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Cape Cod National Seashore
Massachusetts

Environmental Assessment

Electrical Supply for Herring Cove Beach Facilities

May 2008

Cape Cod National Seashore

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1.0 INTRODUCTION

SUMMARY

The purpose of this Environmental Assessment (EA) is to address the need to upgrade the present deteriorating underground electric supply line at Herring Cove Beach facilities at Cape Cod National Seashore (CCNS). The current supply line extends approximately two miles from Provincetown and is in need of direct replacement or provision of an alternate means of electrical supply.

CCNS is under the mandate of Executive Order 13423, (Strengthening Federal Environmental, Energy, and Transportation Management), requiring federal agencies to "lead by example in advancing the nation's energy security and environmental performance" by achieving a number of goals, including increased purchases of renewable power sources and increased usage of renewable power. Potential alternatives to direct line replacement include a switch to the use of a small scale stand-alone renewable energy application such as solar panels, wind power, or a combination. This EA will examine the National Park Service (NPS) preferred alternative in addition to one other action alternative and the no action alternative.

1.1 PURPOSE AND NEED:

The park needs to provide reliable electrical power to Herring Cove facilities, maximizing use of renewable and non-greenhouse gas producing energy technologies where possible. The purpose of this project is to remedy the ongoing deterioration of the electrical supply to Herring Cove in a manner that maximizes use of renewable and non-greenhouse gas producing technologies.

The facilities at Herring Cove Beach incorporate a two story bath house, a snack bar located next to the bath house, and a fee booth located at the entrance to the parking lot. Currently, there are also eight traffic lights located on Route 6 at the entrance to the beach. These lights are to be removed within the next few years when the intersection is better reconfigured for safety. The main section of the bath house is used by lifeguards, and there are restroom and changing room areas on either end of the building which are open for public use.

The present electric supply line for Herring Cove Beach starts in east Provincetown and extends underground along Moors Road from a utility pole approximately two miles to the site. This supply line was installed over 30 years ago and has deteriorated to the point that electric service is frequently interrupted from failures in the line. The line terminates at a pad-mounted transformer located on site near the bath house, and branches to three separate meters. The electricity sent to the site is single phase and 120/240V[1]. The current power line poses a potential safety threat to visitors and staff and/or a disruption in services in the event of an electrical fire. The need for considering alternatives is necessary.

[1] Antares Group Incorporated, 2007.

Two of the electric meters are located on the rear exterior wall of the bath house building (on the side of the facility facing away from the beach) and provide service for the bath house and the snack bar. From these meters, electric service is branched to the electrical system for each building. The third meter is located in the field to the northeast of the bath house. This meter services the fee booth and traffic lights.

An energy audit revealed a significant potential for energy conservation measures to reduce the overall capital and operational costs for any of the alternatives undertaken for this project, as the most cost-effective method for designing a remote power system is to reduce the power consumption as much as possible. The site visit revealed the presence of many out-of-date appliances such as fluorescent lights, refrigerators, upright freezers, chest freezers, electric grills, and a 52 gallon hot water heater that could be replaced with newer more efficient models or equipment.[2] It is anticipated that over time, the existing appliances will be replaced with energy-efficient and gas models.

[2] Antares Group Incorporated, 2007.

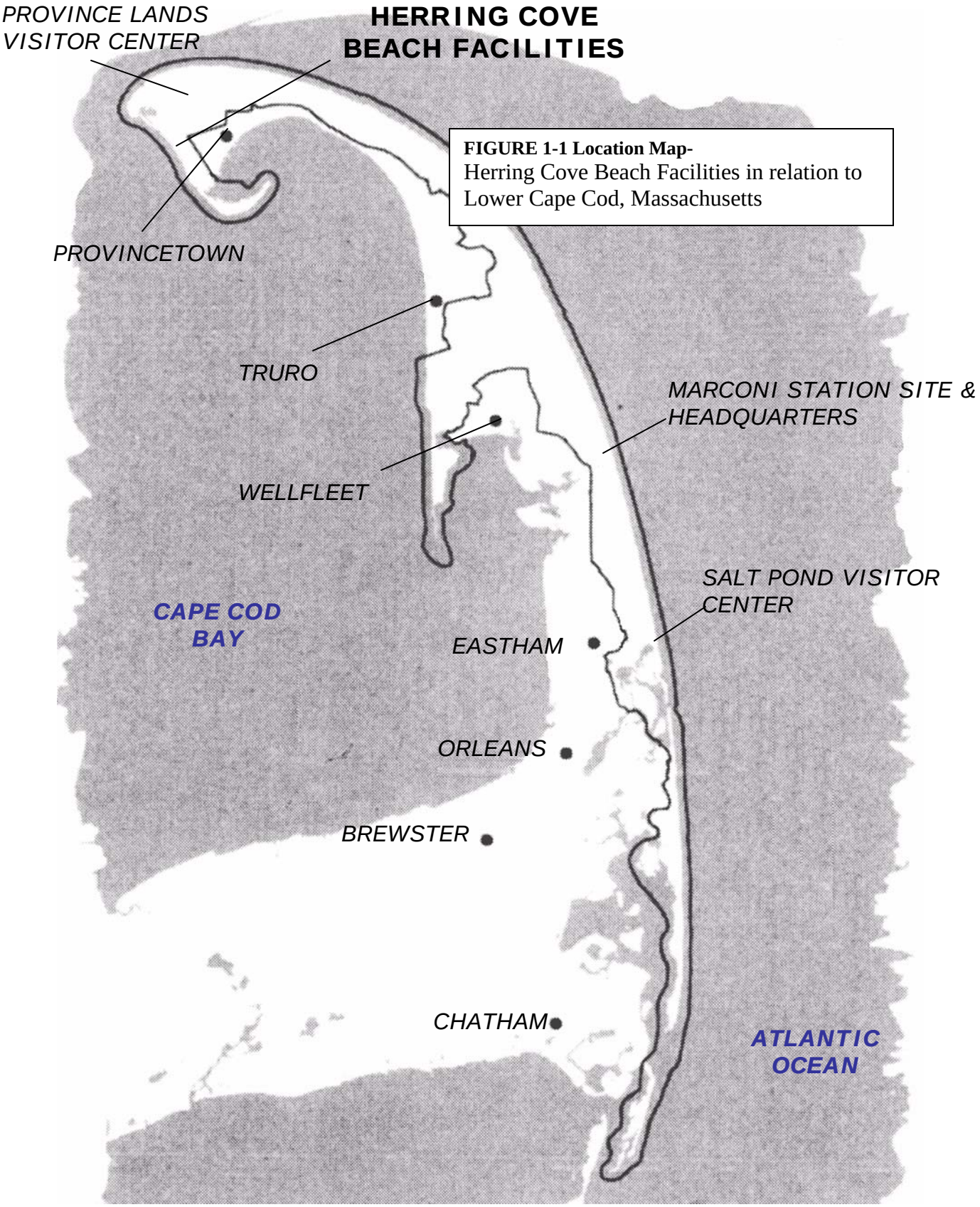


FIGURE 1-1 Location Map-
Herring Cove Beach Facilities in relation to Lower Cape Cod, Massachusetts

1.2 PARK SIGNIFICANCE

CCNS was established to protect the outer portion of Cape Cod, from Chatham to Provincetown. As the largest glacial peninsula in the world, Cape Cod is a striking geographic feature that extends well out into the Atlantic Ocean. One of its outstanding elements is the Great Beach, a long, uninterrupted natural beach. CCNS also contains a variety of physiographic features – a mosaic of landscapes and their accompanying flora and fauna that is unique in its combination and diversity. This includes habitat for state and federally-protected species and globally rare plant communities. In the national seashore, the relationship of the land to the wind, waves, tides, and rain, remain largely unaffected by development, so that it is easy to observe the actions of natural elements and their affect on the land. However, undisturbed prehistoric archeological sites also document the early presence of people on Cape Cod. In fact, the interactions of humans with nature on the Cape have gone on for thousands of years. Centuries of continuous human occupation have resulted in the development of occupations, folkways and pastimes that have given us some of the nation's most compelling stories.

Because of the Cape's prominent position in the Atlantic Ocean, it has been a key landmark for explorers and mariners. The Pilgrims made their first landfall and created the Mayflower Compact here. The surge in settlement that followed featured a dynamic whaling and fishing industry, as well as a long and famous tradition of shell fishing. Cape Cod's name reflects this heritage. The many lighthouses, lifesaving and Coast Guard stations that dot the Cape reflect this heritage as well. In addition, because of the Cape's location, it was the site of many communications milestones, including the French trans-Atlantic cable and the first two-way trans-Atlantic wireless communication for the U.S., sent and received by Guglielmo Marconi in 1903. The beauty, sense of solitude and other aesthetic values of the Cape have created an intense affection felt by residents of the Northeast, who have come here for inspiration and renewal for more than 100 years. This includes a longstanding tradition of use of the area by artists and writers including Edward Hooper, Mark Rothko, Jackson Pollack, John Dos Passos, Mary McCarthy, and Henry David Thoreau. At present, sunbathing, ocean swimming and sport fishing are also a part of this interactive relationship. As time goes by, the relatively undisturbed character of the park so close to densely populated urban areas is becoming more and more precious.

2.0 ALTERNATIVES

2.1 NO ACTION ALTERNATIVE

Under the No Action Alternative, the existing electrical supply line would not be replaced, and no renewable energy application would be installed to supply electrical needs of Herring Cove Beach facilities. The continued electrical service would be dependent on the capability of the line to provide power. Over time, the existing appliances would be replaced with energy-efficient and gas models.

2.2 ALTERNATIVE ONE, PREFERRED ALTERNATIVE: WIND AND SOLAR COMBINED

This option would entail installation of a *10.1 kilowatt Wind and Solar Photovoltaic (PV) Hybrid* system with a 2.64 kW solar PV array, 7.5 kW wind turbine, 8.5 kW Liquid Petroleum Gas generator setup (LPG genset), 11 kW inverter, and 84 kWh battery storage. The system is based on a packaged system offered by Bergey Windpower Company, Norman, Oklahoma (with several certified dealers in Massachusetts). The small-scale wind turbine would be approximately 75 feet in height with 22 foot diameter blades, for an overall elevation of 91 feet above sea level. The land-based, non-commercial turbine would not have lights or guy wires.

The total estimated installed cost for this system and other required components to achieve the required objectives of this project would be approximately $125,000. Significant reductions in installed costs are possible because this calculation was made using the highest estimates for wind tower installation costs.

Based on performance and economic modeling, this system results in a mid-ranged 20-year life-cycle cost operation (about $159,000), but would supply from 85% to 97% of the existing required power for the site from a renewable resource. This wide range results from the lack of site-specific wind resource data. Actual performance is expected to be towards the high side of this range due to the ample wind in this coastal location.

It should be noted that sizing (and therefore the costs) for this system are based on an existing packaged system and have not been optimized across all available wind turbines. It is possible that the installed costs for a smaller wind/solar/genset hybrid system, which could provide a very large fraction of this site's power from renewable resources, could be significantly lower than what has been estimated at this time.[3] In addition, it does not take into account that existing appliances would be replaced with energy-efficient and gas models.

During a site visit by consulting engineers and economists, Antares Group Incorporated, possible solar array locations were investigated. There are many considerations in determining the best location for a solar array. Some of these considerations include: minimizing shading, isolation to avoid vandalism or safety risks, sufficient area to hold a solar PV system sized to meet the electric load, and mounting requirements to allow south facing solar PV panel orientation. Three locations were considered: the parking lot, the sand dune directly to the north of the bath house, and the upper-story roof of the bath house.

Although the parking lot area and the sand dune to the north provide larger areas to place modules, the bathhouse roof was considered as the most appropriate location for the solar PV system. There are little shading concerns on the roof and the system would be adequately isolated to avoid any concerns associated with vandalism. The horizontal roof structure will provide easy installation of solar PV panels, whereas with the other locations, structures will have to be built to support the panels. There are a variety of mounting systems that are

[3] Antares Group Incorporated, 2007.

designed for horizontal roofs. With a roof-mounted system, proximity to the control center will be minimized since it is most likely that controls will be housed in the bath house. This will help avert losses in transmission lines.

Depending on the size of the solar PV system chosen to be installed, various steps would perhaps need to be taken to be able to fit the entire system on the roof structure. One option could involve installing solar PV panels horizontally on the roof to better take advantage of the area. Horizontal placement of panels, although less efficient, avoids extra spacing necessary to avoid shading when panels are tilted. The type of solar PV panel used could also affect the amount of area necessary. Amorphous silicon panels are the least efficient type of panel and therefore take up the most area. Monocrystalline solar PV panels are the most efficient and use the smallest area. Also, the awnings on the east and west side of the bath house could be potential locations for panels. Based on calculations by Antares Group Incorporated, there is ample space available on the roof, and if need be on the east and west awnings, to accommodate enough panels for the required size of solar PV system. [4]

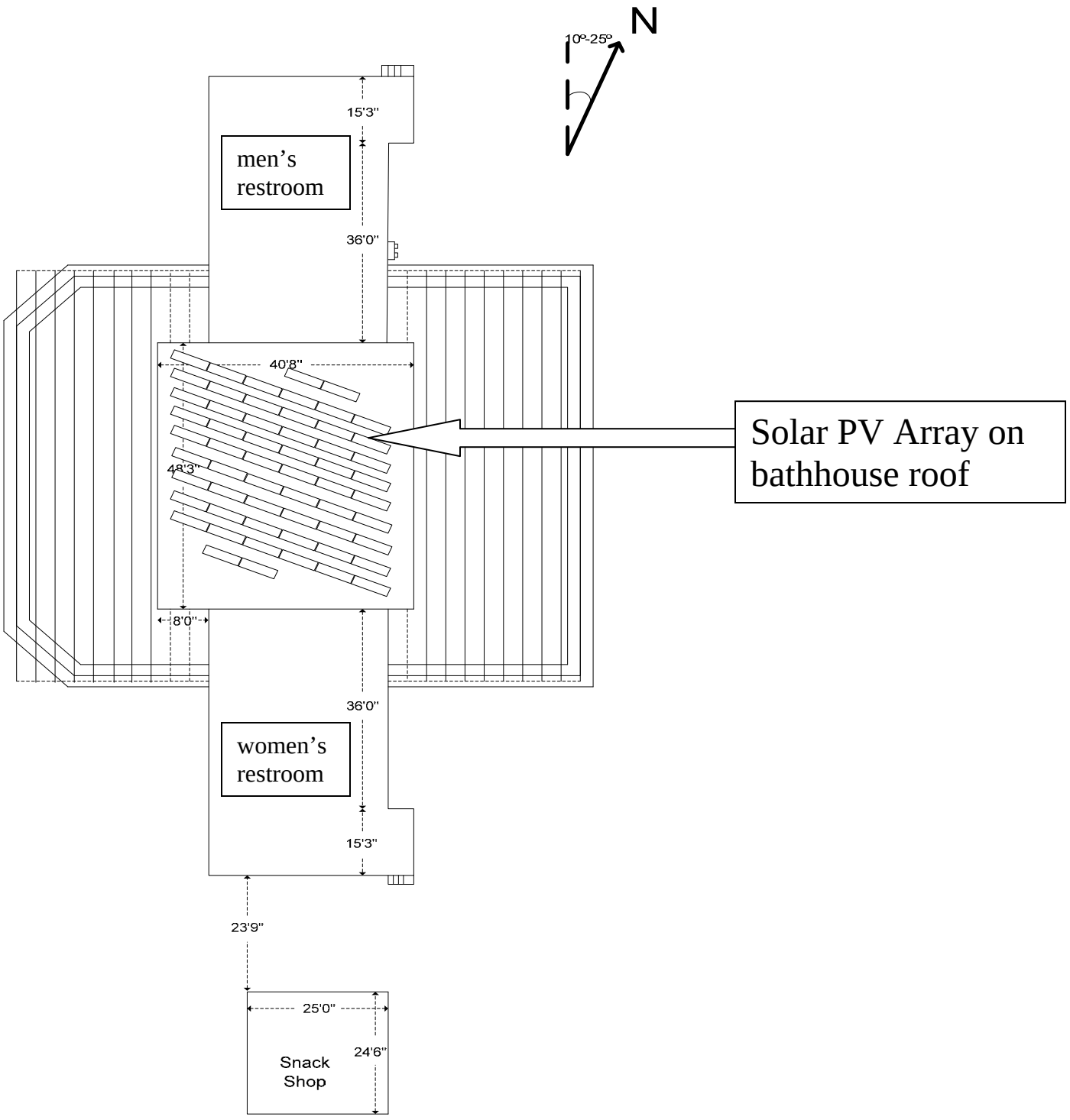
Several siting options were considered for the land-based wind turbine. A rooftop installation was considered, but the bathhouse structure is not structurally sound enough to support a turbine unit. Therefore a location 35 feet from the building was determined to be close enough to provide needed power, without significant transmission line loss, while far enough from the building to be affected by the wind turbulence. In the event of power loss resulting from severe weather conditions, the aforementioned battery storage would supply electricity to the site. If the wind and solar systems are not operational for any reason, the existing power line would be used for backup until complete line failure, at which point bio-diesel and propane options would be considered.

The wind turbine would be adaptively managed to ensure that impacts to state and federally listed species are avoided, and that impacts to bats and other bird species are avoided or minimized. The two phase adaptive management plan is described more fully in Appendix A, and provides for: (I) preliminary assessment of bird use and the Herring Cove airspace and, (II) subsequent monitoring and possible adjustment to wind turbine operations.

The adaptive management plan would include a pre-construction avian use assessment and a post-construction monitoring protocol developed in coordination with the U.S. Fish and Wildlife Service (FWS) and the Massachusetts Natural Heritage and Endangered Species program (NHESP). The pre-construction assessment would be designed to collect information on the species of birds flying over and through the Herring Cove area. Monitoring would be designed to detect any bat or avian mortality resulting from collisions with the wind turbine. Monitoring results would be used to determine time of year, time of day, and weather conditions during which the turbine would be shut down, if necessary, to ensure that impacts to state and federally listed species are avoided, and that impacts to bats and other bird species are avoided or minimized. In this event, the existing power line would be used for backup until complete line failure, at which point bio-diesel and propane options would be considered.

[4] Antares Group Incorporated, 2007.

FIGURE 2-1 Herring Cove Bath House –
Possible Arrangement for Roof Mounted Solar PV Array



2.3 ALTERNATIVE TWO: SOLAR ONLY

This alternative would incorporate the considerations of solar PV siting and placement as discussed in Section 2.2, Alternative One, Wind and Solar Combined, with the following change in the proposed renewable energy system.

Alternative Two would entail installation of solely the *10 kilowatt Solar PV Hybrid*, with a 10.0 kW solar PV array, 8.5 kW LPG genset, 11 kW inverter, 252 kWh battery storage. This system is designed to maximize the power supplied by solar panels, and the solar array is larger than the array proposed in Alternative One.

The total estimated installed cost for this system and other required components to achieve the required objectives of this project would be about $152,000 (or less). Based on performance and economic modeling, this system results in the highest 20-year life-cycle cost operation (about $206,000) of any of the remote power system options considered, but would supply about 95% of the site's power needs from solar panels. The balance of the power would be provided by the aforementioned propane (LPG) fueled genset. All solar PV panels from this system will fit on the 2-story portion of the roof of the bath house building, but only if they are mounted flat or with a very slight angle.

If the solar system is not operational for any reason, the existing power line would be used for backup until complete line failure, at which point bio-diesel and propane options would be considered.

2.4 ALTERNATIVE CONSIDERED, BUT REJECTED –UNDERGROUND ELECTRIC LINE REPLACEMENT

Under this alternative, the current electric power line-running underground along the side of Moors Road to Herring Cove facilities would be replaced. This would entail ground disturbance along Moors Road to reach the facilities. Based on quotes provided to the NPS from local contractors, upgrading the existing electric supply line would cost about $200,000. Including costs for purchasing power from the utility based on current electrical loads, Antares Group Incorporated estimates the 20-year life-cycle operation costs to the NPS for this option to be about $219,000. The installed costs of the remote power systems considered would be from $48,000 to $121,000 less expensive than upgrading the existing power line. On a 20-year life cycle cost basis, the remote power systems would be from $13,000 to $95,000 less expensive than upgrading the existing power line.[5]

In the interest of installing renewable technologies where appropriate and given consideration of the various impacts examined in this EA, it was determined that even with the planned reduction of current energy consumption loads, in a cost-benefit analysis, underground electric line replacement is not considered a cost-effective and environmentally beneficial long-term solution.

[5] Antares Group Incorporated, 2007.

Opportunities to showcase and inform the public about alternative energy were taken into account in this decision. Also considered were CCNS long-term goals of increasing usage of renewable technologies in order meet the mandate of the abovementioned Executive Order 13423 and move towards being a Climate Friendly Park (CFP). The CFP Program is a collaboration of the National Park Service and the U.S. Environmental Protection Agency that provides national parks with a system approach to manage climate change. The program aims to provide national parks with comprehensive support to address climate change both within park boundaries and the surrounding community.

2.5 ENVIRONMENTALLY PREFERRED ALTERNATIVE

In accordance with the NPS DO-12, the NPS is required to identify the "environmentally preferred alternative" in all environmental documents, including EAs. The environmentally preferred alternative is determined by applying the criteria suggested in NEPA, which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that the environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of NEPA. Generally, the criteria mean the environmentally-preferable alternative is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (Federal Register, 1981).

As considered in this EA, the environmentally preferred alternative is Alternative Two, the solar only option. None of the alternatives would cause adverse cumulative impacts upon historic or cultural resources. Under Alternatives One and Two, use of renewable and non-greenhouse gas producing technologies would have moderate, long-term beneficial impacts to public use and park operations. Due to the logistically complementary nature of wind and solar, interpretive opportunities of using both technologies, and the provisions in the adaptive management plan described in Appendix A and under Section 2.2, a hybrid system is not anticipated to be environmentally detrimental and is considered the NPS Preferred Alternative. However, Alternative Two, the solar option only, would have a lesser chance of impact to the biological and physical environment because it is a rooftop installation and would require less ground disturbance and no adaptive management planning.

3.0 AFFECTED ENVIRONMENT

This chapter presents the relevant baseline resource components of the existing environment. The environmental resources that would be affected by the alternatives considered in this EA are described, including natural resources, cultural resources, public use, the surrounding community, and the national seashore management and operations. This chapter does not present the effects of these alternatives; these effects are described in Section 4, Environmental Consequences.

3.1 NATURAL RESOURCES

3.1.1 WATER RESOURCES

Cape Cod National Seashore has a wide variety of marine and fresh water resources formed by the geological events that created the landmass of Cape Cod. These diverse water resources are often interrelated, and each is an integral part of the ecology, history, and beauty of Cape Cod. The area's ecosystems consist of various marine, freshwater, and terrestrial areas including beaches, sand spits, tidal flats, salt marshes, swamps, kettle ponds, scrub oak forests, dunes, sand plain grasslands, amongst others[6].

The entire layer or zone of fresh water underlying the Cape is referred to as an aquifer. Within this single Cape-wide aquifer are six separate lenses of groundwater, four of which underlie parts of the national seashore. Tidal rivers that cut across the Cape hydro geologically separate these lenses from one another. From north to south, they are the Pilgrim, Pamet, Chequessett, and Nauset lenses. The freshwater contained in these lenses is vital to sustaining the lifestyle and ecological resources of the Outer Cape. It is the Outer Cape's sole source of potable water, as well as the hydrologic source for water dependent natural resources (Cape Cod Commission 1997).

The source of freshwater to the aquifers of the Outer Cape is precipitation. A little less than half of this amount infiltrates the aquifer and recharges the groundwater system. Precipitation that is not recharged to the aquifer evaporates or is transpired by plants. Surface runoff is negligible because of the highly permeable soils of the Outer Cape. The greatest percentage of the recharge passes slowly through the aquifer and is discharged into the ocean. Every day, millions of gallons of fresh groundwater seep out of the ground directly into the ocean (Cape Cod Planning and Economic Development Commission, 1987).

The potential wind turbine project site is approximately 300 feet east of the Cape Cod Bay shoreline at Herring Cove Beach, and the potential solar photovoltaic project would be sited on the roof. The Hatches Harbor estuary is approximately 4 km (2.5 miles) to the north of Herring Cove, and West End Marsh is about 2.5 km (1.6 miles) to the south. There are numerous ponds and dune slack wetlands farther east of the project area. There are no wetlands in the immediate Herring Cove area. Thus, there is no potential for this project to affect wetlands or marine water resources. Water resources may be removed from further consideration as an impact topic for this environmental analysis.

3.1.2 GEOLOGY AND SOILS

The soils of Cape Cod have been classified as excessively drained outwash and are derived from glacial outwashes and moraines. They vary in composition and include glacial till, sand, gravel, interspersed layers of clay and silt, and scattered large boulders. In several areas of the Cape, dune deposits overlie the glacial soils. Many of these dunes are formed from beach material that was transported inland by winds.

[6] National Park Service.

Herring Cove is at the western end of the post-glacial portion of the Cape. This area consists of sands eroded from the bluffs in Truro and to the south, and transported by wind and water to the north and west forming the hook at the Cape's tip. The sand in the Herring Cove area generally comes from the north, carried around the "race" at Race Point, and transported southward feeding the beaches at Wood End and Long Point.

None of the alternatives would have an adverse impact on the geological resources of CCNS. Solar panel installation would not involve removal of geological features or subsurface components. Replacement of the existing electrical line would involve digging in a previously disturbed area. There would be a negligible amount of ground disturbance associated with the installation of the proposed turbine. Therefore, geological resources may be dismissed as an impact topic for more detailed study.

3.1.3 VEGETATION

Immediately adjacent to the Atlantic Ocean, Herring Cove area vegetation is dominated by American beachgrass (*Ammophila breviligulata*). Presently, no federally-listed rare plants have been identified in the proposed project area, but the national seashore-wide distribution of 34 state-listed rare, threatened, or endangered species is documented. Of these, the outer beach is an available habitat to three rare plant species. They include sea lyme grass (*Elymus mollis*), seabeach knotweed (*Polygonum glaucum*), and oysterleaf (*Mertensia maritima*). Sea lyme grass has been historically located on the foredune, usually among beachgrass. Seabeach knotweed has also been historically found on the beaches of Cape Cod.

3.1.4 WILDLIFE

A number of species of amphibians and reptiles are found in the backdune habitats behind Herring Cove and throughout the Province Lands. These include spring peepers, Fowler’s toads, Eastern spadefoot toads (state threatened), redbacked salamanders, black racers, Eastern hog-nosed snakes, Eastern box turtles (state species of special concern), spotted turtles, painted turtles, and snapping turtles. Most prominently, the Eastern spadefoot toad is a specialist of dry, sandy habitat that breeds in shallow temporary wetlands. The Province Lands, with their abundance of dune slack wetlands, provide an ideal landscape for spadefoots, and supports the most significant known population of spadefoot toads in the Northeast United States (Cook 2005).

The beaches of lower Cape Cod provide important nesting and feeding habitat for a number of sensitive species including piping plovers (*Charadrius melodus*), which are federally and state listed as threatened, and least and common terns (*Sterna antillarum* and *S. hirundo*), both of which are state listed as species of special concern. The lower Cape's beaches, salt marshes, and estuarine waters also provide important resting and feeding habitat for migratory species including the federally endangered roseate tern (*Sterna dougalli*), and several shorebird species. The beach at Herring Cove is not used by these species. This is probably due to the presence of developed facilities (parking areas, bathhouse, snack bar) along the length of the beach, disrupted sand dynamics due to past paving and seawall construction, and intensive recreational use. While the beach at Herring Cove does not

provide habitat used by these species, it is in the vicinity of areas of high habitat value. Hatches Harbor, which is about 4 km (2.5 miles) to the north, provides nesting, feeding, and staging habitat for piping plovers. Hatches Harbor is also used by other shorebirds and terns during migration. West End marsh, which is about 2.5 km (1.6 miles) to the south, is also used by migrating shorebirds and terns. And Wood End/Long Point beach, starting about 8.5 km (5.3 miles) to the south and east, is also used by nesting plovers and migrating shorebirds and terns.

Backdune habitats in this area support many species of terrestrial birds. The state threatened northern harrier makes extensive use of the dunes and salt marshes found throughout this area for foraging, and the state threatened vesper sparrow also utilizes backdune habitats for nesting and in migration.

Mammals found in the beach, dune, and backdune habitats of Provincetown and Truro coastal area are a product of the habitats present. Because this landscape is a mosaic of dune slack wetlands, stands of pitch pine and shrubs, native grasses, and open sand, it is used by many species of both marine and terrestrial mammals. These include coyote, red fox, raccoon, striped skunk, long-tailed weasel, Eastern cottontail rabbit, white-tailed deer, and smaller mammals including various species of rodent. Information about bats in this area is currently lacking.

The Massachusetts Natural Heritage Atlas, 12th Edition, published by NHESP in October of 2006 identifies the Herring Cove area as priority and estimated habitat for rare plant and wildlife species. Surveys have confirmed the presence of the state listed species discussed above in the general vicinity of the proposed project.

3.1.5 AIR QUALITY

The Clean Air Act of 1973, as amended, and associated NPS policies require NPS to protect air quality in parks. CCNS is classified as a Class II area under the Clean Air Act. CCNS is within a non-attainment area for ozone, an area that includes the entirety of the Commonwealth of Massachusetts. The primary local source of pollution at Herring Cove comes from emissions generated by vehicles entering, exiting, and idling in the parking lot. As the parking lot capacity would not increase under any of the proposed alternatives, no increase in emissions levels is expected as a consequence of any of the courses of action.

The state may permit a moderate amount of air pollution as long as neither national ambient air quality standards nor the maximum allowed increase over established baseline concentrations is exceeded. As stated above, the major air pollutants originating in the seashore are vehicle emissions (primarily hydrocarbons, carbon monoxide, and nitrogen oxide), most of which are generated during periods of high visitation (NPS, 1999).

3.2 SURROUNDING COMMUNITY

The facilities at CCNS, dedicated to public experience as well as resource and visitor protection, have a significant positive influence on the local economy, with statewide and

regional contributions. The quality of visitor experience in the seashore has contributed to regional status as a destination that attracts out-of-state visitors and local residents alike to enjoy the natural beauty of the area.

Herring Cove Beach is located at the most outer portion of the Cape Cod Peninsula in Provincetown, Massachusetts. None of the proposed alternatives introduce new adverse impacts to the surrounding community in the Herring Cove area. The proposed project area is fully surrounded by park lands. There is no private land adjacent to the proposed wind or solar site.

3.3 PUBLIC USE

CCNS was estimated to have 4.3 million visits in 2007, including those by residents and repeat visitors. The national seashore and adjacent towns provide a wide variety of opportunities for visitors and residents to enjoy athletic, sporting, touring, and educational activities. CCNS has two visitor centers, two environmental education centers, trails, picnic areas, historic buildings, cultural landscapes, and numerous beach facilities available to the public, including Herring Cove beach, the area in question.

Most visitors to CCNS come from the Northeast. However, all 50 States, plus the District of Columbia and Canada, were represented in a visitor survey, completed by the University of Vermont in 1994. Although there were 24 (including "other") activities in which visitors participate at CCNS, the primary activities include: 1) viewing scenery, 2) sunbathing, 3) swimming in the ocean, 4) beachcombing, 5) hiking, and 6) driving scenic roads. According to that survey, most visitors were highly supportive of protecting the natural and historic resources of the seashore; most approved of the current balance between public use and resource protection, and most felt that natural and historic resources are being well preserved.

3.4 PARK MANAGEMENT, OPERATIONS, AND PUBLIC SAFETY

Herring Cove Beach facilities and services are described in the introduction of this document. Parking lots throughout CCNS are open from 6 A.M. to midnight, daily, year-round. The park has developed a staff with significant expertise for monitoring park resources, enforcing park rules, providing visitor services and education, and ensuring public safety. Uninterrupted and efficient park operations at CCNS are vital to meeting the NPS mission.

3.5 CULTURAL RESOURCES

There are no structures, archeological sites or cultural landscapes currently eligible for or listed on the National Register of Historic Places in the direct vicinity of this project. In October 2004, Northern Ecological Associates, Inc. performed a Phase I archeological investigation in advance of the installation of 2 vault toilets and lift station in the vicinity of this project area. They concluded that no prehistoric or historic sites or features potentially eligible for inclusion on the National Register of Historic Places were located in the area.

The nearest National Register properties are approximately 1 mile from the site outside the park boundary in the town of Provincetown. Within the park, the Race Point and Wood End Lighthouses are both approximately 1 ½ miles from the site, and the Dune Shacks of the Peaked Hills Bars Historic District is 2 miles distant. The Herring Cove Bathhouse, upon which the proposed solar panels would be placed, is currently not considered a historic structure, but it has never been evaluated. It is anticipated that the park will evaluate the structure in the next year and it could be determined to be eligible for the National Register of Historic Places. Built in 1953, it is over 50 years old and one of the first bathhouses built by the Commonwealth of Massachusetts.

4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the environmental consequences associated with the alternatives. It is organized by impact topics, which distill the issues and concerns pertaining to natural resources, public use, park operations, and cultural resources. NEPA requires consideration of context, intensity and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate for impacts. NPS policy also requires that "impairment" of resources be evaluated in all environmental documents.

General Definitions. The following definitions were used to evaluate the context, intensity, duration, and cumulative nature of impacts associated with project alternatives:

Context is the setting within which an impact is analyzed, such as the affected region, society as a whole, the affected interests, and/or a locality. In this EA, the intensity of impacts are evaluated within a local context, while the intensity of the contribution of effects to cumulative impacts are evaluated in a regional context.

Impact Intensity

For this analysis, intensity, or level of the impact is defined as follows:

Negligible – impact to the resource or discipline is barely perceptible and not measurable and confined to a small area.

Minor – impact to the resource or discipline is perceptible and measurable and is localized.

Moderate – impact is clearly detectable and could have appreciable effect on the resource or discipline.

Major – impact would have a substantial, highly noticeable influence on the resource or discipline on a regional scale.

Impact Duration

The duration of the impacts in this analysis is defined as follows:

Short term - when impacts occur only during treatment or last less than one year; or

Long term - impacts that last longer than one year.

Direct versus indirect impacts

The following definitions of direct and indirect impacts were used in this evaluation:

Direct – an effect that is caused by an action and occurs at the same time and place.

Indirect – an effect that is caused by an action but is later in time or farther removed in distance, but still reasonably foreseeable.

Cumulative Effects

The CEQ regulations, which implement NEPA, require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7).

IMPAIRMENT OF (PARK) RESOURCES OR VALUES

The 2001 NPS Management Policies and other policy guidance require analysis of potential effects to determine if actions would impair (park) resources. Initially, the National Park Service was established by its Organic Act of 1916 which charged the Service, as the Federal administrative bureau with the authority and responsibility, for promoting and regulating the use of national parks, monuments and reservations, by means and measures, to conserve the scenery, natural and historic objects and wild life therein as being the purpose [in part] for which each park, monument, and reservation [having nationally significant resource values] was authorized. The General Authorities Act of 1970, as amended in 1978, recognized such federal areas administered by the National Park Service, as being a National Park System comprised of nationally significant resource values, and reaffirmed the conservation of those values to prevent their impairment, as provided for in the Service's Organic Act. National Park Service managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within parks, that discretion is limited by statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibition of impairment includes impacts that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or

value may constitute impairment. However, an impact would more likely constitute impairment to the extent it affects a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;

- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or

- Identified as a goal in the seashore's Master Plan or General Management Plan or other relevant NPS planning documents.

Impairment may result form NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operation in the park.

A determination of impairment is made for each alternative in each "Cumulative Impacts" section of this EA under "Environmental Consequences."

4.1 NO ACTION ALTERNATIVE

4.1.1 IMPACT ON NATURAL RESOURCES

Analysis. There would be no change to the current electrical service. The No Action alternative would not affect soils, vegetation or wildlife or air quality.

Conclusion. Leaving the existing underground line in place would not result in new impacts to natural resources.

4.1.2 SURROUNDING COMMUNITY

Analysis. The deteriorated electrical line at Herring Cove would continue to serve the bath house, snack bar, fee booth facilities while experiencing frequent interruptions in service. There is no specific direct impact to the surrounding community associated with this alternative. An indirect impact to the surrounding community may be the consequences of reduced visitation to the Herring Cove site, due to the inconvenience in the case of frequent electric line failure as a short to long term adverse impact on visitor experience.

Conclusion. Short and long term adverse impacts to the surrounding community may result from electric line failures.

4.1.3 IMPACT ON PUBLIC USE AND ACCESS

Analysis. Recurring loss of electricity will inconvenience visitors using the bath house and restroom facilities. These inconveniences could continue long-term if the electrical line lasts, though operating inconsistently. Unexpected and permanent failure of the system, however,

could result in immediate closure of the beach facilities while the problem is resolved. This could turn away visitors and limit access, depending on how repairs are approached. Electrical failure of the existing system could have moderate to major impacts on public use of the Herring Cove facilities.

Conclusion. The no-action alternative could produce the long-term, indirect consequence of turning visitors away who may be frustrated with inconsistent services.

4.1.4 IMPACT ON PARK MANAGEMENT AND OPERATIONS

Analysis. Park staff, including rangers, lifeguards, fee booth operators, and snack bar concessionaires, are adversely impacted during unexpected electrical failures. Normal and safe operation of equipment for these staff members and the traffic lights leading to the beach are dependent on reliable electricity, not available with the current system. In the event of a power failure, the snack bar will indirectly suffer economically, as food storage and production will be impaired. Also, lifeguards who use the second floor of the bathhouse for their offices will be directly inconvenienced, as will the fee booth operators. An unexpected failure during peak visitor season would require the park to divert significant time and resources to repairing this problem.

Conclusion. The No Action alternative could have major adverse impacts on the operation and management of Herring Cove facilities if repeated electrical outages continue to occur.

4.1.5 IMPACT ON CULTURAL RESOURCES

Analysis. The No Action Alternative involves no new construction. There would be no historic properties affected by this alternative.

Conclusion. No historic properties would be affected by the No Action alternative.

4.1.6 CUMULATIVE IMPACTS

Under the No Action alternative, the existing electrical supply line would not be replaced, no new construction would occur and facilities would not be changed. No renewable energy application would be installed to supply electrical needs of Herring Cove Beach facilities. There would be no adverse impacts upon natural or cultural resources. There would be potential long-term direct adverse impacts upon public use, surrounding community, and park management and operations. However, this impact would not constitute impairment of park resources.

4.2 PREFERRED ALTERNATIVE: WIND AND SOLAR COMBINED

4.2.1 IMPACT ON NATURAL RESOURCES

Analysis. The turbine proposed in the preferred alternative would have no effect on rare plant species as no species of concern are in the project area. Vegetation would incur no adverse impact from the installation of solar panels**.** Neither solar panels nor the wind turbine would have an adverse impact upon marine mammals, terrestrial mammals other than bats, reptiles, or amphibians.

The use of renewable energy technologies would have a minor long-term beneficial impact on air quality as wind they would be non-greenhouse gas emitting means of power generation.

Direct impacts to birds and bats have been observed at a number of commercial-scale wind developments (NWCC 2004). However, there is little information regarding the impacts of small, single turbine wind installations. A study to assess avian mortality associated with a larger turbine (73.5 m (241 ft) rotor tip height) at the Massachusetts Maritime Academy estimated 1.39 bird fatalities/year resulting from collision with the turbine based on the death of one laughing gull (Vliestra 2007). This study also counted 24,564 birds passing though the turbine's air space during the four-month tern nesting period in 2006. Of these, 254 were terns which were abundant in the area, particularly foraging in the waters off the Academy during the chick rearing season. Comparison of the numbers of terns flying through the rotor-swept zone when the turbine blades were and were not spinning indicates that terns may avoid the turbine airspace when the blades are rotating. No impacts to bats were detected. Very few bird mortalities and no bat mortalities have been detected in association with a turbine (27 m (91 ft) rotor tip height) at Missisquoi National Wildlife Refuge in Vermont after three years of operation, and starlings have nested in the structure behind the rotor for the last few nesting seasons (M. Sweeney, pers com). At the Eastern Neck National Wildlife Refuge in Maryland, a total of 15 bird deaths were attributed to a turbine 18.3 meters (60 feet) tall over a three year period. Thirteen of these were European starlings which had nested in the turbine structure. The other two mortalities were a bank swallow and a catbird. No effects to bats were observed (Willis 2005).

Based on the observations of avian interactions with other small, non-commercial, land-based turbines at other sites, it appears that the potential for the Herring Cove turbine to have more than negligible impacts to birds is quite low, and the potential for impacts to bats would seem virtually nonexistent. However, the habitats and species in the vicinity of National Wildlife Refuge turbines are different than those in the vicinity of Herring Cove, and although the species of concern for the Maritime Academy's turbine are substantially similar to Herring Cove, the ecological setting is quite different. To ensure that the turbine's impacts to birds and bats are minimal, and that adverse effects to state and federally listed species are avoided, the preferred alternative incorporates a two part adaptive management strategy described in Appendix A. The first part will focus on assessing bird use in the area of the proposed turbine, and the second part integrates monitoring into turbine management to ensure that turbine operations are modified or shut down if adverse effects to state or

federally listed species appear likely, and well before any impacts to other species approach the level of having an appreciable effect. The adaptive management plan includes continued and frequent coordination with FWS and NHSP to ensure those agencies' expertise is incorporated into review and interpretation of the data collected, and that those agencies concur with decisions regarding turbine operations. As a result, direct impacts are anticipated to be minor, and the project is not anticipated to adversely affect state or federally listed species.

It is projected that such small sized, land-based turbines as the scale proposed are not enough equipment to form a long-term adverse effect to migration patterns or bird populations, thus indirect effects to birds and bats are anticipated to be negligible.[7] The solar panels would present no adverse effect to wildlife because of their stationary position atop the roof of the bathhouse.

Conclusion. The potential minor adverse impacts to birds and bats would be limited by managing turbine operations in response to monitoring results.

4.2.2 IMPACT ON SURROUNDING COMMUNITY

Analysis. The preferred alternative would provide an example of zero-emission source of electricity in the park. In addition to direct environmental benefits, the wind and solar alternatives would result in indirect beneficial effect by showcasing and providing educational information about renewable power opportunities.

The proposed wind turbine is approximately 11,510 feet (2.18 miles) from the Provincetown Municipal Airport. It is not in the direct path of the airport runway over Hatches Harbor. Consultation with the Massachusetts Aeronautical Commission on an airspace review of the potential project confirms that the proposal does not conflict with state aviation laws or regulations, and the Federal Aviation Administration has been asked in December 2007 for their findings regarding the public use airport and navigation aid facilities as per Section 5.2 and a final determination is pending. It is not anticipated that such a small wind turbine would have an adverse impact on air traffic or safety, and would not be considered an airport obstruction.

Conclusion. Through the preferred alternative, there would be long term moderate to major beneficial impact to the community. It is not anticipated that such a small wind turbine would have an adverse impact on air traffic or safety, and would not be considered an airport obstruction. The combination of both wind and solar is preferred in an effort to be most efficient and demonstrating the presence of varied types of renewable power sources.

[7] Woods Hole Oceanographic Institution Quissett Campus Pre-Construction Avian Surveys Final Report, 2007.

4.2.3 IMPACT ON PUBLIC USE AND ACCESS

Analysis. A combined wind and solar would provide educational opportunities to the surrounding community, and thus would result in a long-term beneficial impact upon public use. As issues of sustainability become increasingly acknowledged, visitors to the park could be drawn to the Herring Cove Beach to see wind and solar apparatuses in action.

The potential installation of wind and solar renewable energy technologies at Herring Cove would have negligible adverse impact on public use and access during the off-season installation. As all installations would be scheduled to occur when these services are closed for the season, there would be negligible impact on public use, aside from temporary closure of the South parking lot.

Fee collection at the site begins on Memorial Day weekend, continues on weekends only until the third week of June, then goes into full-time operations until Labor Day and back to weekend operations for the month of September. Installation would not occur during peak summer months, as this would result in a major short-term adverse impact on park use and access. For the purpose of construction, a small section of the parking lot could be temporarily roped off to ensure visitor safety for a short duration. Once installed, full access would be restored; no long-term adverse impacts would occur.

There would be long-term minor visual impact from the presence of the potential land-based wind turbine. As the turbine would be built in scale with the existing environment, some would find this to be an adverse impact, while others would find it to be a beneficial impact.

Conclusion. Having renewable energy technologies on site could have long-term beneficial impacts on public use and access due to the presence of reliable power from two different types of renewable technologies.

4.2.4 IMPACT ON PARK MANAGEMENT AND OPERATIONS

Analysis. The proposed wind turbine would have a short-term impact on park operations. As there would be post-construction bird and bat monitoring of the site to ensure negligible wildlife mortality, the park would need to schedule a staff member to survey the area daily. This task could be incorporated into the duties of park rangers, lifeguards, and/or fee collectors who monitor the area regularly for other purposes. Therefore, this poses a minor impact.

The combined wind and solar technologies would provide a reliable source of energy that would ensure that the park does not have to anticipate the negative results and expense of power failures. A system involving both solar PV panels and a wind turbine would have the complementary nature of solar and wind resources—when one of these resources is not plentiful, the other is often available. When it is either dark or overcast (low solar resource), it is often more windy. During warm summer days when the wind is relatively calm, solar availability is often very high.[8]

[8] Antares Group Incorporated, 2007.

As discussed in Section 2.2, there are contingency plans for backup power if necessary. There is an additional long-term moderate beneficial impact upon park management, as increasing usage of renewable technologies aids the park in fulfilling the objective of preservation and stewardship through using environmentally conscious practices and educating the public, and meeting federal requirements for use of renewable energy technologies.

Conclusion. The installation of solar and wind technologies at Herring Cove would have long-term, moderate beneficial impacts on park management and operations. Despite the short-term direct adverse impact of increased daily tasks for some staff, the long-term impact upon park management and operations would beneficial due to the presence of reliable power provided by renewable technologies.

4.2.5 IMPACT ON CULTURAL RESOURCES

Analysis. There are currently no structures, archeological sites or cultural landscapes eligible for or listed on the National Register in the direct vicinity of this project. In October 2004, Northern Ecological Associates, Inc. performed a Phase I archeological investigation in advance of the installation of 2 vault toilets and lift station in the vicinity of this project area. They concluded that no prehistoric or historic sites or features potentially eligible for inclusion on the National Register of Historic Places were located in the area.

The Herring Cove Bathhouse is currently not considered a historic structure, but it has never been evaluated. It is anticipated that the park will evaluate the structure in the next year and it could be determined to be eligible for the National Register of Historic Places. Built in 1953, it is over 50 years old and one of the first bathhouses built by the Commonwealth of Massachusetts.

Conclusion. There are no historic properties affected for the proposed alternative.

4.2.6 CUMULATIVE IMPACTS

There would be no adverse cumulative impacts upon cultural resources. The overall impact of a varied renewable electrical production system would have multiple benefits as described above upon public use, surrounding community, and park management and operations. The adverse impact of the wind turbine component of this alternative upon birds and bats is anticipated to be minor since turbine operations would be managed in response to impact monitoring.

The combined renewable energies alternative is NPS preferred option, as it adequately addresses the electrical needs for the facilities on site at the Herring Cove, offers interpretive opportunities by using both technologies, and addresses potential natural resource impacts in the adaptive management plan. Additionally, there would be no impairment to park resources expected by this alternative.

4.3 ALTERNATIVE TWO: SOLAR OPTION ONLY

4.3.1 IMPACT ON NATURAL RESOURCES

Analysis. Solar PV panels installed on the roof of the Herring Cove bath house are not expected to have any direct or indirect impact upon water resources, geology and soil, vegetation, air quality, marine or terrestrial wildlife. The use of this renewable energy technology would have a minor long-term beneficial impact on air quality as it would be a non-greenhouse gas emitting means of power generation.

Conclusion. The solar panels will have a minor long term beneficial impact on natural resources.

4.3.2 IMPACT ON SURROUNDING COMMUNITY

Analysis. Similar to the preferred alternative, the installation of solar panels would provide an example of a functioning renewable energy source on a park facility. However, it would not demonstrate the advantages of two different types of renewable systems and the ways in which they work in concert together. The indirect moderate beneficial effect of this showcasing comes from educational opportunities regarding renewable energy.

Conclusion. Installation of solar panels would result in a long term moderate beneficial impact to the community.

4.3.3 IMPACT ON PUBLIC USE AND ACCESS

Analysis. Installation of solar panels on the roof of the Herring Cove bath house would provide educational opportunities to the surrounding community, and thus would result in a long-term beneficial impact upon public use.

Similar to the preferred alternative, the presence of solar renewable energy technology could draw visitors to the Herring Cove facility so they can see the appliances in action. This could bolster public morale and support for the park operations, and possibly result in increased visitation to the beach facilities in future years.

Installation of a solar PV system on the roof would not interfere with visitor parking.

Conclusion. Having a solar PV system on site could have long-term beneficial impacts on public use and access due to the presence of reliable power from a renewable technology.

4.3.4 IMPACT ON PARK MANAGEMENT AND OPERATIONS

Analysis. This alternative provides a more consistent energy supply than the existing power line, resulting in more reliable electricity to all Herring Cove service areas, including the fee

booth, snack bar, and bath house. This alternative, estimated over a 20-year period of time, would be $47,000 more expensive to operate than the preferred alternative, having a major impact on the park's budget. Also, energy capture is less consistent with this alternative, potentially forcing the park to purchase more energy from an electric supplier. These are minor to moderate long-term adverse impacts.

Conclusion. This solar-only alternative is more costly than the preferred alternative and less reliable as an energy source. Therefore, there would be a minor to moderate impact on park operations.

4.3.5 IMPACT ON CULTURAL RESOURCES

Analysis. There are currently no structures, archeological sites or cultural landscapes eligible for or listed on the National Register in the direct vicinity of this project. In October 2004, Northern Ecological Associates, Inc. performed a Phase I archeological investigation in advance of the installation of two vault toilets and lift station in the vicinity of this project area. They concluded that no prehistoric or historic sites or features potentially eligible for inclusion on the National Register of Historic Places were located in the area.

The Herring Cove Bathhouse is currently not considered a historic structure, but it has never been evaluated. It is anticipated that the park will evaluate the structure in the next year and it could be determined to be eligible for the National Register of Historic Places. Built in 1953, it is over 50 years old and one of the first bathhouses built by the Commonwealth of Massachusetts.

Conclusion. There are no historic properties affected for the proposed alternative.

4.3.6 CUMULATIVE IMPACTS

There would be no adverse cumulative impacts upon natural or cultural resources. The overall impact of a varied renewable electrical production system would have multiple benefits as described above upon public use, surrounding community, and park management and operations. The solar only option is preferred to no action and is the environmentally preferred alternative. Implementation of this alternative would not constitute an impairment of key park resources.

5.0 CONSULTATION AND COORDINATION

5.1 SUMMARY OF PUBLIC INVOLVEMENT

On May 23, 2007, seashore staff held a public information meeting at Provincetown Town Hall. The purpose of the meeting was to share information and accept suggestions on various planning and construction projects, including improvements to the Herring Cove Bathhouse, in the Provincetown and Province Lands areas. The public was informed of this meeting via a press release of April 19, 2007.

In January 2008, the park superintendent and chief of maintenance met with Provincetown selectmen and town management officials in order to discuss public feedback and the need to upgrade the present deteriorating underground electric supply line at Herring Cove Beach facilities. No concerns or objections were raised by Town selectmen or the public present at these meetings.

Public notice regarding the availability of this Environmental Assessment will be distributed to the media and interested parties. There will be a 30-day public comment period to receive public and agency feedback on the plan. Comments can be submitted to:

Superintendent George E. Price, Jr.
Cape Cod National Seashore
99 Marconi Site Road
Wellfleet, MA 02667

5.2 CONSULTATION WITH AGENCIES AND ORGANIZATIONS

The following agencies and organizations were consulted leading to the development of this EA, or are being sent copies of this EA for review:

Federal Aviation Administration
Massachusetts Aeronautics Commission
U.S. Fish and Wildlife Service
U.S. Coast Guard
Massachusetts Division of Fisheries and Wildlife:
Natural Heritage and Endangered Species Program
Massachusetts Historical Commission
Advisory Council on Historic Preservation
Wampanoag Tribe of Gay Head (Aquinnah), Tribal Historic Preservation Office
Mashpee Wampanoag Tribal Council
Massachusetts Department of Environmental Protection
Massachusetts Audubon Society
Massachusetts Coastal Zone Management
Provincetown Board of Selectmen
Provincetown Airport Commission
Provincetown Conservation Commission
Provincetown Department of Public Works
Provincetown Town Manager
Town libraries and town halls:
Chatham, Orleans, Eastham, Wellfleet, Truro, Provincetown
Department of Energy Federal Energy Management Program
Provincetown Alternative Energy Committee

The NPS prepared a Notice of Proposed Construction or Alteration with the Federal Aviation Administration (FAA) for the potential wind turbine. The purpose of the consultation is to determine if the agency has concerns if the project presents an airport obstruction.

FAA sent confirmation of receiving our notice on 12/19/07. In early May 2008, we expect to receive the FAA determination of the impact of the potential wind turbine to a public use airport or NAVAID facility through aeronautical study process.

A Massachusetts Aeronautics Commission (MAC) letter of December 14, 2007 confirms that the proposal of a wind turbine at the Herring Cove bath house site does not violate MAC laws or regulations and is not subject to further action required by MAC laws or regulations. The letter also indicates that the MAC Boston office may offer additional comments after considering FAA's determination.

The Advisory Council on Historic Preservation (ACHP), by letter of February 19, 2008, acknowledged the park's notification of this EA to examine possible effects on historic properties. Should CCNS determine, in consultation with the State Historic Preservation Office, tribes, and other consulting parties, that this proposed undertaking may have an adverse effect on properties listed or eligible for listing on the National Register of Historic Places that will be documented in the EA, ACHP requests to be notified by CCNS of the adverse effect and provided adequate documentation for their review.

Under Massachusetts law, 220 CMR 11, Rules Governing the Restructuring of the Electric Industry, special approval is not needed for a wind or solar generation project less than 60kW, provided the generation facility meets the interconnection standards and all relevant safety and power quality standards. Projects above 60 kW require Federal Energy Regulatory Commission approval if power is to be exported back to the utility grid. Alternatives One and Two would fall well below the 60kW threshold thus would not be subject to the review process.

The electric utility supplier would be consulted if one of the alternative energy alternatives, Alternative One or Two, is selected. This is because the utility grid-connected underground line would serve as back-up power until it is no longer a viable power source. This consultation process would entail a review of the proposed utility interconnection engineering portion of the project, particularly the inverter and transfer switch engineering, so that the independent system would not cause improper feedback to the electrical supply grid.

5.3 RELATIONSHIP TO OTHER PLANNING EFFORTS

Other recent and upcoming NPS activities in the Provincetown and Truro areas of the park include some transportation-related construction activities that have undergone NEPA evaluation, such as the environmental assessment of rehabilitation of the Province Lands Bike Trail, and a categorical exclusion for the Herring Cove area road and parking reconfigurations as assessed by Federal Highway Administration- Massachusetts Division.

Another potential land-based wind-turbine related project by NPS is an upcoming wind feasibility study planned for the Highlands Center at Cape Cod National Seashore, located in North Truro. There is no current proposal for this facility. An environmental assessment will be conducted once the study is underway. The park is considering undertaking a separate planning process for dune shack use and management in the Dune Shacks of the Peaked Hill Bars Historic District (2 miles distant from the site of this proposed action); a separate NEPA document is expected when funding becomes available for a civic engagement initiative. Cumulative effects with these actions, therefore, are not being considered.

6.0 COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

6.0.1 FEDERAL REGULATIONS

Americans with Disabilities Act: The Americans with Disabilities Act establishes federal guidelines that define requirements for disabled access to parking facilities, pathways, and buildings. All structures and facilities available for public use need to be upgraded in full compliance with the act as they are rehabilitated. The act does not apply to the implementation of these alternatives.

Archeological Resources Protection Act of 1979: The Archeological Resources Protection Act (ARPA) requires that archeological resources be identified and that proper permits be obtained prior to excavating any resources. The NPS has not identified any known or potential archeological resources in the project area.

Analysis of Impacts on Prime and Unique Agricultural Lands in Implementing the National Environmental Policy Act (45 FR 59189): Federal agencies are required to analyze the impacts of federal actions on agricultural lands, in accordance with NEPA. This policy was developed to minimize the effect of federal programs in converting prime, unique, or locally important farmland to nonagricultural uses. There are both prime and unique farmlands within the seashore; however, the proposed project at Herring Cove does not affect these lands nor will it convert these lands to nonagricultural uses.

Clean Air Act, as Amended (42 USC 7401 et seq.): Cape Cod National Seashore is designated a class II clean air area. Maximum allowable increases of sulfur dioxide, particulate matter ad nitrogen dioxides beyond baseline concentrations established for class II areas cannot be exceeded. Class II increments allow modest industrial activities in the vicinity of a park. Section 118 of the Act requires all federal facilities to comply with existing federal, state and local air pollution control laws and regulations. Cape Cod National Seashore will work with the Massachusetts Department of Environmental Protection to ensure that all activities in the national seashore meet the requirements of the state's air quality implementation plan.

The Clean Air Act establishes regulations regarding disclosure, control, and abatement of air pollutants. There are no air-borne contaminants of concern that will be generated by the project, and therefore the alternatives are compatible with the requirements of the Clean Air Act.

Coastal Barrier Resources Act: This law encourages the conservation of hurricane prone, biologically rich coastal barriers by restricting federal expenditures that encourage development, such as Federal flood insurance through the National Flood Insurance Program. The alternative sites considered in this environmental assessment do not entail federal expenditures or financial assistance that would adversely affect ecologically sensitive coastal barrier resources.

Comprehensive Environmental Response, Compensation and Liability Act: The Comprehensive Environmental Response, Compensation and Liability Act establishes regulations regarding the assessment, remediation, and liability for remediation of hazardous substances that have caused contamination. None of the alternatives considered in this environmental assessment have been designated as National Priority List sites. There is no known contamination at this site.

Endangered Species Act of 1973, as amended (16 USC 1531 et seq.): Section 7 of the Endangered Species Act directs all federal agencies to further the purposes of the act, which are to conserve threatened and endangered species and the ecosystems on which they depend. Federal agencies are required to consult with the USFWS to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of listed species or critical habitat.

To ensure that adverse effects to state and federally listed species are avoided, the preferred alternative incorporates a two part adaptive management strategy described in Appendix A. The first part will focus on assessing bird use in the area of the proposed turbine, and the second part integrates monitoring into turbine management to ensure that turbine operations are modified or shut down if adverse effects to state or federally listed species appear likely. The adaptive management plan includes continued and frequent coordination with FWS and NHSP to ensure those agencies' expertise is incorporated into review and interpretation of the data collected, and that those agencies concur with decisions regarding turbine operations. Based on this element of the preferred alternative, the Seashore has determined that selection and implementation of the preferred alternative is not likely to adversely affect federally listed species. This EA will be submitted to the USFWS with a request for informal consultation and confirmation of their concurrence with the Seashore's determination of "not likely to adversely affect."

Executive Order 11987: (Exotic Organisms): This executive order requires federal agencies to restrict the introduction of exotic species into natural ecosystems on lands and waters that they own, lease, or hold for purposes of administration and into any natural ecosystem of the United States and to encourage the states, local governments, and private citizens to prevent the introduction of exotics into natural ecosystems of the United States. CCNS has determined that the alternatives evaluated in this EA do not pertain to the introduction of exotics as defined by this executive order.

Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands): Executive Orders 11988 and 11990 direct federal agencies to enhance floodplain and wetlands value, to avoid development in floodplains and wetlands whenever possible, and to minimize adverse impacts if development cannot be avoided. None of the alternatives affect a floodplain or wetland areas as defined by the executive orders.

Executive Order 12898 (Environmental Justice in Minority Populations and Low-Income Populations): Environmental Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to identify and address disproportionately high and adverse human health or

environmental effects of their programs and policies on minority and low-income populations and communities. None of the alternatives considered in this document would result in substantial changes in the socioeconomic environment of the project area. Job creation would be subject to the Equal Employment Opportunity Act. Minority and low-income populations do not live adjacent to the project site. Consequently, the project is expected to have no discernible direct or indirect adverse impacts to minority or low-income populations.

Federal Water Pollution Control Act, as Amended (1972), Clean Water Act of 1977 and Water Quality Act of 1987 (33 USC) 1251-1376: The proposed actions will have no effects on water quality. Construction activities would need to comply with the requirements of sections 401 and 404 of the Clean Water Act and other applicable federal, state, and local regulations.

Fish and Wildlife Coordination Act: This act provides the basic authority for the USFWS's involvement in impacts to fish and wildlife from proposed water resource development projects. The project contained in this EA does not entail water-related construction, and there will be no modifications to waterways or bodies of water protected by this act.

Magnuson-Stevens Fishery Conservation and Management Act: This act requires federal agencies to consult with the National Oceanic and Atmospheric Administration (NOAA) regarding proposed actions that could damage Essential Fish Habitat (EFH) as identified by NOAA Fisheries and the appropriate fishery management council. The proposed actions in this EA will not affect EFH; therefore consultation on the proposed modification to CCNS's project is not required.

Migratory Bird Treaty Act, and other laws and treaties that protect migratory birds: There are a number of laws and treaties-such as the Migratory Bird Treaty Act, the Lacey Act, the Weeks-McLean Law, and the Waterfowl Depredations Prevention Act- designed to protect migratory birds. If selected, turbine operations would be managed in response to monitoring to ensure impacts to migratory species are minimized.

National Environmental Policy Act of 1969: NEPA requires consideration of the environmental effects of proposed federal actions. NEPA also ensures that environmental information is available to public officials and members of the public before decisions are made and before actions are taken. This Environmental Assessment provides a description of the preferred alternative plus one other alternative, the no action alternative, and summarizes potential environmental consequences of the alternatives. A 30-day public comment period will be scheduled.

National Historic Preservation Act of 1966, as Amended: Section 106 of the National Historic Preservation Act requires that an assessment be conducted of any project, activity, or program that could change the character or use of properties listed in or eligible for listing in the National Register of Historic Places. The National Park Service will prepare an assessment of effects in accordance with section 106 that no historic properties will be affected by the alternative management and development actions.

6.0.2 STATE REGULATIONS

Coastal Zone Management Act of 1972 and Coastal Barrier Resources Act (1982) both as amended in 1990:

The Coastal Zone Management Act requires that federal agencies adhere to state Coastal Zone Management Plans when conducting projects or activities that affect the coastal zone. These policies recognize the ecological significance of coastal waters and strive to protect both the water quality and the integrity of significant resource areas. All of Cape Cod is within the coastal zone; however this plan is not expected to have a change in affect to coastal resources. The NPS will send a copy of this EA to the Cape and Islands Coordinator of the Massachusetts Coastal Zone Management program for a federal consistency review a determination of consistency will be required for the proposed alternatives.

Massachusetts Endangered Species Act

The Massachusetts Endangered Species Act (MESA) is administered by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) - a branch of the Massachusetts Department of Fisheries and Wildlife. MESA prohibits take of species listed as endangered, threatened, or of special concern. However, projects that will result in take of listed species may be eligible for a Conservation & Management Permit if alternatives to both temporary and permanent impacts to state listed species are assessed, if the project will impact an insignificant portion of the local population of the affected species, and if the project includes a conservation and management plan that provides a long-term net benefit to the conservation of the affected species.

To ensure that adverse effects to state and federally listed species are avoided, the preferred alternative incorporates a two part adaptive management strategy described in Appendix A. The first part will focus on assessing bird use in the area of the proposed turbine, and the second part integrates monitoring into turbine management to ensure that turbine operations are modified or shut down if adverse effects to state or federally listed species appear likely. The adaptive management plan includes continued and frequent coordination with FWS and NHSP to ensure those agencies' expertise is incorporated into review and interpretation of the data collected, and that those agencies concur with decisions regarding turbine operations. Based on this element of the preferred alternative, the Seashore has determined that selection and implementation of the preferred alternative is not likely to result in take of state listed species. This EA will be submitted to the NHESP with a request for informal consultation and confirmation of their concurrence with the Seashore's determination that take is not likely to result from the proposed action.

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APPENDIX A: Herring Cove Wind Turbine Adaptive Management Plan

Background:

The beaches of lower Cape Cod provide important nesting and feeding habitat for a number of sensitive species including piping plovers (*Charadrius melodus*), which are federally and state listed as threatened, and least and common terns (*Sterna antillarum* and *S. hirundo*), both of which are state listed as species of special concern. The lower Cape's beaches, salt marshes, and estuarine waters also provide important resting and feeding habitat for migratory species including the federally endangered roseate tern (*Sterna dougalli*), and several shorebird species. The beach at Herring Cove is not used by these species. This is probably due to the presence of developed facilities (parking areas, bathhouse, snack bar) along the length of the beach, disrupted sand dynamics due to past paving and seawall construction, and intensive recreational use. While the beach at Herring Cove does not provide habitat used by these species, it is in the vicinity of areas of high habitat value. Hatches Harbor, which is about 4 km (2.5 miles) to the north, provides nesting, feeding, and staging habitat for piping plovers. Hatches Harbor is also used by other shorebirds and terns during migration. West End marsh, which is about 2.5 km (1.6 miles) to the south, is also used by migrating shorebirds and terns. And Wood End/Long Point beach, starting about 8.5 km (5.3 miles) to the south and east, is also used by nesting plovers and migrating shorebirds and terns.

Direct impacts to birds and bats have been observed at a number of commercial-scale wind developments (NWCC 2004). However, there is little information regarding the impacts of small, single turbine wind installations. A study to assess avian mortality associated with a larger turbine (73.5 m (241 ft) rotor tip height) at the Massachusetts Maritime Academy in Buzzard's Bay estimated 1.39 bird fatalities/year resulting from collision with the turbine based on the death of one laughing gull (Vliestra 2007). This study also counted 24,564 birds passing though the turbine's air space during the four-month tern nesting period in 2006. Of these, 254 were terns which were abundant in the area, particularly foraging in the waters off the Academy during the chick rearing season. Comparison of the numbers of terns flying through the rotor-swept zone when the turbine blades were and were not spinning indicates that terns may avoid the turbine airspace when the blades are rotating. No impacts to bats were detected. Very few bird mortalities and no bat mortalities have been detected in association with a turbine (27 m (91 ft) rotor tip height) at Missisquoi National Wildlife Refuge in Vermont after three years of operation, and starlings have nested in the structure behind the rotor for the last few nesting seasons (M. Sweeney, pers com). At the Eastern Neck National Wildlife Refuge in Maryland, a total of 15 bird deaths were attributed to a turbine 18.3 meters (60 feet) tall over a three year period. Thirteen of these were European starlings which had nested in the turbine structure. The other two mortalities were a bank swallow and a catbird. No effects to bats were observed (Willis 2005).

Based on the observations of avian interactions with small turbines at other sites, it appears that the potential for the Herring cove turbine to have more than negligible impacts to birds is quite low, and the potential for impacts to bats would seem virtually nonexistent. However, the habitats and species in the vicinity of National Wildlife Refuge turbines are different than

those in the vicinity of Herring Cove, and although the species of concern for the Maritime Academy's turbine are substantially similar to Herring Cove, the ecological setting is quite different. To ensure that the turbine's impacts to birds and bats are minimal, and that adverse effects to state and federally listed species are avoided, turbine operations will be guided by a two-phase adaptive management approach. The first phase will focus on assessing bird use in the area of the proposed turbine, and the second integrates monitoring into turbine management to ensure that turbine operations are modified or shut down well before any impacts approach the level of having an appreciable effect on the resource.

Phase I: Assessment of Bird Use of Herring Cove Air Space

Bird abundance in the Seashore is highest and the species of concern are present during the spring and summer months when nesting and migration occur. To better understand which species could be affected by the turbine, a non-quantitative survey of birds moving through the air space above Herring Cove will be conducted May through September of 2008. Surveys will be conducted at random times during day-light hours. Observations will be collected from a stationary point selected by the observer based on light conditions at the time. Observation points will be selected to provide a view of the airspace over and surrounding the bathhouse. Information recorded will include: start and end times of each survey, weather and light conditions, observation point location, number of each species observed flying through the bathhouse airspace, the height at which each bird transits the bathhouse air space estimated relative to the height of the bathhouse, and the number of each species observed flying in the Herring Cove area in general.

The information will be compiled into a brief summary report, and shared with FWS and NHESP. This information will be used to reassess the likelihood of adverse effects to state or federally listed species, and to determine if changes should be made to the design of Phase II.

Phase II: Adaptive Management of Turbine Operations

Mortality Monitoring:

Once the turbine is operational, the area within a 30 meter (100 ft) radius of the turbine would be surveyed for evidence of bird and bat mortality. After turbine construction is completed, a grid, incrementally increasing radius, or other search method would be established to aid thorough searching of the survey area. Carcass surveys would be conducted a minimum of four times per week April 1 through October 10. To assess night-time mortality, survey times would include first light. Surveys would also occur randomly throughout daylight hours, or might be focused on specific times of the day as indicated by the results of the Phase I bird use assessment. Any carcasses recovered would be photographed in place, and then examined for signs of injury, scavenging, starvation, or other visual indications of potential causes of death. Data recorded would include species, sex and age class if evident, condition, and presumed cause of death. Carcasses would be disposed of at least a half mile from the turbine.

Reporting:

Recoveries of any carcasses would be reported by phone to the Chief of Natural Resource Management (NRM) upon completion of that day's survey. Survey efforts and results would be summarized in a brief written report and provided to the Chief of NRM on a weekly basis. These weekly reports would be synthesized into an annual report at the end of October and provided to NHESP and FWS.

Coordination and Turbine Management:

The Chief of NRM would forward any weekly reports in which mortalities were detected to NHESP and FWS. At any time that levels of mortality or the species killed generate concern among NHESP, FWS, or the park, a conference call would occur to discuss the status of the turbine and whether or not it should be shut down. While take of listed species is not anticipated, should it occur, NRM would immediately notify the Chief of Maintenance and the turbine would be shut down. NRM would then notify NHESP and FWS immediately thereafter.

Adaptive Management Plan Review:
At the end of the year, the results of mortality surveys and turbine operation will be reviewed to inform plans for the following year. Issues that should be addressed in this review include:

-changes in mortality monitoring methods;
-whether or not studies should be included to estimate scavenging effects and searcher efficiency;
-effectiveness and utility of the reporting and coordination strategy; and
-times of year, weather conditions, or other conditions during which the turbine should be preemptively shut down to avoid wildlife impacts.

Any agreed upon changes in monitoring or turbine management will be documented to guide activities in the coming year. This cycle of monitoring, reporting, annual review, and revised plans for the coming year will be repeated as long as desired by the park, NHESP, or FWS.

Appendix A References:

Mark Sweeney, Missisquoi National Wildlife Refuge. Personal communication, 2007.

NWCC. 2004. Wind Turbine Interactions with Birds and Bats: A summary of research results and remaining questions. National Wind Coordinating Committee. http://www.nationalwind.org/publications/wildlife/wildlife_factsheet.pdf.

Vliestra, L.S. 2007. Potential Impact of the Massachusetts maritime Academy Wind Turbine on Common and Roseate Terns. Massachusetts Maritime Academy Report, Buzzards Bay, MA. 60 pp.

Willis, T. 2005. A Small Scale, Hybrid, Alternative Energy Project at Eastern Neck National Wildlife Refuge, Rock Hall, Maryland, Final Report. Looking Glass Environmental Consultants, Chestertown, MD. 26 pp

FIGURE 3-1 Herring Cove Beach Facilities and Proposed Project Sites-
Herring Cove Bathhouse, parking lot, entrance fee booth, and proposed wind tower site