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Boston Harbor Islands National Park Area Scenic Analysis and Assessment: A Pilot Study

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Boston Harbor Islands National Park Area Scenic Analysis and Assessment: A Pilot Study

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Table of Contents

Executive Summary

The goal of this study is to identify, rank, and classify the important viewsheds of the Boston Harbor Islands National Park Area (BHINPA). This study was undertaken by the University of Massachusetts Department of Landscape Architecture and Regional Planning - Landscape Planning Studio – in the fall of 2006 for the clients of the National Park Service (NPS) and Island Alliance. This study is the first step in a larger undertaking to accurately document and assess the visual resources within the park. Although this study contains its own assessment findings, it's primarily purpose is to serve as a pilot study to establish the framework for future assessment efforts.

It is necessary to assess and manage the scenic views of the Boston Harbor Islands National Park Area because the visual resources are among the park's attributes and values. The views that Park visitors will enjoy in the future are dependent upon decisions being made today. Areas identified as having high scenic value warrant additional protection through special management attention. This study, and the continuing efforts that follow, will help to inform future decision making within the National Park Area.

The assessment methods used in this study were initially adapted from a model developed by the Bureau of Land Management (BLM) entitled Visual Resource Management Program (VRM). The VRM provided our study with an established foundation so that our methods utilized a combination of proven standards and flexibility toward the study area. This study also included a rigorous methodology phase in which the initial methods were tested and refined through external feedback. The unit of analysis for this study was a viewshed, defined as "all surface areas that can be seen from a certain point" (Smardon et al., 1986). Hundreds of viewsheds were documented, however only sixty-six (66) viewsheds were assessed and included in the findings.

The viewsheds have been divided into five Scenic Quality Classes based on their visual quality rating: Class A, B, C, D, and E. The majority of the viewsheds- over 50%- fell into the two highest categories: Class A and B. Geographically, the highest rated viewsheds tend to cluster around the Brewster Islands and the upper-harbor islands of Georges, Spectacle and Thompson. Further analysis of these findings along with a discussion of trends is included in this report. Following the assessment findings, this report contains a synopsis of recommendations for incorporating the study findings into park plans and activities. Here is a summarized listing of our key recommendations:

1) Increase visitor access to scenic, yet under-viewed areas of the park.
2) Incorporate a landscape management policy within the park Management Plan to maintain scenic vantage points.
3) Add two scenic ferry routes that connect the on-water, Class A and B viewsheds.
4) Overlay scenic assessment with all relevant park management plans.

Beyond our recommendations, our team has suggested a series of next steps to be addressed by those continuing the work. The primary task that should be focused on is the incorporation of a broad public input process in further assessments of the study area. This would increase the validity of the findings before integrating the data into park planning. The report concludes with a discussion of challenges and opportunities faced throughout this study.

Introduction and Purpose

The goal of this study is to identify, rank, and classify the important viewsheds of the Boston Harbor Islands National Park Area. This study was undertaken by the University of Massachusetts Department of Landscape Architecture and Regional Planning – Fall 2006 Landscape Planning Studio. The clients are the Island Alliance and the National Park Service. This pilot study can be used to inform future assessment projects.

The Boston Harbor Islands National Park Area is a unique geologic, natural, cultural, and historic resource in the heart of one of the nation's most densely populated urban areas. Visual resources are among the park's attributes and values. In 2005, over 325,000 visitors came to the park; a survey indicated that many came for the visual quality of the park as well as the cultural, historical and natural features. Currently there is no identification or qualification of where these visual resources are located or what the priority viewsheds are. A viewshed assessment will provide answers to those questions and serve as a tool for managing visual attributes of the study area. This viewshed study will provide information on the qualities and importance of various viewscapes within the park; however, it is not designed to determine the acceptability of a particular structure.

Site Background and Context

Park Area has an innovative multi-jurisdictional ownership and management model. Federal, state, local agencies, and the private sector come together to manage the Park Area. Legislation passed in 1996, establishing the Boston Harbor Islands as a National Park Area and the National Park Service as a non-land owning participant in the Boston Harbor Island Partnership. The National Park Service is concerned with the park's mission and management direction. The General Management Plan outlines the mission, policies and land of the Boston Harbor Islands and projects a vision for the next fifteen to twenty (15-20) years.
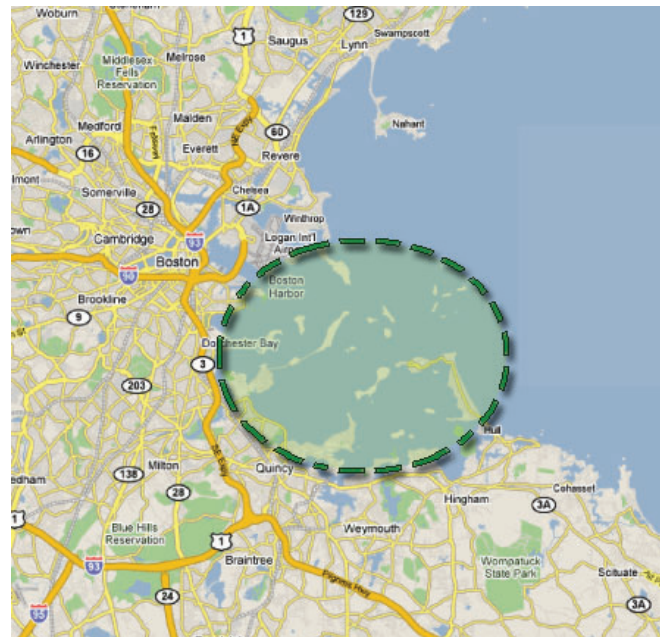
Boston Harbor Islands Study Area.

"To make the island system an integral part of the life of the surrounding communities and region, and to protect the islands as a resource of national significance, while improving public knowledge and access for education, recreation, and restful solitude within an urban area". – Mission from 2002 General Management Plan

The park encompasses fifty (50) square miles and is made up of 3,500 acres of land during low tide and 1,600 acres during high tide. It is comprised of thirty-four (34) islands and peninsulas. The park boasts an array of natural and cultural resources and it is the only drumlin field in the United States that intersects with a coastline. Cultural impacts on the islands include Native American use, lighthouses, coastal defense, resorts, agriculture, landfills and sewage treatment facilities. Over the past decade, the improved water quality in Boston Harbor has created an increase in recreational use of the harbor and islands. The park area offers opportunities for active and passive recreation, tranquility and personal renewal, land and water based education and recreation in close proximity to the large urban area of Boston. For more detailed information about the management and history of the Boston Harbor Islands National Park Area please see www.NPS.GOV/BOHA.

Indications for Scenic Analysis and Assessment

One of the goals for the National Park Area is to preserve the character of the islands and guide development to make sure it's appropriate. The park area boasts four Historic Landmarks listed on the National Register as well an Archeological District listed on the National Register of Historic Places. While the park recognizes the need for revenue, as well as development that will occur to accommodate tourism demands, it also recognizes that development must meet certain criteria that are in appropriate for the park. Development should not impair park resources and must be placed in appropriate management areas.

Development that is considered for the park includes visitor facilities and renewable energy sources. The Island Alliance sponsored a study that was completed in 2005 that studied the potential for renewable energy in the park such as solar cells, wind turbines and hydro turbines. Recently the park has experienced development pressure regarding leasing Outer Brewster Island to a corporation to develop a large Liquefied Natural Gas (LNG) terminal and depot, a bill presently before the legislature.

Wind Turbines at Hull   Deer Island Digesters   Solar Panels at Peddocks Island

The premier position of the islands, visible from a variety of mainland and harbor areas, furthers the need for visual assessment and management. A sensitive approach is necessary to identify and assess existing visual quality and to evaluate the visual impacts of future management and development alternatives. The Boston Harbor Islands National Park Area requires an innovative model for visual assessment, since many existing visual assessment approaches by federal agencies have focused on more remote, undeveloped settings, like the Forest Service's Scenic Management System (1995) and Bureau of Land Management's Visual Resource Management program (1980). Work by the University of Massachusetts -Department of Landscape Architecture and Regional Planning will merge research and application to develop an innovative visual resource assessment for the Boston Harbor Islands National Park Area.

Process

Phase 1: Documentation	Phase 2: Methodology	Phase 3: Assessment	Phase 4: Conclusion
Determine Study Area	Literature Review	Select Viewsheds	Analysis
Document Viewsheds	Develop Methods	Apply Methods	Recommendations
	Test Methods	Classification and Mapping	Deliverables
	Identify Strengths & Weaknesses		
	Refine Methods		
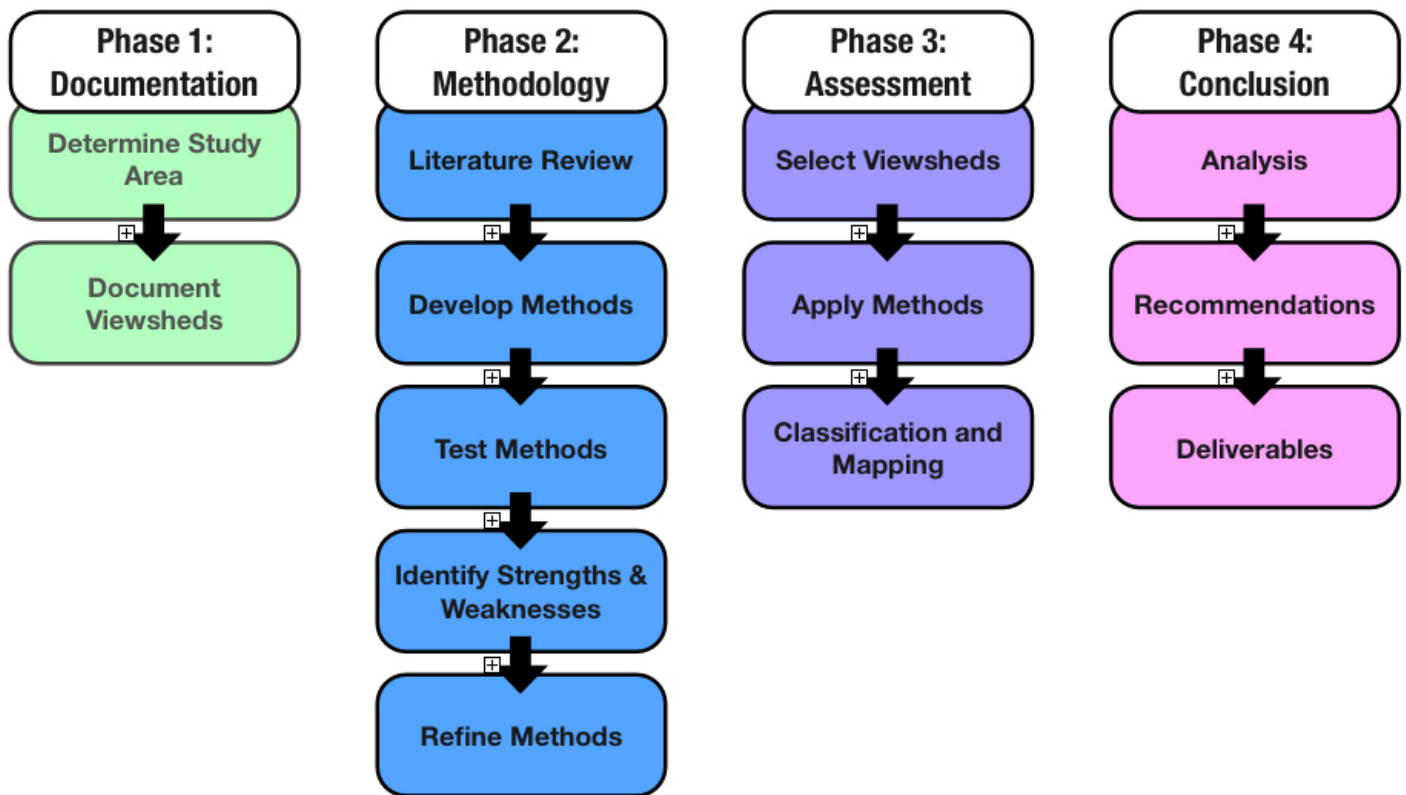
Documentation

During September and October 2006 the research team visited the National Park Area seven (7) times. Dates and routes of visits were:

Trip	Date	Route
1	09/09/2006	Start: Inner Boston Harbor • north of Long Island • between Lovells Island and Gallops Island • Little Calf Island • The Graves • Brewster Islands • Long Island • Return: Inner Boston Harbor
2	09/11/2006	Start: Inner Boston Harbor • under Long Island bridge • (landing on) Georges Island • Peddocks Island • Bumpkin Island • Grape Island • Peddocks Island • George Island • Return: Inner Boston Harbor (same route)
3	09/16/2006	Start: Inner Boston Harbor • (landing on) Spectacle Island • Return: Inner Boston Harbor
4	09/16/2006	Start: Inner Boston Harbor • (landing on) Little Brewster Island • The Graves • Green Island • Calf Island • Return: Inner Harbor
		Driving to Deer Island
5	09/23/2006	Start: UMass • Thompson Island • under Long Island bridge • (landing on) Grape Island • (landing on) Peddocks Island • Hull Gut • (landing on) Lovells Island • passing north of Long Island • Return: UMass
6	09/30/2006	Driving to the mainland points • World's End • Webb Memorial Park • Nut Island • Wallaston Beach • Castle Island
7	10/22/2006	Start: EDIC Dock (Outward Bound ferry) • (landing on) Thompson Island • Return: EDIC Dock

The purpose of these visits was to document the viewsheds of the park and obtain as much coverage as possible. While the focus of the study was the viewsheds within the park area, certain viewsheds, such as the skyline of Boston, and the land around important gateways were also documented as were views of the islands from popular points on the mainland such as Castle Island.
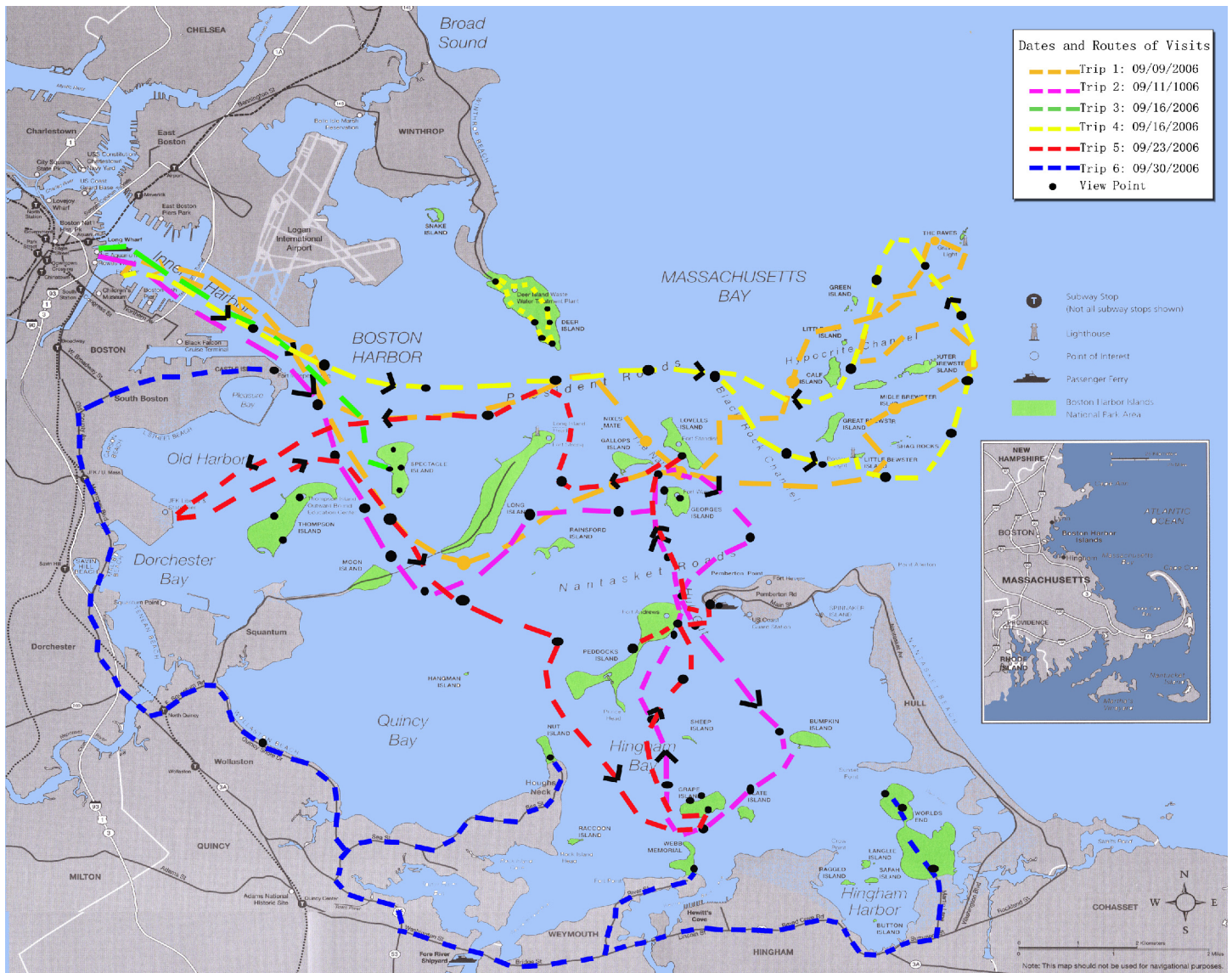
Maps with different trips and points taken by Global Positioning System (GPS) unit.

In general, these viewsheds will be more panoramic landscape scale views rather than narrow framed vistas. The methodology for taking pictures will be the landscape preference methods developed by environmental psychologists Stephen Kaplan and Rachel Kaplan (1989), which have been utilized and validated in numerous photo-preference surveys, including those conducted in collaboration with the principal investigator (e.g., Ryan, 2002). This method includes taking photographs of vistas from several different vantage points, limiting seasonal variability between photos, and avoiding close views of people, automobiles (or boats), and other temporal images that will bias the landscape preference. Permanent historic, cultural or other human built landscape features that may dominate a viewshed will be important to include, such as views to historic forts, lighthouses and other structures.

The pictures were taken from points at which the visitor would experience the view. This means photos were taken from defined vistas (clearing, benches, etc) and from points that visitors are directed to.   For example, when walking along a path of one of the islands you would photograph the view from the path and not walk across tall grass where a visitor is unlikely to go. Because the vantage point the photographer chooses, can affect if the photo has foreground or not, this rule of thumb was to be followed so that foreground was captured when it was appropriate.

The pictures were taken by 35mm camera focus to standardize the view distance. Panoramic photos were captured when possible, though this was challenging when taking photos from a moving ferry. Some photographers captured panoramas by just continuously taking shots, while other used "stitch assist" functions available in their cameras.

Once the photos were imported onto a computer they were stitched together by two different methods- 1) Photoshop software and 2) specific camera software that supported the "stitch assist" functions. The use of camera software is recommended because it can automatically place the pictures together making the stitch process fast and simple (though look carefully for mismatch errors). In Photoshop the photos must be connected one at a time by hand. Because the width of the panoramas varied because of the different overlap in the photos and the number of photos taken it was important to standardize the angle of the viewshed. Using Photoshop, the panoramic pictures were all cut to ninety (90°) degrees, which was usually about 3 photos. Though we understand that the human eye can see one hundred and fifty (150°) degrees, we settled on ninety (90°), choosing to display what the viewer focuses on and not to include what is in the periphery.   We also knew that if we moved to a larger angle, the viewsheds we had captured which were not wide enough for this angle would not be able to be used.

The viewpoints from which the photos were taken on the ferries, islands, and mainland were precisely positioned and recorded by TerraSyncTM software in a Global Positioning System (GPS) unit. Using GPS Pathfinder Office software, this data was transformed for use in Geographic Information System (GIS) software. A database was created in Arc GIS, detailing the position descriptions, viewsheds captured, and assessment results. The viewpoints from which the photos were taken can be displayed on maps created in GIS. The base map for the all GIS maps created, is an ortho photo of BHI National Park Area, which was provided by the department of Research and Natural Resources, National Park Service – Boston.

Literature Review

What is a viewshed?

The term viewshed has not been widely used in literature about visual resource management. Generally, a viewshed is an area of land, water, and other environmental elements that is visible from a fixed vantage point. In some cases, viewshed is defined as all the surface area that is visible from a certain point (Department of the Interior 1996, Smardon et at 1986, 323). However, in some cases it may be appropriate to define viewshed more specifically as "surface areas from which a critical object or viewpoint is seen" (Smardon et al 1986, 323). In landscape planning, viewsheds tend to lean toward this second definition, where they are considered in areas of particular scenic or historic value that are deemed worthy of preservation against development or other change.

Why manage visual resources?

The management of visual resources is essential to preserving the quality of the visual environment and reducing the visual impact of development activities (Department of the Interior 1980, 10). Aesthetic issues evoke strong reactions from people and deeply affect their feelings about a place. Whether or not visual attractions and panoramic views of a place will be there for future generations to enjoy depends upon decisions being made today (Scenic Hudson 2006). Scenic areas warrant protection through special management attention.

Managing vast and varied resources is a complex undertaking, especially since the priorities set for one management activity often conflict with the priorities set for another. The Bureau of Land Management believes that land should be managed for multiple use and a sustained yield. Multiple uses involve balancing the development of diverse resources both renewable and non-renewable. Sustained yield involves coordinating the management of these resources so that the environmental quality and productivity of the land are not permanently impaired. In order to achieve these goals, "visual resource considerations should be included in environmental assessments, in land use planning decisions, and in the implementation of resource projects" (Department of the Interior 1980, 10).

The scenic value and management objectives of public lands vary so it is not practical to provide a uniform level of visual management for all areas. "A system is necessary for evaluating the visual resources of a given area and for determining what degree of protection, rehabilitation, or enhancement is desirable and possible" (Ibid, 11).

Who is concerned with the management of visual resources?

Interest in the systematic analyses and study of landscape beauty came about in the 1960s and 1970s, under pressure from the environmental movement and environmental legislation (e.g., National Environmental Protection Act, 1969, and the Federal Land Policy & Management Act, 1976) (Ryan 2005, 40; Zube 1982, 1). These legislative initiatives stimulated the drafting and publication of manuals and guidelines for use in identifying and managing landscape resources and scenic quality. Agencies which manage public lands, such as Bureau of Land Management and the Forest Service became committed to managing visual resources with equal credence to all other resources (Zube 1982, 2).

How can aesthetic quality be assessed?

Consider the common phrase "beauty is in the eye of the beholder"- sensory perception is often implied to be highly situational and individualistic (Smardon and Others 1986, 39). Instead of assessing aesthetic qualities of landscape subjectively, it must be quantified where consistent qualities are described and measured (Department of the Interior 1980, 13). Research efforts have shown that the public's scenic preferences can be assessed objectively and quantitatively (Dearden, 1980). This research has also demonstrated that public perceptions can be related to and, in fact, predicted from environmental attributes (Buhyhoff and others, 1994). One of the biggest problems in developing quantitative assessment methods for scenic impacts is that of measuring the contributions of specific landscape elements to overall preference (Buhyoff and Riesenmann, 1979). Bureau of Land Management has noted that perception of visual quality in the landscape seems to be based on several common principles, regardless of the terrain and the observer:
• Landscape character is based on four basic elements present in every landscape in varying degrees- form, line, color, and texture.
• The stronger the influence exerted by these elements, the more interesting the landscape.
• Typically the more visual variety in a landscape, the more aesthetically pleasing it will be. Variety must have harmony, especially in terms of alterations (cultural modifications), which must be made with great care (Department of the Interior 1980, 13).

Line, pattern, contrast, balance, harmony, and other aspects from aesthetic tradition have influenced much of the visual resource management and assessment approaches within Federal agencies (Smardon 1986; USDA Forest Service 1974, 1995; USDI Bureau of Land Management 1980). This theory usually relies on experts trained in landscape architecture or other design fields to evaluate the landscape for its scenic beauty (Zube and Others 1982) (Ryan, 2005: 7). After evaluation landscapes are often described in terms of visual quality. Visual quality is phrase that's synonymous with beauty. This phrase however is intended to convey an impression of objectivity and landscape evaluation (Jacques, 1980).

What methods exist for scenic assessment?

The scenic assessment method most frequently appearing in the literature is the Bureau of Land Management's Visual Resource Management (VRM) Program. The VRM Program is an analytical process that identifies sets and meets objectives for maintaining scenic values and visual quality. The Forest Service introduced the Visual Management System (VMS) to classify and identify scenic resources and to provide management guidelines and quality objectives for alteration of visual resources. In 1995, the VMS was revised to take into consideration ecosystem management and was renamed the Scenic Management System (SMS). For the most part, the landscape inventory process and classification system have remained the same, with minor modifications to the landscape objectives terminology (USDA Forest Service 1995). The Forest Service and the Bureau of Land Management systems have many similar components, and in fact, have borrowed ideas from one another, such as the classification of the landscape (Smardon and Others 1986). The methods have been reviewed and compared in the book "Foundations for Visual Project Analysis" edited by Smardon, Palmer, and Felleman, which is a comprehensive guide for visual resource management methods and procedural guidance.

The Bureau of Land Management's VRM program includes three steps: scenic quality, sensitivity levels, and distance zones. To access scenic quality an area is divided into sub units based on landform and vegetation (Department of the Interior 1980, 10). Lands are given relative visual ratings based on seven factors: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modification. A standardized point system assigns -great, some, or little importance to each factor. The points are totaled and Scenic Quality Classes are determined and mapped (18). Critics suggest that the VRM overemphasizes certain types of landscapes and while underrating the importance of flatter, more homogeneous landscapes that are still highly valued by local residents for their scenic beauty (Kaplan and Kaplan 1989).

In the case of the Forest Service Scenic Management System program, the highest ratings are given to landscapes that have "the most positive combinations of variety, vividness, mystery, intactness, coherence, harmony, uniqueness, pattern and balance" (USDA Forest Service 1995, 1-15). Landscapes are ranked Class A-Distinctive, Class B-Typical, and Class C-Indistinctive. In general, this classification system gives higher rankings to more varied and steep topography, large water bodies and rivers, and more varied or unique vegetation types.

The VRM program measures sensitivity in two ways- use volume, and user or public reaction. Use volume involves the frequency of travel through an area and use of that area is tabulated. The concern of the change to the scenic quality is then rated high, medium, or low (Department of the Interior 1980, 20).

Similarly, the next step of the SMS program is to determine the landscape visibility and sensitivity to alteration. In general, the greater the number of people likely to view a landscape and the longer the duration, the more sensitive the landscape is to modification. Of particular concern are travelways such as primary highways, trails, and waterways, as well as primary use areas such as campgrounds, visitor centers, and resort areas. Landscape visibility is affected by, "1) context of viewers, 2) duration of view, 3) degree of discernable detail, 4) seasonal variations, and 5) number of viewers" (USDA Forest Service 1995, 4-2). The next step in the VRM process is dividing the landscape into basic distance zones: foreground/middleground, background, and seldom-seen (Department of the Interior 1980, 22). Management classes are derived from an overlay technique that combines the maps of Scenic Quality, Sensitivity Levels, and Distance Zones. The overlays are used to identify areas with similar combinations of factors. The Management classes describe the different degrees of modification allowed to the basic elements of the landscape (Ibid, 24).

When an activity is proposed that might alter the landscape the VRM Contrast Rating System can be used to measure the degree of contrast between a proposed activity and the existing landscape. It compares the proposed activity with existing conditions- feature by feature (land, water, vegetation, etc) and element by element (form, line color, texture) and according to the degree of contrast. The total contrast score will be compared to the appropriate management class to determine if contrast totals are acceptable. The VRM program encourages making visual impact of proposed activities more acceptable while a project is in the design stages by suggesting modifications. VRM also encourages illustrating the extent of potential visual impact through graphic simulations. The Visual Resource Management Program recognizes that visual quality can be improved without obstructing the development of essential resources- specifically sources of energy. This challenge is important, because many energy sources can be found on the land administered by the Bureau of Land Management.

An adaptation of the Visual Resource Management System was developed by Richard Smardon and others leaders in the field of visual resource assessment for the United States Army Corps of Engineers. Their Visual Resource Assessment Procedure includes:

1)   Landscape Similarity Zone Establishment
2)   Visual Resource Inventory/Forecasting
3)   Assessment Framework Development -Landscape elements are listed down the left side, with adjacent column headings titled distinct, average, and minimal (descriptions go in each cell)
4)   Public Framework Development –Use of a 5 – 1 scale, 5 being Extremely Attractive, 1 being Extremely Unattractive (landscape elements listed specifically along left column)
5)   Analysis & Similarity Zone Assessment
6)   Management Zone Classification (Smardon and others, 1988).

The Bureau of Land Management VRM has been used and adapted for a variety of applications and a variety of landscape types. Bureau of Land Management land where this has been used includes:

- Thomas Creek Watershed Analysis -Salem, Oregon
- Imperial Sand Dune Recreational Area - El Centro, California
- Glenwood Spring - Grand Junction, Colorado
- Moab Field Office -Utah

An example of a non Bureau of Land Management land where it has been used would be the Comprehensive Planning Study (Open Space & Viewshed Protection components) -Amherst, Massachusetts (University of Massachusetts, Amherst, 2004).

Methodology

What methods should be used for the Boston Harbor Islands project?

In developing the project's methods, it was important to build from the literature review by utilizing an established framework of proven visual assessment theories. At the same time it was necessary to account for the fundamental specifics of the project such as: 1) the characteristics of the study area, and 2) the needs of the National Park Service. To successfully develop methods that were appropriate for this project, our studio team employed a four-step process.

- Step 1: Establish guidelines that incorporate the critical features of the study that   must be included in the methods.
- Step 2: Identify the existing assessment model that comes closest to meeting those guidelines.
- Step 3: Make appropriate adjustments to the existing model.
- Step 4: Test the newly adapted model through example assessments and outside feedback to evaluate the method's effectiveness and determine if additional adjustments are needed.

The end result of this process will be the creation of a new assessment model that utilizes proven standards, though is adapted for the study area.

Step 1: Establish Guidelines

The initial methodology task for our team was to establish the general guidelines that would direct the rest of the methodology process. These guidelines were the basic elements that we knew needed be incorporated into our methods. Discussions with the client brought many of these critical elements to light and helped steer this initial step. Guidelines are as follows:

Ephemeral Elements • First the team has made the assumption that visits photographing viewsheds from late August through mid October is justified by the fact people visit the Islands in the late spring, summer, and early fall months. Ephemeral factors such as the weather or sun position are not to play a factor in rating viewsheds. Viewsheds were to be photographed on clear days, towards the middle of the day. For the purpose of this study vegetation will not be considered ephemeral because it is present for the entirety of the visitor season.

Clear Valuation • The client expressed early on that their basic need for this project is to identify and valuate the viewsheds in the National Park based on there overall visual quality. From this basic premise, our team understood the importance of developing methods that had a clear system for evaluating viewsheds in a way that allowed us to compare and rank them. The Park Area includes a variety of features and landscape types, our methods would need to find a way to compare the values of very distinct visual elements. This suggested developing a quantitative approach to evaluating the visual importance of individual elements in the landscape. It also suggested the need for our methods to be systematic, transparent, and replicable so those looking back on our assessments, such as our client, have a way of understanding why each viewshed was given a certain value. By creating this guideline, our team ensured that a clear system for valuation will be a central feature in our methods.

Objectivity • It is impossible to completely objectify the task of assessing the beauty and appeal of visual elements. However, by employing highly structured and systematic methods that provide control over several areas in the assessment process, it is possible to come closer to a objective study. The risk of using open-ended and flexible methods is that it may result in allowing personal opinions to override a fair and balanced weighting system. This guideline suggests adhering to a highly structured system so that our methods can limit the degree to which personal judgment influences the assessments.

Incorporation of Built Structures • Last, the study area contains both impressive natural landscapes and appealing built structures. It was important that our methods be able to effectively weigh these two different settings in a balanced manner. In addition, built structures often have a polarizing effect on the perception of the landscape, and many times they either add to or take away from the overall quality of the viewshed. To ensure our methods successfully integrated the assessment of man-made structures, we established a guideline that the methods must properly weigh built and natural elements.

Step 2: Select Existing Model

After establishing guidelines, it was time to delve back into the literature to select the existing assessment model that came closest to meeting our needs. The well established Visual Resource Management Program (VRM) by the Bureau of Land Management was determined to be the best-fit Boston Harbor Islands National Park Area given the guidelines. The VRM is highly structured, and breaks the viewshed into individual categories providing a means for clear quantitative valuation and systematic scoring. This meets the needs of our Clear Valuation and Objectivity guidelines. The Incorporation of Built Structures guideline is met by the Cultural Modifications category. This is the VRM model in its original form:

Landform	Vegetation	Water	Color	Adjacent Scenery	Scarcity	Cultural Modifications
High vertical relief such as prominent cliffs, spires or massive rock outcrops; or highly eroded formations including major badlands or dune systems; or detail features dominant and exceptionally striking and intriguing such as glaciers.	A variety of types, interesting forms, textures and patterns.	Clear and clean appearing, still, or cascading white water, any of which are a dominant factor in the landscape.	Rich color combinations, variety or vivid color; or pleasing contrasts in the soil, rock, vegetation, water or snow fields.	Adjacent scenery greatly enhances visual quality	One of a kind; or unusually memorable; or very rare within study area. Consistent chance for exceptional wildlife or wildflower viewing.	Free from esthetically undesirable or discordant sights and influences; or modifications add favorably to visual variety.
5	5	5	5	5	6	2
Steep canyons, mesas, buttes, cinder cones and drumlins; or interesting erosions patterns or variety in size and shape of landform; or detail features present and interesting though not dominant of exceptional.	Some variety of vegetation, but only one or two types.	Flowering or still, but not dominant in the landscape.	Some intensity or variety of colors and contrast of the soil, rock and vegetation, but not a dominant scenic element	Adjacent scenery moderately enhances overall visual quality	Distinctive, though somewhat similar to others within the region.	Scenic quality is somewhat depreciated by inharmonious intrusions, but not so extensively that they are entirely negated; or modifications add little or no visual variety to the area.
3	3	3	3	3	2	0
Low, rolling hills, foothills, or flat valley bottoms, interesting, detailed landscape features few or lacking.	Little or no variety or contrast in vegetation	Absent or not noticeable.	Subtle color variations, contrast or interest; generally muted tones	Adjacent scenery has little or no influence on overall visual quality.	Interesting within its setting, but fairly common within the region.	Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced.
1	1	0	1	0	1	-4

Chart of VRM model in its original form.

In addition to evaluating the scenic quality of the viewshed, the VRM model also accounts for issues of sensitivity and distance zones. It is important that these aspects of viewshed analysis be incorporated into the model as it aids our team in supporting our assessment findings with some context on how often the view is seen and how far away the key features are. Sensitivity is measured in two ways: user volume and user reaction. The concept of user volume was particularly interesting to our study as it opened the door of understanding park user patterns and their relationship to visual appeal. How to account for distance and how that affects the scores of individual features is something that challenged us when finalizing our methodology.

It is important to mention features of the VRM methods are beyond the scope of this project, yet may be useful for further visual assessment work in the Boston Harbor Islands. First, the VRM methods, through the added analysis of sensitivity and distance zones, transpose the visual assessments into management classes. These management classes take the form of categorized "zones of land" which determine appropriate activities and protection for the land itself. The scope of our study did not go beyond assessing the scenic quality of the viewshed to zone the land of the suface areas present within the viewshed.

Another issue beyond our project's scope is the use of contrast ratings in visual assessment. When development is proposed, the VRM has a method to determine the extent of visual contrast that the development will impose on the existing landscape. The contrast rating system uses a quantitative approach, and categorizes developments into three ranges:

1) Contrast that can be seen but does not attract attention (1-10 points)
2) Attracts attention and begins to dominate (11-20 points)
3) Demands attention and will not be overlooked by the average observer (21-30 points)

The VRM's ability to systematically evaluate the effects and acceptability of proposed activity on the existing landscape is important in the case of the Boston Harbor Islands where there has been recent interest in developing energy sources such as wind turbines. Though it goes beyond our scope, the Park Service may find the contrast rating system useful when dealing with future development proposals.

While doing an assessment one must be wary of variable effects. Variable effects recognized by the VRM System include distance, atmospheric conditions, lighting direction, and the time of day (Sheppard and Newman 1979, 7).

Step 3: Adapt Methodology

Having selected the most appropriate model, our team began the adoption process so that the methods would relate specifically to our project's study area. The VRM system has not yet been applied in a similar coastal setting the rating system would have to be modified. This initially involved changes to the valuation criteria to speak directly to the features in our study area such as drumlins, beaches, shores, vegetation density, etc. We specifically discussed the category of water and its unique role in our study area. It is unique because virtually every view within the Harbor Islands contains water. Due to this, our group considered taking this category completely out of the methods. However, further discussion brought up the interesting point that there are times when water may be more of a central feature in the viewshed then others. This is specifically concerning viewsheds that look out to the open ocean or across vast spans of open water. Our team felt it best to leave this category in the methods to specifically reward viewsheds that offer these more impressive views of water.

Having adjusted the scoring criteria, our team moved on to addressing the numeric value in each category. We felt that for the sake of objectivity and equal treatment, each category should be measured uniformly within a range of one through five (1-5), with five (5) being the highest score receivable. In contrast, the original model had the highest score for scarcity and cultural modifications at six (6) and two (2) respectively. Finally, we felt the category of scarcity seem to be an inappropriate concept for our particular study area. We changed the category title and text to reflect the concept of "uniqueness". We felt that the word unique represented a more positive understanding about one-of-a-kind features as opposed to the word scarceness, which could be interpreted as landscapes that are barren or have depleting resources. After adapting the Bureau of Land Management's VRM system to our site, this is the first scoring system we created:

Landform	Vegetation	Water	Color	Adjacent Scenery	Scarcity	Cultural Modifications
Cliffs, drumlins, vertical relieves, bluff, rock outcrops, erosion **5**	Dense vegetation. Variety type of vegetation, forms, shapes, textures and patterns. **5**	Exceptional open ocean views or 360 surrounded by water. **5**	Natural rich color combination, variety or vivid color. Contrast in soil, vegetation, rocks and water. **5**	Adjacent scenery greatly enhances visual quality **5**	One of a kind; or unusually positive memorable; or very rare within region. **5**	Modifications that add favorably to visual variety. **5**
Beaches, shore, erosion patterns, artificial drumlin, not dominant features or exceptional **3**	Some variety of vegetation, but only one or two types. **3**		Some intensity or variety of colors and contrast of the soil, rock and vegetation, but not a dominant scenic element **3**	Adjacent scenery moderately enhances overall visual quality **3**	Somewhat similar to other within a region. **3**	Modifications that add little or no visual variety to the area. **0**
Landscape features few and lacking, horizontal flat land **1**	Little or not variety in vegetation **1**	Base constant score for all images containing water. **3**	Unharmonious color or muted tones **1**	Adjacent scenery has little or no influence on overall visual quality. **1**	Fairly common within a region. **1**	Modifications are so extensive that scenic qualities are mostly nullified or substantially reduced. **-5**

Initial Scoring System.

When using our methods, distance became a factor which highly influenced how different categories within the rating system scored. Because this analysis is to be purely aesthetic we decided that the viewshed is to be scored as it is scene, and if particular elements lose prominence because they are distant they should be scored as such.

We then considered the additional concept of sensitivity. Sensitivity refers to two measurable elements: user volume and user reaction. Although the original scope for this project included using a public survey to aid in determining the user reaction, the project in its current form could not employ that objective. As a result, this study will not account for a comprehensive analysis of public input. However, it is still possible to account for user volume. Including this feature allows us to incorporate an important dimension of the visual assessment methods. To accomplish this in our study, we will analyze visitor numbers tallied by the National Park Service. With this information in hand, the visual assessments will be compared with user volume numbers so that our findings will address a larger context of overall importance to the National Park.

Step 4: Testing the methods and feedback process

Initial Assessment • We used our first scoring system to score a selected variety of viewshed photos and test its effectiveness. First, we each performed an individual assessment with no sharing of ideas or preferable standards. The goal of this test was to see if our assessments of different viewsheds would result in overall scores that seemed to follow in a reasonable order of value. Additionally, this was an opportunity to see how each team member would valuate each category without being influenced.

After this initial internal test, the consensus amongst the team was that the methods were fairly soundly constructed. It is important to note that there were minor differences in how each team member scored each category. These differences were not so divergent to suggest a misunderstanding of the criteria, and the variety of opinions allowed us to reflect on different the ways in which one could interpret these categories. This helped us understand the crucial task of ensuring clarity in defining the valuation objectives of each category. We also decided that when scoring the viewsheds it is a good idea to continue to rate the photos separately, then they scores could be averaged to eliminate any different interpretations that may still remain among the categories.

Client Presentation (October 10th, 2006) • The first opportunity to gain outside feedback on our methods took place in a meeting with our client and other interested National Park stakeholders on October 10, 2006 in Boston. This was a crucial test for our methods as it was the first opportunity for our client to provide feedback on the structure and criteria of the methods. After a twenty minute presentation, the client and other stakeholders were able to provide detailed feedback and constructively added to the methodology process. Stakeholder feedback from this presentation included:

- Address seasonality.
- Emphasize that study is being done for visitors not residents.
- Bring in more historical factors to methodology.
- Color category may be difficult to assess.

- Park Area is within Boston Metropolitan Area and not just Boston.
- Address uniqueness of park.
- Show examples of where methodology was used before.
- Change word "uniqueness" to "rarity" as one of the methodology categories.
- Cones can be various widths reflective of obstructions from vegetation such as the fort on George's or can be overlapping cones with wider and multiple views.
- Would like to see Long and Thompson Islands as part of the viewshed and recommended contacting Bill Hayle for a source of transportation.
- Next Partnership meeting will be to do a panel rating of view shed assessment.
- Would like to see included in the final product:

  - Island uses and changes.
  - Current context.
  - Overlay visual assessment with Management Plan.
  - Recommendations.

There was a general sentiment that cultural landscapes, and historic elements needed to have more influence on the overall valuations, and adjusting our approach to cultural features was key aspect of our methods that changed after this feedback. It was also clear that the client wanted to expand the methodology feedback process to include participation from other park stakeholders.

Those that attended this meeting also expressed they wanted an additional, more structured opportunity for incorporating stakeholder input in a following meeting. To accomplish this, we set up the November 6th meeting where our team facilitated a process in which stakeholders used the refined assessment methods themselves.

Refinement of Methods • After considering our feedback the methods chart was revised to include the categories of "Historic Merit" and "Harmony of Form". We then rated thirty (30) photos to test the new methods.

	Natural		Natural & Cultural				Cultural	
	Landform	Vegetation	Water	Color	Adjacent Scenery	Rarity	Historic Merit	Harmony of Form
	5 Cliffs, bluffs, drumlins, rock outcroppings, etc	5 Dense vegetation; variety of types, forms, shapes, textures	5 Exceptional open ocean views, or complete surrounding of water	5 Natural rich color combination, contrast, variety, or vivid color.	5 Adjacent scenery greatly enhances visual quality	5 One of a kind, rare within region, unusually positive, or memorable	5 Structures have significant historic merit and are listed as landmarks	5 Form, size, and placement of structures are appealing with surroundings
	3 Beaches, typical shoreline, features not exceptional or dominant	3 Some variety of vegetation but only one or two types	3 Base constant score for all images containing water	3 Some intensity, variety, and contrast- not dominant scenic element	3 Adjacent scenery moderately enhances overall visual quality	3 Somewhat similar to others within region	3 Structures have historic merit, although not listed as landmarks	0 Form, size, and placement of structures do no affect scenic value
	1 Landscape features few and lacking, flat land	1 Little or no variety in vegetation		1 Un-harmonious color or muted tones	1 Adjacent scenery has little or no influence on overall visual quality	1 Fairly common within a region, negatively memorable	1 Structures have little or no historic merit OR there is no structure	-5 Unappealing or un-harmonious with surroundings

Chart of Methods Refined.

Preference Test • Prior to the November 6th meeting with our clients and other stakeholders the group wanted to conduct a preference test to validate our refined methods and see if our structure quantified beauty in a way that reflected public perception. The same thirty photos we rated were shown to a class of landscape architects and regional planning graduate students as well as professors who were relatively unfamiliar with the site. The class was asked to rank the photos from one to five (1-5) based on initial reaction. Five (5) indicated that they extremely liked a photo and one (1) indicated they did not like it at all. Some of the class comments about the photos were that photos that had long stretches of water were considered "boring" and tended to receive lower scores. Weather factors such as gray sky and glare also affect the scores of the images. Panoramic pictures and images with more layers of landscape such as foreground, middle ground and background were more appealing to this group than single shots images.

The preference test results were then compared to our assessment results in order to test our methodology. The one to five (1-5) scores from the preference test were translated to a forty (40) point scale. The following graph demonstrates that the preference test ratings are correlated with the ratings of the photos using the methodology. The line for the preference test is higher because photos often received a perfect five (5), while with the methods no photo received a perfect score of forty (40) points. Though the preference test line generally mimics the methods line, we looked closely at points, which had discrepancy to determine why. We wanted to understand if our methods overemphasized of certain types of landscapes, while underrating others that did have a positive response from the public. Our next step was to test out our methodology at the stakeholder meeting on November 6th.

Stakeholder Meeting (November 6th, 2006) • We tested our methodology with our clients; the National Park Service, Island Alliance, Advisory Committee and Planning Board members as well as other stakeholders. This meeting served as the client's chief opportunity for reflecting on, and recommending adjustments to, the project's final methods. Over 200 invitations were sent out by the NPS. We began the presentation by explaining our methodology and then asked the participants to assess ten (10) photos based on the revised methodology. The following chart compares our team assessment scores, the participant assessment scores from this meeting and the student preference test scores for the ten (10) photos that the group rated.
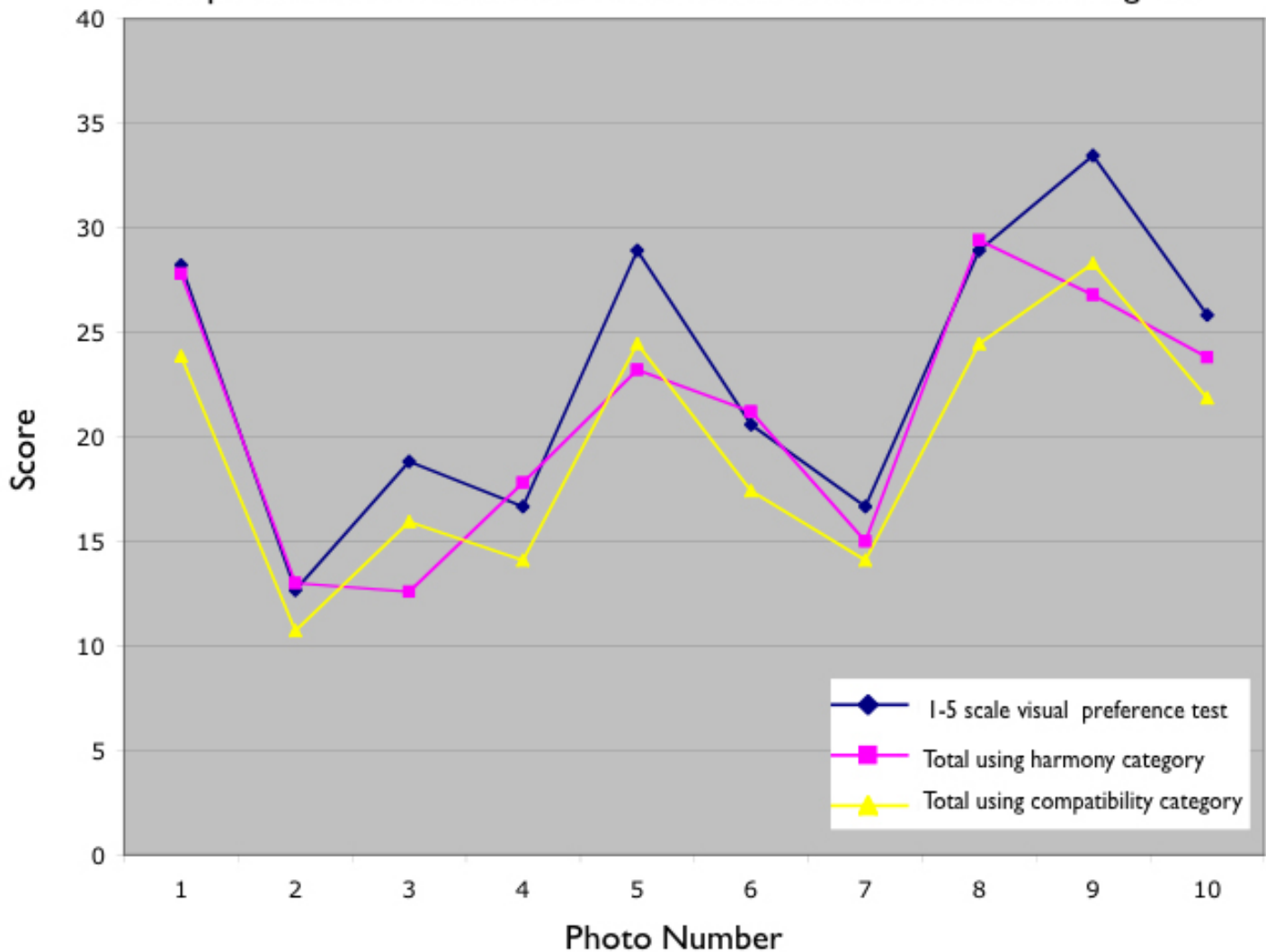
Chart of Comparison of Visual Preference Test to Two Potential Methods Categories.

This chart was presented at the November 6th meeting immediately following the exercise. The results show stronger correlation between the scores that the earlier methods did –however there are still a few discrepancies. With the meeting participants we looked closely why photos certain ranked so differently. It appeared that our methodology still underrated some natural views which had a positive response from the public. Also the participants of the meeting were familiar with the part and therefore rated views which had historic importance, but were not necessarily aesthetically pleasing higher. Recognizing that fine tuning of the methodology was still indicated we asked the participants for feedback on the methodology:

• Some of the participants indicated that they had difficulty assessing historic merit without knowing the history behind the building or site.
• Participants asked how seasonality was going to be addressed.We explained that the study only being conducted during the late summer tourist season from September to October.

- Participants indicated that they had difficulty assessing the category adjacent scenery category, when it lacked fore or background.
- Ranking photos with or without historic structures was difficult to do if you didn't know the history of the site or structure.
- It was difficult to rank harmony of form when structures were lacking
- Another suggestion was that photos should be consistent and be either panoramas or single shots.
- Angles of views should all be consistent.
- Why didn't photos include features of sand and shells and the sky? Our client addressed this by saying the study area only includes viewsheds that the average visitor sees.

Refinement of Methods • From the stakeholder meeting on November 6th we knew we had to further refine our methodology to reflect the suggestions that were made. Our client also in indicated that he liked the category "Harmony of Form" but wanted the "Historic Merit" category eliminated since we should be assessing viewsheds for the aesthetic quality and not the historic merit. Our client indicated that he would overlay the scenic assessment results with historic overlay at a future time.

We made adjustments to the "Historic Merit", "Harmony of Form" and "Adjacent Scenery" categories. We changed the category of "Adjacent Scenery" to "Layers of Landscape" to reflect layers of fore, middle and background. The category "Historic Merit" was eliminated and replaced with "Compatibility", reflecting both the built and natural landscape. It was important that our methodology allow both the natural and built landscape to be able to achieve the highest possible score. The next step was to present this further refined methodology at the next Partnership meeting on November 21st.

Client and Boston Harbor Islands Partnership Presentation November 21st, 2006

We presented the final methodology to our clients and the Boston Harbor Island Partnership. Our client the NPS explained to the audience and Partnership that the viewshed assessment and analysis study was done in order to manage and discover what the important scenic qualities are for the BHINPA. This study would guide future development within the park as well as development outside the park such as wind farms. The client indicated that the NPS would like to conduct future web based and public surveys. After the presentation of the refined methodology and assessment some of the questions that were brought up were how can a natural feature not be considered compatible. Professor Robert Ryan from UMass addressed this question by explaining that although a Christmas tree farm is natural it would not be a compatible landscape within the Boston Harbor Islands Park Area. The seasonality issue was addressed again as well as open ocean views. Interpretative signage and guided tours were also discussed as a future possibility for the park area. Overall our clients, the Partnership and participants indicated that the methodology appeared to be replicable.

Rating System	Landform	Vegetation	Water	Color	Layers of Landscape	Rarity	Compatibility
5	Cliffs, bluffs, drumlins, rock outcroppings, etc (5)	Dense vegetation; variety of types, forms, shapes, textures (5)	Exceptional open ocean views, or complete surrounding of water (5)	Natural rich color combination, contrast, variety, or vivid color. (5)	Layers (fore, middle, and background) greatly enhance visual quality (5)	One of a kind, rare within region, unusually positive, or memorable (5)	Highly compatible elements in viewshed contribute to visual quality (5)
3	Beaches, typical shoreline, features not exceptional or dominant. (3)	Some variety of vegetation but only one or two types (3)	Base constant score for all images containing water (3)	Some intensity, variety, and contrast- not dominant scenic element (3)	Layers moderately enhance overall visual quality (3)	Somewhat similar to others within region (3)	Elements in viewshed neither contribute or detract from visual quality (3)
1	Landscape features few and lacking, flat land (1)	Little or no variety in vegetation (1)		Un-harmonious color or muted tones (1)	Layers do not enhance overall visual quality OR layers are absent (1)	Fairly common within a region OR rare but negative (1)	Incompatible elements in viewshed detract from visual quality (1)

Note: The point structure is only a guide, scores of 2 & 4 points are also possible

Chart of Final Methods.

Assessment Results

Viewshed Selection & Assessment Process

Hundred of pictures were taken during visits to the site and it was necessary to go through a selection process to determine which viewsheds should be used for the assessment. When choosing viewsheds we tried to have good geographic coverage of the study, capture views from notable vistas, and capture the visitor experience from points on both land and on sea. This map shows the sixty-six (66) viewing points/vistas that we chose to assess, these points represented by three different symbols and colors: The pink represents points on the mainland, the blue represents views from boats, and the yellow are points from the islands.

Map of Study Area with Points selected for Viewshed Analysis.

Our team served as the expert panel rating the viewsheds with the methods we had developed. Each of the five members of the team individually scored the sixty-six (66) photos. We then averaged the total score for each photo and used that as the score for the viewshed. We felt that averaging the scores would create the most accurate viewshed score because it would help to eliminate individual interpretation of specific categories within the scoring system.

Interpretation of Viewshed Assessment into Scenic Quality Classes

Viewshed scores ranged from 12 to 31 points; many viewsheds had the same score or scored very closely to one another. The scores for all 66 viewsheds can be found in Final Viewshed Assessment Table in the appendix (add page#). Though it is interesting to look at how different views ranked, we felt that it would be most effective to look the results in terms of scenic quality classes. We chose to group the viewsheds into five scenic quality classes. Though we considered doing three (which would separate the view into high, medium, and low categories), we chose five because we wanted to provide more detailed and useful information. Class A contains the viewsheds which earned the highest number of points with our methods and are therefore the highest quality views, while Class E is contains the lowest quality. Fifty-nine percent (59%) of the viewsheds fall into Classes A and B, and the largest Class is Class B with twenty six (26) viewsheds.

Class	Point Range	# of Viewsheds
A (High Scenic Quality)	31 - 27.4	13
B	27.3 - 23.6	26
C (Mid Level)	23.5 - 19.9	13
D	19.8 - 16.2	11
E (Low Scenic Quality)	16.1 - 12.4	3

59%
20%
21%

Graph of Viewshed per Quality Class.

Distribution of Viewsheds
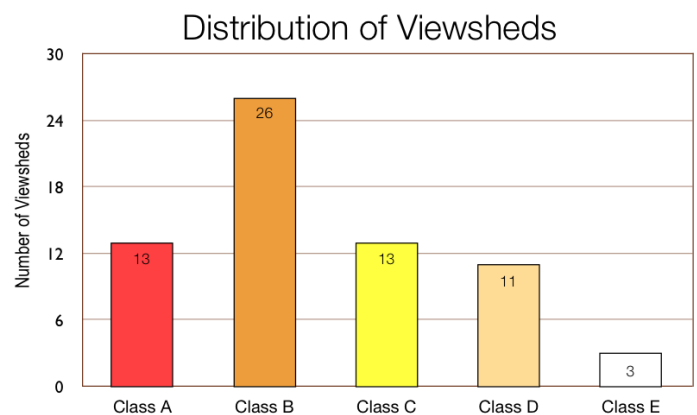
Graph of Distribution of Viewshed per Quality Class.

Trends & Examples of Viewsheds by Class

You can see trends by looking at the scenic quality classes reflected onto a viewshed cone map. The scenic quality classes are represented on the map by a spectrum of colors: Class A (red), Class B (orange), Class C (yellow), Class D (pearl), and Class E (white). Though there is an overwhelming amount of information with all the view cones visible, one general trend you can see is that the higher scenic quality classes –Classes A and B which are represented by the bolder colors are clusters around the central group of islands between the two channels. The lower scenic quality classes –Classes D and E, which are represented by the lighter colors, are on the outer edges of the study area often from points with in the park, looking at the land outside.
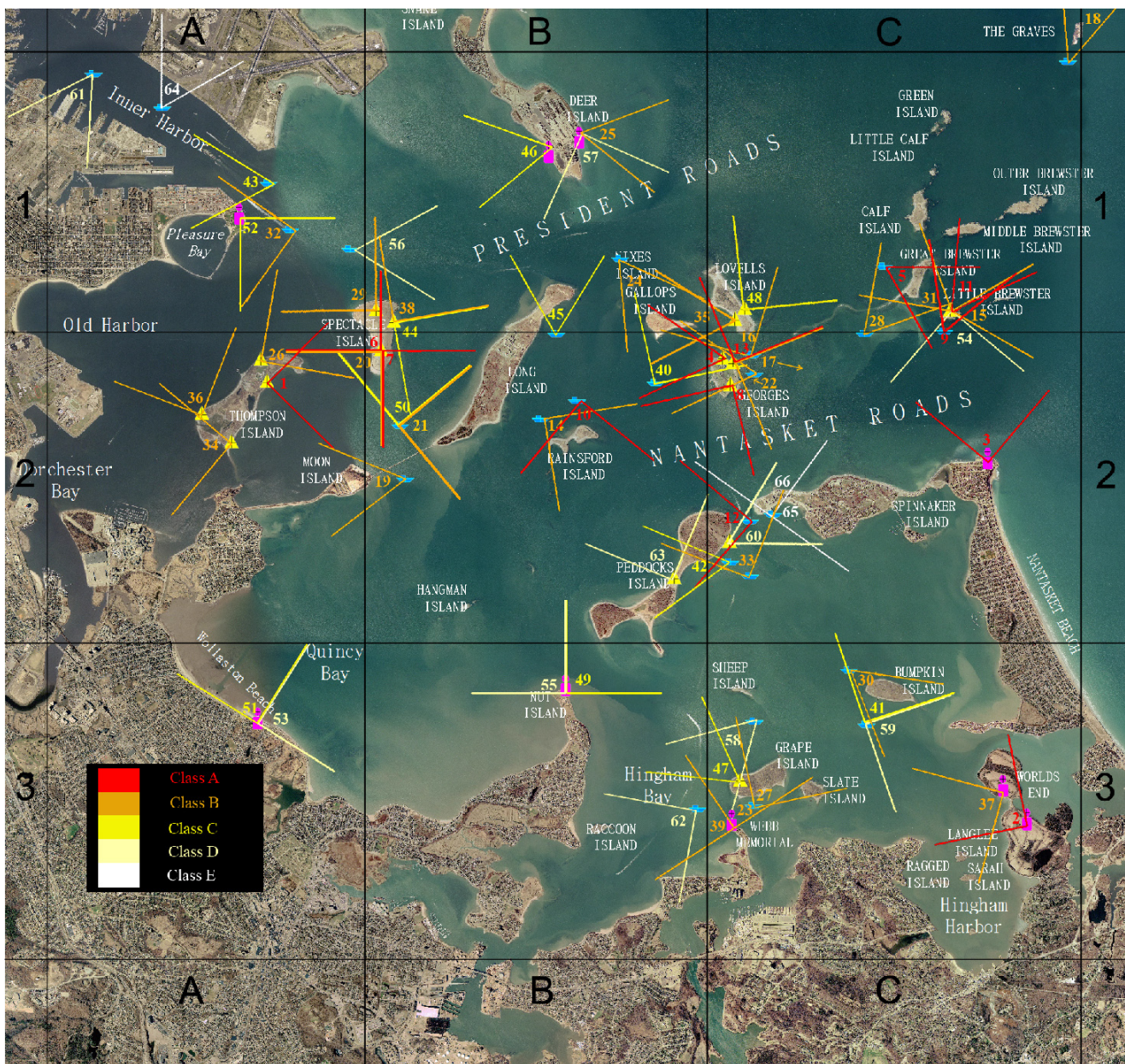
Map of Study Area with All Viewshed Classes.

It is easier to interpret trends within the scenic quality classes by looking at the viewshed cones one class at a time. Class A views are clustered around the Brewster Islands, the central region of islands between the two channels, and a number of views looking towards the city and likely have the skyline in the background. Typical characteristics of Class A photos include interesting landscape layers, landform, and vegetation as well as focal points which are memorable sites in the park area.

Map of Study Area with Class A Viewsheds.

Viewshed Number 1: From Thompson Island: Looking South East.

Viewshed Number 2: From Planter's Hill, World's End: View of Islands and City.

Viewshed Number 3: From Hull: View of the Brewsters and Boston Light

Class B viewsheds are higher in number (26), they also tends to cluster around the central group of islands, around the Brewsters, some looks towards the city, and we also see that there are a greater presence of Class B views in the south-east portion of the study area. Class B views have similar characteristics of those in Class A, but they likely ranked lower in one or more categories (like landform, and rarity).
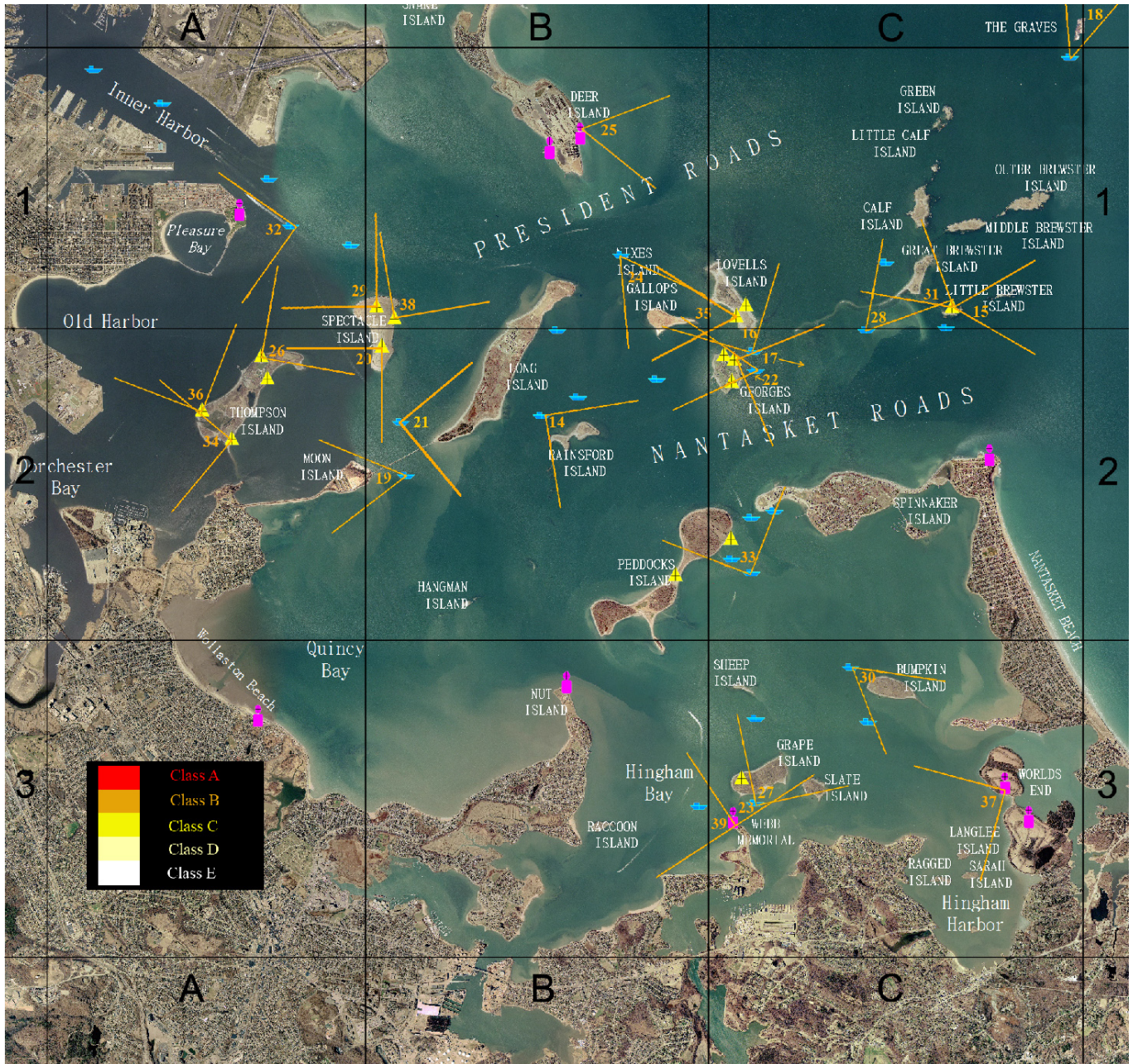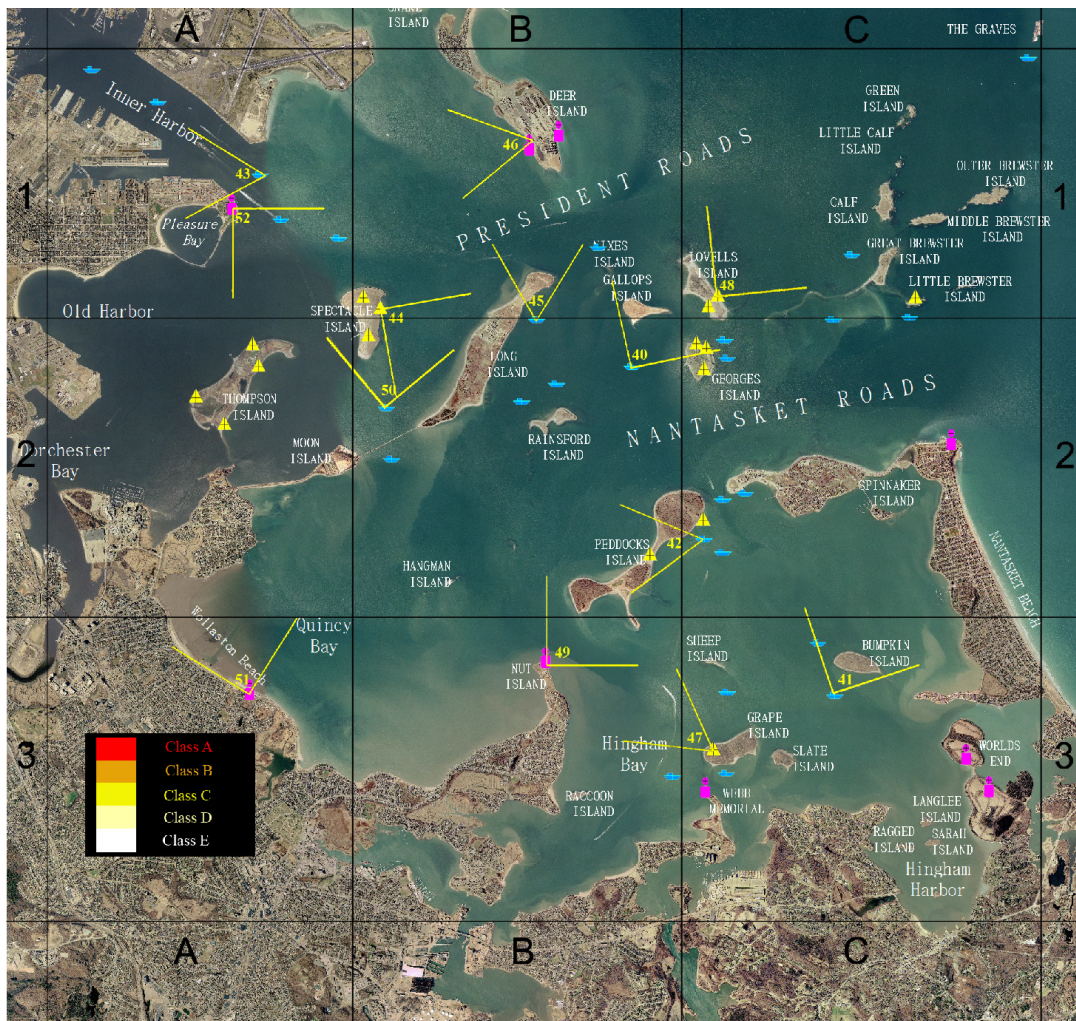

Map of Study Area with Class B Viewsheds.

Viewshed Number 23: From Webb Memorial Park: View of Islands.

Class C viewsheds become more scattered, they are often more typical or common views in the study area- they may lack the interesting layers, landform, or positive rare elements of the previous classes. Also within this class you start to see elements, which may be incompatible.
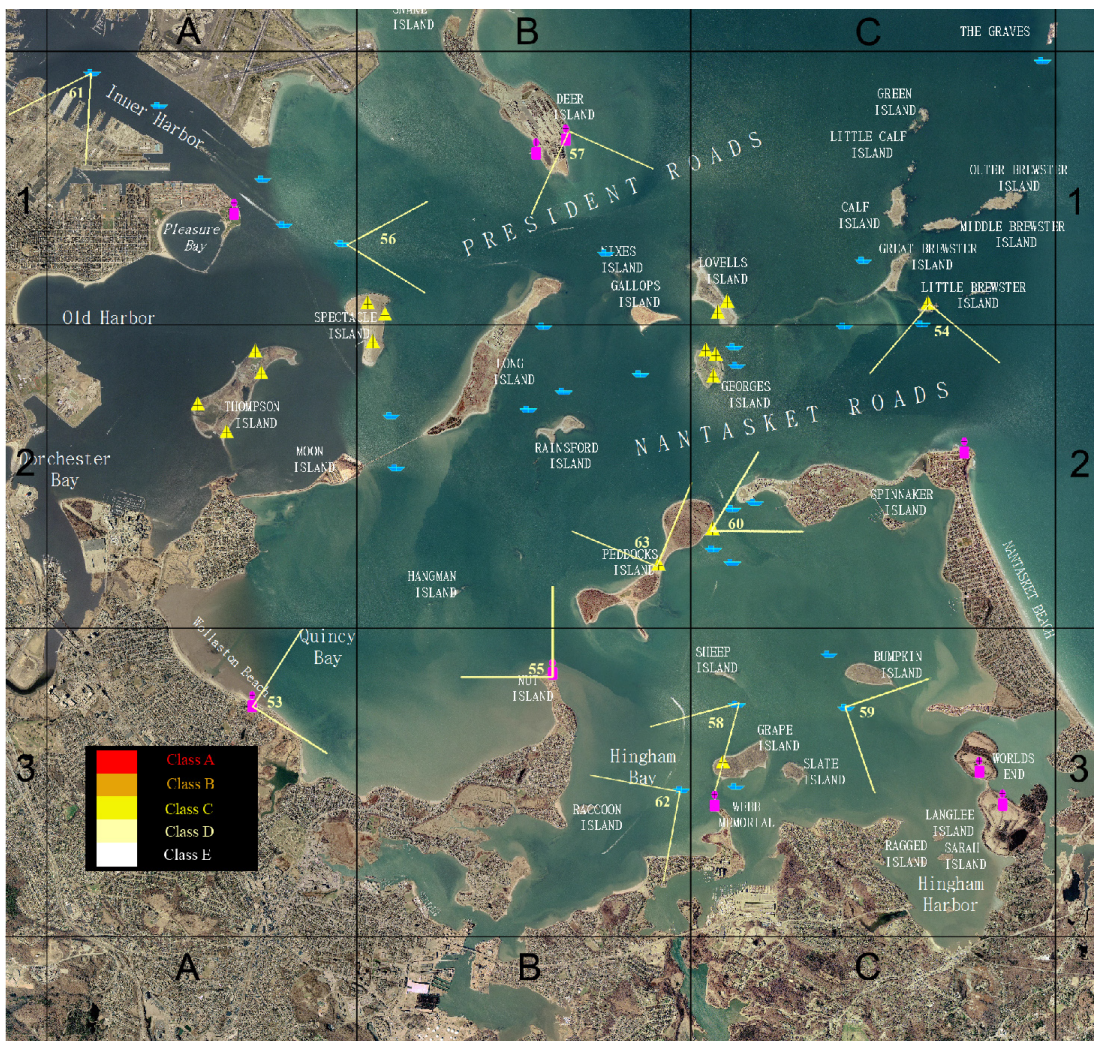

Map of Study Area with Class C Viewsheds.

Viewshed Number 40: From Ferry Boat: View of Long Island, Deer Island, and Gallops .

Class D viewsheds are present in the southeast region, looking to the mainland as well as a number of other areas on the outskirts of the park. These viewsheds frequently had large amounts of water in the fore or middle ground and there is less visual interest in these views. When we did our photo preference test to see how viewsheds rated upon first impression (a 1-5 scale) participants found views which looked across large spans of water in the fore and middle grounds to be boring and rated them low.
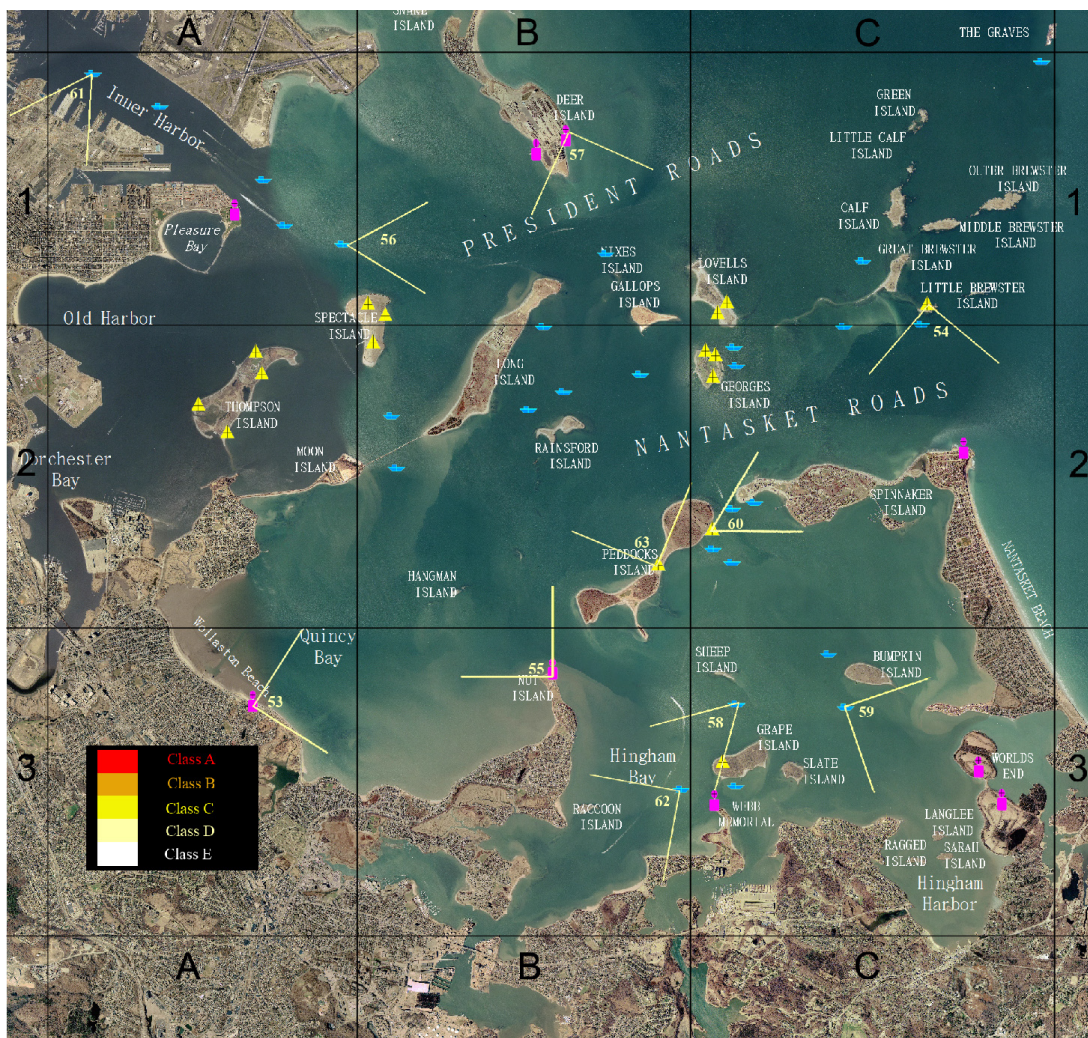

Map of Study Area with Class D Viewsheds.

Viewshed Number 55: From Nut Island: View of Quincy Bay.

Only three viewsheds scored fell into Class E. All three are from points within the park area to land that is outside. One of these viewsheds is the airport, which can be seen when on the ferry entering or existing the park area through the inner harbor would be the airport. The other two viewsheds are of the tip of hull, a highly developed area in the southeast region of the study area.

Map of Study Area with Class E Viewsheds.

Viewshed Number 65: From Ferry Boat: View of Hull.

Clients as well as participants in the Advisory Council Workshop held on November 6th expressed their opinions about what views were more scenic. Some of these view included:

- Two vistas from George's Island (submarine tower)
- Grape Island
- Little Brewster Island (from lantern house)
- Two vistas from Spectacle Island (porch of visitor's center and gazebo at North Hill)
- Two vistas from Deer Island (top of public walkways and base of digesters)
- Planter's Hill, Worlds End
- Lovell's Island

After completing the viewshed assessment we looked to see where these views fell and the ten out of thirteen fell into Scenic Quality Classes A & B. This assessment has looked purely at aesthetics, the utility and applications of the aesthetic assessment will be discussed in the following sections.

Recommendations

Management

According to the Management Plan management areas or zones help determine a balance between resource preservation and visitor use in each part of the park. There are six management areas or zones that designate allowable uses. For example, in Managed Landscape areas where tranquility is being promoted, development is discouraged. Special Uses areas are uses that are permitted that existed before the establishment of the park, such as a sewage plant. Each island and peninsula within the park is zoned. Zones include:

1. Mainland Gateways
2. Visitor Services and Park Facilities
3. Historical Preservation
4. Managed Landscape
5. Natural Features
6. Special Uses
   Overlay: Overlay over any areas of the management areas for special protection of issues such as breeding and nesting and erosion.

When overlapping our findings with the Land Use map from the Boston Harbor Islands Management Plan, we recognized that the Management Plan Land Uses were very general in its configuration and explanation. Nevertheless we can see that the high scenic points Class A and Class B follow a pattern of being located in the central area of the park and in the Brewster's Islands region.

Fifty nine percent (59%) of the photos assessed fall within categories A & B, in the two highest categories of high scenic quality. These viewsheds are typically located in the middle harbor island areas and Brewster Islands. These high scenic value viewsheds Class A and Class B are located randomly on Historic Preservation areas, Managed and Natural Landscapes and even on Special Uses areas, and there are also a high number of points located from the ferry routes (16 out of 35). Many of the viewsheds are looking towards the City, Boston skyline, Historic Preservation areas such as Fort Warren's and Boston Light and also towards Managed Landscapes areas such as Worlds End which is an Olmstead's designed landscape.

Low scenic value viewsheds Class D and E are typically when looking towards highly developed areas of the Boston harbor such as the airport; there are also several points located on Managed Landscapes looking towards vast areas of sea.
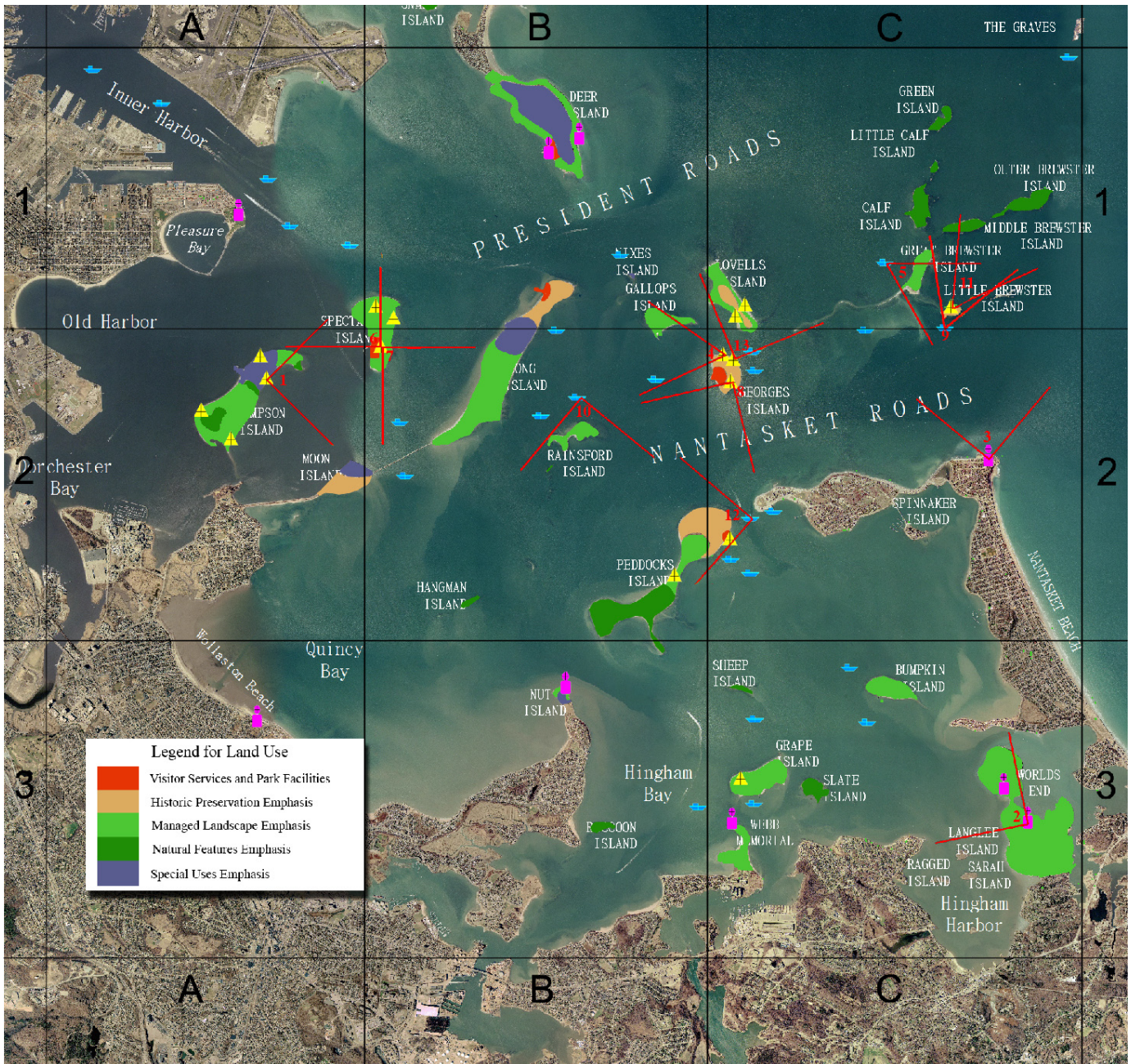
Map of Study Area overlaying Land Use map from Management Plan and scenic viewshed Class A.

For a closer example of an island management use we looked at the management plan for Georges Island. There are 3 high scenic viewsheds from Georges which fall within the Historical Preservation area of the Management Plan. Little Brewster Island also has high scenic viewsheds to and from the island and falls within the Managed Landscape Area of the Management Plan. The N.P.S. may want to consider revising certain management areas within the park to reflect high scenic assessments such as on Little Brewster. Little Brewster could have the Historical Preservation area added to reflect the historic structure of Boston Light and the high viewshed rating.
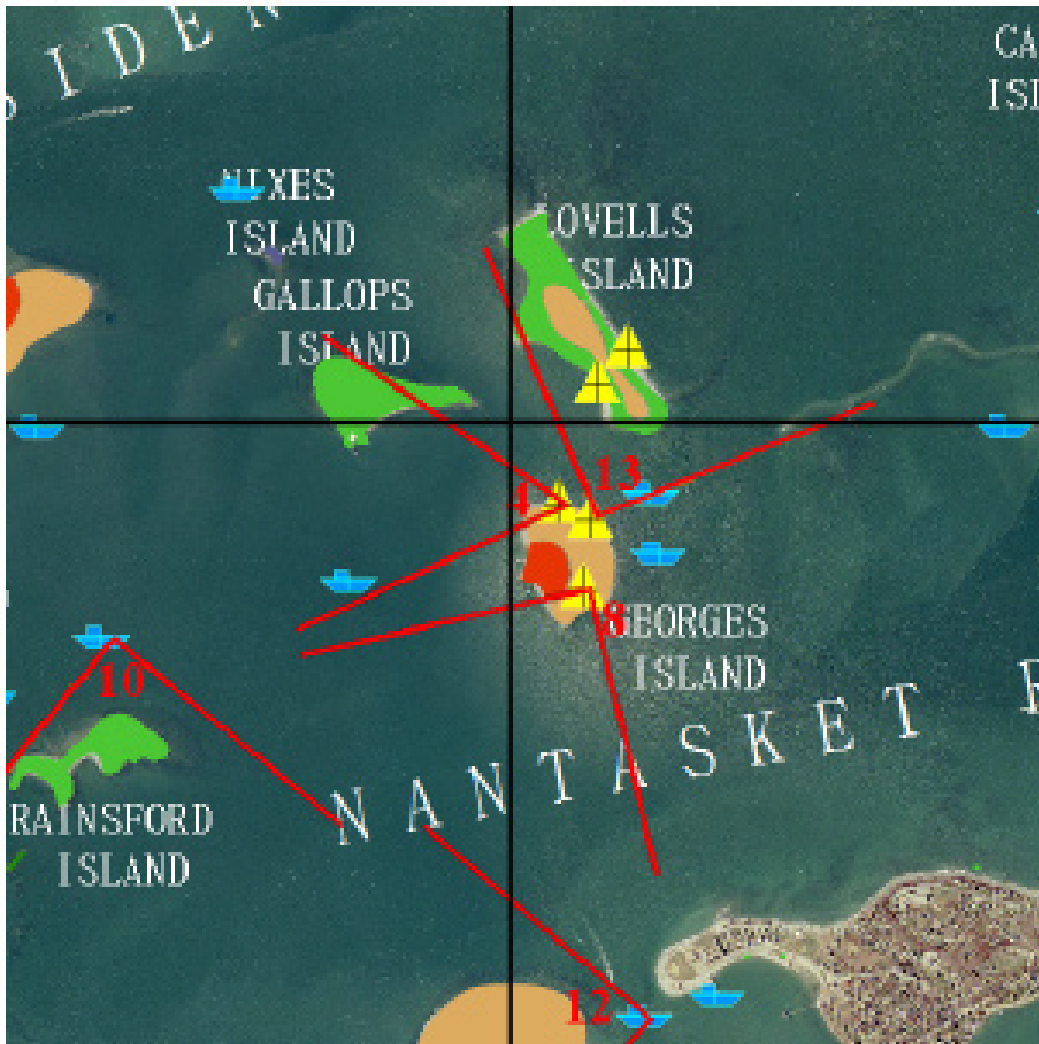
Close up look at Georges Island, overlay of Land Use map and scenic viewshed Class A.

High scenic viewsheds should be protected from development that doesn't fit the theme or mission of the National Park Area. Actions to enhance the aesthetic value of these viewsheds should be taken, such as landscape management for viewshed areas with overgrown vegetation that obstructs potential views. Interpretation signage should be implemented especially for historic preservation areas that would explain the different elements of a viewshed and their importance into the area, this action would enhance the visitor's experience of the site.

Low scenic viewsheds should be protected from development as well, and actions to decrease the unappealing appearance or improve the visual appearance should be taken. We recommend that actions such as re-vegetation of erosion areas and tree planting in high development should be taken into account.

User Volume

As discussed in the Methodology chapter, it is important to incorporate some understanding of how user volume relates to our assessment findings. To do this we overlapped our findings with the visitor numbers from the 2005 season. This allowed us to put our visual assessment findings into a larger context of overall importance to the Park based on how frequently the viewshed is seen.
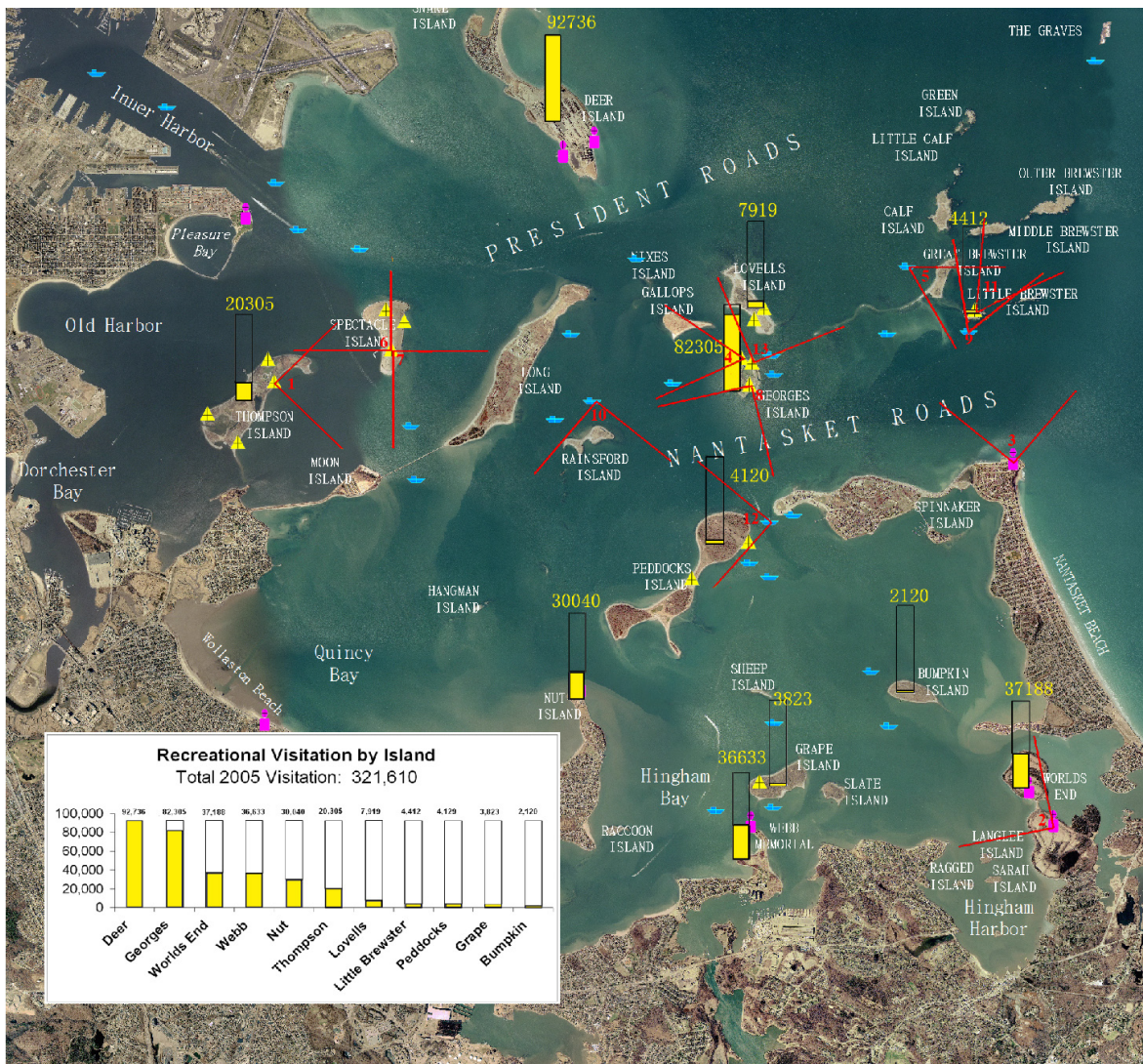
Map of Study Area with Class A Viewsheds.

It is important to note that visitor numbers for the 2006 season will be different, particularly for Spectacle Island which recently opened as a new service center to accommodate on-island visitation.

As displayed here, Deer and Georges Islands exhibit the highest user volume numbers in 2005. This is primarily due to the accessibility of these Islands as Deer is connected to the mainland and accessible by roads, and pedestrian paths, while Georges is home to a large visitor center and is the destination of many visitor ferry routes. Other areas of the park that are connected to mainland also exhibit higher rates of visitation such as Worlds End, Webb and Nut Island.

When comparing the visitation numbers to our Class A and B viewsheds, it is clear that potential exists to promote visitation to highly appealing, yet under-viewed areas of the islands. Particularly, the Brewster Islands are contains several Class A and B viewsheds, yet on-island visitation to this area is limited to only Little Brewster Island. Similarly, Thompson Island is home to many highly rated viewsheds, yet, due to the presence of the Outward Bound organization, access to on-island visitation is limited. While it important to know where untapped visitation potential exists, it is also necessary to consider the implications of increased visitation. Expanding visitation could potentially lead to increased human intrusion into the nature landscape which could degrade the scenic quality of these areas. Any visitation increase should take into account issues of protection and interpretation of the scenic resource.

Scenic Ferry Routes

In addition to the high quality viewsheds on the islands, there are also several scenic viewsheds located on sea. To further expose the Park's visual resources, we have developed two potential scenic ferry routes that link many of the Class A and B viewsheds. The goal of these two routes is to capitalize on the Park's best views as seen from water by offering visitors an opportunity to experience them in succession. One ferry route would take visitors towards the north east region of the site around the Brewster and Outer Brewster Islands. A second ferry route can take visitors across the central and south region of the site, linking high scenic points.

Map of Study Area with Proposed Scenic Ferry Routes.

Next Steps

Public Survey • We recommend that our clients conduct a larger public feedback. This could include a website forum as well as a large public survey that could be conducted during the next summer visitor season.

Management Plan • We recommend revising the management plan to reflect the scenic quality assessment to guide future development and protect viewsheds. Improvements to the lower rated viewsheds could also be done as well as the management of landscapes.

- A more detailed analysis of individual islands and scenic viewsheds could be conducted.
- In addition, there is a need for more vegetative management to improve and preserve viewsheds.

Historic Inventory • Many of the islands and peninsulas have historic sites and landscapes. It is felt that a more comprehensive survey should be done to protect these qualities of the park.

User Frequency • When overlapping our findings with user frequency data from 2005 season, it is noticeable that Deer and Georges Island had the highest visitor figures. Those numbers might be different for the 2006 season since Spectacle Island open to visitors this year. Nevertheless there are opportunities to increase visitation numbers on islands with high scenic viewsheds such as Thompson Island and Great Brewster's Islands. The visitation increase has to take into account protection and interpretation of the scenic resource.

Interpretive Signage • Many of the viewsheds fall within or look at historic sites and structures within the park area. We recommend creating interpretative signage for the full visitor experience.

Scenic Ferry Route • There are several high scenic viewsheds Class A and Class B located on sea. There are opportunities to develop two different scenic ferry routes by linking these points. One ferry route would take visitors towards the north east region of the site around the Brewster and Outer Brewster Islands. A second ferry route can take visitors across the central and south region of the site, linking high scenic points.

Conclusion

The incorporation of scenic analysis into the park manager's decision making process is a necessary step towards protecting the park's visual resources. This study has the potential to improve the park's approach to addressing both current management issues and future development activities. Those moving forward with this project, whether it be continued adaptations or implementation, should be aware of the challenges and opportunities that exist within a visual assessment study.

Challenges

By far the biggest challenge that our team faced in conducting this work was to quantify such a subjective element as beauty. There will undoubtedly be continued scrutiny over the process by which a viewshed can be converted into a number. However, it is precisely because this is such a difficult task that it must be addressed head on. While the protection of the park's visual resources is one of the National Park Service's primary goals, this undertaking is best supported with some rational means for determining areas of priority.

We also recognize that our study is limited in terms of incorporating ephemeral elements such as season, lighting, weather and vegetation changes. This study is based on a documentation process that took place only during the months of September and October, and only during daylight hours. A more comprehensive study would involve documentation during different seasons and different times of day. However, the documentation process within this study does represent the ephemeral conditions that exist during primary visitation times, that being summer daylight hours.

Opportunities

There are many opportunities for this project to positively impact on the Boston Harbor Island Park Area. Primarily, this study can be used as an informative tool within the decision making process for the NPS and other partnership members. This can help with prioritizing areas for protection, or future development activities. As mentioned previously, there are opportunities to further utilize the VRM methods to evaluate the contrast rating of development proposals.

This study can also serve as a guide for tangible park activities such as visitor programming and event planning. This can take the form of either promoting visitation to under-viewed areas of the park or capitalizing and areas where exiting visitation coincides with high scenic quality. Event planning and visitor guides can be updated with the addition of identified scenic vantage points. With a focus on improving the visitor experience, this study can help to connect visitation to the park's primary visual resources.

Additionally, there are opportunities to improve upon this work with a broad public input process that would further validate the legitimacy of the assessment findings. The visual assessment research and methodology established within this study can be used as a framework to guide this public input process. By expanding upon this study, the Park Service could further substantiate the results and improve the reliability of the findings.

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Pictures, Maps and Charts Credits

UMASS-Amherst Boston Harbor Islands Scenic Analysis and Assessment: A Pilot Study. Studio team members.

Appendix

Section I

Assessed Viewsheds Sorted by Classes

Section I

Final Assessment Summary

Section I

Final Assessment Summary

Viewshed, Score, Location

1. From Thompson Island: View of Long Island Bridge (AL) 30.8   A2
2. From Planters Hill at Worlds End: View of Boston Harbor Islands and Boston Skyline (AL)   30.8   C3
3. From Boat: View of Hull and Brewsters Islands (AL)   30.6   C2
4. From Georges: View of Boston Skyline (AL)   30 C2
5. From Boat: View of Boston Light and Greater Brewster (JA) 29.8   C1
6. From Spectacle South Summit: View of Boston Skyline (IC)   29.4   B2
7. From Spectacle South Summit: View of Long Island Bridge and Thompson Island (IC)   29.2 B2
8. From Georges Island: View of Brewsters, Hull and Peddocks Islands (IC)   29.2 C2
9. From Boat: View of Boston Light (JA)   28.8 C1
10. From Boat: View of Rainsford, with Hull and Peddocks in background (IC) 28.4 B2
11. From Little Brewster: View of Outer and Middle Brewsters (JA)   28.2   C1
12. From Boat: View of Hull and Peddocks Islands (IC)   27.6 C2
13. From Georges Island: View of Brewsters & Lovells (IC)   27.4   C2
14. From Boat: View of Rainsford with Peddocks in background (IC) 27.2   B2
15. From Little Brewster: View of Shag Rocks (JA)   27   C1
16. From Boat: View of Lovells Island (IC)   26.8 C2
17. From Georges Island: View of Brewsters & Lovells Islands (IC) 26.8 C2
18. From Boat: View of Graves Island (JA)   26.6   C1
19. From Boat: View of Moon Island and Long Island Bridge (JA)   26.4   B2
20. From Spectacle Island North Summit: View of Bridge, Thompson Island and Boston (IC)   26 B2
21. From Boat: View of Spectacle, Long Island and Bridge (IC)   25.8   B2
22. From Boat: View of Georges Island (JA)   25.6   C2
23. From Webb Park: View of Grape Island (AL)   25.6 C3
24. From Boat: View of Nixes, Gallops, and Georges Island (JA)   25.4   B1
25. From Deer Island:View of Little Brewster (JA) 25.4   B1
26. From Thompson: View of Spectacle and Deer Island digesters (AL)   25.4 A2
27. From Boat: View of Grape and Slate Islands (IC)   25.2   C3
28. From Boat: View of Great Brewster, Calf, and Graves Islands (JA) 25   C1
29. From Spectacle Island North Summit: View of Boston Skyline and Presidents Roads (IC)   25   B1
30. From Boat: View of Bumpkin Island (JA)   24.8   C3

Viewshed, Score, Location

31. From Little Brewster: View of Deer and Greater Brewster Islands (JA) 24.8 C1
32. From Boat: View of Castle Island (IC)   24.8   A1
33. From Boat: View of Peddocks and Hull Islands (AL)   24.6   C2
34. From Thompson Island: View of Moon Island and Mainland (AL)   24.4   A2
35. From Lovell's: View of Gallops Island (AO)   24.4   C1
36. From Thompson Island: View of Boston with Foreground (AL)   24.2   A2
37. From Worlds End: View looking South (AL)   24.2   C3
38. From Spectacle Island's Central Gazebo: View of Deer and Long Island (IC) 23.8   B1
39. From Webb Memorial: View of Quincy Bay and Boston Skyline (AL)   23.6 C3
40. From Boat: View of Georges, Gallops, Long Island and Digesters in Background (IC)   23.2   B2
41. From Boat: View of Bumpkin Island (IC)   23.2   C3
42. From Boat: View of Peddocks Island (JA)   23   C2
43. From Boat: View of Boston Skyline and Working Harbor (IC)   22.8   A1
44. From Spectacle Island: View of Deer and Long Islands (IC)   22.8   B1
45. From Boat: View of Long Island (JA) 22.2   B1
46. From Deer Island: View of Boston Skyline (JA)   22.2   B1
47. From Grapes Island: View of Peddocks Island (JJ)   22.2   C3
48. From Lovells Island: View of Brewsters Islands (AO)   21.7   C1
49. From Nut Island: View of Peddocks and Grapes Island (AL)   21.4   B3
50. From Boat: View of Spectacle Island and Long Island Bridge (IC)   21.2   B2
51. From Wallaston Beach: View looking West (AL)   21.2   A3
52. From Castle Island: View of Spectacle Island (AL)   21   A1
53. From Wallaston Beach: View looking East (AL)   20   A3
54. From Little Brewster Island: View of Hull Island (JA)   19.8   C1
55. From Nut Island: View looking West (AL)   19.6   B3
56. From Boat: View of Long Island and Deer Island (JA) 19.4   A1
57. From Deer Island: View looking South (JA) 19.2   B1
58. From Boat: View of Grapes Island with cranes (JA) 19   C3
59. From Boat: View of Worlds End and Hingham Harbor (IC) 19   C3
60. From Boat: View of Peddocks Dock and Hull Island (JJ)   18.8   C2
61. From Boat: View of Inner Harbor & World Trade Center (JA) 18   A1
62. From Boat: View of Weymouth Cranes (AL)   17.6   B3
63. From Peddocks Island: View of Rainsford & Long Island Bridge (JJ)   16.8 B2
64. From Boat: View of Inner Harbor and Logan Airport (JA)   15.6   A1
65. From Boat: View of Hull looking South (JJ)   14.4   C2
66. From Boat: View of Hull looking North (JJ)   12.4   C2