Boston Harbor Islands Partnership
U.S. Department of the Interior

CLIMATE*Friendly* PARKS

BOSTON HARBOR ISLANDS ACTION PLAN

A NATIONAL PARK AREA
BOSTON HARBOR ISLANDS

A National Park Area

Boston Harbor Islands National Recreation Area is comprised of 12 diverse islands ready for exploring and 22 more that form an island wilderness. In all, there are 1,600 acres and 35 miles of ocean shoreline within this unit of the national park system.

The islands are both a recreational haven and a laboratory in which to learn about natural change and stewardship. Each of the 34 Boston Harbor Islands has a rich human history.

Vistors are invited to explore the rich biodiversity of Boston Harbor Islands and learn about the stories, people, places, and objects associated with each island, and with the overall island system.

For details about the park and its management:
nps.gov/boha

For details about visiting the park:
bostonharborislands.org

Boston Harbor Islands Partnership

The Boston Harbor Islands Partnership represents a range of federal, state, city, and nonprofit agencies. The Partnership coordinates the activities of the managers of the islands and the national park as a whole. Twelve members are appointed by the U.S Secretary of the Interior, one member is appointed by the U.S. Secretary of Homeland Security. The following member organizations are represented by voting partners and voting alternates.

- National Park Service
- United States Coast Guard
- Massachusetts Department of Conservation and Recreation
- Massachusetts Port Authority
- Massachusetts Water Resources Authority
- City of Boston
- Boston Redevelopment Authority
- Thompson Island Outward Bound Education Center
- The Trustees of Reservations
- Boston Harbor Island Alliance
- Boston Harbor Islands Advisory Council

This Action Plan adopted by the Boston Harbor Islands Partnership on December 14, 2010.

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EXECUTIVE SUMMARY

The Boston Harbor Islands Partnership has an opportunity to serve as a model for more than 350,000 visitors annually. This report summarizes the operational actions we commit to undertake to address climate change. The strategies presented in this action plan present an aggressive first step toward moving Boston Harbor Islands National Recreation Area to the forefront of Climate Friendly Parks. Desired outcomes and proposed actions accompany each of the five strategies. Following are the top 25 actions planned to reduce greenhouse gas emissions at Boston Harbor Islands.

Cooperative Park Management

- Establish a Boston Harbor Islands "Green Team."
- Collect transportation energy use data for park operations.
- Complete an energy audit of park buildings.
- Take a leadership role in the use of alternative fuels for marine applications.
- Implement an integrated solid waste management plan.
- Explore becoming a plastic-water bottle-free park.
- Partner with surrounding state and local communities on alternative transportation systems.

Energy Management

- Install energy efficient light fixtures and controls.
- Adjust thermostats.
- Utilize alternative energy sources.
- Implement energy management actions at Fort Andrews.

Transportation Management

- Increase vessel fleet fuel efficiency through replacement.
- Develop and use maintenance schedules.
- Incentivize visitor use of alternative transportation.
- Reduce vehicle and vessel idling.

Waste Management

- Establish a yard waste composting program.
- Reduce waste through green procurement.
- Implement a waste management for the Fort Andrews project.

Staff Behavior

- Promote energy efficiency and energy conservation in the park.
- Incorporate waste reduction into green office practices.
- Incorporate Climate Friendly messages into staff development.
- Promote low-impact transportation options to, from, and within the park.

Education & Outreach

- Pack-in, pack-out.
- Incorporate Climate Friendly information into park programs and media.
- Develop a Boston Harbor Islands Do Your Part! program for visitors

Cover photo by Meredith Eustis

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Climate Friendly Parks

Boston Harbor Islands National Recreation Area belongs to a network of parks nationwide putting climate friendly behavior at the forefront of sustainability planning.

Boston Harbor Islands becomes a Climate Friendly Park

By conducting an emission inventory, setting emission reduction targets, developing this action plan, and committing to educate park staff, visitors, and community members about climate change, the Boston Harbor Islands Partnership provides a model for climate-friendly behavior within the national park system. This action plan identifies steps island managers and members of the Boston Harbor Islands Partnership can undertake to reduce greenhouse gas (GHG) emissions and mitigate their impact on climate change.

The Climate Friendly Parks actions within this plan were developed by a working group (*see* Appendix A) and through planning carried out by the Partnership prior to the development of this plan. The Climate Friendly Parks process provides needed structure to prior work—specifically the park's 2016 strategic plan.

While the Climate Friendly Parks action plan provides a framework needed to meet green house gas emissions targets, it is not intended to provide detailed instructions on how to implement each of the proposed measures. As called for in the park's 2016 strategic plan, the National Park Service and the nine other Partnership agencies implementing this plan will enter into annual agreements identifying specific actions and responsibilities.

2016 Strategic Plan

The Boston Harbor Islands Partnership adopted strategies for the years 2010 to 2016 aimed at achieving the park's mission goals. Culminating several years of discussion about sustainability, the 2016 plan directly addresses climate change response in three of its five strategic themes:

> **Environmental Leadership:** The Boston Harbor Islands Partnership demonstrates environmental leadership and a commitment to the principles of sustainability.
>
> **Education & Interpretation:** The Boston Harbor Islands Partnership fosters exceptional learning opportunities that connect people to the islands.
>
> **Professional Excellence:** The Boston Harbor Islands Partnership demonstrates management excellence worthy of the treasures entrusted to our care.

The Climate Friendly Parks action plan presents more specific actions that park managers are committed to undertaking in order to reduce emissions from visitor activities within the park, and from actions by park managers.

These "climate friendly" actions further the goals of the park's 2016 strategic plan—which in turn is based on the park's general management plan. Thus, this document is an implementation plan of the general plan. (*See* Appendix B for a listing of the 2016 strategies and desired outcomes *and* Appendix C for excerpts from the general plan.)

The Challenge Of Climate Change

Climate change presents significant risks and challenges to national parks. Scientists cannot predict with certainty the severity of climate change or its impacts. Average global temperatures on the Earth's surface have increased about 1.1°F since the late 19th century. Further, the 10 warmest years of the 20th century all occurred in the last 15 years; 2010 may turn out to be warmest year on record. The single leading cause of this warming is the buildup of

greenhouse gasses in the atmosphere—primarily carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—which trap heat that otherwise would be released into space.

The continued addition of CO_2 and other greenhouse gases to the atmosphere will raise the Earth's average temperature more rapidly in the next century; a global average warming of 4°F to 7°F by the year 2100 is considered likely[1]. Rising global temperatures will further raise sea levels and affect all aspects of the water cycle, including snow cover, mountain glaciers, spring runoff, water temperature, and aquatic life. Climate change is also expected to affect human health, crop production, animal and plant habitats, and many other features of our natural and managed environments.

Boston Harbor Islands is a coastal park, comprised of multiple islands and peninsulas. Park lands contain nationally significant cultural and natural resources within the intertidal and adjacent coastal areas. These include military fortifications, prehistoric middens, lighthouses, bird nesting sites, and rare plants. Significant coastal resources are already being directly affected by bluff erosion and storm surge inundation, and this direct threat to island resources is predicted to accelerate with sea level rise and increased storm intensity.

Greenhouse Gas (GHG) Emission Inventory

Naturally occurring greenhouse gases include CO_2, CH_4, N_2O, and water vapor. Human activities (e.g., fuel combustion and waste generation) lead to increased concentrations of these gases in the atmosphere.

Greenhouse Gas Emissions

Greenhouse gas emissions at Boston Harbor Islands National Recreation Area ("the park") result from the combustion of fossil fuels for transportation (e.g. boats and motor vehicles) and energy (e.g. heating and cooling, generators), from decomposing of waste generated in the park, and from the release of gases from smaller sources such as refrigerants.

In 2008, greenhouse gas emissions within The park totaled 2,080 metric tons of carbon dioxide equivalents ($MTCO_2E$). This includes emissions from park operations and visitor activities. For perspective, a typical single family home in the United States produces approximately 11 $MTCO_2$ per year[2]. Thus, the combined emissions from park and concessioner operations, and visitor activities within the park are roughly equivalent to the emissions from the electricity use of 189 households each year.

The greenhouse gas emissions analysis for Boston Harbor Islands National Recreation Area fall into three "sectors:" Energy Management, Transportation Management, and Waste Management. Greenhouse gas emissions within Boston Harbor Islands for 2008 are shown by sector in Figure 1. and by sector and source in Table 1.The largest emission sector for Boston Harbor Islands is Transportation, totaling 1,317 $MTCO_2$.[3]

Following is an overview of greenhouse gas emissions at other national parks participating in the Climate Friendly Parks program, by sector, which provides perspective for Boston Harbor Islands. The three sectors plus three additional topics—Cooperative Management, Staff Behavior, and Visitor Education & Outreach—form the basis for emissions reduction planning by the Boston Harbor Islands Partnership.

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[1] IPCC 2007. Climate Change 2007: The Physical Science Basis. Intergovernmental Panel on Climate Change, Geneva Switzerland. Available online at < http://ipcc-wg1.ucar.edu/wg1/wg1-report.html>

[2] U.S. EPA, Greenhouse Gases Equivalencies Calculators – Calculations and References, Retrieved , Website: http://www.epa.gov/RDEE/energy-resources/calculator.html.

[3] Only 2 of our "top priorities" are in transportation. Should we look into adding more transp. actions as "top priority?"

FIGURE 1

Boston Harbor Islands 2008 Greenhouse Gas Emissions by Sector

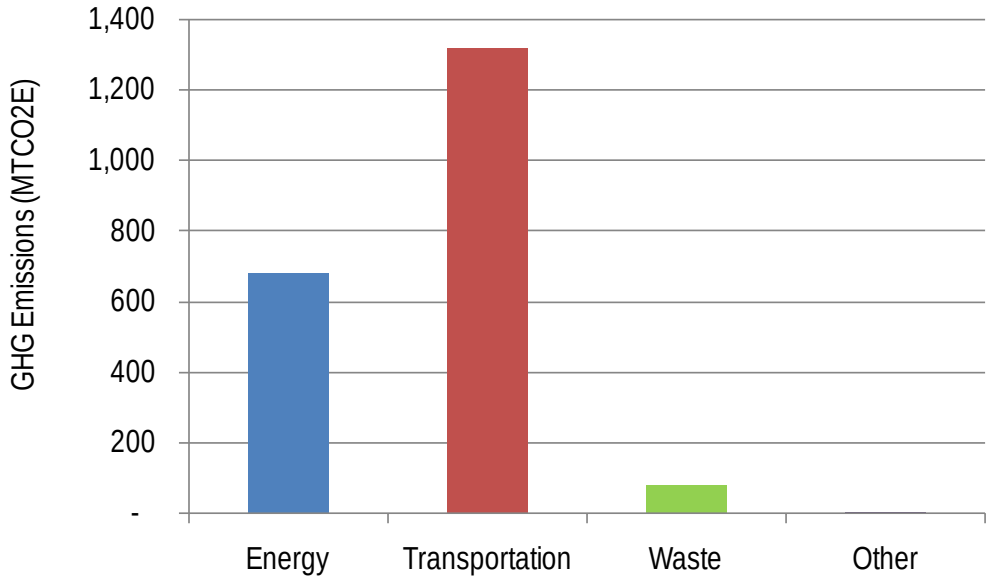

TABLE 1

Boston Harbor Islands 2008 Greenhouse Gas Emissions by Sector and Source

	$MTCO_2E$
Energy	**681**
Stationary Combustion	303
Purchased Electricity	378
Transportation	**1,317**
Mobile Combustion	1,317
Waste	**77**
Land-filled Waste	77
Other	**5**
Refrigeration and Air Conditioning	5
TOTAL	2,080

Totals may not sum due to rounding.

Cooperative Park Management

Unlike other national parks, the National Park Service does not own or manage the lands forming Boston Harbor Islands National Recreation Area. Instead, eight federal, state, municipal, and nonprofit agencies own and manage the islands in the park. One half of the islands are the responsibility of Department of Conservation & Recreation (DCR), the Massachusetts state park agency. The Boston Harbor Islands Partnership coordinates management of the island park, with representatives from a range of government and nonprofit agencies. The Boston Harbor Islands Advisory Council advises the Partnership on ongoing park operations. Together, we collaborate with many other government offices, tribes, nonprofit organizations, colleges and universities, and businesses. We're all working to achieve the park's mission (*see* Appendix C). Regarding greenhouse gas emissions reduction, the Partnership sets general policy, provides guidance, and works to assist the individual agencies and island managers in reducing emissions.

Energy Management

Energy accounts for about 50 percent of greenhouse gas emissions from the park operations profile of an average Climate Friendly Park, and about 16 percent of the average Climate Friendly Park member's entire profile. Energy efficiency and energy management provide some of the lowest hanging fruit in terms of emission reductions at park facilities. Low or no cost measures such as eliminating phantom loads and installing energy efficient light bulbs can be implemented immediately and offer significant paybacks. Larger capital improvements should be guided by a site specific energy audit and associated management plan. By taking a portfolio approach to improvements, items with high paybacks can often help offset the costs of those with lower paybacks.

Transportation Management

Transportation represents the largest emission sector for most Climate Friendly Parks, accounting for about 32 percent of greenhouse gas emissions from an average park operations profile, and about 78 percent of the average member park's entire profile. The majority of these emissions result from visitor vehicle miles traveled within the park, considering the average Climate Friendly Park sees about 25 million visitor vehicle miles travelled each year. An effective public transportation system provides an alternative way for visitors to explore a national park. The typical park vehicle fleet also provides significant potential for greenhouse gas emission reductions and serves as an opportunity to demonstrate climate friendly transportation alternatives.

Waste Management

While the connection between waste and greenhouse gas emissions may not be obvious, waste accounts for about 13 percent of greenhouse gas emissions from an average Climate Friendly Park's park operations profile, and about 2 percent of the average member park's entire profile. Waste management—in the form of source reduction, green procurement and solid waste reduction—can dramatically reduce greenhouse gas emissions. The less materials consumed in terms of products and packaging, the less energy is used and fewer tons of greenhouse gases are emitted. Additionally, reducing the amount of waste sent to landfills reduces methane (CH_4) emissions caused by decomposition. Waste sent to landfills is the largest source of human-generated CH_4 emissions in the United States.

Staff Behavior

It is important that park employees have the knowledge, skills, and motivation necessary to carry out the climate friendly actions planned. Climate change is complex. A better understanding of the issue and the benefits of reducing greenhouse gas emissions can motivate staff to incorporate climate friendly actions in their own lives. Staff training must be a key component of a park managers' approach in order to reduce the park's greenhouse gas emissions. Likewise, park staff must be held accountable for achieving emissions reduction goals.

Education & Outreach

Climate change is a complex issue that national parks can help communicate to the public. From increasing the efficiency of public transportation to developing a green purchasing program, the actions park managers take to address climate change serve as opportunities for increasing the public's awareness of climate change, and understanding of the benefits of reducing greenhouse gas emissions. Understanding can lead to visitors and community members incorporating climate friendly actions in their own lives. Since the greatest potential impact parks can have on mitigating climate change is through public education, it should be the end goal of any climate initiative. From increasing the efficiency of public transportation to developing a green purchasing program, the actions a park takes to address climate change become opportunities for increasing the public's awareness of climate change.

Data Management

Accurate and consistent data is needed to inventory and track park-related greenhouse gas emissions. The success of Boston Harbor Islands' Climate Friendly Parks program relies on the full participation of Partnership entities in collecting and managing data. As part of the Climate Friendly Parks program, the Partnership uses the Climate Leadership in Parks—or CLIP—Tool for data management. After all pertinent data is collected and entered, the CLIP Tool (an Excel spreadsheet) calculates estimated greenhouse gas emissions for the park.

Given the cooperative management of the park, several CLIP Tools are maintained, which identify the Partnership entities with the most potential for reducing park greenhouse gas emissions. Summary sheets calculate the inventory for the entire park. This action plan summarizes three separate CLIP Tools (Modules 1 and 2) for:

1. Massachusetts Department of Conservation and Recreation (DCR)
2. Thompson Island Outward Bound Education Center (TIOBEC)
3. National Park Service (NPS) & Boston Harbor Island Alliance (BHIA)

The National Park Service and Boston Harbor Island Alliance are included in one CLIP Tool because they share office space; both are non-landowning Partners; and they both carry out significant visitor- and resource management-related activities on the islands. These include: the park food, water transportation, and retail services; Spectacle Island landscape management; resource stewardship activities; and public programs. *See* Figure 2 for a breakdown of emissions by the three reporting Partnership CLIP Tools.

CLIP Tools for other Partners may be created as the Boston Harbor Islands Climate Friendly Parks program develops. Not all activity within park boundaries will be included, however. For example, the emissions from the wastewater treatment plant on Deer Island are not part of park operations. The same is true for Boston Light, as this historic lighthouse is maintained as an active aid to navigation. Emissions reduction at these, and other facilities that are incidental to park operations, are not the joint responsibility of the Boston Harbor Islands Partnership.

One of the biggest challenges in collecting data for the analysis upon which this plan was built was the absence of a consistent tracking system. Therefore, estimates were made in the CLIP Tool where data could not be obtained. Current gaps in the inventories include: food concessions, visitors' private boats, wastewater treated from visitor centers and mainland offices, fuel used for two-stroke engine landscaping equipment, and stops made at Georges Island by the commuter ferry serving Quincy, Massachusetts.

Maintaining separate CLIP Tools will allow Partners to plan the specifics (e.g., replace light bulbs) of how they will achieve broader strategic goals agreed upon by the Partnership (e.g., conserve energy). Maintaining separate CLIP Tools will also allow engaged island managers to move ahead at their own pace and to their track progress.

FIGURE 2

Boston Harbor Islands 2008 Park Operations Emissions by Partnership Entity

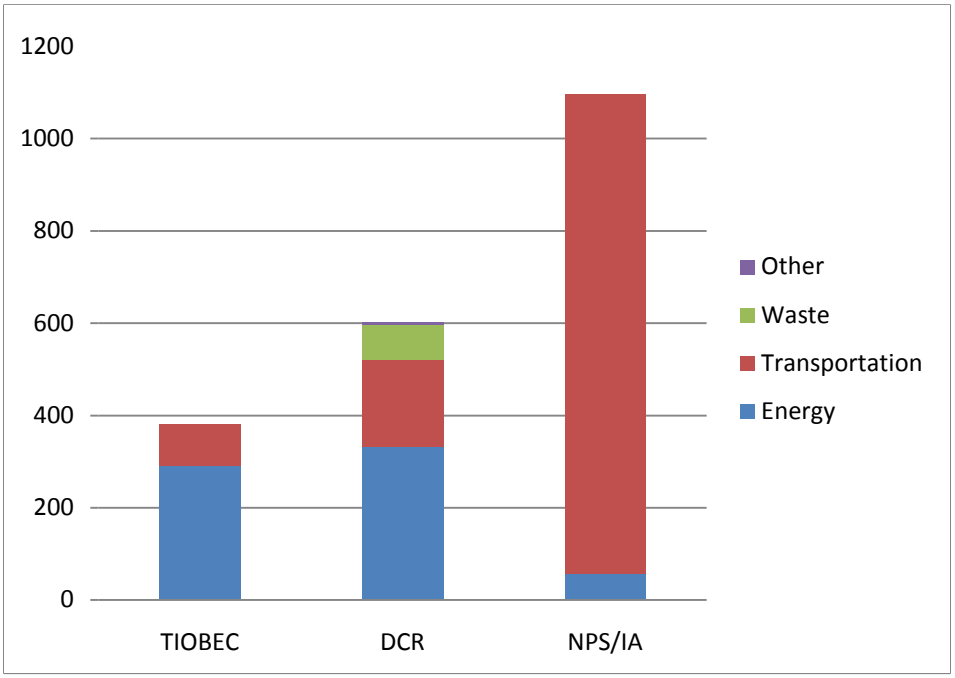

TABLE 2

Boston Harbor Islands 2008 Greenhouse Gas Emissions by Sector, Source, and Partnership Entity

	TIOBEC	DCR	NPS/IA	$MTCO_2E$
Energy	292	332	57	681
Stationary Combustion	99	204	0	303
Purchased Electricity	193	128	57	378
Transportation	90	189	1,038	1,317
Mobile Combustion	90	189	1,028	1,317
Waste	0	77	0	77
Land-filled Waste	0	77	0	77
Other	0	5	0	5
Refrigeration	0	5	0	5
TOTALS	382	603	1,095	2,080

Totals may not sum due to rounding.

Boston Harbor Islands Partnership Responds to Climate Change

The Boston Harbor Islands Partnership must act in response to climate change on many fronts. For example, assessing and adapting to the impacts of sea level rise on salt marshes or national historic landmark structures. The following actions were developed to meet the park's greenhouse gas emission-reduction goals.

CLIMATE FRIENDLY STRATEGIES

Strategies to achieve the Boston Harbor Islands National Recreation Area's mission were adopted by the Partnership in the park's 2016 strategic plan (*see* Appendix B). Among them, the following five strategies relate to the park's current and future greenhouse gas emissions, and are incorporated into this Climate Friendly Parks action plan:

Professional Excellence

1. Model what it means to work in partnership.

Environmental Leadership

2. Make Boston Harbor Islands National Recreation Area a "carbon neutral" park by promoting renewable energy resources, both on-site and off, as well as by reducing fossil fuel use.
3. Reduce solid waste generated by park operations and visitors through waste reduction, recycling, and environmentally sound materials management.
4. Act in a way that is consistent with an ethic of environmental responsibility and sustainability.

Education & Interpretation

5. Inspire an ethic of environmental responsibility and sustainability in park visitors.

The outcomes/performance measures associated with the climate friendly strategies in the park's 2016 plan are carried forward to this Climate Friendly Parks action plan. The Climate Friendly Parks program CLIP Tools provide a needed method to track progress on reducing greenhouse gas emissions.

Outcomes/Performance Measures

- By 2016, identify and adopt best management practices and standards for each strategic theme.
- By 2016, reduce or offset greenhouse gas emissions resulting from park operations (including transportation emissions) by 50% (2007 baseline).
    - *Furthermore,* by 2020 reduce or offset GHG emissions resulting from park operations by 100%.
- By 2016, reduce overall energy consumption at park buildings by 25% (2008 baseline).
- By 2016, procure or produce 25% of annual electricity consumption at park facilities from renewable sources.
- By 2016, reduce solid waste that must be removed from the islands by 40% (2008 baseline).
- By 2016, increase recycled material removed from the islands by 30% (2008 baseline).
- By 2016, establish a park-wide materials management system for "waste" and other materials being brought off the islands.
- By 2016, create and implement a park-wide informational program based on the principles and practices of "Leave-no-Trace" (no program in 2008).
- By 2016, integrate messages about reducing visitors' carbon footprint while at the park into four (4) information channels: interpretive programs, exhibits, promotional brochures, and the park website (no messages presented in 2008).

GREENHOUSE GAS REDUCTION ACTIONS

Actions that Boston Harbor Islands Partnership, and island managers, will take are presented below within each strategy. The actions have been prioritized based on a qualitative assessment of a set of criteria including: emission reduction potential; cost-effectiveness; feasibility; co-benefits; regional impact; and ability to rapidly implement.

The following are visual keys for the actions in the plan.

☼ *A. Priority action heading, those to be accomplished within 1 to 2 years.*

- *Individual action component, the "nuts and bolts"*
  - *supplemental action, supporting information*

A. Additional action heading, to be accomplished within 2 to 5 years.

- *Individual action component; the "nuts and bolts"*
  - *supplemental action, supporting information*

STRATEGY 1: Model what it means to work in partnership.

Outcomes / Performance Measures

- By 2016, identify and adopt best management practices[4] and standards for each strategic theme.

Cooperative Park Management

Given the unique management structure at the park, working in partnership is fundamental to reducing greenhouse gas emissions. The Boston Harbor Islands Partnership establishes general park policy and share best practices. Collective action by the Partnership, plus action at the individual agency level, is critical in achieving the emissions reduction goals for the park. Achieving these goals will require an ongoing commitment, which will include subsequent emission inventories, additional mitigation actions, and revaluation of goals.

The specific work to be done for each of the coming years will be presented in a formal agreement between the National Park Service and each Partnership entity. These agreements will answer the question: **Who** will do **What, When**, and **Where**? The actions to be undertaken collectively through the Partnership as part of this strategy are presented below.

[4] *Best management practices* — Practices that apply the most current means and technologies available to not only comply with mandatory environmental regulations, but also maintain a superior level of environmental performance.

Cooperative Park Management Actions: 1-2 Years

☼ *A. Establish a Boston Harbor Islands "Green Team."*

Develop a green team, relying on the Partnership entities with the most potential for reducing park greenhouse gas emissions. Formally charge the group with developing recommendations for implementing Climate Friendly Park action items, and presenting them on a regular basis to the Partnership for consideration. The green team will be responsible for coordinating recycling and waste reduction; energy conservation and efficiency; transportation improvements; and education and outreach. This dedicated group of permanent and seasonal employees, interns, and youth program participants will act as the park's "climate conscience," and carry on the work of the former Subcommittee on Renewable Energy and Sustainable Design.

- Establish work group to gather information and to make recommendations to Operations Committee regarding GHG emissions reductions and climate change.
    - appoint front-line staff from DCR, NPS, BHIA, and TIOBEC, with supervisors' support.
    - Island Ambassadors and interns could elect to participate in this group.
- Monitor progress with respect to reducing emissions. This will include subsequent emission inventories to evaluate progress toward goals stated in this action plan.
- Develop a park scorecard based on the Climate Friendly Parks action plan and distribute to park staff.
- Develop additional emission mitigation actions beyond those listed in this plan.
- Hold internal Climate Friendly Parks discussions and workshops.
    - distribute resources and tools to staff through Operations Committee and staff training.
    - acknowledge success of current strategies, award Climate Leaders recognition throughout the staff.
- Inventory light fixtures in park facilities and ensure 100% incandescent free usage.
- Periodically review and recommend updates to this plan.

☼ *B. Collect transportation energy use data for park operations.*

Transportation—primarily the park's water transportation system—accounts for 63 percent of overall greenhouse gas emissions at Boston Harbor Islands. One of the biggest challenges in collecting data for the analysis upon which this plan is built was lack of a consistent tracking system. Collectively, the Partnership must develop and implement procedures to collect energy use data for the boats used to transport visitors, staff, and materials. The data collection system should also include use of motor vehicles on the mainland (primarily by DCR).

- Establish standard procedures for capturing and reporting transportation energy use data for vessels and vehicles used for park operations.

☼ *C. Complete an energy audit of park buildings.*

Building energy audits can provide insightful information into unknown building energy losses as well as assess the relative energy efficiency of the park's building portfolio: buildings used for administration, operations, and visitor services.

- Generally follow the procedures specified in the NPS Energy Audit Guidance document to complete an energy audit of all operational buildings at the park.

☼ *D. Take a leadership role in the use of alternative fuels for marine applications.*

Diesel engines are the preferred power source for in-board marine applications; park ferries and work boats at Boston Harbor Islands are powered by diesel engines. Biodiesel[5] is biodegradable and nontoxic, making it an excellent fuel for marine applications. Bio-diesel blends are widely used to fuel land-based engines around the world. The situation with respect to marine applications is less clear, however. Local marine operators report that engine manufacturers advise against using biodiesel. Yet, there are instances where biodiesel is successfully used in boats. For example, Channel Islands National Park utilizes biodiesel in 100 percent of its vessel fleet. Other alternative fuels to be considered for marine use include fuel cells and ethanol.

- Work with other national parks to address challenges associated with biodiesel and alternative lubricants in the Boston Harbor Islands context. Plan and sponsor a Park Service-wide biodiesel/lubricant webinar to get the best knowledge available for use here and at other marine parks.
- Collect success stories from other locales where alternative power is used to power boats and share with the marine operators in Boston Harbor.
- Explore solar-fueled ferries (photo voltaic conversions should be able to a power two-mile trip).

☼ *E. Implement an integrated solid waste management plan.*

In 2005, a comprehensive waste management system was proposed to replace the existing fragmented approach. The overall planning project was a cooperative effort of the NPS and BHIA, on behalf of the Boston Harbor Islands Partnership. In 2006, DCR commissioned a study to refine recycling and solid waste management operations at Spectacle and Georges Islands. A few of the recommendations of the studies have been implemented. However, the need for a comprehensive system has become more apparent over the past several years, highlighting the requirement of active participation by many of the Partnership agencies that cooperatively manage the park (*see* Appendices D and E.)

- Explore opportunities to allow for placement of a dumpster for island waste on the mainland (e.g., City of Boston or DCR).
- Explore UMASS as an option for joining existing recycling program.
- Co-locate waste stream, recycling, and compost (may be island specific): identify partner and schedule to haul compost, trash and recycling.
- Ensure disposal on mainland is carried out by visitors at appropriate locations (i.e. avoid "dumping" all trash at the boat docks).
    - research visitor trash behavior.

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[5] Biodiesel can be produced from any vegetable oil or animal fat and used as a substitute or partial substitute for mineral diesel.

- Monitor amounts of waste and recyclables collected in various locations.
- Expand food waste composting program by requiring and training concession operators to collect food waste from kitchen operations.
- Pilot test "Pay as You Throw" system on Spectacle or Georges Island for a limited period (giving visitors the option of purchasing trash bags and disposing of waste on-island).
- Revise contracts with vendors to incentivize waste management strategies.

☼ ***F. Explore becoming a plastic-water bottle-free park.***

At Boston Harbor Islands, a cool drink of water is welcomed by many visitors on a warm summer day. Given that many of the islands do not have running water, plastic water bottles are common, but consequences of the use of individual plastic bottles remain an issue. An obvious one is the creation of solid waste that must be removed and recycled or dumped in landfills. Recycling a single plastic bottle can conserve enough energy to light a 60-watt light bulb for up to six hours.[6] The Partnership will work to eliminate the use of plastic water bottles in the park.

- Encourage visitors to reduce their use of plastic water bottles through education.
- Include in concessioners' contracts language indentifying the park as plastic bottle-free and require the sale of reusable containers/bottles for water use. Sell reusable bottles full of water by vendors. Use proceeds from the sale of reusable to invest in recycling bins around the park and islands.
- Explore establishment of "hydration stations" on the islands to encourage visitors to refill water bottles.

☼ ***G. Partner with surrounding state and local communities on alternative transportation systems.***

As a Partnership, work cooperatively with other federal agencies; state and local governments; regional planning bodies; concessioners; citizen groups; and others to design and promote alternative water transportation systems for park access and circulation. Link in-park transportation systems to public transportation through cooperation with public transportation agencies and gateway communities to reduce visitor vehicle fuel consumption.

- Partner with MBTA and local communities on alternative transportation opportunities for visitors; explore integration of park ferry system into MBTA ferry system.
- Designate the park's first "official" gateway at Long Wharf with opening of the Boston Harbor Islands Pavilion.
- Explore bike racks at Mainland Gateways.

Related Cooperative Management Actions

- ☼ *See* "Incorporate Climate Friendly messages into staff development." in Staff Behavior section.
- ☼ *See* "Utilize alternative energy sources." in Energy Management section.
- ☼ *See* "Incentivize visitor use of alternative transportation." in Transportation Management section.
- ☼ *See* "Promote energy efficiency and energy conservation in the park." in Staff Behavioral section.
- ☼ *See* "Pack-in, pack-out." in Visitor Outreach section.
- ☼ *See* "Incorporate Climate Friendly information into park programs and media." in Visitor Outreach section.
- ☼ *See* "Develop a Boston Harbor Islands Do Your Part! program for visitors." in Visitor Outreach section.

[6] http://yosemite.epa.gov/R10/TRIBAL.NSF/Newsletter/Issues/$FILE/tribal_l3_bulletin_aug_09.pdf (accessed 12/03/2010)

Cooperative Park Management Actions: 2-5 Years

A. *Collect additional park energy and waste data for analysis.*

- Inventory food concessions, visitors' private boats, stationary combustion from 2- and 4-cycle engines (e.g. maintenance equipment) and wastewater treated from visitor centers and mainland offices.

B. *Partner with local universities and organizations on global warming issues.*

- Engage Boston-area institutions (e.g. MIT) in developing marine-related innovation, e.g. marine biofuel.
- Participate in existing global warming initiatives in Greater Boston.

C. *Use dayligting.*

- Establish guidelines requiring new and retrofitted buildings to more effectively utilize natural lighting by bringing it into buildings via conventional glazing, light shelves, skylights, and clerestory windows (see LEED requirements).

D. *Install energy efficient outdoor lighting.*

- Review and implement Best Management Practices for outdoor night lighting from NPS's Night Sky program.

E. *Include sustainable criteria in all contracts with concessioners.*

- Review concessioner contractual language and modify to ensure the park's sustainability goals are reflected in concessioners' activities.

F. *Promote four-stroke engines for small equipment.*

- Establish guidelines for replacement of two-stroke engines and small equipment with four-stroke engines.
    - research replacement opportunities for park's lawnmower.

STRATEGY 2: Make Boston Harbor Islands a "carbon neutral" park by promoting renewable energy resources, both on-site and off, as well as by reducing fossil fuel use.

Outcomes / Performance Measures

- By 2016, reduce or offset greenhouse gas emissions resulting from park operations (including transportation emissions) by 50% (2007 baseline).
    - Furthermore, by 2020 reduce or offset GHG emissions resulting from park operations by 100%.
- By 2016, reduce overall energy consumption at park buildings by 25% (2008 baseline).
- By 2016, procure or produce 25% of annual electricity consumption at park facilities from renewable sources.

Energy Management

Improving energy efficiency and implementing alternative energy sources reduces park-based fuel use, lowers greenhouse gas emissions, decreases electricity consumption, and offers monetary benefits for the park. Emissions inventory results indicates 33 percent of the park's greenhouse gas emissions from park operations are from energy consumption. Consequently, we identified actions to reduce energy-related emissions. Presented below is progress to date, as well as those actions we will pursue, primarily on an individual agency basis.

Energy Management: Progress to Date

- Recent upgrades to Georges Island facilities.
    - replaced two 60kW generators, which ran constantly, with 30kW photovoltaic system backed up with efficient diesel generators.
    - Mine Storage Building improvements included: new windows, doors, insulation, upgraded high-efficiency furnace, and roof insulation.
    - new maintenance building includes day-lighting, an efficient heating system, and low flow toilets.
    - food service area fitted with propane to provide for cleaner/cost effective power.
- Thompson Island Outward Bound Education Center was the 2009 recipient of the Boston Green Business Award for their efforts to run a more sustainable organization. Recent energy upgrades to Thompson facilities include:
    - replaced windows with double-pane energy-efficient windows in three buildings.
    - reduced winter heat use by going from 14 heated structures to 3.
- 100kW photovoltaic panels are installed on GSA building housing the Partnership Office (the park uses 5% of generated energy); 3% of total purchased energy is from alternative energy.
- A feasibility study of using renewable energy on the grid-linked islands was completed in 2005.
- Spectacle Island visitor center was designed as a "day-lighting" building and has motion-activated light switches.
- An assessment of scenic resources in the park was completed in 2007 to aid the Partnership in decisions regarding the siting of wind turbines and other alternative energy generators.

Energy Management Actions: 1-2 Years.

☼ *A. Install energy efficient light fixtures and controls.*

To reduce energy consumption, install light fixtures and lighting controls. Use high intensity discharge (HID) lamps and/or fluorescent lights in all fixtures used for more than 3 hours a day. Replace incandescent light bulbs with Compact Fluorescent Light bulbs (CFLs) where appropriate

- Install energy efficient light fixtures.
- Install lighting controls such as motion sensors.
  - make sure that a re-commissioning schedule is in place to ensure appropriate use.
  - the re-commissioning schedule would include requirements to periodically check the functionality of motion sensors and to fix any non-working sensors. Upgrade lighting options.
- Install dimmable lighting systems (ballasts), programmed with photo sensors to reduce the need for electricity use during daylight (as available).

☼ *B. Adjust thermostats.*

Adjusting thermostat settings to not exceed more than 68 degrees Fahrenheit in the winter and no less than 78 degrees Fahrenheit in the summer can significantly reduce energy consumption. (Most park buildings do not have summer air conditioning and/or the building temperature is controlled by others.)

- Adjust thermostat settings to no more than 68 degrees in the winter and no less than 78 degrees in the summer for the new DCR Hingham building. (Temperature in the existing building is not controllable.)

☼ *C. Utilize alternative energy sources.*

By exploring cutting-edge technologies and demonstrating state-of-the-art technologies the park's carbon footprint can be reduced, and messages to the public about the issues associated with global warming can be strengthened. In concert with reducing energy use in the park, the remaining energy supply should be provided from sources that are as "green" as possible. Other alternative sources could include wind turbines located on the islands (following criteria established in the general management plan); replacing an existing device with a biotic-fueled device or fuel an existing device with biodiesel/biomass; or purchasing "green" energy from local utilities

- Research renewable electric utilities and purchase electricity from renewable energy providers. [7]
- Switch to biomass and biofuel instead of conventional fuel to heat park buildings.[8]
- Explore the use of fryolater grease for oil-fired generators on Georges Island.
- Install photovoltaic panels on park buildings and other locations that do not negatively impact natural and cultural resource values (e.g. Boston Harbor Islands Pavilion).
- Partner with technology companies and area universities to re-examine tidal/wave generation as possible energy source for the islands.
- Study additional options for wind turbines and photovoltaics to produce the park's own energy, particularly on Peddocks, Spectacle, and Moon islands. Consider state grant program for funding.

[7] The CLIP Tool Module 2 Renewable Electricity Calculator calculates emission savings associated with using renewable electricity.
8 The CLIP Tool Module 2 Biotic Fuel Calculator calculates energy and emission savings associated with switching to biofuel.

☼ *D. Implement energy management actions at Fort Andrews.*

Rehabilitating the buildings and landscape of Fort Andrews on Peddocks Island is a signature project of Boston Harbor Island Alliance which provides the opportunity for BHIA and DCR—the island's owner—to demonstrate their commitment to sustainability in building rehabilitation.

- Use energy efficient lighting:
  - install energy efficient light fixtures.
  - use daylighting principles and materials.
  - install dimmable ballasts.
  - install lighting controls.
  - install energy efficient outdoor lighting
- Use energy-efficient boiler or furnace models.
- Upgrade windows to better insulation and provide solar selectivity (e.g., spectrally selective glass, double-glazed, low-E systems, gas filled windows, and electrochromic windows).
- Utilize alternative energy supply: assess photovoltaic array on Peddocks Island and consider replacement.
- Install "building-level" or "smart" utility metering to track and continuously optimize performance.

Energy Management Actions: 2-5 Years

A. Improve coordination of work schedules.

- DCR can explore reducing the number of off-season trips to Georges Island.
- BHIA and NPS staff should use scheduled ferries whenever possible.
- TIOBEC continues to monitor the need for unscheduled trips to Thompson Island, and maintain an efficient schedule.

B Switch to more efficient electronics and devices.

- Ensure all new electronic/office equipment is energy efficient, and mandate each device is used by the maximum feasible number of people to reduce redundancy.
- Ensure all new electronic/office equipment is ENERGY STAR qualified; additionally consider purchasing a multi-function device rather than purchasing individual copy, fax, print, and scanning equipment.
- Ensure all computers' power management settings follow current ENERGY STAR recommendations.
  - set computers to enter system standby or hibernation mode after 30 minutes of inactivity and monitors to enter sleep mode after 15 minutes of inactivity.
- Set the default settings on all computers and copiers to double-sided printing.
- Install Smart Strip power strips to reduce idle electricity use from electronics and office equipment not in use.

C. Review guidance for improving the energy performance of new and existing buildings.

- Review the DOI Sustainable Buildings Plan for rehab goals for park's buildings.[9]

D. Install metering.

- Install "building-level utility" "smart" meters that transmit data on existing buildings and new major construction and renovation projects to track and continuously optimize performance.

E. Incorporate energy-efficiency criteria into new contracts for park construction.

- Take energy efficiency and sustainability into account with all new building design and renovations.
- Work with contractors to ensure that these requirements are met during both the design and construction phases.

Transportation Management

As the emissions inventory indicates, transportation accounts for 63 percent of the park's overall greenhouse gas emissions. However, unlike many national parks, vehicle miles traveled by visitors at Boston Harbor Islands are limited to the parking areas at Deer and Nut Islands, Webb Memorial, and Worlds End. It is the park water transportation system—both public ferries and operations vessels—that contributes the most to greenhouse gas emissions. Energy-conscious scheduling, improving vessel efficiency, and using alternative fuels can significantly reduce park emissions. Accordingly, the Boston Harbor Islands Partnership included water transportation in the reduction goals set for becoming a "carbon neutral" park by 2020. Presented below are the actions summarizing progress to date, as well as actions to be pursued, primarily on an individual agency basis.

Transportation Management: Progress to Date

- The park ferry operator, Boston's Best Cruises, uses high efficiency diesel engines in mainland ferries.
- All NPS employees use subsidized alternative transportation for commuting to and from work.
- All four trucks were removed from Thompson Island and replaced with electric golf carts and a trailer that is pulled by a tractor.
- TIOBEC improved engine efficiency by increasing engine maintenance.
- TIOBEC reduced fuel oil use by on-boat generators by converting from a 32-volt to a 24-volt system.
- TIOBEC reduced boat fuel use by 60% in 2009 by eliminating duplicate mainland trips.
- Switched to environmentally friendly hydraulic lube oils for TIOBEC operations.

Transportation Management Actions: 1-2 Years

☼ *A. Increase vessel fleet fuel efficiency through replacement.*

Increasing fuel efficiency for the motor vessels within the park water transportation system and park operations fleet is the single potential greatest impact on greenhouse gas emissions at Boston Harbor Islands.

- Benchmark existing motor vessel fleet-wide hours per gallon average and raise the average through vessel replacement.

[9] "Department of the Interior (DOI) Sustainable Buildings Implementation Plan: http://www.doi.gov/greening/buildings/"

- Look for most environmentally friendly engines for replacement in vessels.
- Include emissions performance in drafts of new contracts for water transportation.
- Right-size public ferry vessels to actual visitorship to increase efficiency of operations.

☼ ***B. Develop and use maintenance schedules.***

Keep vehicles and vessels in top mechanical condition. For example, rotate tires every 5000-miles, maintain tire pressure, do not top off tank (which can cause the gas station's vapor recovery system to operate improperly), on motor vehicles. Get regular tune-ups for all engines. Use bio-based lubricants without added petroleum synthetics.

- Develop and maintain a maintenance schedule for all park vehicles and vessels.
- Clean boat hulls for hydro-dynamic efficiency.
- Use bio-based lubricants and greases and recycle used oil.

☼ ***C. Incentivize visitor use of alternative transportation.***

Recognize those visitors who are driving high efficiency (>40 mpg) or alternative fuel vehicles (e.g. with "climate-friendly visitor" bumper stickers). Give incentives or discounts to those traveling to mainland locations by transit, bike, or on foot.

- Explore the use of incentives for visitors to use public transportation to park gateways (e.g., reduced ferry ticket with proof that public transportation was used to get to the ferry).
- Explore the use of incentives for visitors to use public transportation to park gateways (e.g., reduced ferry ticket with proof that public transportation was used to get to the ferry).
- Provide bike racks at all gateways to encourage reduced fuel consumption

☼ ***D. Reduce vehicle and vessel idling.***

Prohibit staff vehicle and vessel idling unless required for vehicle maintenance.

- Prohibit staff vehicle and motor vessel idling unless required for vehicle maintenance.
- Create dashboard idling guidelines and post in vehicles and vessels.

Transportation Management Actions: 2-5 Years

A. Identify areas to reduce or eliminate mowing.

- Incorporate xeriscaping and increase the use of native vegetation throughout landscaped areas to reduce the use of gasoline-powered mowers and hedge trimmers.
- Improve parking lot designs to include local vegetation that reduces mowing by eliminating grassy areas.

D. Reduce agencies' vehicle and equipment fuel consumption.

- Analyze fleet fuel-consumption patterns for efficiency improvements.

STRATERGY 3: Reduce solid waste generated by park operations and visitors through waste reduction, recycling, and environmentally sound materials management.

Outcomes / Performance Measures

- By 2016, establish a park-wide materials management system for "waste" and other materials being brought off the islands.
- By 2016, reduce solid waste that must be removed from the islands by 40% (2008 baseline).
- By 2016, increase recycled material removed from the islands by 30% (2008 baseline).

Waste Management

The connection between waste and greenhouse gas emissions may not be obvious. In fact, the park's 2016 strategic plan identifies desired outcomes for waste reduction that were developed without thought to reducing greenhouse gases. A separate solid waste strategy was developed in the 2016 plan focused on the traditional issues of "reduce, reuse, recycle." However, waste management—in the form of source and solid waste reduction—can dramatically reduce greenhouse gas emissions, as landfills are the largest human-generated source of CH_4 emissions in the United States. Reducing the amount of waste sent to landfills reduces CH_4 emissions caused by decomposition as well as the greenhouse gases emitted from the transportation of waste. The less the park and its visitors consume by way of products and packaging, the less energy is used and fewer greenhouse gases are emitted. Therefore, this strategy is closely allied with Strategy 2.

Park operation activities emitted 77 $MTCO_2E$ from waste management at Boston Harbor Islands in 2008. Diverting or reducing the park's waste stream through increased recycling efforts, composting, and waste management will reduce the amount of waste sent to landfills and resulting emissions. Presented below are the waste management actions currently under way, as well as those greenhouse gas reducing actions the Partnership agencies will pursue.

Waste Management: Progress to Date

- An Integrated Solid Waste Assessment Plan (ISWAP) was developed on behalf of the Partnership in 2005.
- Installed hand air-dryers at Spectacle Island to reduce paper towel waste.
- Replaced toilets with low-flow models in the Georges Island visitor center and installed composting toilets in Spectacle Island visitor center.
- Food concessioners have agreed to implement "green" criteria of contract.
- Conserved water used in grounds maintenance:
    - rain barrels installed throughout the campus on Thompson Island and collected rainwater used to irrigate all plantings.
    - rain barrels have been installed at the new visitors' center on Georges Island.
- Drinking fountains installed on Georges and Spectacle Islands to reduce need for bottled water.
- Recycling:
    - DCR now has single-stream recycling, and has recycling bins available with trash cans. The Islands District has the distinction of leading all of DCR in tonnage of material recycled.

  - NPS and BHIA recycle paper at the Partnership office.
  - Thompson Island recycling program was strengthened to reduce the landfill waste stream by 40% in 2009.
- Vendors (Summer Shack) are required to use recyclable materials, and have moved to fountain drinks on Georges and Spectacle to reduce waste from bottles and cans.
- Trash compacting trucks have been stationed by DCR on both Georges and Spectacle Islands to compact large quantities of trash, which can be easily offloaded at Nantasket Beach.
- Composting:
  - established food compost system for ranger stations on DCR camping islands; compost is used locally on gardens/plantings.
  - campgrounds on Bumpkin and Lovells Islands have food composting available for campers.
  - disposed of the waste collected on Thompson Island from past years and removed it from the island.
- TIOBEC reduced water use by going from 14 buildings active in winter to 3.

Waste Management Actions: 1-2 Years

☼ *A. Establish a yard waste composting program.*

Composting grass and brush along with food waste creates a beneficial product for local reuse of otherwise unwanted materials. A comprehensive compost program on each managed island would cut down on transportation impacts of moving debris off-island and reduce the amount of materials going to landfills. The finished compost can be used as an organic slow-release fertilizer that beautifies ornamental plantings and improves the capacity of soil to hold moisture. Creating compost can also be a part of hands-on learning opportunities for park staff, volunteers, and students.

- Explore options for composting grass clippings and other brush or vegetative waste as appropriate.[10]

☼ *B. Reduce waste through green procurement.*

A simple step agencies can take to reduce waste is to evaluate the need for office and operations purchases. Then, attempt to reduce purchases and avoid duplicate purchases. Agencies can also provide guidance to staff on what products are best from a sustainability perspective.

- Purchase locally produced materials whenever possible; work with concessioners and procurement departments to find local vendors and food producers when making purchasing decisions.
- Purchase durable, reusable supplies to reduce waste.
- Eliminate use of Styrofoam.
  - use biodegradable cornstarch utensils (Earthshell) and biodegradable foam "peanuts."
  - some Styrofoam can be taken in for reuse at package delivery stores, or local businesses that ship items.
- Use post-consumer recycled paper in all park publications.

[10] The CLIP Tool Module 2 Compost Calculator calculates emission savings associated with composting instead of landfills.

- establish requirements to purchase 100% post-consumer (PC) content, processed chlorine-free (PCF) copy paper. Consider alternative fibers (i.e., non-wood) and water-based or vegetable-based ink.
- target paper reduction.

- Buy FSC-certified wood.
  - Forest Stewardship Council certified wood ensures that wood products are produced in an environmentally responsible, socially beneficial, and economically viable way.
- Do not use pressure treated wood with CCA, ACC, ACA, CZC, and ACZA chemicals.
- Use no-VOC (volatile organic compound) paint for interior use.
- Use recycled content or factory refurbished carpet, reduce amount of carpet and use alternative flooring materials instead such as fast growing, renewable materials (i.e., bamboo).
- Establish purchasing guidance for computers, fax machines, printers, scanners, and other office electronic equipment.
  - ensure that ENERGY STAR qualified equipment is given preference.
  - purchase LCD monitors instead of CRT, which use less toxic substances.
  - purchase remanufactured toner cartridges. Consider less toxic materials/components, increased recycled content, and recyclability.
- Develop a green procurement checklist specifying preferred products and providing guidance to staff on what products are better than others from a sustainability perspective.
  - attempt to reduce purchases where possible and avoid duplicate purchases. Purchase durable, reusable supplies.
  - share DCR procurement guidance for green products with Partners.
  - use an "Authorized List" of products with environmental attributes developed by Cape Cod National Seashore.

☼ *C. Implement a waste management plan for the Fort Andrews project.*

All park construction projects should have a waste management plan that includes reducing, reusing, and salvaging deconstructed building materials. It is particularly important that BHIA and DCR practice environmentally responsible deconstruction at Fort Andrews on Peddocks Island.

- Practice environmentally responsible deconstruction at Fort Andrews including:
  - specify materials recovery (including reuse and recycling) as a priority when conducting building deconstruction bidding and property redevelopment assessments.
- Include source reduction as the priority practice for new construction and building rehabilitation at Fort Andrews. Other important components of planning should include:
  - reuse of construction waste on-site, reuse elsewhere, or selling recycling materials of value (lumber/wood, drywall, metal, rubble, cardboard, fixtures, hardware, and wiring).

- require drywall and other construction contractors to recycle waste.
- evaluate the reuse of old fixtures, windows, toilets, etc. that are not energy efficient, unless there is historic value.
- require waste haulers to prevent contamination of waste sorting.
- require documentation to ensure no illegal dumping occurs off job site.

Related Waste Management Actions

- ☼ *See* "Implement Integrated Solid Waste Management Plan" in Cooperative Management section.
- ☼ *See* "Carry in, Carry out" in Education & Outreach section.

Waste Management Actions: 2-5 Years

A. Minimize waste associated with paper towels.

- Install energy efficient hand dryers throughout park facilities instead of using hand towels.
  - explore installing hand air-dryers at Thompson Island.

B. Reduce and reuse wastewater.

- Replace toilets with low-flow models in all bathrooms.
  - install low-flow toilets and waterless urinals in the new DCR Hingham Office.
  - install low-flow-toilet in Harbor Islands Pavilion staff restroom.
- Explore ways to conserve water.
- Implement design of graywater system on Spectacle Island to decrease the amount of wastewater pumped off-island. Explore Thompson Island graywater re-use.
- On Georges Island, encourage landscaping native water tolerant plants/grasses now that construction is completed.

STRATEGY 4: Act in a way that is consistent with an ethic of environmental responsibility and sustainability.

Staff Behavior

Many actions reducing emissions are based on behavioral change. Staff at all levels of the Partnership agencies must act in a way consistent with our emissions reduction goals in every-day behavior. Staff actions also demonstrate to the public our commitment to addressing climate change issues. By incorporating climate change education into staff development programs, The park will enable its staff and volunteers to demonstrate their commitment through leading by example, and providing visitors with the tools and resources they need to reduce greenhouse gas emissions in the park and in their own communities. Planned actions include the following.

Staff Behavioral Actions: 1-5 Years

☼ *A. Promote energy efficiency and energy conservation in the park.*

Staff and volunteers can make significant contributions to load reduction by turning off equipment and lighting when it is not in use and enabling energy-saving settings for computers and monitors. Existing mandatory training should include energy conservation practices. Internal information technology can encourage staff to achieve more greenhouse gas emissions reductions, and advise staff on new ways to reduce greenhouse gas emissions.

- Conserve first.
  - encourage energy conservation in all park activities by shutting off lights, using natural lighting, turning off electronics or setting to hibernate, etc.
  - adjust thermostat settings to no more than 68 degrees in the winter and no less than 78 degrees in the summer.
  - identify "vampire energy users" (e.g. electronics that are using energy while not in active use).
  - add conservation to closedown checkout process.
- Promote efficient driving by encouraging staff to limit travel speeds in park vehicles to reduce excess engine load and decrease fuel consumption.
- Encourage staff use of CFL lighting fixtures on desks.
- Set computer power management settings to follow current ENERGY STAR recommendations.
  - enter system standby or hibernation mode after 30 minutes of inactivity.
  - set monitors to enter sleep mode after 15 minutes of inactivity.
- Use Smart Strip power strips to reduce idle electricity use from electronics and office equipment not in use.
- Set the default settings on all computers and copiers to double-sided printing. (This can easily be changed back to single-sided printing as needed.)

☼ *B. Incorporate waste reduction into green office practices.*

Promote standards for double-sided printing and copying, office supply reuse, electronic correspondence procedures, electronic file storage, and elimination of colored paper.

- Create an itemized material tracking sheet and evaluate the need for office purchases.
- Attempt to reduce purchases where possible and avoid duplicate purchases.
- Print documents double-sided.

☼ *C. Incorporate Climate Friendly messages into staff development.*

Developing a climate change education program for park staff is vital to increasing awareness about climate change among park visitors and fostering a sense of collective responsibility among staff. Use materials, publications, and tools available from the U.S. Environmental Protection Agency (EPA) and other agencies and organizations to mentor fellow staff about climate change.

- Create an orientation packet and provide information on policies and practices for recycling, green procurement, and other aspects of the park's waste management policy.
- Conduct brown bag lunches and seminars for all park personnel on topics related to climate change, waste reduction, park sustainability, green procurement, and recycling policy.
    - use Operations Committee and Green Team as opportunity for exchange of information.
- Encourage employees to take the Office of the Federal Environmental Executives' online green purchasing training.
- Update existing mandatory staff trainings— including joint seasonal training and those conducted by NPS, DCR, and TIOBEC— to include:
    - energy conservation practices. Center the training on the park's "Top Five" energy conservation tips for each job function.
    - green procurement practices.
    - source reduction, waste prevention, recycling and composting.
    - climate change information to keep staff informed of the park's position on climate change.
- Create visual reminders for park employees regarding climate change and how employees can help reduce emissions.
- Develop intranet pages on the park Ranger Portal to inform staff about climate friendly actions.
- Draft talking points on climate change for use by staff, based on the NPS Climate Change portal and "Do Your Part!".
- Use the Green Team to implement workshops for the Operations Committee as well as individual offices.

☼ *D. Promote low-impact transportation options to, from, and within the park.*

Raising awareness of energy-saving options by developing carpooling information and support services for staff can lead to reductions in greenhouse gas emissions. Partnership agencies can also provide alternative transportation options during the work day.

- Encourage staff to carpool or use public transportation when commuting.
- Establish an employee bike-to-work program.
- Provide kayaks or sailboats for transportation from mainland to islands in Hingham Harbor.
- Improve coordination of work schedules with the goal of sharing boat trips (e.g. fewer off-season trips to Georges Island).

STRATEGY 5: Inspire an ethic of environmental responsibility and sustainability in park visitors.

Outcomes / Performance Measures

- By 2016, create and implement a park-wide informational program based on the principles and practices of "Leave-no-Trace" (no program in 2008).
- By 2016, integrate messages about reducing visitors' carbon footprint while at the park into four (4) information channels: interpretive programs, exhibits, promotional brochures, and the park website (no messages presented in 2008).

Visitor Outreach

The Boston Harbor Islands Partnership recognizes that the greatest potential impact the park can have on mitigating climate change is through public education. Understanding climate change and its consequences is essential to initiating individual behavioral change. Thus, public education is an end goal of any climate initiative.

Many audiences visit the park, including local and out-of-town recreational visitors, "virtual visitors" who visit the park online, youth program participants, and school classes. In addition, approximately four million residents of metropolitan Boston are in close proximity to the park. By using existing materials, developing park-specific materials, highlighting what we are currently doing about climate change, and encouraging visitors to reduce emissions, we can play a role in educating the public about climate change. We are fortunate to have the opportunity to cooperate with the many local institutions already working to educate residents of Greater Boston about the consequences of climate change. Presented below are the actions currently under way, and those actions that we will pursue to educate and reach out to visitors.

Visitor Outreach: Progress to Date

- Developed and installed a wayside exhibit on Georges Island "green" energy installation.
- Developed and installed a Spectacle Island visitor center exhibit on the buildings "green" features.
- Created (and recently repaired) the "Amazing Energy Cart" interactive exhibit.
- Developed and printed a brochure about the renewable energy in the park and companion pages on the Partnership website titled, "Boston Harbor Islands Renewable Energy: What We Have Today; What Is Possible Tomorrow."
- Designed education programs to address sustainable practices on Thompson Island and within students' own communities.

Visitor Outreach Actions – 1-5 Years

☼ *A. Pack-in, pack-out.*

The park has adopted a policy of "pack-in, pack-out" for visitors, using the Leave-No-Trace program model. However, comprehensive information for visitors has not been available. Providing park rangers with the information needed to educate the public about climate change helps to ensure consistent and accurate messaging is key to reducing solid waste left in the park.

- Include waste prevention/recycling messages in park programs.
- Provide recycling messages in brochures, trail guides, maps, and posters.
- Use recycling messaging at waysides, campground display boards, and kiosks
- Offer recycling options with every trash receptacle.
- Communicate the "pack in/pack out" and "Leave-No-Trace" trash policy within the park.
    - implement Leave-No-Trace education for visitors.
- Educate visitors about their recycling options in the park and at home.
    - provide clear signage to identify recycling locations and information on materials that can be recycled.

☼ *B. Incorporate Climate Friendly information into park programs and media.*

Brochures (both electronic and printed) can describe the success of the Climate Friendly Parks program, in terms of resource and economic savings, and link climate change and park stewardship to visitor actions such as using public transportation. Throughout the park, consistent messaging is needed to foster overall emission reduction. There is considerable climate change information available through the Climate Friendly Parks and other websites as well as through the activities of researchers within park boundaries. Using this information as opposed to developing new materials saves time and resources.

- Revise the park's Long Range Interpretive Plan—specifically the Renewal and Reconnection theme—to include Climate Friendly Parks' messaging.
- Provide DCR and NPS rangers with the information needed to educate the public about climate change.
- Make climate change a focus of some community programs offered by Boston Harbor Island Alliance.
- Explore developing a park-centric climate change poster or electronic brochure.
- Incorporate Climate Change information into existing park brochures.

☼ *C. Develop a Boston Harbor Islands "Do Your Part!" program for visitors.*

Do Your Part! for Climate Friendly Parks is a joint effort between the National Parks Conservation Association (NPCA) and NPS with a goal of reducing the effects of climate change on national parks. NPS provides guidance and communications assistance, helping to spread the word to its park employees and 275 million annual visitors. Through Do Your Part!, the Boston Harbor Islands Partnership can help park visitors shrink their own carbon footprints—also known as reducing greenhouse gas emissions. The program suggests actions rooted in scientific studies and common sense.

- Expand the Do Your Part! for Climate Friendly Parks program presence on the Partnership website.
- Incorporate the Do Your Part! for Climate Friendly Parks program into future publications.
- Develop and distribute Do Your Part! print materials.

Appendices

APPENDIX A—CLIMATE FRIENDLY PARKS WORK GROUP

The Climate Friendly Parks action items were developed by a working group at a two-day workshop held at Cape Cod National Seashore on May 19 and 20, 2010, lead by the consulting firm ICF International. Original notes from the workshop, including detailed action items not presented in the final plan have been filed by National Park Service and are available upon request. Volunteer Meredith Eustis facilitated the Climate Friendly Parks process for Boston Harbor Islands.

Marc Albert, Stewardship Program Manager—Boston Harbor Islands National Recreation Area, National Park Service

Meredith Eustis, Volunteer—National Park Service and Massachusetts Executive Office of Energy and Environmental Affairs

Bill Green, Volunteer—National Park Service

Deni Sarno-Bucca, Forest and Park Regional Coordinator—Boston Harbor Islands District, Massachusetts Department of Conservation and Recreation

Bruce Jacobson, Superintendent—Boston Harbor Islands National Recreation Area, National Park Service

APPENDIX B—BOSTON HARBOR ISLANDS NATIONAL PARK AREA IN 2016: STRATEGIC PLAN

On September 15, 2009, the Boston Harbor Islands Partnership adopted strategies to prepare the park for the year 2016: the 20th anniversary of Boston Harbor Islands National Recreation Area; the end of the life of the park's general management plan; the centennial of the National Park Service; and the tercentenary of Boston Light. The strategies are based in the park's mission goals which assert the ideals that 1) the harbor islands are protected; 2) park visitors are satisfied and knowledgeable; and 3) the Partnership is effective. The 2016 strategic plan was shaped by general and strategic planning conducted by the Partnership over its first 12 years, by trends affecting America's national parks, and by public involvement.

Strategies contained in three of the five strategic themes in the 2016 plan are directly related to reducing greenhouse gas emissions. Those strategies—and their associated outcomes—are presented below. The Boston Harbor Islands National Park Area in 2016: Strategic Plan (2009) is available at: http://www.nps.gov/boha/parkmgmt/upload/BOHA_2016_strategicplan.pdf .

Education & Interpretation

The Boston Harbor Islands Partnership fosters exceptional learning opportunities that connect people to the islands. — MISSION GOAL: Park visitors and the general public understand and appreciate the resources and values of the island system, through the park themes: *Islands on the Edge, Home in the Harbor, Portal to New England, and Renewal and Reconnection.*

Strategy 5: We will inspire an ethic of environmental responsibility and sustainability in park visitors.

- By 2016, create and implement a park-wide informational program based on the principles and practices of "Leave-no-Trace" (no program in 2008).
- By 2016, integrate messages about reducing visitors' carbon footprint while at the park into four (4) information channels: interpretive programs, exhibits, promotional brochures, and the park website (no messages presented in 2008).

Environmental Leadership

The Boston Harbor Islands Partnership demonstrates environmental leadership and a commitment to the principles of sustainability. — MISSION GOALS: (a) The Partnership agencies lead by example in all aspects of park management including policy development; park planning; park operations; natural and cultural resource management; interpretation and education; facilities design, construction, and management; and commercial services. (b) The Partnership conducts its activities in a manner consistent with the principles of sustainability with reference to the use of energy, natural resource, and materials. Appropriate measures, such as use of biodegradables, recycling, and reuse, are taken to minimize solid waste.

Strategy 10: We will make Boston Harbor Islands a "carbon neutral" park by promoting renewable energy resources, both on-site and off, as well as by reducing fossil fuel use.

- By 2016, reduce or offset greenhouse gas emissions resulting from park operations by 50% (2007 baseline).
    - *Furthermore,* by 2020 reduce or offset greenhouse gas emissions resulting from park operations by 100%.
- By 2016, reduce overall energy consumption at park buildings by 25% (2008 baseline).
- By 2016, procure or produce 25% of annual electricity consumption at park facilities from renewable sources.
- By 2016, purchase only alternative-fuel, flexible-fuel, or hybrid motor vehicles, unless they are not available for the needed function; new motor vehicles are the most fuel-efficient within their vehicle class.

Strategy 11: We will reduce solid waste generated by park operations and visitors through waste reduction, recycling and environmentally sound materials management.

- By 2016, reduce solid waste that must be removed from the islands by 40% (2008 baseline).
- By 2016, increase recycled material removed from the islands by 30% (2008 baseline).
- By 2016, establish a park-wide materials management system for "waste" and other materials being brought off the islands.

Strategy 12: We will act in a way that is consistent with an ethic of environmental responsibility and sustainability.

- By 2016, ensure that every new park facility achieves at least the Silver rating equivalent under the Leadership in Energy and Environmental Design (LEED)

All but two of the 2016 outcomes/performance measures for Environmental Leadership were incorporated into the Climate Friendly action plan. ***The following did not return sufficient GHG reductions to be included.***

> *10.4 By 2016, purchase only alternative-fuel, flexible-fuel, or hybrid motor vehicles, unless they are not available for the needed function; new motor vehicles are the most fuel-efficient within their vehicle class.*
>
> *12.1 By 2016, ensure that every new park facility achieves at least the Silver rating equivalent under the Leadership in Energy and Environmental Design (LEED).*

Professional Excellence

The Boston Harbor Islands Partnership demonstrates management excellence worthy of the treasures entrusted to our care. — MISSION GOALS: (a) Park management is coordinated by the Boston Harbor Islands Partnership in cooperation with Indian tribes and historical, business, cultural, civic, environmental, recreational, and tourism organizations. Cooperators and individuals support the park mission through contributions and creative initiatives. (b) Each member of the Boston Harbor Islands Partnership is committed to the funding, operation, and development of the park using best management practices, systems, and technologies to accomplish the park's mission.

Strategy 19: We will model what it means to work in partnership.

- By 2016, identify and adopt best management practices and standards for each strategic theme: Stewardship, Environmental Leadership, Recreational Experience, Education, and Professional Excellence.

Strategic Plan Model

The 2016 strategies are based in the park's mission goals which assert these ideals:

Harbor islands are protected.

Visitors are satisfied and knowledgeable.

Partnership is effective, thus supporting the park mission.

APPENDIX C—BOSTON HARBOR ISLANDS GENERAL MANAGEMENT PLAN EXCERPTS

The purpose of the general management plan is to clearly define the park's mission and management direction. It provides a foundation to guide and coordinate all subsequent planning and management. The plan is a policy-level document that provides guidance for park managers. It is not detailed, specific, or highly technical in nature. As the foundation for all subsequent planning and management, other plans tier off the general management plan. It provides a consistent framework for coordinating and integrating all the various types of park planning and implementation that are needed.

The Boston Harbor Islands management plan was developed by the Boston Harbor Islands Partnership in consultation with interested stakeholders. It was printed and unanimously endorsed by the Partnership in 2002. Then the plan was adopted by the National Park Service: on October 17, 2005, the NPS Northeast Regional Director concluded the general management planning and environmental analysis (EIS) by signing a record of decision.

The general management plan is available at: http://www.nps.gov/boha/parkmgmt/boston-harbor-islands-general-management-plan.htm

Park Mission

"The mission of the Boston Harbor Islands National Recreation Area is to make the Boston Harbor Islands system—with opportunities for education, recreation, and restful solitude within an urban area—an integral part of the life of the region and the nation by protecting the islands and their associated resources while at the same time improving public knowledge and access" (page 46.p).

Sustainability and Environmental Leadership

"The Boston Harbor Islands Partnership demonstrates environmental leadership and a commitment to the principles of sustainability. The Partnership agencies lead by example in all aspects of park management including policy development; park planning; park operations; natural and cultural resource management; interpretation and education; facilities design, construction, and management; and commercial services. Infrastructure, programs, and functions are models for the use of sustainable design, planning, construction, development, access, resource use, and maintenance. To ensure appropriate commitment, the Partnership agencies adopt sustainable practices on the islands over time. Collaborations foster environmentally, socially, and economically compatible solutions.

Maintenance

"The Partnership conducts a program of preventive and rehabilitative maintenance and preservation to protect the physical integrity of facilities so as to provide a safe, sanitary, and aesthetically pleasing environment for park visitors and employees and to preserve or maintain those facilities.

Solid Waste Management

"The Partnership encourages environmentally sound solutions to solid waste management. All waste management decisions are based on a consideration of economics, proper use of resources (both personnel and physical), safety, effect on the total environment, and other factors of sound engineering and are in compliance with all federal, state, and local regulations regarding avoidance, amelioration, or elimination of environmental pollution.

Hazardous Materials and Toxic Waste

"The Partnership makes efforts to avoid hazardous material incidents and to control or minimize them should they occur. Prevention includes acquisition of minimum quantities of hazardous materials; selection of the least toxic materials; implementation of safe use, storage, and disposal practices; recycling of spent materials; and development of emergency response programs.

Energy Management and Recycling

"The Partnership conducts its activities in a manner consistent with the principles of sustainability with reference to energy use. It demonstrates a preference for, and promotes, renewable energy as well as ensuring that energy is used wisely and economically. It encourages energy upgrades to include renewable technologies. Appropriate measures, such as use of biodegradables, recycling, and reuse, are taken to minimize solid waste." (pages 89-90)

APPENDIX D—BOSTON HARBOR ISLANDS RENEWABLES PLANNING GUIDE

This 2005 report was submitted by the Urban Harbors Institute, University of Massachusetts Boston, and Island Alliance as the final product of the "Predevelopment of Renewables in the Boston Harbor Islands National Park Area" feasibility study, which was funded by the Massachusetts Technology Collaborative Renewable Energy Trust.

Five grid-tied islands were studied:

- Long Island (214 acres)
- Moon Island (44 acres)
- Peddocks Island (188 acres)
- Spectacle Island (97 acres)
- Thompson Island (157 acres)

Renewables Planning Guide Preferred Alternative

"The preferred alternative is a configuration of renewable energy facilities on the Boston Harbor Islands which achieves the goals set out for the project and is responsive to the physical and environmental conditions of the islands, costs and revenues, and the institutional and socio-political considerations associated with Boston Harbor and the park.

"The recommended sites were selected based on a consideration of the factors presented in section IV, particularly potential community impacts, i.e., visualizations, potential impacts on environmental, historical, and cultural resources, air navigation, and the utility distribution network (capacity, age, location). The ownership, financial and operational aspects of the preferred alternative are based on an assessment of alternatives.

"The preferred alternative is presented with options. For wind turbines, the options relate to siting and size of the turbine. For photovoltaics, the option is simply one of magnitude, related to cost. Reasons for and implications of the options are described below.

"The preferred alternative for wind power is:

- two 660 kW turbines on Long Island at sites in the vicinity of the former Nike installation, labeled L4 and L7 on Figures 20 and 21a;
  - as an alternative, one 1.5 MW wind turbine at either one of the above sites.
- one 1.5 MW turbine located on Moon Island at M2;
  - as an alternative, one 660 kW turbine at M2.
- A 660 kW turbine on Peddocks Island at the south end of the tombolo at P2, and
- a 100 kW turbine on Spectacle Island on the northwest slope of the south drumlin at S4."

"…These particular sites and the turbine sizes respond to the key opportunities and constraints. The number of turbines will produce a sufficient amount of renewable energy and revenue to fulfill project objectives and be economically feasible, while remaining compatible with the park mission and policies and the various siting constraints. It is also possible, if circumstances permit or dictate, to do any one or any combination of the above sites and turbines." (page 54)

Criteria for evaluating Proposed Revenue Generating Activities on the Islands

"The General Management Plan (p. 86) lists a number of criteria to be used in evaluating proposed revenue generating activities on the islands. The following are those criteria relevant to the development of renewable energy on the Boston Harbor Islands. The study and recommendations in this Planning Guide were shaped by these standards:

- Resource protection and preservation: will not impair park resources or associated values
- Management areas: will not impinge on areas of natural features or managed landscape emphasis
- Construction standards: both new construction and adaptive reuse of existing structures adhere to Partnership development guidelines.
- Carrying capacity: consistent with the carrying capacity of the proposed location
- Program relevance: activities with a direct thematic relationship to the islands are preferred
- Linkage or synergy: activities with potential for direct linkage or synergy with other projects and programs affecting the islands are preferred
- Constituency building: revenue generating programs enhance the park's identity and expand its constituency

"Further, the GMP (p. 87) envisions park infrastructure to be the only development on the BHINPA, and such infrastructure development should be consistent with at least one of six stated purposes and leave park resources unimpaired. A renewable energy project is consistent with at least two of these purposes: (1) to generated revenue for park programs and operations, and (2) to support park programs and education." (page 21)

Renewables Planning Guide Outline

I. Basis and Background for Renewable Energy on the Boston Harbor Islands
II. The Boston Harbor Islands National Park Area: Existing and Planned Conditions
    a. Institutional Setting of the BHINPA
    b. Park Planning
    c. Park Financing and Revenue Generation
    d. The Affected Environment
        i. Existing Conditions and Use of Each Island
        ii. Plans for Future Use and Development of the Islands
    e. E. Regional energy distribution system
        i. Interconnection
III. Resource Analysis
    a. Amount of Resource
        i. Wind
        ii. Solar
    b. Renewable Energy Resource Analysis: Power and Energy Estimations
        i. Wind
        ii. Photovoltaics
IV. Identification of Alternative Technologies and Sites
    a. Wind Power
    b. Photovoltaics
    c. Development and ownership options
    d. Financing
    e. Operation and maintenance (O&M)
V. Environmental, Community and Regulatory Assessment
    a. Overview of environmental and community impact criteria
        i. Birds
        ii. Navigable Airspace
        iii. Terrestrial and Wetlands Resources

iv. Historic, Cultural, and Archeological Resources
v. Aesthetics and community acceptance
vi. Native American interests

b. Administrative and Other Regulatory Authorities
i. National Park Service
ii. Massachusetts Environmental Policy Act (MEPA)
iii. Permit for Post-Closure of a Landfill (Spectacle Island) Municipal Zoning
iv. Article 97
v. Map of Scenic Landscapes
vi. Massachusetts Coastal Zone Management Federal Consistency

VI. Preferred alternative
a. Project Ownership Structure and Financing
b. Project Economics
c. Recommendations for Project Development

VII. Obstacles to development and strategies for overcoming them
a. Interconnectivity
b. Parkwide Scenic Resources Study
c. Revenue Sharing
d. Navigable Airspace

VIII. Outreach and Education 66

Appendices
A. Outreach and Education Plan
B. Sample Visualizations
C. Summary of findings for Tidal and Wave Energy
D. Definitions related to wind energy
E. Advisory Council Members

APPENDIX E—BOSTON HARBOR ISLANDS NATIONAL PARK AREA INTEGRATED SOLID WASTE MANAGEMENT PLAN

This 2005 report presents the results of research and summarizes design recommendations for a comprehensive, integrated waste reduction and recycling program for the Boston Harbor Islands national park area. The report consolidates and presents research conducted by Haley & Aldrich and WasteCap of Massachusetts. The overall planning project was a cooperative effort of the National Park Service and Island Alliance, on behalf of the Boston Harbor Islands Partnership.

Solid Waste Management Plan Executive Summary

"The Boston Harbor Islands national park area (BHINPA) includes thirty four islands rich in natural and cultural resources situated within the Greater Boston shoreline. WasteCap of Massachusetts was hired through a National Park Service grant to develop an integrated solid waste management plan for the BHINPA. Haley & Aldrich, Inc. was hired by WasteCap of Massachusetts to complete work begun on the project by WasteCap of Massachusetts. An extensive survey of existing recycling and waste disposal systems on the islands was conducted….

"The Massachusetts Department of Conservation and Recreation (MA DCR) currently operates a Landing Craft Medium (LCM8), an amphibious ship, between the BHINPA islands. The highlight of the plan includes a new system where recyclables and limited amounts of trash (from small generation sites) will be collected in a weekly "milk run" by the LCM8 and transported to the Massachusetts Water Resource Authority (MWRA) Deer Island pier. The recyclables stored in dumpsters on the LCM8 will be lifted onto the pier with a proposed marine crane at the MWRA pier. The recyclables from the BHINPA, and recyclables generated by the MWRA Deer Island facility and also stored in dumpsters on the pier, will be marketed through an innovative partnership with the MWRA and a recycling services provider.

"The new comprehensive system replaces the existing fragmented approach and uses the combined volume of materials from the islands and the MWRA Deer Island facility to reduce disposal costs, conserve scarce landfill space, maximize recycling revenues and save valuable natural resources, while creating a sustainable recycling and integrated waste management program for the BHINPA and the MWRA Deer Island facility.

"If use of the MWRA Deer Island Pier is impossible due to lack of funds for the necessary marine crane, then the second best location for a recyclables transfer facility is the Massachusetts Department of Conservation and Recreation Islands District Headquarters facility in Hingham, MA. In this scenario, wheeled carts would be used to transfer recyclables from the islands to roll-off containers at the Hingham facility." (page i)

Solid Waste Management Plan Outline

1. **Research Into Existing Recycling And Trash Disposal Systems On BHINPA Islands- Methodology**
2. **Recommendations**
   - 2.1. Target Recyclable Materials
   - 2.2. Recyclables and Trash Transfer Site
   - 2.3. Massachusetts Department of Environmental Protection Solid Waste Regulations Impact

2.4. Marine Cargo Transport/Recycling & Trash Collection Container Systems
2.5. Marine Crane
2.6. Marine Crane Alternatives
2.7. Spectacle Island Recycling, Composting, and Trash Collection Containers
2.8. Recycling and Trash Disposal Services
2.9. Carry On/Off Public Outreach and Education for Staff and Visitors
2.10. Recycling/Composting Public Outreach and Education for Staff and Visitors
2.11. Composting Pilot Program
    2.11.1. Location
    2.11.2. Technology
    2.11.3. Concessions Operations Specification- reusable, recyclable, and biodegradable products
    2.11.4. Biodegradable plates, bowls, cups, and utensils
    2.11.5. Compost Product End Use
2.12. Waste Oil Recycling
2.13. Biodiesel, Re-refined Oil, and Bio-lubricants
2.14. Post-consumer Recycled Content Outdoor Picnic Tables and Park Benches
2.15. Overview of Existing Recycling and Trash Disposal Systems on BHINPA Islands

APPENDIX A - Boston Harbor Islands national park area (BHINPA) Islands Map
APPENDIX B - Overview of Existing Recycling and Trash Disposal Systems on BHINPA Islands
APPENDIX C - TechCrane Global Marine Crane Quotation
APPENDIX D - Davit Sales, Inc. Marine Crane Quotation
APPENDIX E - Kinshofer Pallet Fork Specification Sheet
APPENDIX F - Outdoor Furnishings Vendor List
APPENDIX G - Recycled Outdoor Furnishings Price List
APPENDIX H - RFP for Recycling and Trash Disposal Services
APPENDIX I - Recycling and Trash Disposal Services RFP Results
APPENDIX J - National Park Service "Leave No Trace" Educational Materials
APPENDIX K - Massachusetts Department of Conservation and Recreation "Litter Lugger" Educational Materials

APPENDIX F—ROAD MAP FOR WASTE REDUCTION AND RECYCLING ON GEORGES AND SPECTACLE ISLANDS

This 2006 report was prepared for the Massachusetts Executive Office of Environmental Affairs and Massachusetts Department of Conservation and Recreation by Peter H. Allison Consulting.

Executive Summary

"Peter H. Allison Consulting (PHA) was hired by the Massachusetts Executive Office of Environmental Affairs (EOEA) to develop a "road map" for the Department of Conservation and Recreation (DCR) to use in developing and refining recycling and solid waste ("waste ") management operations at Spectacle and Georges Islands (islands).

"PHA analyzed the waste stream and identified the following materials in significant quantities:

- Food waste and wrappers from concession stand and visitors;
- Plastic, aluminum and glass beverage containers; and
- Washed up wood, metal, plastic containers, Styrofoam flotation materials, bricks and concrete.

"PHA estimated that there is 72 tons of waste generated on the two islands during the year, with a majority generated during the visitor season, Memorial Day through Columbus Day. Of this amount about 30 tons represents material washed up on shore, and people using the islands generate the remaining 42 tons. Roughly 21 tons is generated and managed by the concession operators, with the remainder (51 tons) managed by the DCR.

"The estimated cost to DCR to manage this waste is $16,717, with $4,163 representing tipping fees, and the remainder split between waste-dedicated labor, and dedicated boat and packer truck operation and maintenance costs. Estimated costs to the concession operators are $4,896.

"In addition, there is are various reuse and recycling efforts underway, including:

- Collection of deposit beverage containers by the concession operator on Spectacle Island, and by DCR staff on Georges Islands (which generates an estimated $200 per year);
- Collection of non-deposit plastic recyclable beverage containers on Spectacle Island;
- Efforts to return valuable marine equipment to owners on Georges Island;
- Reuse of drift wood by burning for fuel on the islands; and
- DCR Hingham Facility is planning to begin paper recycling in near future.

"PHA identified and considered a number of issues and challenges related to waste management on the islands, and identified three critical criteria for any successful waste management program on the islands:

1. The program must be cost sensitive, given the limited financial resources available to DCR.
2. The program must demonstrate a commitment to environmental stewardship.
3. The program must be simple to implement, evaluate and modify.

"PHA then identified six options for managing waste, describing the key features, benefits and costs of each. They are:

1. Improve and expand existing systems;
2. Develop system to compost food waste on the islands;
3. Institute a "Pay as You Throw" program for island visitors;
4. Hire a Resource Manager that is given a financial incentive to reduce and recycle waste on the islands;
5. Create a "milk run" between waste generated on Spectacle Island and Georges Island, and make greater use of DCR packer truck for waste storage and transportation; and
6. Hire an outside entity to manage and transport all waste.

"Finally, PHA created a metric to evaluate these options, based on their likelihood to meet the three principle objectives, and made recommendations for the short term (this year and next) and the longer term (next year and beyond). Following are the key recommendations:

"Short Term Recommendations (2006-2007)

1. Expand deposit container recycling efforts on both islands;
2. Begin composting food waste from island staff by use of enclosed, low cost, vermin-proof back yard composting bins;
3. Install garbage cans on Georges Island near composting toilets and in bathrooms on Spectacle Island that will be managed by DCR staff to reduce litter; and
4. Monitor amounts of waste and recyclables collected in various locations.

"Longer Term Recommendations (2007 and Beyond)

1. Expand food waste composting program by requiring and training concession operators to collect food waste from kitchen operations;
2. Consider adding food waste from customers, once kitchen food waste program is operational and running (e.g., in 2008). This will include changing vendor contracts to require use of biodegradable dishware and utensils that can be composted with the food waste;
3. Pilot test Pay as You Throw (PAYT) on Spectacle Island for a limited period (giving visitors the option of purchasing trash bags and disposing of waste on island);
4. Revise contracts with vendors to incentivize waste management strategies, and explore opportunities to allow for placement of a dumpster for island waste on the docks in Boston." (pages 2-3)