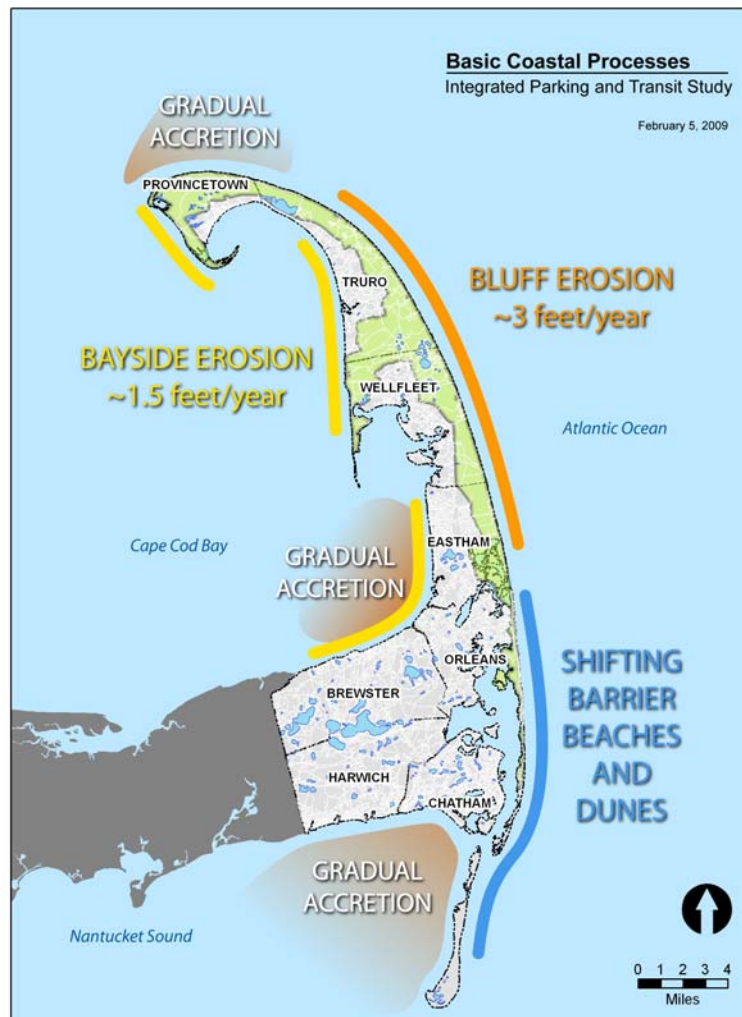
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<sup>\*</sup> "Cape Cod Landforms and Coastal Processes." Cape Cod Cooperative Extension and the Woods Hole Oceanographic Institution Sea Grant Program.

<sup>†</sup> Giese, Graham and Mark Adams. Telephone interviews. December 11, 2008 and January 26, 2009.

Figure 2 illustrates some of the major coastal processes that are occurring on the Lower/Outer Cape. This study is concerned with site-specific erosion issues at each of Lower/Outer Cape's established beach sites, and their effect on beach access and parking. At the same time, however, it is important to recognize that depending on a beach's location, multiple short-term and long-term coastal processes are taking place at each beach site. For example, in addition to erosive forces, a few areas are also experiencing accretion, or the gradual buildup of land caused by the steady deposition of sand and sediment by ocean currents. Thus, both erosion and accretion are taking place on different time scales at several beach sites in these areas.

**Figure 2**  
**Basic Coastal Processes**



### 3.3 Cape Cod National Seashore

The U.S. Congress authorized the Cape Cod National Seashore (the Seashore) in 1961. According to the park's General Management Plan, the Seashore's authorization "was an attempt to conserve a fragile and precious resource that overlays six established communities so



that residents and visitors alike may enjoy it for generations to come.” The Seashore’s purpose is to “preserve the nationally significant and special cultural and natural features, distinctive patterns of human activity, and ambience that characterize the Outer Cape, along with the associated scenic, cultural, historic, scientific, and recreational values,” as well as “provide opportunities for current and future generations to experience, enjoy, and understand these features and values both the natural environment and the cultural character of the Cape”.<sup>†</sup> Based on these notions, NPS is charged with protecting both the natural and cultural or recreational resources of the Cape, two goals that are deeply interconnected but not always compatible.

Cape Cod National Seashore encompasses over 43,500 acres of wetlands, dunes, woods, and shoreline. It is comprised of lands and waters in six incorporated towns: Provincetown, Truro, Wellfleet, Eastham, Orleans, and Chatham, from north to south. Over the past decade, the Seashore has averaged between four and five million visits annually, with 60 percent of those visits coming during the peak season of June through September.<sup>†</sup>

In addition to recreational facilities, historic sites, and interpretive centers, the Seashore manages six beaches: Coast Guard Beach (Eastham), Nauset Light Beach (Eastham), Marconi Beach (Wellfleet), Head of the Meadow Beach (Truro), Race Point Beach (Provincetown), and Herring Cove Beach (Provincetown).

Below is a list of management objectives for the Seashore, as defined in the Seashore’s General Management Plan.

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<sup>†</sup> Cape Cod National Seashore General Management Plan. National Park Service. 1998.

<sup>†</sup> NPS Public Use Statistics Office, <http://www.nature.nps.gov/stats/>

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## Management Objectives of Cape Cod National Seashore

Source: Cape Cod National Seashore General Management Plan (1998)

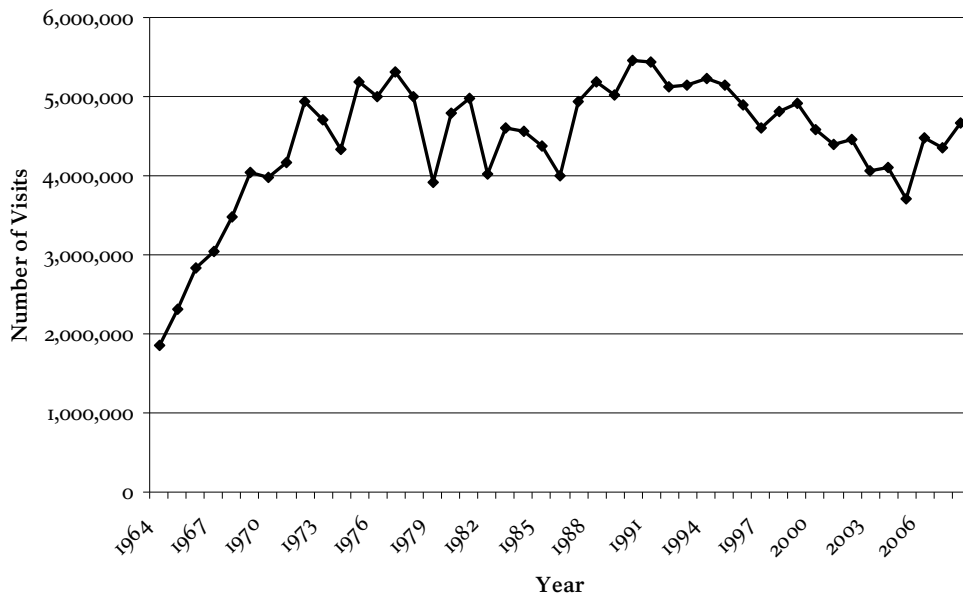
- In concert with local, regional, and state agencies, manage the natural and cultural resources of the national seashore to sustain the distinctive character of the Outer Cape, a resource held in common among the six towns and the people of the United States.
  - Seek to understand, foster, and maintain native biological and physiographic diversity to sustain thriving, dynamic natural communities and systems. Within these standards protect water resources through a cooperative, balanced approach to water use management.
  - Encourage a commitment to the stewardship of the buildings, places, activities, and artifacts of Cape Cod that best exemplify its traditional character, and conserve them to ensure their continuing contribution to the culture of Cape Cod, in collaboration with local communities.
  - Allow natural processes to continue unimpeded in natural zones, including the action of wind and water, and neutralize the effects of human intervention where it has adversely affected natural systems, with consideration for public safety.
  - Provide opportunities for a diverse range of quality experiences that are based on the resources and values of Cape Cod, with consideration for sustainable practices and traditional uses, and that are consistent with the purposes of the national seashore.
  - Stimulate, and then satisfy, a public desire to understand the natural and cultural resources and the history and sociology of Cape Cod through the primary interpretive themes identified for the national seashore.
  - Respect and cooperate with the residents of the Outer Cape, with an emphasis on collaborative decision making and problem solving to address common Outer Cape issues and to promote a stewardship ethic for the national seashore.
  - Consult with a broad variety of interested parties, or stakeholders, to generate effective public participation and better-informed decisions.
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### 3.4 Visitation

As mentioned above, the Cape Cod National Seashore has reported on average between four and five million visits annually for the past three decades, with over half of visits occurring during the summer. The Seashore counts vehicles entering a number of its facilities and beaches. This data serves as one indicator of the number of monthly and annual visits to the Seashore. Annual visits over the past several decades and monthly visits from the past five years are provided in Charts 2 and 3. Some of the variance shown in the visitation is likely due to changes in methodology for how traffic was counted by the Seashore as well as weather and national, external events.

**Chart 2**  
**Annual Visitation to Cape Cod National Seashore (1964-2008)**

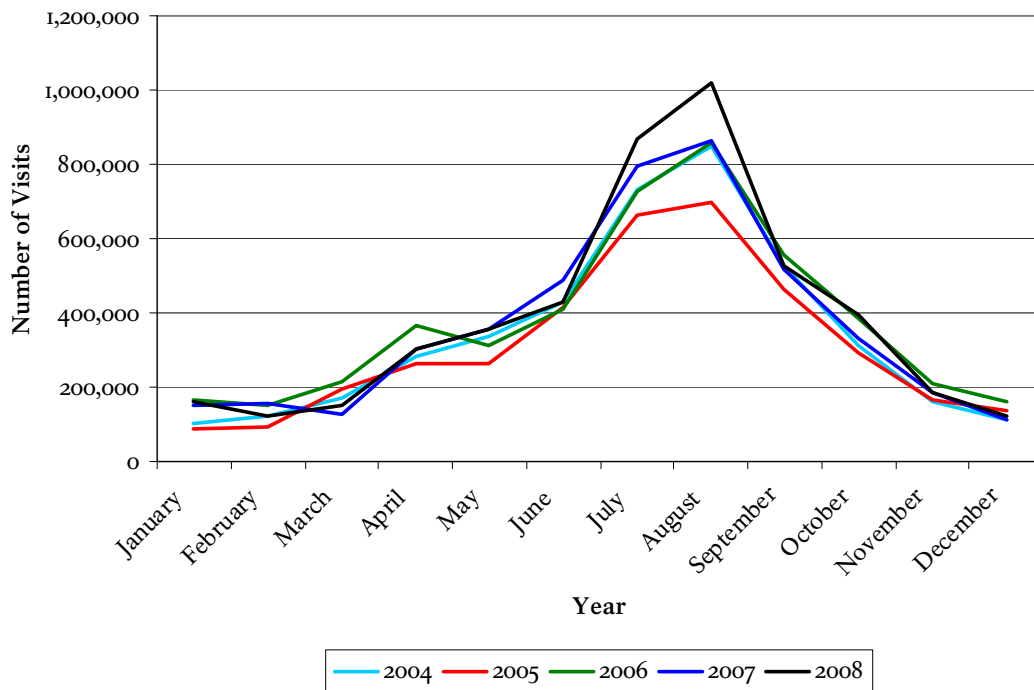
Source: NPS Public Use Statistics Office, <http://www.nature.nps.gov/stats/>



**Chart 3**

**Cape Cod National Seashore Monthly Visitation for the Last 5 Years (2003-2007)**

Source: NPS Public Use Statistics Office, <http://www.nature.nps.gov/stats/>



The Seashore currently does not have the ability to count the number of visits by foot or bicycle, and as there are multiple possible points of entry by foot or bicycle, it would be impossible to monitor all of these locations. Anecdotal observations suggest that the numbers would be of some significance, especially visits by bicycle to Herring Cove, Coast Guard, and Head of the Meadow, all of which have connections to bicycle trails. In addition, all but the Provincetown NPS beaches are connected by road to the Cape Cod Rail Trail. In terms of transit access, there is a bus stop at Herring Cove for both the Provincetown Shuttle and the Provincetown trolley; however, no numbers related to visits by that point of access are available. Another limitation of the vehicle counts is that they do not include other visitor and demographic information, such as: return vs. first-time visitors; local vs. out-of-town visitors; average length of stay; or parking lot turnover.

The towns of the Lower/Outer Cape do not have systems in place to count vehicles, pedestrians, or bicycles accessing their beaches. The main indication of beach use available is the number of beach parking permits that are sold each season. Based on available data, it appears that towns vary in what percentage of permits are bought or issued to residents and on-resident taxpayers, daily visitors, weekly visitors, and seasonal visitors. For example, in Chatham, nearly 60 percent of all permits sold (14,000) in 2008 were daily permits with the majority of the remaining (35 percent) being residential permits; in Truro and Orleans, on the other hand, the non-resident seasonal permits seem to make up a larger percentage of the total permits sold.

Visitation to the Lower/Outer Cape Cod beaches takes a number of forms. Day visitors come from the mainland or Upper Cape by vehicle on Route 6 or from the Boston metropolitan area via ferry to Provincetown. Visitors who drive in usually seek the closest open beach (often

Nauset Beach in Orleans, Nauset Light, or Coast Guard). Visitors who spend nights on the Cape have a number of choices: campgrounds, hotels, motels, B&Bs, and long-term house rentals. Visitors staying more than one or two nights in one place typically use the beaches in the town in which they are staying, unless there are other factors at play. Availability of parking at the beaches is not the only significant factor in visitors' selection of which beach to visit or whether to visit beaches at all. Other determining factors include the following:

- *Water quality.* The Commonwealth of Massachusetts state law sets minimum requirements for the water quality of bathing beaches that take into account physical and bacteriological characteristics; the latter involves setting maximum limits on the level of indicator organisms, Enterococci or E.Coli, which indicate the potential for contamination. The Barnstable County Health Department oversees the testing of all bathing beaches in Cape Cod and when elevated levels are discovered, issues closures of the beach for bathing but not for other activities, which can still be enjoyed without risk. The closure is removed once a subsequent test shows safe levels of the indicator organisms.
- *Weather.* Cold, cloudy, wet, or windy weather can lower visitation to all beaches, but beaches can vary in how cold and windy they are, with bayside beaches often being more protected.
- *Mung.* Mung is drift seaweed composed of a variety of algae (primarily a brown algae, *Pilayella littoralis*). Mung has been common on oceanside beaches in the Outer Cape in July and August since the 1850s. It is most commonly found at beaches north of Eastham, in Wellfleet and Truro, concentrating at Head of the Meadow in Truro.<sup>†</sup>
- *Tide.* The tide affects the width of beach, accessibility to the water, and potential for other beach activities.
- *Width of Beach.* Width of beach is related to the tide but also to the deposit and erosion of sand and the ability of towns to pursue beach replenishment.
- *Fee cost and enforcement.* Although most of the towns have coordinated in setting the cost of a daily pass, enforcement at each beach varies in terms of when and how often it is enforced. Visitors can choose beaches based on the enforcement policy or find alternative parking options (including beaches that do not require fees) from which they can walk to the beach.
- *Insects.* Greenheads, horseflies, and a variety of other insects can be present at some of the beaches at different times during the season.
- *Desired activity.* Beaches offer various activities to visitors, especially bayside vs. oceanside beaches. Oceanside beaches offer surfing and other opportunities while bayside beaches offer warmer, calmer water with opportunities to explore tide pools.
- *Visitor characteristics.* Different visitors prefer different beaches, often associated with the types of activities of interest. For example, families with small children often prefer bayside beaches for the smaller waves and the opportunity to walk out onto the sand during low tide. In addition, some beaches are more accessible than others in terms of the distance and grade drop between the parking area and beach.

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\* Water Quality Testing Information Page. Barnstable County Health Department.  
<http://www.barnstablecountyhealth.org/bsgeneralinfo.htm>

<sup>†</sup> The What and Why of "Mung". Cape Cod National Seashore.  
<http://www.nps.gov/caco/naturescience/upload/mungrackcardshort.pdf>

## 4 Beaches

The study aims to evaluate the status of existing beach parking areas in terms of factors that will impact access over the next 25 years; namely, erosion and demand. This section identifies and introduces the beaches that will be considered by this study, describes the beach parking areas by jurisdiction, and presents initial assessments of their status in terms of capacity, occupancy, and erosion.

### 4.1 Introduction

Cape Cod's beaches are a major part of life on the peninsula, for both residents and visitors. Much of the Cape is outlined by white sand and beaches are located either on the Atlantic Ocean, the Cape Cod Bay, or the Nantucket Sound. It is difficult to identify or quantify the total number of beaches on Cape Cod due to the various definitions that can be used; each town has a number of beaches which they maintain and manage, but in addition, there are several beaches and areas identified as public swimming beaches. For the purposes of this study, a list of beaches has been developed in collaboration with the eight towns. In general, the beaches being evaluated for parking area erosion and capacity are established, publicly-accessible beaches with some parking capacity that are within the defined study area and are managed by either the town or Seashore. Thus, each of the Lower/Outer Cape beaches can be broadly categorized into one of three groups:

- (1) Beach and beach facilities located within the Seashore boundaries; beach and facilities managed by NPS.
- (2) Beach and beach facilities located within the Seashore boundaries; beach and facilities managed by town in which beach is located.
- (3) Beach and facilities not located within the Seashore boundaries; beach and facilities managed by town in which beach is located.

Figure 3 shows the beaches that will be considered in this study. The beach names and locations were derived from publicly-available geospatial data. Further refinements were provided by NPS and town representatives.

**Figure 3**  
**Lower/Outer Cape Cod Beaches**

Source: Massachusetts Office of Geographic and Environmental Information. <http://www.mass.gov/mgis/>



Beaches at inland freshwater and marine ponds are not being considered in the evaluation of erosion and capacity, although the role of such beaches in each town will be considered.

Beach sites vary in level of improvement and facilities; one may provide only a small, unpaved parking area, whereas a highly visited beach will have hundreds of paved parking spaces, as well as lifeguards, concessions, restrooms, and other amenities. Other characteristics vary from beach to beach. Some of these characteristics are reviewed in the visitation section. The main characteristics that this study will examine are parking area capacity, crowdedness or occupancy of the beach and parking area, and erosion of the beach and parking area.

#### 4.2 Common Characteristics

Some common characteristics of all the beaches on the Lower/Outer Cape are discussed below.

*Fees and Permits.* Beach parking fees are an important source of income for both the Seashore and for the towns. The majority of Cape Cod beach-goers access the beach by car, and parking is usually available at each beach with a valid permit or paid entrance fee. For each Lower/Outer Cape town, except Provincetown, residents and non-resident taxpayers pay for or receive a seasonal permit while everyone else must purchase a daily, weekly, or seasonal permit. Provincetown does not have any town beaches that require specific parking permits; all publicly-accessible beaches are either NPS beaches or are served by general municipal parking facilities.

The Seashore offers similar types of permits, which are valid at any of the NPS beaches. Coast Guard Beach is not accessible to the general public by car during the summer; visitors must park at Little Creek and ride a shuttle to the beach. Eastham town residents may access a parking lot within walking distance to the beach during the summer under an agreement between the town and NPS.

The fee for each type of permit varies for each town and the Seashore; Table 1 shows the types of permits and costs by jurisdiction. Permits are generally required for weekends May through October and daily for June through September.

**Table 1**  
**Types of Permit and Cost by Jurisdiction\***

Source: Cape Cod National Seashore and towns

Type of Permit	NPS**	Truro	Wellfleet	Eastham	Orleans	Brewster	Harwich	Chatham
Residents and non-resident taxpayers (annual)	N/A	\$10	\$15	\$15	Free	\$5	\$20	Free
Daily Permit	\$15	\$10	\$15	\$15	15 (\$5)***	\$15	\$15	\$15
Daily Permit (pedestrians, bicyclists, and motorcyclists)	\$3	Free	Free	Free	Free	Free	Free	Free
Weekly	N/A	\$30	\$70	50 (\$90 for 2 weeks)	\$50	\$50	\$55	\$60
Seasonal Permit	\$45	\$30-\$150	\$225	\$135	\$110/\$150****	\$125	\$125	\$125
Interagency Pass	\$80	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Senior Pass (U.S. citizens or permanent residents age 62 or over)	\$10	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Access Pass (U.S. citizens or permanent residents with permanent disabilities)	Free	N/A	N/A	N/A	N/A	N/A	N/A	N/A

\* Provincetown does not have any town beaches that require specific parking permits; all publicly-accessible beaches are either NPS beaches or are served by general municipal parking facilities.

\*\*Eastham taxpayers, with an Eastham sticker, may enter NPS beaches in the town of Eastham at no charge, if spaces are available.

\*\*\*Lower charge is for pre-season (5/24-6/8) and post-season (9/6-9/21)

\*\*\*\*Visitors staying in Orleans are given a discount and pay \$100; visitors staying elsewhere pay \$150.

As an alternative to arriving by car, some beach-goers may be able to access beaches by foot, bicycle, or public transportation. For town beaches, there is no fee system in place for those who do not wish to park a car; for NPS beaches, there is a \$3.00 entrance fee for pedestrians, bicyclists, and motorcyclists.



*Alternative Access.* Certain beaches are more convenient than others to access without a personal automobile. Many of the town-managed beaches are located within walking distance of residential neighborhoods. These residents can walk or bicycle to a town-managed beach, without paying an entrance fee. Several NPS-managed beaches are accessible by improved bicycle or pedestrian trails, and in some cases (such as Coast Guard Beach and Head of the Meadow Beach), these trails are connected to non-fee parking areas. The NPS-managed Herring Cove Beach in Provincetown is serviced by the Provincetown Shuttle (public) and the Provincetown Trolley (private) during summer months. As mentioned above, the NPS Coast Guard Beach is not accessible to the general public by car during the summer; visitors must park at Little Creek and ride a shuttle to the beach.

*Coastal Processes.* Many of these parking areas are situated on especially sensitive lands that are vulnerable to erosion and other potentially detrimental coastal processes. Parking areas may be threatened by:

- Direct loss of asphalt or parking surface due to erosive forces by wind or wave action
- Undermining of land beneath parking surface
- Degradation and migration of unstable dune systems
- Erosion due to storm runoff
- Beach erosion (begging the question of what will happen to beach parking areas if the beach no longer exists)

### 4.3 *Assessment of Beaches and Beach Parking Areas by Jurisdiction*

The Volpe Center contacted the Seashore and the individual towns to obtain information on the beach parking areas under their management in terms of capacity, occupancy during the peak season, and erosion risk. The Center also consulted coastal geologists working with the Seashore. The information from these discussions is described below, by jurisdiction. In some instances, the information is incomplete as it has been requested but not yet received.

#### **Cape Cod National Seashore**

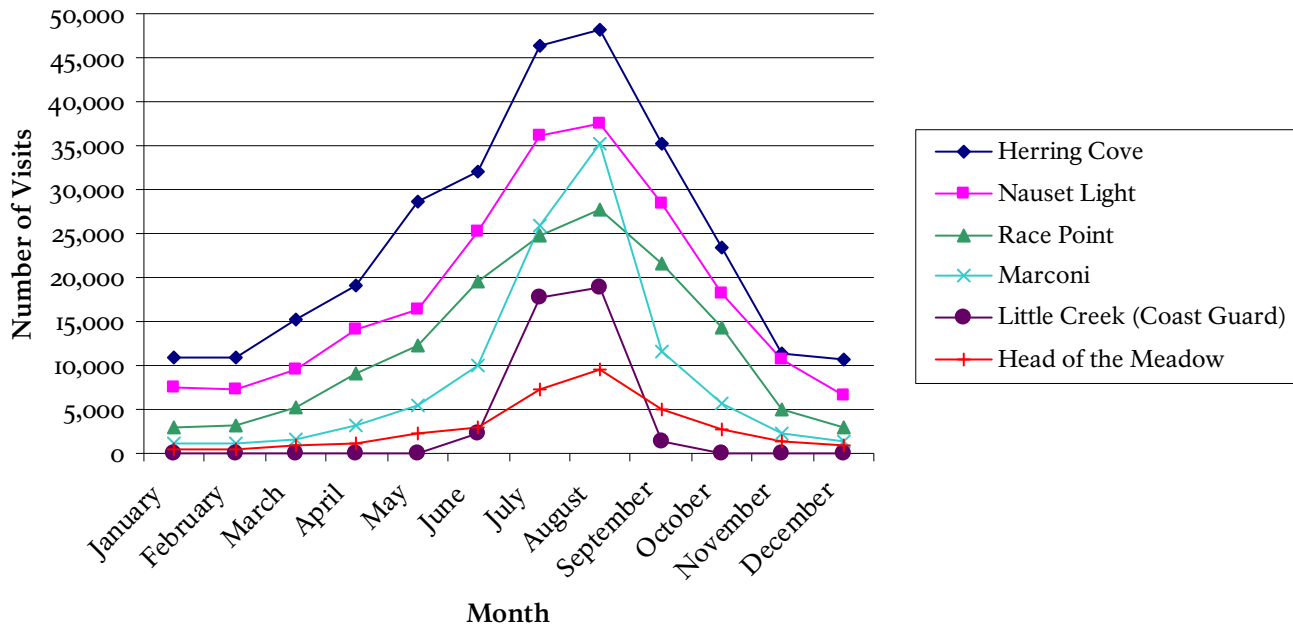
As mentioned above, the Cape Cod National Seashore manages six beaches: Coast Guard Beach (Eastham), Nauset Light Beach (Eastham), Marconi Beach (Wellfleet), Head of the Meadow Beach (Truro), Race Point Beach (Provincetown), and Herring Cove Beach (Provincetown).

The Seashore collects data on the number of vehicles entering each beach parking area; Chart 4 below shows this data from 1991-2007 for each of the six beaches, and Chart 5 below shows data for the summer of 2008 for each beach. From this data, it appears that the most popular, or commonly visited, beaches are Herring Cove in Provincetown and Nauset Light in Orleans. However, the Seashore also estimated the number of people on each beach for eight different days during the summer of 2008; below, the average number of people observed on each beach is shown in Chart 6, and the actual number of people observed by beach by date is shown in Chart 7. This data indicates that the most popular, or commonly visited, beach was Coast Guard, with Nauset Light and Marconi the next most visited beaches.

**Chart 4**

**Average Monthly Visits 1991-2007**

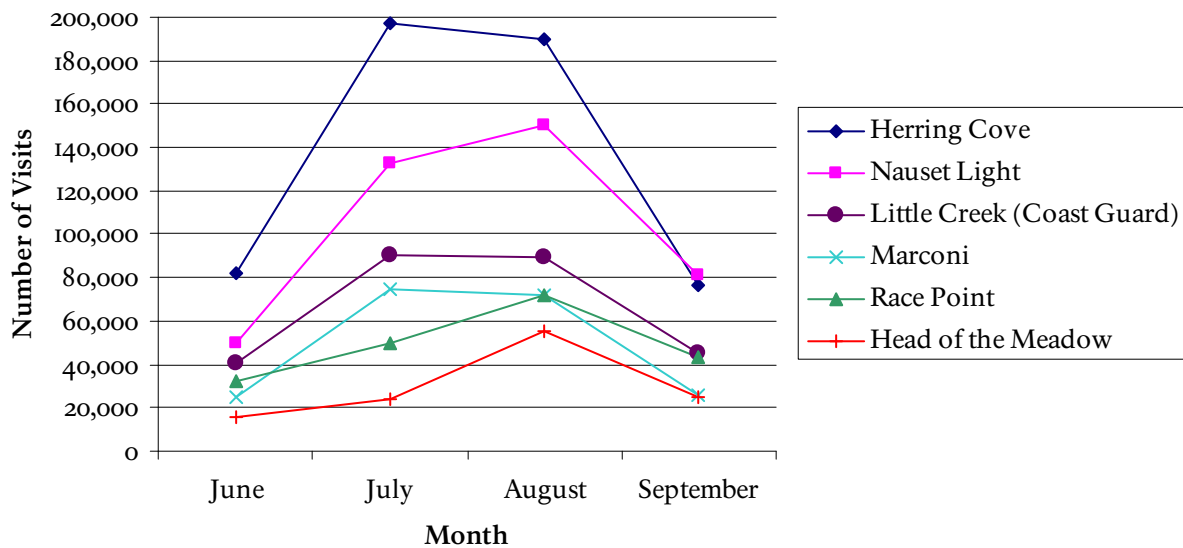
Source: Raw Vehicle Count Data from NPS Public Use Statistics Office



**Chart 5**

**Number of Visits by NPS Beach, Summer 2008**

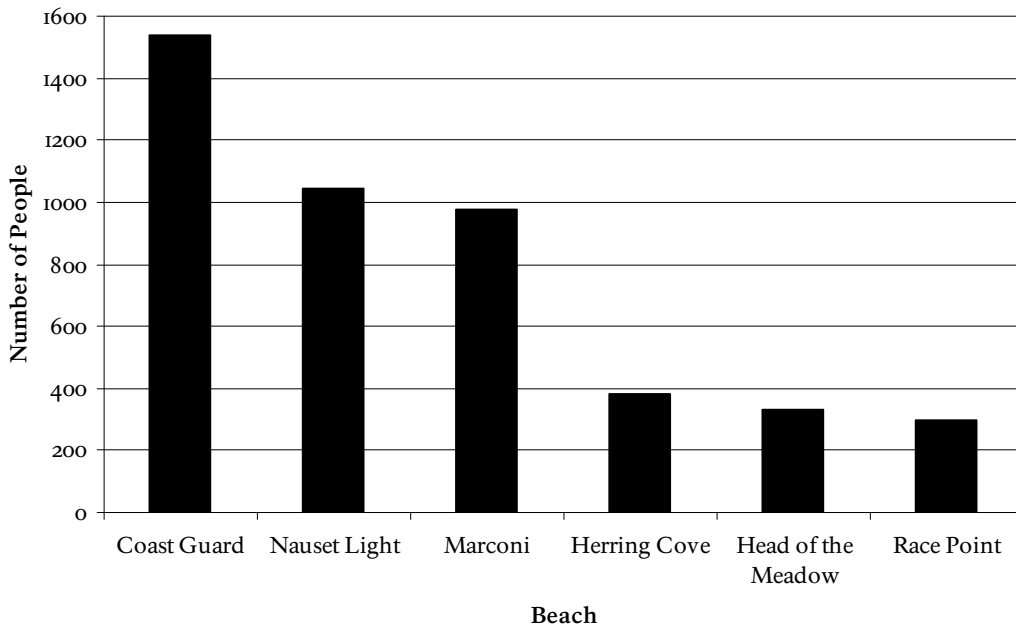
Source: NPS Public Use Statistics Office, <http://www.nature.nps.gov/stats/>



**Chart 6**

**Average Estimate of Visitors on Beach for 8 Observed Days in June, July, August, and September 2008**

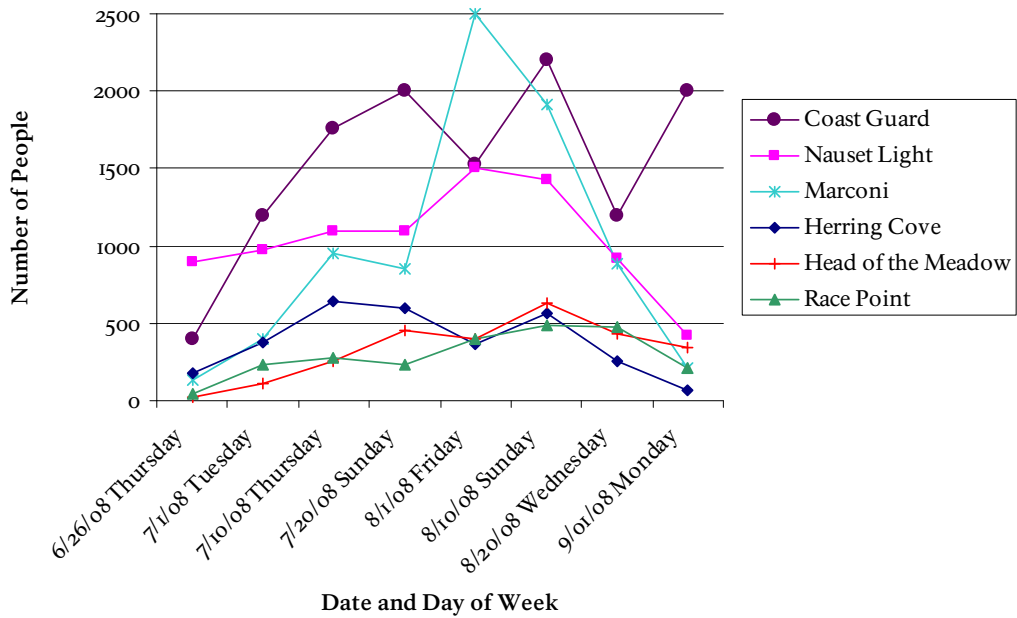
Source: Cape Cod National Seashore Staff



**Chart 7**

**Estimate of Visitors on Beach by Beach for 8 Days in June, July, August, and September 2008**

Source: Cape Cod National Seashore Staff



In 1978, Coast Guard Beach experienced a significant erosion event in which its parking area was lost in a powerful storm, and a new parking lot inland was constructed at Little Creek with a shuttle providing access to the beach. The parking area at Nauset Light Beach is regarded as most at risk; it is predicted that Nauset Light will lose its bathhouses to erosion within 10 years and the entire parking area within 15-20 years. According to Cape Cod coastal geologists, Nauset Light is at the edge of the strip of bluff that runs north from Coast Guard Beach and lacks separation or protection from dunes.

Marconi and Race Point Beaches are not considered to be in danger of significant erosion. Herring Cove in Provincetown is facing several challenges, some man-made and some natural. The North parking area, which is unique in providing parking with an ocean view and easy access to the beach, fills up regularly, and experiences overwash during storms at its northern end, near the entrance to the bicycle trail. In between the north and south parking areas, the bathhouse is structurally unsound and needs to be removed, with replacement facilities built further back from the beach. There are remnants of macadam along the beach in front of the bathhouse, which has caused erosion of the shore to the south. Its removal would eventually lead to the stabilization of the coastline but the immediate effects are unknown.

During the summer of 2008, the National Seashore posted a programmable sign for Coast Guard, Nauset Light, and Marconi that provided real-time feedback on parking capacity with updates through the NPS dispatch center. Local residents and businesses provided feedback to the Seashore that they did not like its appearance and were worried about its impact on business.

Table 2 below lists the six NPS beaches and provides information on their parking areas. NPS collects entrance fees at all beaches from late June through early September when lifeguards are on duty, and on weekends/holidays from Memorial Day to the end of September.

**Table 2**  
**NPS Beach and Beach Parking Area Information**

Source: Cape Cod National Seashore Staff

Town	Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces
Eastham	Coast Guard	Oceanside	Y	368 (+3 RV and +44 additional unmarked locations that could be used for vehicles)	7
Eastham	Nauset Light Beach	Oceanside	Y	98 (+62)*	5 (+2)*
Provincetown	Herring Cove Beach (North)	Oceanside	Y	232	
Provincetown	Herring Cove Beach (South)	Oceanside	Y	525	
Provincetown	Race Point Beach	Oceanside	Y	355	
Truro	Head of the Meadow Beach	Oceanside	Y	365	
Wellfleet	Marconi Beach	Oceanside	Y	530	
<b>Total</b>				<b>2582</b>	<b>14</b>

\*An additional 62 regular spaces and 2 handicapped spaces are used exclusively by Eastham residents between ~ July 4 and Labor Day.

### Provincetown

Provincetown is the northern-most town included in this study. It is geographically isolated, primarily surrounded by water and land under the jurisdiction of the Cape Cod National Seashore, though it does connect to Truro to the south. Many of Provincetown’s visitors arrive by ferry from Boston; others drive or take a bus from the mainland via Route 6.

According to the Provincetown Comprehensive Plan, 4,500 acres of Provincetown’s 6,444 acres (approximately 70 percent) is under the jurisdiction of the Seashore. This primarily consists of an area known as the Province Lands. The town has no dedicated beaches of its own but does have several Harbor beach landings and beach access points within the town. The two primary beaches, Herring Cove and Race Point, are located within the Seashore and managed by NPS. The two beaches are connected to the town during the summer by the Provincetown Shuttle. In addition, a seasonal, private interpretive service, the Provincetown Trolley, takes visitors on a 40-minute ride that includes at the Provincelands Visitor Center near Race Point. Herring Cove can be reached by foot or bicycle from the town; however, there is a need for adequate bicycle parking at one access point on Province Lands Road and for management and containment of the multiple pedestrian trails through the sand dunes to prevent further erosion.

### Truro

The Town of Truro is located between Provincetown and Wellfleet. According to the town’s Comprehensive Plan, approximately 70 percent of the town lies within the Cape Cod National Seashore’s jurisdiction. It is the smallest town in the Study Area with a population of just over 2,000. Because of its geographic position, Truro is mostly likely to be visited by those staying

long-term in the town or day visitors from Provincetown; day visitors from the mainland or even from other Upper Cape towns tend to stop at the earliest open beach, further south.

The Town of Truro manages eleven beaches: four on the ocean side of the Cape, and seven on the bayside. Its oceanside beaches all lie within the National Seashore boundaries and thus the parking areas are surrounded by National Seashore land. One of Truro's oceanside beaches, Head of the Meadow, is shared with the National Seashore. The town and Seashore each have separate parking areas. Truro's oceanside beaches are known for their cliffs; Coast Guard Beach also offers surfing and fishing. Ballston and Longnook are the most popular Truro beaches and the town and coastal geologists estimate that their parking areas are in the most danger of erosion. The Town of Truro estimates that Ballston has lost 30 spaces in the last 30 years and is at high risk of losing the entire parking area to a storm. Head of the Meadow, also estimated to have lost parking area (about 90 feet) in the past 30 years, is currently experiencing a dune migration into the parking lot. According to coastal geologists, Ballston is a very unique barrier beach located near the headwaters of the Pamet River, and its dune system is essential to maintaining its integrity as the only natural land-link around the Pamet River.

A beach permit, issued by the Town of Truro, is required for parking at all town beaches from mid-June through Labor Day; the fee is per vehicle. The town's Head of the Meadow oceanside beach and Corn Hill bayside beach offer on-site daily passes (\$10) and accept weekly stickers (\$30), and provide the largest parking areas. The rest of the beaches require seasonal (\$30-150) or residential (\$10) stickers. Stickers are required from mid-May to Labor Day and can be purchased from the Beach Commission Sticker Sales Office. Entry to Truro beaches is free after 4pm. Three oceanside beaches – Ballston, Longnook, and Coast Guard – have parking areas and street-side parking and are all often at full capacity during the peak season. Fisher Beach on the bayside is also often at full capacity but has fewer parking spaces.

Truro sold 2,400 residential permits in 2008, slightly down from previous years; this number is still more than the estimated number of Truro residents for 2007. This is most likely due to several factors: the presence of non-resident taxpayers who are eligible for residential permits; multiple cars per resident; and the fact that most if not all residents purchase permits. Truro does not maintain a breakdown of weekly and daily permits, but overall revenues from those sales indicate that Truro sells anywhere from 1,500 to 5,000 weekly and daily permits each year. Truro also sells almost 4,500 non-resident seasonal passes. Thus, in total, Truro has at least 6,900 seasonal stickers (resident and non-resident)

Table 3 below lists the eleven Truro beaches and provides information on their parking areas.

**Table 3**  
**Truro Beach and Beach Parking Area Information**

Sources: Town of Truro staff.

Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces	Type of Permit(s) Accepted
Ballston	Oceanside	Y	60 (15)*	2	Residential or Seasonal
Coast Guard	Oceanside	Y	25 (30)*	2	Residential or Seasonal
Cold Storage	Bayside	N	25	2	Residential or Seasonal
Corn Hill	Bayside	N	150	4	All
Fisher	Bayside	N	10	1	Residential or Seasonal
Great Hollow	Bayside	N	40	2	Residential or Seasonal
Head of the Meadow (town only)	Oceanside	Y	180	3	All
Longnook	Oceanside	Y	50 (40)*	2	Residential or Seasonal
Noon's	Bayside	N	15 (not paved)	0	Residential or Seasonal
Ryder	Bayside	N	25	2	Residential or Seasonal
<b>Total</b>			<b>665</b>	<b>20</b>	

\*street-side parking

### Wellfleet

Wellfleet is located between Truro and Eastham. It has eight coastal town beaches, four on the oceanside and four on the bayside. The Cape Cod National Seashore's headquarters and one of the NPS beaches, Marconi, are located in Wellfleet, south of the town beaches. According to the town's Comprehensive Plan, approximately 61 percent of the land in Wellfleet is under the jurisdiction of the Seashore.

A beach permit, issued by the Town of Wellfleet, is required for parking at all town beaches except for Mayo Beach, on the bayside. Only two of the beaches – White Crest and Cahoon Hollow – allow daily passes (\$15); as a result, over half of weekend visitors to White Crest are day visitors from out of town. Visitors can also park at White Crest and walk 10 minutes along the beach to Cahoon Hollow, which has an adjacent bar that is a popular destination. All other beaches are only accessible by residents and non-resident tax-payers with passes (\$15) or visitors staying in Wellfleet with weekly (\$70) or seasonal (\$225) passes.

All four of the oceanside beaches are facing erosion threats despite differences in their geology. An average loss of three feet per year is the accepted standard but the erosion will not be gradual or incremental, but rather more significant losses at once. Newcomb Hollow lost 30 feet of macadam when it was undercut during a storm several years ago; the town had paved too close to the beach and left no natural barrier for drainage. In addition, Cahoon Hollow has a drainage problem that is causing erosion of the parking lot.

The four oceanside beaches are often at full capacity during the peak season. Newcomb Hollow is the only exception – in the past it filled to capacity by 11am but in 2008 it only filled up a few times. The Town of Wellfleet believes that Newcomb Hollow’s drop in visitation is an indication that the increasingly high price of summer rentals is decreasing the ability of families to vacation in Wellfleet.

Wellfleet has considered a shuttle bus in the past that would serve the four oceanside beaches on Oceanview Drive, but when the idea was presented in a town meeting, residents expressed concerns about the shuttle going by kettle ponds, which residents want to protect from noise and from non-local visitors, and possibly increasing the number of visitors to the beach.

Table 4 below lists the eight Wellfleet beaches and provides information on their parking areas.

**Table 4**  
**Wellfleet Beach and Beach Parking Area Information**

Source: Town of Wellfleet staff.

Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces	Type of Permit(s) Accepted
Burton Baker	Bayside	N			-
Cahoon Hollow	Oceanside	Y	110		All
Duck Harbor	Bayside	Y			Residential
Indian Neck	Bayside	N			Residential
Maguire's Landing/LeCount Hollow	Oceanside	Y	167		Residential
Mayo	Bayside	N			None required
Newcombs Hollow	Oceanside	Y	375		Residential
White Crest	Oceanside	Y	400		All
<b>Total</b>			<b>1052</b>		

## Eastham

Eastham is located between Wellfleet and Orleans. Approximately a third of the land area in Eastham lies within the jurisdiction of the Seashore, according to its Comprehensive Plan. The Seashore’s main visitor center, the Salt Pond Visitor Center, is located in Eastham, as are two of its beaches (Coast Guard and Nauset Light). Eastham has eight bayside beaches and no town oceanside beaches. However, Eastham residents and non-resident taxpayers with an Eastham parking sticker may access either of the two oceanside NPS beaches in Eastham (Coast Guard and Nauset Light) for free, if spaces are available. In addition, one of the NPS beaches, Nauset Light, has 62 regular spaces and two handicapped spaces available in a lot adjacent to the beach that are open exclusively to Eastham residents between July 4 and Labor Day; the town helps manage these spaces.

On the bayside, the beach with the largest parking area is First Encounter. Its parking area is often at full capacity and when it is, the facilities and beach are nearly at capacity. The four most northern bayside beaches are facing the most serious erosion threats. The bayside beaches (not



including First Encounter) lost approximately 15 feet of asphalt around 2001-2 and have little to no beach area at high tide. In addition to First Encounter, Sunken Meadow and Campground beaches are often at capacity, and are surrounded by private property, thus restricting the possibility of moving or extending the parking lots. The Town of Eastham estimated that 1500 cars visit the 600 parking spaces at the bayside beaches on a good day.

A beach permit, issued by the Town of Eastham, is required for parking at all town beaches. First Encounter, Campground, and Cook’s Brook sell and accept daily passes; the rest of the beaches accept only weekly, seasonal, and residential passes.

Table 5 below lists the nine Eastham beaches and provides information on their parking areas.

**Table 5**  
**Eastham Beach and Beach Parking Area Information**

Source: Town of Eastham staff.

Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces	Type of Permit(s) Accepted
Boat Meadow	Bayside	N	10		All but daily
Campground	Bayside	N	119		All
Cole Road	Bayside	N	12		All but daily
Cook's Brook	Bayside	N	85		All but daily
First Encounter	Bayside	N	199		All
Kingsbury	Bayside	N			-
Nauset Light*	Oceanside	N	62	2	All but daily
Sunken Meadow	Bayside	N	26		All but daily
Thumpertown	Bayside	N	18		All but daily
<b>Total</b>			<b>531</b>	<b>2</b>	

\*NPS-managed beach but Town manages some of the parking

## Orleans

Orleans borders Eastham to the north, Brewster and Harwich to the west, and is separated from Chatham in the south by water. It is the main entry point to the Outer Cape. It has one bayside beach, Skaket, and one oceanside beach, Nauset. Nauset is the first oceanside Lower/Outer Cape beach that visitors coming up Route 6 from the mainland and Upper Cape encounter. Nauset also has the largest parking area on the Lower/Outer Cape, with 900 spaces. It is experiencing erosion at an average rate of five feet per year, and is expected to erode completely in the next 25-30 years. The parking area is sometimes at capacity, and when it is, the beach and facilities are over capacity. In recent summers, a variable message sign on Route 6 to indicate whether Nauset Beach is open has received favorable feedback from visitors, residents, and local businesses.

Although the National Seashore does not manage any beaches in Orleans, Nauset Beach lies within the Seashore’s boundaries, and the Seashore has jurisdiction over 15 percent of Orleans’ land area, according to the town’s Comprehensive Plan.

A beach permit, issued by the Town of Orleans, is required for parking at both town beaches daily from mid-June through Labor Day and on weekends from Memorial Day through Columbus Day. The daily permits are \$15 during the peak season and \$5 before and after. Resident and non-resident taxpayer parking permits for the Orleans beaches are free; Orleans sells approximately 8,000 resident permits, more than the estimated residential population of a little over 6,000. Orleans sells approximately 38,000 daily passes and 3000 weekly (\$50) permits a year; seasonal permits (\$150) are also sold, with a discount given to visitors staying in Orleans (\$110).

Table 6 below lists the two Orleans beaches and provides information on their parking areas.

**Table 6**  
**Orleans Beach and Beach Parking Area Information**

Source: Town of Orleans staff.

Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces	Type of Permit(s) Accepted	Dates Permit Required
Nauset	Oceanside	Yes	900		All	Weekends: ~5/24 to ~9/21 Full week: ~6/14 to Labor Day
Skaket	Bayside	No	175		All	Weekends: 6/14 to 9/21 Full week: 6/14 to Labor Day
<b>Total</b>			<b>1075</b>			

### Chatham

Chatham is located at the “elbow” of Cape Cod, to the east of Truro and west of Orleans, from which it is separated by water. It is also separated by water from the Cape Cod National Seashore, to the east, and the U.S. Fish & Wildlife Monomoy National Wildlife Refuge, to the south.

Chatham has five beaches on Nantucket Sound and one oceanside beach, Lighthouse Beach.

All of the beaches on the Sound have limited parking space except Hardings Beach and all have very narrow beach areas. The town is contemplating dredging projects off-shore for sand replenishment. The parking area at Cockle Cove is the most threatened by erosion; the town has planned an emergency, temporary fix with boulders and sand replenishment but may consider a more engineered solution in the future. The parking area at Hardings Beach is set back from the dune line but the break in the dune line between it and the beach leaves it vulnerable. Parking permits are required from 73 days before Labor Day to Labor Day at Hardings, Cockle Cove, and Ridgevale, but not Forest. Ridgevale often fills up during peak season.

Lighthouse Beach has a main parking area with short-term (30-minute) parking that often fills up during peak season as well as street parking along Bridge Street. In December 2008, the town Council decided to implement a parking sticker requirement for Bridge Street July 1<sup>st</sup> through Labor Day starting in the summer of 2009. The plan is experimental and is intended to raise revenue, possibly discourage parking on Bridge Street, and encourage parking at other town

beaches. In addition, in January, the Town Board of Health voted to close Lighthouse Beach for swimming due the safety hazard created by the dangerous currents and drop-offs. Three people in the past four years have died in the waters off the beach, including one over Labor Day Weekend in 2008. How the swimming ban will affect the demand for parking is unknown at this time.

Access to the beaches is mainly by car. There is a 3-phase sidewalk project underway from Hardings Beach to Route 28, mainly for neighborhood use. The owners of a former gas station property charge \$5 for parking and another \$5 to drive people to Lighthouse Beach in a station wagon; the lot can hold 50 cars and can fill in peak season with people visiting Main Street and/or the beach.

Table 7 below lists the six Chatham beaches and provides information on their parking areas.

**Table 7**  
**Chatham Beach and Beach Parking Area Information**

Source: Town of Chatham staff.

Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces	Type of Permit(s) Accepted	Dates Permit Required
Cockle Cove Beach	Sound	N	75	4	All	73 days before Labor Day - Labor Day
Forest Beach	Sound	N	38	2	No permit required	N/A
Hardings Beach	Sound	N	389	8	All	73 days before Labor Day - Labor Day
Lighthouse Beach	Ocean	N	48 30-minute parking spaces (counted from aerial) (Bridge Street Parking: 125)	2	Bridge Street fee as of July 1, 2009	July 1-Labor Day
Pleasant Street Beach	Sound	N	20	1	No permit required	N/A
Ridgevale Beach	Sound	N	96	4	All	73 days before Labor Day - Labor Day
<b>Total</b>			<b>791</b>	<b>21</b>		

### Brewster

Brewster is located in the Mid or Lower Cape, between Orleans and Dennis and north of Harwich. Its coast is entirely on the bayside and it has seven bayside beaches. None of its land lies within the National Seashore's boundaries but visitors must pass by Brewster (usually to the south, along 6) to access the Outer Cape. Brewster is connected to the Outer Cape via the Flex bus system.

Virtually all of Brewster's beach parking areas are at or over capacity during peak season and two of the parking areas, at Paines Creek and Ellis Landing, are currently threatened by erosion.

They have experienced a recent loss of parking surface and increased steepness of the access to the beach.

A beach permit, issued by the Town of Brewster, is required for parking at any of the beaches. Residents pay \$15 per vehicle per year. Anyone can purchase a daily parking permit at the Town Office for \$15 but may not find parking at beaches; the fine for parking without a permit is \$30. A weekly permit for \$50 and seasonal permit for \$125 are also available.

The town has in the past investigated the idea of a seasonal shuttle bus to bayside beaches from the Eddy Elementary School parking lot.

Table 8 lists the beaches in Brewster.

**Table 8**  
**Brewster Beach Information**

Source: Town of Brewster staff.

Beach	Location	Within NPS Boundary	Type of Permit(s) Accepted
Paine's Creek	Bayside	No	All
Robbin's Hill	Bayside	No	All
Saint's Landing	Bayside	No	All
Breakwater	Bayside	No	All
Ellis Landing	Bayside	No	All
Linnell Landing	Bayside	No	All
Crosby Landing	Bayside	No	All

## Harwich

Harwich, like Brewster, is located in the Mid or Lower Cape, south of Brewster, and between Dennis and Chatham. It has 14 beaches abutting Nantucket Sound. Also similar to Brewster, Harwich is not adjacent to nor does it contain any of the National Seashore, but visitors to the National Seashore must pass through Harwich on Route 6 and Harwich is also connected to the Outer Cape by the Flex bus system.

Harwich's beaches are only accessible by roads running North-South; there is a lack of East-West connections so most people walk to the beach south of their neighborhoods. While the parking areas are not experiencing erosion, the beaches are, and Harwich is considering a number of options through the County's dredging and re-nourishment program. Harwich is, however, facing funding restraints. Bank Street is the beach of most concern in terms of access; it has limited parking that is consistently full and people park downtown and walk to the beach even though there are no sidewalks. Harwich has a number of transportation projects that are undergoing or proposed, including evaluating bicycle and pedestrian access to various destinations, including beaches.

Table 9 below lists the 14 Harwich beaches and provides information on their parking areas.

**Table 9**  
**Harwich Beach and Beach Parking Area Information**

Source: Town of Harwich staff.

Beach	Location	Within NPS Boundary	Regular Parking Spaces	ADA Parking Spaces	Type of Permit(s) Accepted
Allen Harbor	Sound	N			
Atlantic Ave	Sound	N	Yes	No	Sticker required
Bank Street	Sound	N	Yes (35; people also park on Schoolhouse Road and walk)	Yes (5)	Sticker required
Belmont road	Sound	N	No	No	
Brooks Road	Sound	N	Limited	No	Sticker required
Earle Road	Sound	N	Yes (100)	Yes	Sticker required; daily accepted
Grey Neck	Sound	N	Yes	No	Sticker required
Merkel	Sound	N	No	No	
Neel Road	Sound	N	No	No	
Pleasant Road	Sound	N	Yes	No	Sticker required
Red River Road	Sound	N	Yes (~200)	No	Sticker required; daily accepted
Wyndemere Bluffs	Sound	N	No	Yes	
Wah-wah-taysee Road	Sound	N	No	No	
Zylpha	Sound	N			

#### 4.4 *Compiled Assessments of Beach Parking Areas*

From the information described above, the study team conducted an initial evaluation of the level of risk of erosion of each parking area and identified the parking areas most frequently used to capacity. This initial evaluation led to the preliminary identification of priority beach parking areas for the study. Priority parking areas are defined as those parking areas at which erosion was most likely to cause a significant impact on access based on the current demand. These four maps are provided below, as is individual descriptions for each map.

The Beach Parking Area Capacities map (Figure 4) illustrates a capacity range for each Lower/Outer Cape beach parking area based on the total number of parking spaces. Information was provided by the towns and the Seashore. With a few exceptions, most major parking areas in the study area serve ocean-side beaches.

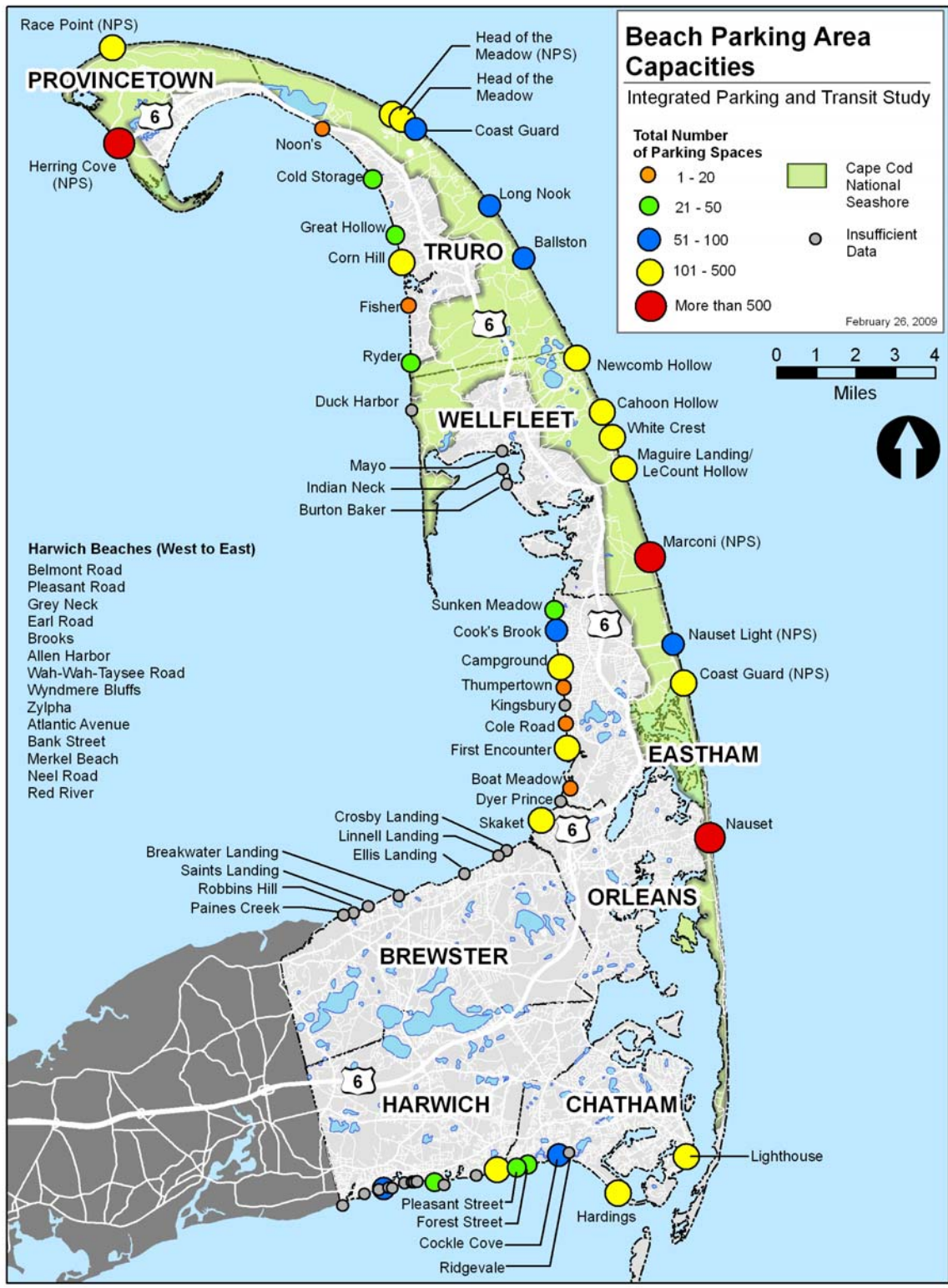
Figure 5 is a preliminary assessment of how often each beach parking area is filled to capacity. Based on input from the towns and the Park Service, it is plausible that on a major summer holiday the majority of the parking areas on the Lower/Outer Cape are fully occupied. This assessment has acknowledged that potential, thus basing the categorization on an average, high-demand summer day.

Figure 6 categorizes each Lower/Outer Cape beach parking area based on its vulnerability to erosion, specifically as it may result in the reduction of parking surface. While long-term erosive trends are quantifiable and generally agreed upon by coastal geologists, the unpredictability of

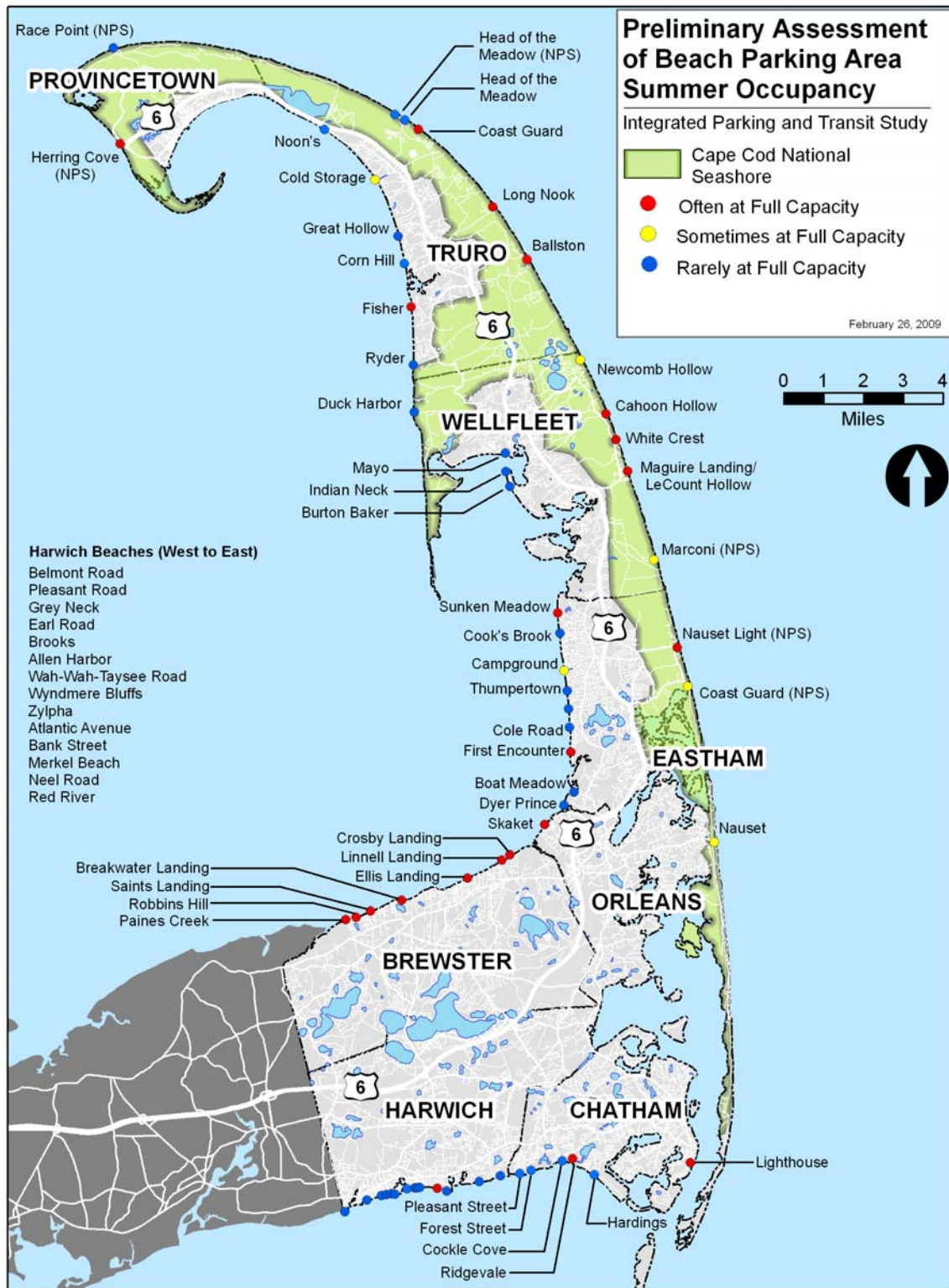
short-term erosive events (such as winter storms and hurricanes) and the dynamic nature of coastal landforms must be taken into account as well. Thus, if it appears likely that detrimental erosion will occur to a beach's parking area within a ten to fifteen year timeframe, the parking area was assigned a high level of risk. If a parking area appears stable and is unlikely to be affected by erosion in the foreseeable future, it was assigned a low risk. If it fell somewhere between the two extremes, a parking area was given a moderate risk. Importantly, this map *does not address* the risk of erosion to the beach itself, though the future of the beach itself is clearly an important consideration when assessing future parking needs.

The evaluation of parking area occupancy and risk of erosion described above led to the preliminary identification of priority areas for this study, as shown in Figure 7. Initial priority areas are defined as those parking areas where erosion is most likely to cause a significant impact on beach access, based on the current demand, in the next ten to fifteen years. Efforts at developing alternatives for beach access will be focused on these parking areas but not to the exclusion of other areas.

**Figure 4**  
**Beach Parking Area Capacities**

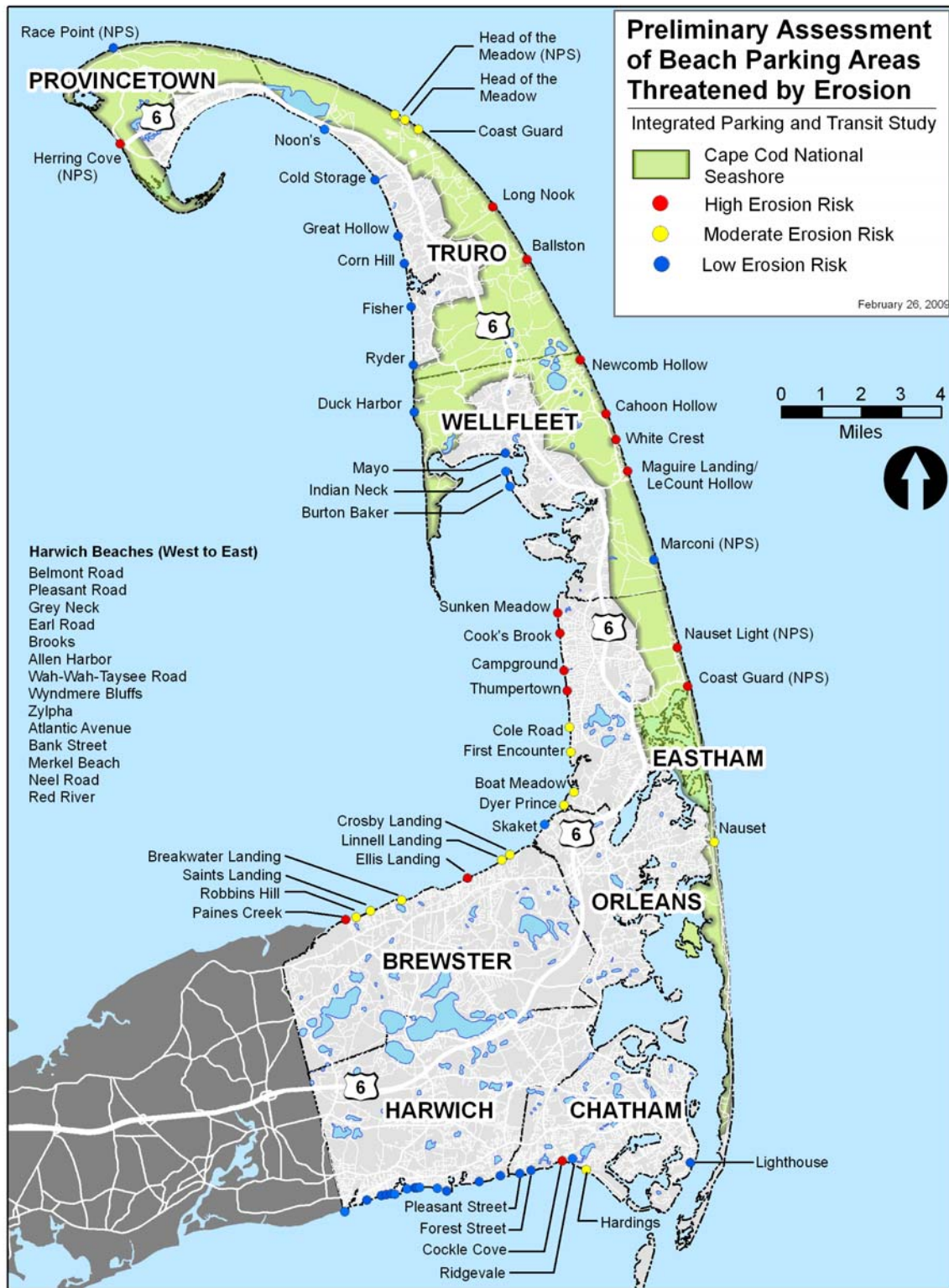


**Figure 5**  
**Preliminary Assessment of Beach Parking Area Summer Occupancy**

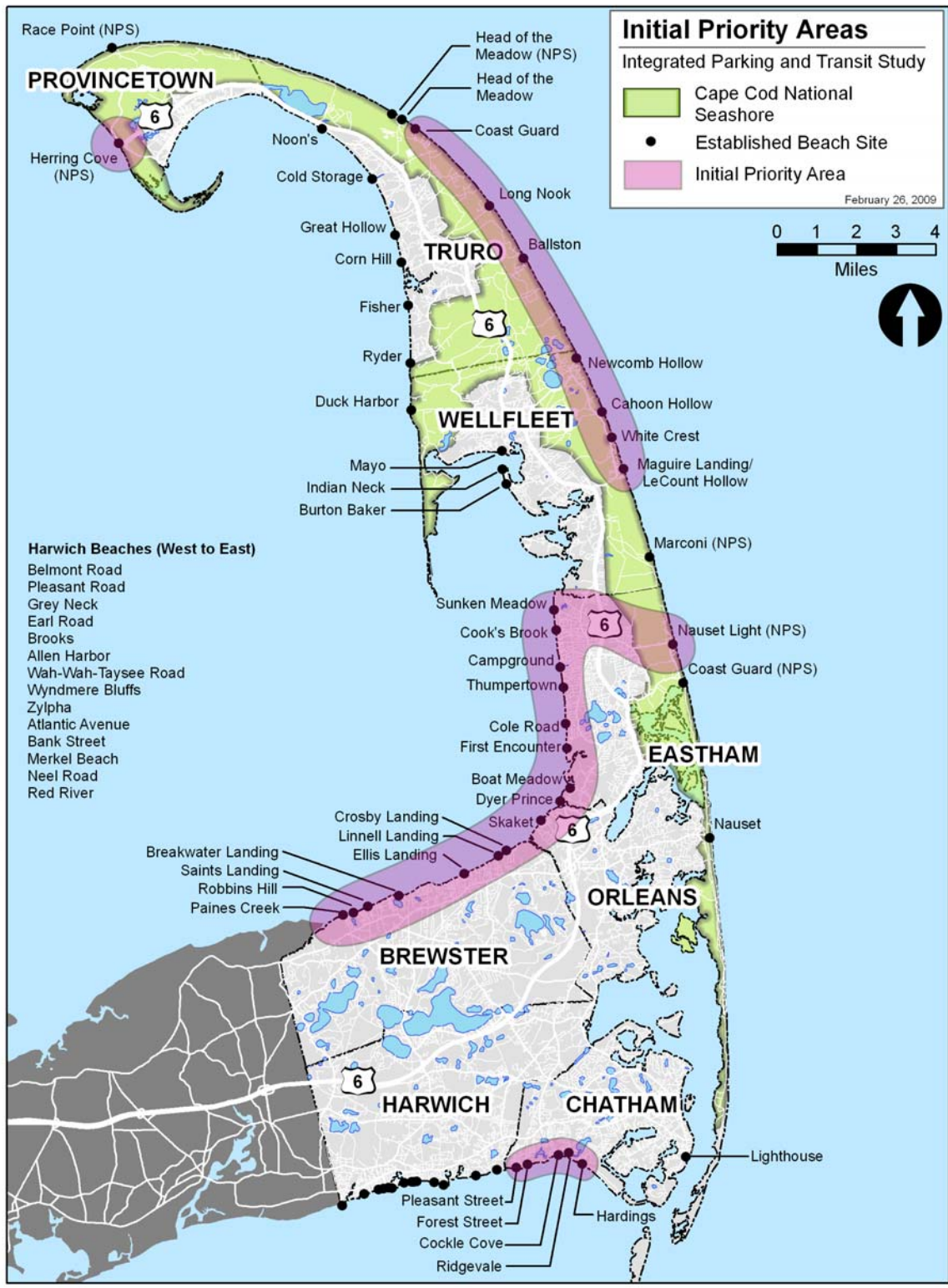




**Figure 6**  
**Preliminary Assessment of Beach Parking Areas Threatened by Erosion**



**Figure 7**  
**Initial Priority Areas**



## 5 Transportation

The second component of the Integrated Parking and Transit study is evaluating and improving access to beaches by transit and other alternative transportation. This section provides the transportation context for the Lower/Outer Cape, namely an overview of the existing road network, transit systems, and non-motorized transportation networks.

### 5.1 Roads and Highways

Cape Cod has an extensive network of roads and highways, most of which are small, residential roads owned and maintained by the individual towns. The major routes of the Lower/Outer Cape are 6, 6A, and 28, all of which are owned and maintained by MassHighway.

By functional class, 70 percent of the Lower/Outer Cape's road infrastructure – by mileage – is composed of local roads, while 30 percent are arterial and collector roads.

U.S. Highway 6 is the main thoroughfare of the Lower/Outer Cape, especially with regard to intra-town travel. Within the study area, it is comprised of two distinct sections. From the highway's entrance in Harwich, through Brewster and continuing to the rotary in Orleans, Route 6 is a two-lane, limited access highway with a raised median and yellow reflective posts. Passing is prohibited on this section. Between the Orleans rotary and its terminus in Provincetown, Route 6 is a fully accessible highway with curb-cuts, usually with four travel lanes but occasionally narrowing to two.

A 1999 study by the Cape Cod Commission performed a license plate analysis on Route 6, once in April and again in August, to determine the percentage of vehicles that were registered outside of Barnstable County. Not surprisingly, cars registered in Cape Cod accounted for more than 50 percent of all vehicles during April and only 28 percent in August. Also of interest is the fact that the number – not just the percentage – of Cape Cod registered vehicles dropped in August. Cape Cod residents perhaps avoid Route 6 in the summertime, either by not driving or finding alternative routes.<sup>†</sup>

It has been noted by several Cape Cod residents and officials that traffic on Route 6 and other major thoroughfares increases when the weather is poor and people turn to attractions and activities other than the beaches.

### 5.2 Public Transportation

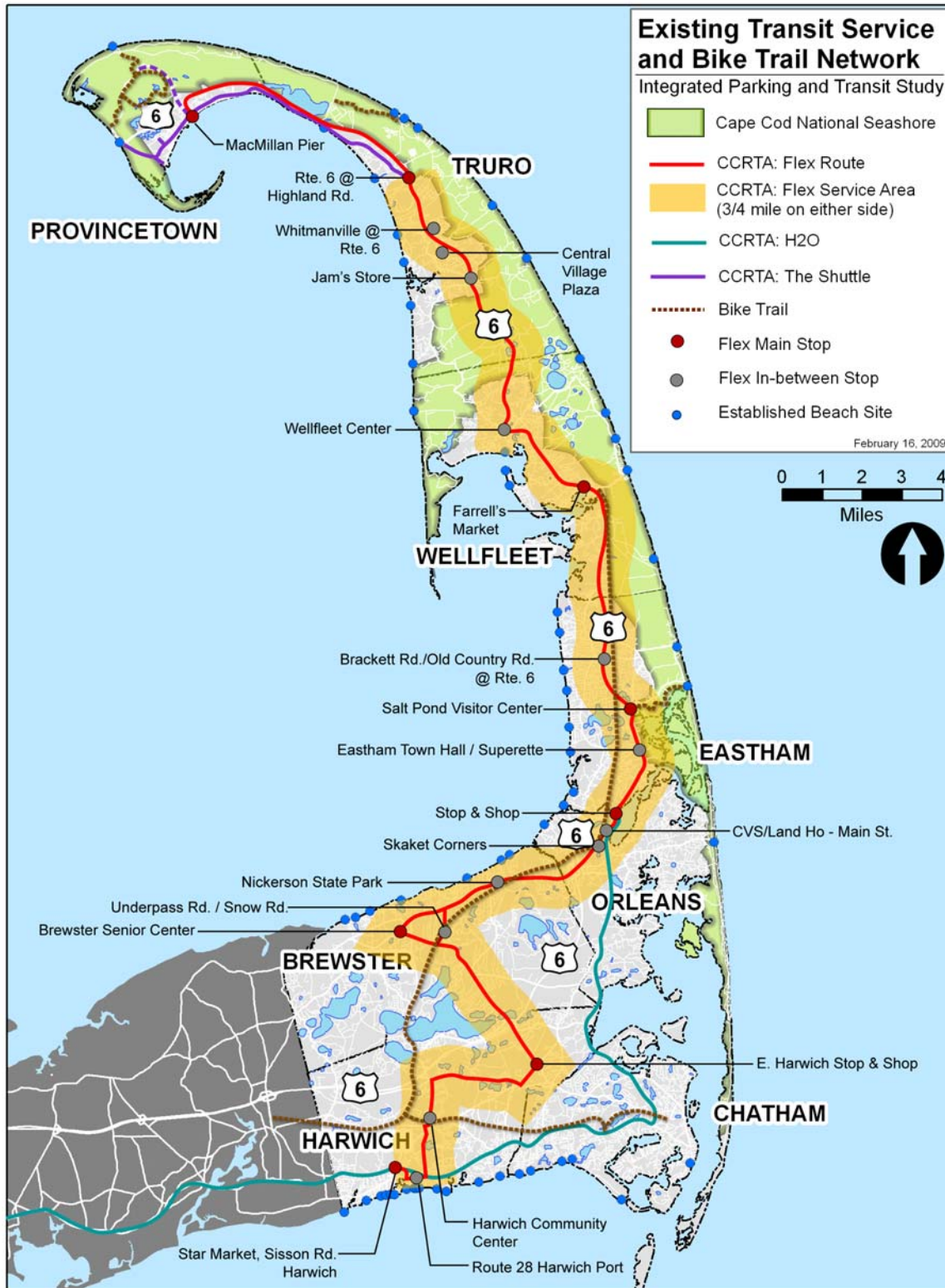
The Lower/Outer Cape has an extensive system of public transportation that includes transit by land and water and nonmotorized trails. These systems are shown in Figure 8 below and described in this section. These networks already provide some access to beaches and other attractions but have the potential to be expanded, connected, and added to.

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\* Cape Cod 2007 Regional Transportation Plan.

† Cape Cod 2007 Regional Transportation Plan.

**Figure 8**  
**Existing Transit Service and Bike Trail Network**



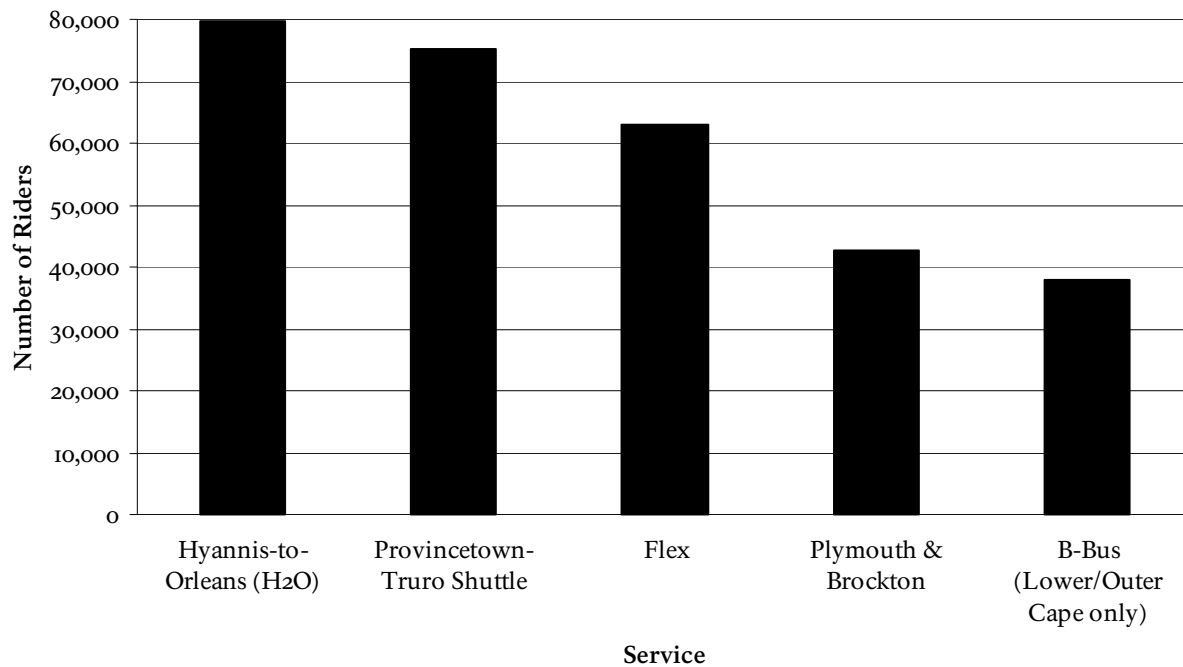
## Transit

Multiple public and private transportation providers contribute to the overall transportation system in the region. Cape Cod Regional Transit Authority (CCRTA) is the public transportation provider for the Lower/Outer Cape. In addition to a number of systems serving the more densely populated towns of the Mid/Upper Cape, CCRTA has three “lines” that operate within the eight Lower/Outer Cape towns, as well as a fleet of paratransit vehicles.

The CCRTA services for the Lower/Outer Cape and the main private service are described briefly below. The total ridership, or one-way trips, for each service for 2007 is shown in Chart 8 below; the ridership shown for the B-Bus, which is a Cape-wide service, is an estimate for the Lower/Outer Cape communities.

**Chart 8**  
**2007 Total Ridership by Service**

Source: Cape Cod Regional Transit Authority



### Flex

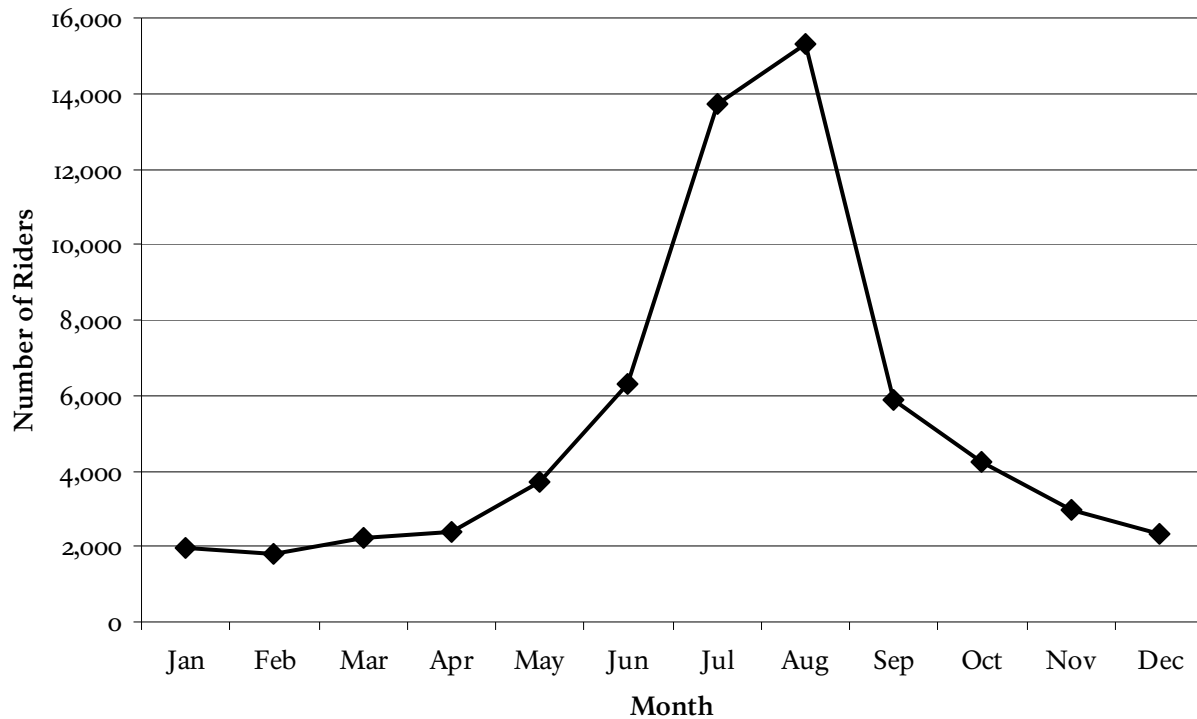
In 2006, the Cape Cod Regional Transit Authority (CCRTA) began operating the Flex system on the Lower/Outer Cape, supported by funding through the National Cape Cod Seashore. It is the primary transit system for the study area. Consisting of a fixed route integrated with a flexible, by-request concept, the Flex bus adheres to a set route and schedule, but is able to deviate from the established route by 3/4 of a mile by rider request. The fixed route begins at Harwichport in Harwich, and continues through Brewster, Orleans, Eastham, Wellfleet, Truro, and Provincetown.

Flex operates on two seasonal schedules: in summer, it runs seven days a week, from early morning through late evening, and in the winter it travels six days a week, with no Sunday

service. The ridership during the summer season is significantly higher than the rest of the year; the monthly ridership for both July and August is more than 12,000 while November through May, ridership is below 4,000 per month. Chart 9 shows the ridership for 2007. The Flex fare is \$2.00 for a one-way ride, including an additional \$2.00 for an off-route trip.

**Chart 9**  
**2007 Flex Ridership**

Source: Cape Cod Regional Transit Authority



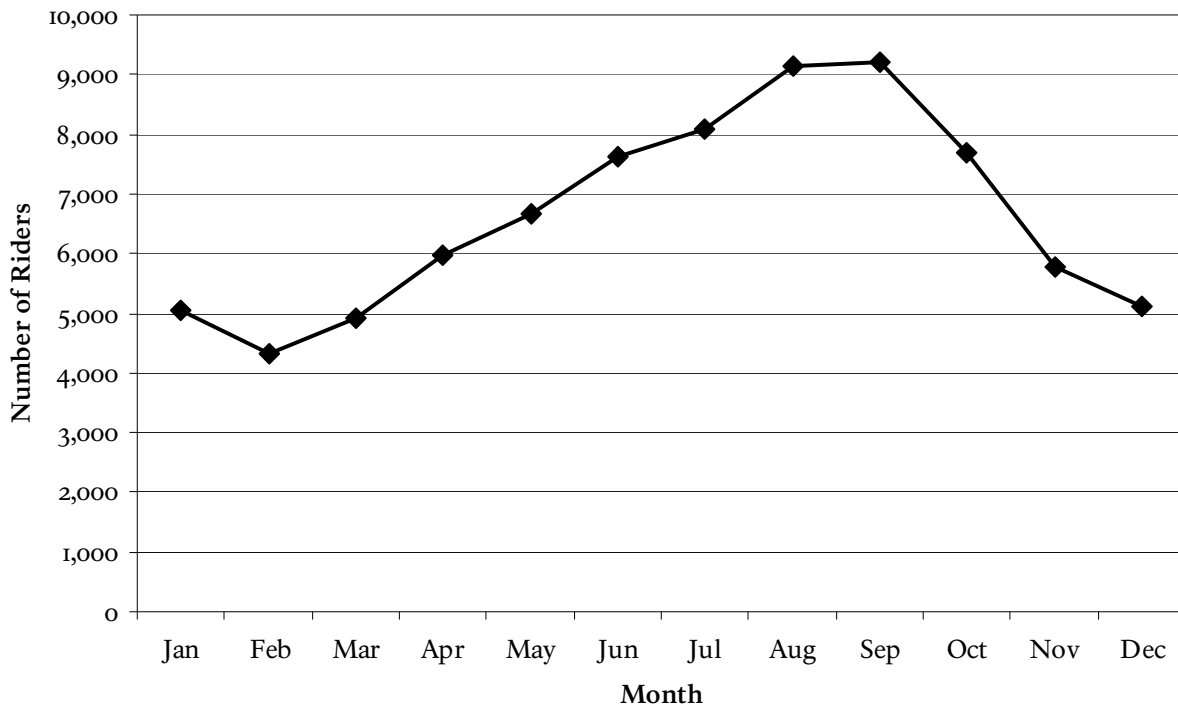
### Hyannis-to-Orleans

Also operated by CCRTA, the Hyannis-to-Orleans (H2O) Breeze Line is a fixed route that serves Harwich, Chatham, and Orleans, in addition to other towns beyond the study area. Like Flex, H2O runs seven days a week during the summer, but eliminates Sunday service during the off-season. Of the transportation systems that serve the Lower/Outer Cape, H2O has the highest annual ridership and serves three of the four most-populated Lower/Outer Cape towns. Its ridership is not as seasonal as the Flex's but it does have higher ridership during the summer, with a dip November through March. Chart 10 shows the ridership for 2007.

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**Chart 10**  
**2007 H2O Ridership**

Source: Cape Cod Regional Transit Authority



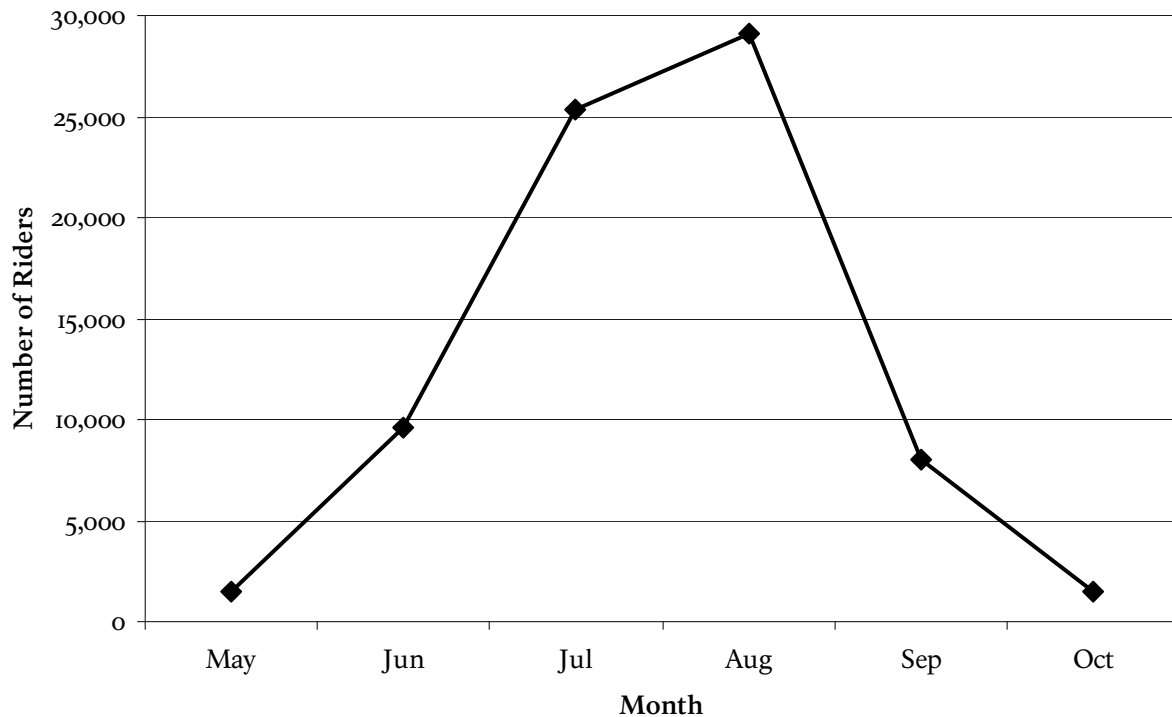
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**Provincetown-Truro Shuttle**

Another component of CCRTA's fleet, the Provincetown Shuttle is seasonal bus line running from North Truro to Provincetown during the summer and fall months (May through October). Ridership for the 2007 season is shown in Chart 11.

**Chart 11**  
**2007 Provincetown-Truro Shuttle Ridership**

Source: Cape Cod Regional Transit Authority



**B-Bus**

CCRTA operates 19 paratransit vehicles, which are available on-demand, with specific pick-up and drop-off points requested by the rider. B-Bus uses a monthly fare system, meaning riders must arrange an account in advance in order to use B-Bus services. Estimated B-Bus ridership for the Lower/Outer Cape communities is fairly constant throughout the year, ranging from 2,500-3,500 per month.

**Private Transportation Providers**

Transportation to the Cape and, in some cases, within Cape Cod, is also provided by a number of private bus and ferry companies. The Plymouth & Brockton Street Railway Co. (P&B) offers daily bus service between Downtown Boston and Logan Airport and Cape Cod, with service all the way to Provincetown. The service is primarily used for commuting and for access to the airport. Monthly ridership averages 3,500, ranging from 5,000 in the summer to 2,000 in the winter. During the summer, Provincetown Trolley, Inc., provides a 40-minute narrated tour of Provincetown that includes a stop at the NPS Provincelands Visitor Center. However, the service does not function as a form of transportation. Bay State Cruise Company and Boston Harbor Cruises provide ferry service between Provincetown and Boston daily May through October; there are also ferry services offered between Provincetown and Plymouth and



Gloucester. The estimated ridership for ferry services out of Provincetown for 2007 was 140,000.

### 5.3 *Non-vehicular Transportation Amenities*

Cape Cod bicyclists and pedestrians are served by a network of paved trails, state-designated bicycle routes, and sidewalks.

#### **Cape Cod Rail Trail**

The Cape Cod Rail Trail is a converted rail grade that runs from Dennis (just outside the study area) to Wellfleet, passing through Harwich, Brewster, Orleans, and Eastham. It includes an extension from Harwich to Chatham. The main line of the trail is 21.9 miles, and the Chatham Branch is 6.2 miles. Massachusetts Department of Conservation and Recreation (DCR), the owner and maintainer of the trail, estimated that 400,000 people use the trail annually.<sup>†</sup>

#### **Nauset Trail**

The Nauset Trail runs 1.9 miles between the Salt Pond Visitor's Center and Coast Guard Beach. It is owned and maintained by NPS.

#### **Provincelands Trails**

The Provincelands Trails are a system of trails in the dunes of the Race Point area of the Seashore. These paths were constructed before the establishment of design standards for bicycle trails, and are often too steep and/or curvy. The maximum speed on these trails is 10 miles per hour. The loop trail is 5 ½ miles long and there are three spurs: Herring Cove (1 mile one-way) , Race Point Beach (1/2 mile one-way) and Bennett Pond (1/4 mile one-way). The system is owned and maintained by NPS.

#### **Head of the Meadow Trail**

Located in Truro and within the Seashore, the Head of the Meadow Trail connects Head of the Meadow Road to High Head Road. It is used primarily for recreation purposes and is owned and maintained by NPS. It is two miles long.

#### **Sidewalks**

More than 90 percent of Cape Cod roads do not have sidewalks. Many of the roads without sidewalks are located in residential and/or non-urban neighborhoods, where traffic is light. Some areas, however, are considered unsafe due to lack of sidewalks, and in places like Harwich, these areas include beaches that might otherwise be easily accessed by foot.

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\* Estimate provided by Bay State Cruise Company referencing the total revenue received by the Town of Provincetown from the embarkation fee charged per ferry passenger.

<sup>†</sup> Cape Cod 2007 Regional Transportation Plan.

## 6 Existing Conditions Chapter Summary

The following is a recap of the major items identified in the Existing Conditions chapter.

- The Parking and Integrated Transit study involves the National Park Service's Cape Cod National Seashore (the Seashore) and eight incorporated towns of Barnstable County, comprising what will be referred to as the "Lower/Outer Cape". The towns are Provincetown, Truro, Wellfleet, Eastham, Orleans, Chatham, Brewster, and Harwich.
- Much of the Cape's shoreline is defined by sandy beaches on the Atlantic Ocean, the Cape Cod Bay, or the Nantucket Sound. Most major beaches and beach access points are managed and maintained by their respective towns, although six major beaches fall under the Seashore's jurisdiction.
- Erosion has and will always be a major factor in shaping the Cape's shoreline. Roads, structures, and parking areas have been lost to erosion in the past, and many existing facilities are situated in areas that are vulnerable to erosion.
- Fees and/or permits for beach parking are an important source of revenue for both the Seashore and the towns.
- Many town and Seashore parking areas are filled to capacity on a typical summer day (Figure 21). Many of those same parking areas are threatened by erosion (Figure 22). A reduction in the number of parking spaces would directly impact beach accessibility and result in a loss of income for the towns or Seashore, unless that parking is able to be replaced. Initial priority areas were established in Figure 23 and include the following beaches: two NPS beaches (Herring Cove in Provincetown and Nauset Light in Eastham), Truro and Wellfleet oceanside beaches from Coast Guard to LeCount Hollow, Eastham and Brewster bayside beaches, and Chatham beaches along the Sound.
- The road network for much of the Lower/Outer Cape is defined by one major thoroughfare, U.S. Highway 6. During summer months, Route 6 experiences heavy traffic congestion, as there are few alternative routes available for travel between towns.
- Transportation alternatives, including public transit and a non-motorized trail network, are available to residents and visitors. With a few exceptions, these systems are not well integrated with beach accessibility.

Subsequent chapters in this study will use Existing Conditions data to determine criteria and identify future options for beach access in high priority areas. The outcome will offer a full assessment of the feasibility of new or expanded beach parking facilities, and their potential integration with existing or additional transit services and non-motorized trails.