

# Recreation Impact Monitoring on Maine Islands

## 2004 Field Report for the Island Monitoring Task Force

*Note: The Island Monitoring Task Force was created to develop a long-range, science-based, island monitoring plan for recreational islands on the Maine coast. This report provides an overview of the first year of the project. The audience of the report is the Island Monitoring Task Force and other interested island managers, owners and volunteers.*

### Project History

There are several hundred Maine islands that are open to various levels of recreational use, including those on the Maine Island Trail, and islands managed by land trusts, private entities, and state and federal agencies such as Acadia National Park.

These islands are popular recreational destinations. Even the best intentioned of people can have an impact on an island's ecology and on visitor experience. In response to this observation, the Maine Bureau of Parks and Lands/DOC and the Maine Island Trail Association recommended, in *The Recreation Management Plan for the Public Islands on the Maine Island Trail* (December 2003), the formation of a task force to develop a long term monitoring plan for the public islands.

The Task Force formed in January of 2004 under the coordination of the Maine Sea Grant College Program at the University of Maine. The project is a nice fit for Maine Sea Grant, whose mission is to provide science-based information, research and outreach about the marine environment and facilitate decision-making in complex coastal problems.

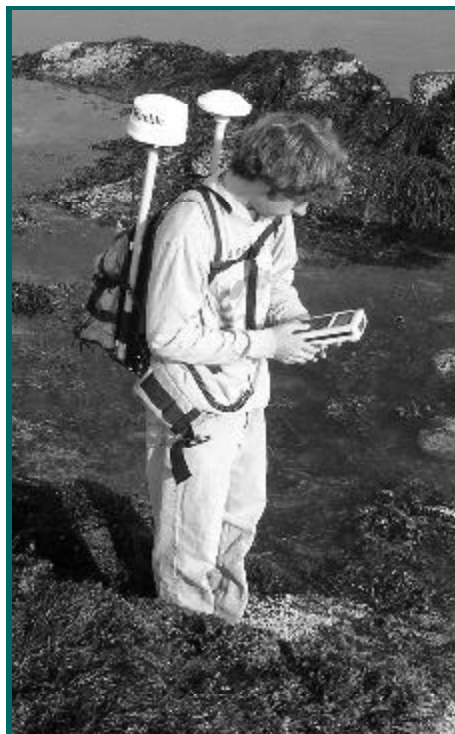
The goal of the Task Force is to develop methods for assessing recreational impacts on islands and to provide managers/island owners with impact information needed to make decisions about island use. The Task Force soon realized that this goal could have broad appeal to diverse island managers/owners throughout Maine's coast, on the Maine Island Trail or not. Therefore, the Task Force membership (see back page) includes this diversity and is open to additional people/organizations.

Island visitors care a great deal about the Maine coast, and Maine's long history of volunteer stewardship benefits island

management. Therefore, another goal of the Task Force is to enhance existing volunteer monitoring programs by engaging island users in quality-assured, science-based monitoring.

### Summer 2004

During summer 2004, Task Force members, volunteers and student interns gathered baseline information on three Maine islands. The islands were chosen because they represent a range of use levels and ecological types. More than 20 methods to monitor impacts were developed and tested on island intertidal zones, shorelines and upland use areas. This report is a compilation of the work and results to date.



*Bowdoin College student Ben Marterns GPS-ing intertidal communities.*

### Recreation Ecology and Islands

Recreation ecology is the study of recreation-related impacts on natural areas. It is still a fairly new science. With the exception of trampling studies conducted in the 1980s by the Island Institute, little literature exists about the particular ecosystem examined here: coastal islands.

Unlike inland recreation areas that tend to have concentrated use zones such as trails and campsites in the midst of larger natural areas, people visiting coastal islands often explore the entire island from the shore to the campsite, from the intertidal zone to the vegetated areas.

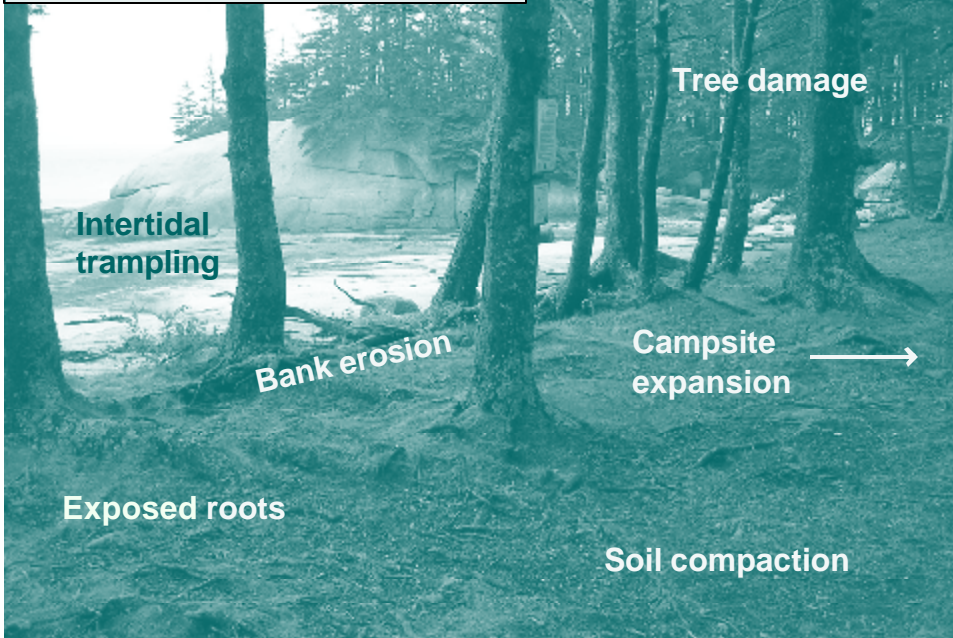
In addition, the island landscape is a blend of widely different yet overlapping habitats, such as a rockweed-dominant intertidal zone adjacent to a spruce/fir thicket. Each habitat type responds differently to recreational use and each requires different monitoring methods, yet all are equally a part of the whole island system.

The Task Force has reviewed and adapted inventory and monitoring methods from a number of sources to begin to develop a monitoring system that is island-specific.

Initially, an island's overall characteristics are assessed for impact issues and overall conditions. Then, for assessing specific impacts, island ecosystems are divided into three zones: the upland zone (an island's land-based use area); the intertidal zone (the area between higher high water and lower low water); and the shoreline zone (between the upland and intertidal zones, including the bank and where land and sea species meet). For each zone, impact indicators and methods to assess them were identified. The following pages describe this process.

# Indicators and Methods

## IMPACT INDICATORS



*Hell's Half Acre, impact indicators at the central meadow campsite (campsite A).*

## Definitions

A series of definitions are useful to help us walk through the steps to monitoring recreation impact on islands.

**Indicator:** specific parameters that can be measured or recorded. For example: tree damage, bank erosion, or presence of barnacle hummocks.

**Standard:** minimum acceptable condition for an indicator. When the condition no longer meets the acceptable level, the standard for that indicator is said to be “violated.”

**Monitoring:** assessing changes over time using a systematic variety of measurements, photographs and other documenting techniques.

**Methods:** specific protocol or technique by which indicators are measured or documented.

**Baseline:** preliminary measurement or inventory that assesses the condition of indicators at the beginning of any monitoring plan.

An example of how the process enables managers to make decisions about recreational use of an island campsite: A campsite's size is one **indicator** that can be used to assess change over time. Managers start by defining the campsite's **standard** or preferred size. A **baseline** measurement can show the initial size. One **method** could be a “variable radial transect,” a system which uses a fixed center point for mapping/measuring campsite boundaries). Subsequent **monitoring** can indicate if the campsite is changing, including if the standard has been violated, or will be violated at the current rate of change. Managers can then take appropriate action.

## Monitoring Indicators and Methods

Monitoring helps managers and island owners notice and track changes in recreational impact so they can make informed decisions about island use. Indicators, as described in the box at lower left, are specific parameters that can be measured or documented. For our work, the objective is to use indicators that, when measured and compared to a baseline or initial assessment, can point to changes in the island's three zones (upland, shoreline, and intertidal).

Methods to monitor indicators depend on a number of variables including: management objectives; time, tide and weather constraints; standards or limits of acceptable change; characteristics of the particular island or site including flora, fauna, geology and overall ecology; expertise or training of monitors; budget constraints; the indicator itself; and the time frame of the particular monitoring project.

During the summer 2004, we used a variety of methods to assess the protocol's effectiveness in obtaining baseline data. Our methods included photographs at fixed points, condition class assessments to identify where a site falls along a scale indicating level of impact, and actual measurements. All these methods have value. Used collectively they can provide much information about resource impacts.

This work is only just beginning. Some important indicators to help examine causes of impact have not yet been looked at, including use numbers (how many people actually visit a site) and social indicators (e.g., how visitors impact each other, or how ecological impacts affect a visitor's experience).

Table 1 on the next page outlines impact indicators that were examined during the summer of 2004.

**Table 1. Indicators and Methods for Three Island Zones.** *This table outlines indicators of recreational impact on islands, followed by methods to assess impact on those indicators. These methods were among those used or tested during summer 2004. For each environmental zone, comments present some challenges and lessons learned regarding indicators and methods.*

**Preliminary Island Assessment**

The initial assessment should occur at the beginning of an island’s monitoring plan. It serves as a broadbrush first step to help choose indicators in each of the three zones described on the right. The goal is to gain an overall sense of an island’s characteristics, its potential sensitivity to recreational impact, and its physical accessibility for recreational use.

**Island Characteristics**

are documented to provide information about key issues and environmental conditions present on an island to guide more specific indicator monitoring. They include:

- Recreational accessibility
- Substrate/habitat type
- Dominant species
- Presence of sensitive shoreline types (e.g., mussel beds, clam flats, eelgrass beds)
- Bank erosion
- Undesignated use areas
- Visible impacts
- Access trails
- Notable changes

**Methods**

These were the methods employed in 2004 to assess island characteristics:

- Boat circumnavigation with checklist
- Perimeter walk with checklist
- Access trail mapping

**Comments**

This assessment needs to be conducted at low tide to get a full picture of the island.

**Upland Zone:** An island’s land-based use area, including fields, forests, campsites, trails, and regions above the intertidal and shoreline areas.

**Goal:** to assess what recreation impacts and changes are occurring and at what rate.

**Indicators and measurement methods** (*methods in italics*).

- Campsite and use-area dimensions (*measuring/mapping from a fixed center point known as variable radial transect method, and geometric figure method for emerging satellite use areas*).
- Campsite condition descriptions (*condition class assessment which is a scale of condition descriptions; and fixed point photography*).
- Vegetation ground cover on and off-site, exposed soil and tree canopy cover (*percent cover scale*).
- Campsite expansion potential (*poor, medium, good scale*).
- Tree damage and root exposure (*none/slight, moderate, severe scale*).
- Tree stumps, fire sites, access trails, human waste, and litter (*presence/absence and counting*).

**Comments:** It is difficult to define a specific use area because visitors tend to wander throughout an island. We decided to apply the “90% rule” which means that we know that the whole island may have seen use, but we are interested in monitoring only where 90% of the visitors go, and comparing that to other areas on the island.

**Shoreline Zone:** The area between an island’s upland and intertidal zones, including the bank, the area where land-based species transition to intertidal species, and above higher high water.

**Goal:** to assess what recreation impacts and changes are occurring and at what rate.

**Indicators and measurement methods** (*methods in italics*).

- Shoreline use area characteristics (*transect mapping and fixed point photography*).
- Shoreline condition description (*condition class assessment which is a scale of condition descriptions; and fixed point photography*).
- Bank erosion (*none/slight, moderate, severe scale*).
- Bank vegetation trampling (*none/slight, moderate, severe scale*).
- Tree damage and bank root exposure (*none/slight, moderate, severe scale*).
- Tree stumps, fire sites, access trails, human waste, and litter (*presence/absence and counting*).
- Access trails and trail width (*counting, measuring and mapping*).

**Comments:** It is difficult to define exact shoreline area because tides fluctuate and vegetation can be salt or disturbance tolerant or may be in season, exaggerating land edge of the shore. It is also complicated to differentiate between human and natural caused change in this highly dynamic area, so the use area along the shoreline needs to be compared to unused shoreline.

**Intertidal Zone:** The area between higher high water and lower low water.

**Goal: 2004:** To acquire baseline information about intertidal characteristics and existing conditions to inform selection of indicators, species, and monitoring areas for future surveys. **Long-term goal:** to assess what recreation impacts and changes are occurring and at what rate.

**Indicators and measurement methods** (*methods in italics*).

- Types, distribution and upper and lower limits of common communities (*Mapping/classifying substrate and habitat types, classifying and photo-documenting intertidal communities, photo transects*).
- Relative abundance of common species (*percent cover of common species*).
- Presence/absence of barnacle hummocks – undisturbed barnacles grow in tall mounds called hummocks (*assessing barnacle mats for hummocks*).
- Age of ascophylum (*Aging ascophylum fronds by height and air bladders*).

**Comments:** It is complicated to differentiate between natural and human caused change in this highly dynamic area. In addition, many of the above methods are extremely time-intensive but limited strictly by the tide, so methods need to be simple enough to be carried out within one tide, and methods also need to be carried out in a comparable amount of time as other zones.

# 2004 Pilot Islands

## A summary of methods and results

### Long Island, Blue Hill Bay

Long Island, in Blue Hill Bay, is an Acadia National Park easement island with five traditional-use campsites on the eastern side and a few private homes on the west. At nearly five miles long, it is a large island with a mostly wooded interior, some coastal fields and a history of traditional use.

Long Island was the first island where actual measurements were taken in the

summer of 2004. All specific assessments occurred in one upland zone area and no shoreline or intertidal assessments were conducted on Long Island in 2004. While rapid indicator monitoring occurred at all five campsites, measurements were focused on Long Island's northern-most site.

#### Data collected included:

- Campsite photos.

- Campsite measurements and mapping using radial transect method.
- Indicator assessments and measurements (substrate, site visibility from the water, distance to nearest campsites, site development and expansion potential, slope, tree cover, condition class, vegetative ground cover on and off-site, exposed soil, tree damage and root exposure, tree stumps, fire sites, access trail and human waste).

### Hell's Half Acre, Stonington region

Hell's Half Acre in the Stonington region is one of the most visited islands on the Maine Island Trail. This small island – although bigger than a half acre – is appealing to many. Sea kayakers often spend a night or two and use it as a base; schooners bring their guests ashore for lobster bakes; and sailors anchor in the protected cove and come ashore to explore.

Hell's Half Acre was a good candidate for the 2004 monitoring season for three important reasons: it gets a tremendous amount of use which tends to disperse throughout the island's landscape; it has been monitored anecdotally for impact by MITA volunteers for years; and it is the subject of several important management strategies (including signage to encourage people away from certain areas, and tent platforms constructed to concentrate camping).

Monitoring was initiated on Hell's in 2004 to get a baseline of island conditions and to help managers assess the results of

management decisions. Monitoring attempts to quantify observations of impact on Hell's such as intertidal trampling, trail proliferation, and campsite sprawl.

An example of quantifying data: Before the 2004 season, the observation was made that Hell's seemed to have a lot of trails for such a small island. In July 2004, a shoreline survey showed at least 20 access trails leading from the shore to the island interior. This information enables managers to make decisions about whether 20 access trails are too many or just enough, and direct use accordingly. It also provides a baseline for comparison in the years to come.

Data were collected on the grassy meadow site, on the shoreline leading to that site, in the intertidal zone under both of the island's campsites, and around the perimeter of the island. The presence of campers prevented comprehensive monitoring in the wooded "tent platform" site.

#### Data collected included:

- Island perimeter survey for accessibility from water and sensitivity.
- Island perimeter survey for access trails from shore to interior.
- Photo documentation of intertidal communities along transect lines.
- Presence/absence of barnacle hummocks.
- Shoreline mapping transect at use area, including areas of special concern.
- Campsite photos.
- Campsite measurements and mapping using radial transect method.
- Campsite and shoreline indicator assessments and measurements including substrate, site visibility from the water, distance to nearest campsites, site development and expansion potential, tree cover, condition class, vegetative ground cover on and off-site, exposed soil, tree damage and root exposure, bank erosion, tree stumps, fire sites, access trails and human waste.

*This composite of photo thumbnails, an example of shoreline documentation, shows the Hell's Half Acre shoreline use area above the north-side granite ledge and below the meadow campground in the middle of the island. Photos were taken every 5 meters at a perpendicular angle along a 50 meter transect. The transect line endpoints were triangulated and photographed for replicability in future years. The photos (which are in full color and much larger in the island's full data files) are only one tool that will help assess change over time.*



## Bangs Island, Casco Bay

Bangs Island in Casco Bay was officially added to the Maine Island Trail in 2004. It is a public island under the jurisdiction of the Bureau of Parks and Lands and has long been enjoyed by boaters and picnickers from the area.

Monitoring was initiated on Bangs to gather baseline information about recreation impact indicators at the beginning of its tenure as a Maine Island Trail island. Bangs' history makes the island an ideal pilot for the island monitoring project. Like most islands in the Gulf of Maine, it has been farmed, burned, planted with trees and inhabited by humans over the last several hundred years. In the second half of the twentieth century, it was recognized as an important eider nesting island. In the more recent past, Bangs is reputed to have hosted a small colony of raccoons, which effectively wiped out the eiders. Since no eider nests have been documented in years, the state deemed it prudent to open the island to recreational use and thus its addition to the Maine Island Trail. It makes sense to monitor this island.

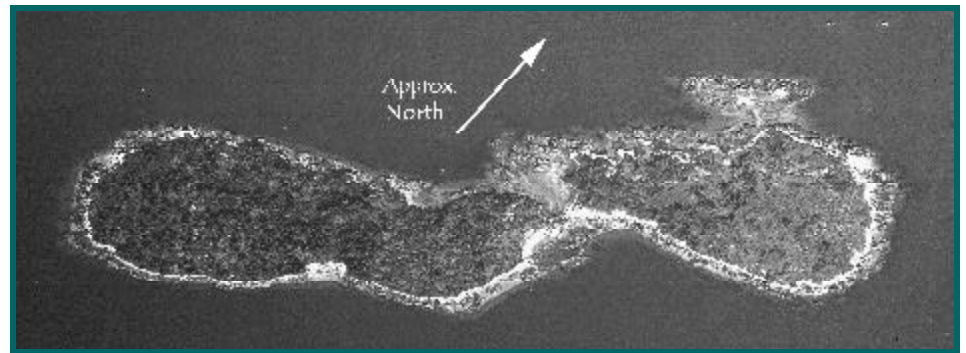
Three campsites have been designated by the Bureau of Parks and Lands and MITA to be the recommended use areas. They are roughly dispersed at the north, middle and south end of the island, within reasonable walking distance but

over rough rocky shores. While the island interior is inviting to visit with its large fern meadows, there are, at this time, no designated trails. There are many potential impacts that increased use could trigger on this island. Monitoring provides a baseline to help managers quickly identify and prevent problems. For example, trails have been identified as a management need.

### Data collected included:

- Types and distribution of common intertidal communities in some or all of the three primary use areas.
- Presence/absence of barnacle hummocks.
- Age of ascomyllum fronds in use area.
- Upper and lower limits of dominant communities.

- Shoreline mapping transect including areas of special concern.
- Campsite photos.
- Campsite measurements and mapping using radial transect method.
- Campsite and shoreline indicator assessments and measurements including substrate, site visibility from the water, distance to nearest campsites, site development and expansion potential, tree cover, condition class, vegetative ground cover on and off-site, exposed soil, tree damage and root exposure, bank erosion, tree stumps, fire sites, access trails and human waste.



*Bangs Island aerial photo, from Maine DMR*



## Volunteers Monitor Islands

In 2004, thanks to a grant from the Maine Community Foundation, Bangs Island became a local outdoor learning project. In July 2002, four Chebeague Island students and local resident Bob Earnest joined a team of monitors on Bangs Island in Casco Bay. Bangs Island is used by many Chebeaguers for everything from picnics to rock collecting. Bowdoin College intern Pat Mahoney led a Leave No Trace activity to introduce the students to their island through a different lens. The students, including Mia, Johnny and Daria, jumped right in, quickly identifying that lichen is not so durable a surface as it looks. Next, the group, which also included Natalie Springuel of Maine Sea Grant and Amy Kersteen and Vinny

Moratta of MITA, collected three bags of trash on Bangs' northwest shore. The following day was spent first learning to measure a campsite using the radial transect method, then swimming and catching fish. Before going home, the students produced a beautiful, accurate and field-tested campsite map, including features of special concern. In October, the Chebeague Island Historical Society hosted a coffee and donuts session on Bangs Island use. Old timers, grandparents, and locals including kids shared stories about times spent on Bangs Island. All this information produced by volunteers is being catalogued by Maine Sea Grant and MITA to form a lasting record about the ecological and cultural history of the island.

## Island Monitoring Task Force 2004 members

### \*Steering committee in bold

- Amy Kersteen**, Maine Island Trail Association (MITA)
- Tracy Hart**, Maine Sea Grant
- Charlie Jacobi**, Acadia National Park
- Sid Quarrier**, MITA
- Steve Spencer**, Bureau of Parks and Lands
- Natalie Springuel**, **Task Force coordinator**, Maine Sea Grant
- John Anderson, College of the Atlantic
- Jane Arbuckle, Maine Coast Heritage Trust
- Susan Brawley, UMaine School of Marine Science (SMS)
- John Daigle, UMaine Parks, Recreation and Tourism
- Lee Dogget, Department of Environmental Protection
- Rich MacDonald, Gulf of Maine Expedition Institute
- Pat Mahoney and Ben Martens, Bowdoin College 2004 Island Monitoring interns
- Rachel Nixon, Georges River Land Trust
- Marney Pratt, Bowdoin College
- Pete Raimondi, University of California at Santa Cruz
- Esperanza Stancioff, Maine Sea Grant/Cooperative Extension
- Lindsay Whitlow, Bowdoin College

### Many thanks to the following people for volunteering their time in the field in 2004 or serving as valuable resource people for the project.

- Melissa Coleman, UMaine SMS
- Bob Earnest, Chebeague Island resident, and Chebeague Island students and Historical Society
- Anne Henshaw, Bowdoin College
- Helen Hess, College of the Atlantic
- Tora Johnson, College of the Atlantic
- David Kleinpeter, Acadia National Park summer staff
- Susan Kynast, Maine Island Kayak Company
- Gordon Longworth, College of the Atlantic
- Vinny Marotta, MITA
- Jeff Marion, Patuxent Wildlife Research Center
- Annette Naegel, George's River Land Trust
- Chris Peterson, College of the Atlantic
- Karen Stimpson, MITA
- Karen Young, Casco Bay Estuary Project
- Elizabeth Stephenson and intern Elizabeth Roberts, UMaine Darling Marine Center

### Note: Task Force encourages input and new members.

*(Special thanks to Anne Henshaw, Director of Bowdoin College Coastal Studies Center for securing Rusack Fellowship funding for two student interns.)*

2004 Island Monitoring Report designed and written by Natalie Springuel, Maine Sea Grant, with the help of the Island Monitoring Task Force steering committee.

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## Call for Volunteers for 2005

Boaters, kayakers, sailors, guides, island owners, tourists and others are invited to participate in the 2005 Island Monitoring project.

Volunteering can be as simple as five minutes documenting indicators when boating or picnicking. It can also be field work measuring campsites or mapping pathways, photographing landing areas, entering GPS coordinates for impact indicators, or inventorying intertidal zone species. Boat captains are needed to help with transportation too!

Two internships are also available (GIS technician and field work).

### For more information, contact

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*Karen Young, director of Casco Bay Estuary Project, and Pat Mahoney, Bowdoin College student fellow use a tape measure and peep-hole compass to determine campsite boundaries on Bangs Island.*

