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Friends of Sears Island

A Guide to Land Stewardship Planning for Public Access Conservation Lands



One of the biggest changes in conservation in recent decades is the increase in awareness and action in land stewardship. Conservation of both public and private lands has seen a shift from less hands-on management in general and work by professionals to active care and management by community members working alongside professionals. Much of this has been of necessity as environmental stresses such as invasive plants have been steadily increasing, but it is also due to a cultural shift in environmental awareness and a desire to participate in protecting our planet. People want to be a part of healing the land in active, concrete ways and land stewardship is a big tent that can encompass many activities to restore and manage land.

Private conserved lands now form a large segment of natural landscapes in addition to public lands, and this is especially true in Maine. Local and regional land trusts have become an active part of both conserving lands and providing community connections to land stewardship. In addition, government organizations ranging from municipalities to state agencies all have needs related to management of natural landscapes including parks, easements and other public access lands. All of these groups can benefit from structuring their land management activities around community involvement and outreach as well as ecological principles.

This guide is based on the work of Friends of Sears Island (FOSI), which has strived to create a model of effective and broad reaching land stewardship and systematic management that involves both professionals and volunteers. Much of the work has been completed with grant funding on a very limited budget, and the scale of the work is tailored to the 601 acre conservation easement that the group manages. Thus, the FOSI Stewardship Guide can provide a helpful outline for land stewardship at a small scale appropriate to the many organizations involved in land conservation. Over the course of about 10 years, the group has implemented professional land assessment and a management plan as well as an educational outreach program and infrastructure such as trails and facilities. The guidelines we offer here are based on our successful process of creating a property that is stewarded by the community with great care and awareness which has led to greater health of the island’s biodiversity as well as public access and education.

This guide is intended to form a starting point by outlining important elements of land stewardship planning in order to help others create and implement an effective strategy to steward natural or conserved lands.

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Describing the land involves scientific assessment.

Above, top: A biologist and students collect invertebrates in a permanent stream on Sears Island. Bottom photo: students measure a large spruce tree on Sears Island.

Planning for Stewardship

Often, we think of land stewardship as work in the field, such as trail building, installing signs, or controlling problems such as erosion or invasive plants. It can also include work such as resource extraction, including timber harvest, fishing or crop production. In reality, stewardship includes these things but also elements of conservation that are more intangible or long range, including providing education, community awareness and supporting biodiversity and ecosystem health.

The process of stewardship begins with understanding the land and then planning systematically to maintain or create healthy conditions and processes on that land. These two steps ideally result in a written plan that serves as a manual for stewardship managers. The land manager is then tasked with implementing those plans through on-the-ground stewardship actions, often with volunteers. The purpose of this guide is to outline a process for creating a stewardship plan for your property.

Here is a list of many general areas to consider during your stewardship planning process. This guide will discuss each of these in more detail.

- Understanding the landscape’s history
- Mapping, spatial representation of information
- Inventory of natural resources including the ecosystem and land features
- Assessing problems and threats
- Prioritizing and managing problems and threats
- Developing goals and objectives for management
- Creating a management plan
- Considering the scale of your work given organizational capabilities
- Recruiting volunteers and selecting professionals
- Tools and equipment needed
- Community outreach and education
- Social and political matrix of your site
- Uses of your site including recreation, study or resource production
- Ecosystem services of your site
- Access and use infrastructure
- Monitoring conditions over time
- Ongoing management
- Communication and oversight
- Funding and fiscal management

Planning for Stewardship, Part 1: Understanding and Describing Your Land

The first step in planning for stewardship involves developing a thorough understanding of the landscape. To begin to create your stewardship plan, you should understand the land through a systematic process of assessing its features and conditions, often called Resource Inventory. Describing these results will often be a part of the final written management plan. Resource Inventory is a process of using available resources to compile information, observing and measuring conditions on the property and mapping certain features. This in turn helps you understand existing conditions and how these can be maintained or improved through stewardship management...which begins your management plan.

Elements of Describing the Land:

General areas to cover in describing the property:

- History: At geological, pre-historical, and historical scales
- Context of the Site: Surrounding landforms, land uses, ecosystems, bioregions, etc.
- Abiotic Features: Geology: soils, bedrock, topography, water features and flow
- Biotic features: Animals, plants, fungi, plant communities, aquatic communities, ecology Current use: public activities and access, resource extraction
- Current infrastructure

Aspects to describe in detail:

- Soils, geological features
- Wetlands, waterways and topographic features
- Unusual or sensitive natural features
- Cultural features (human-made features and historical remnants) features, including current infrastructure

Continued

Biodiversity: Types of Life to Observe and describe for your Property

- ◇ Mammals
- ◇ Birds
- ◇ Reptiles
- ◇ Amphibians
- ◇ Insects
- ◇ Arachnids
- ◇ Soil Invertebrates
- ◇ Stream Invertebrates
- ◇ Tidal Zone Invertebrates
- ◇ Mollusks
- ◇ Crustaceans
- ◇ Plants
 - ◇ Trees and Shrubs
 - ◇ Herbaceous Forbs
 - ◇ Grasses and Sedges
 - ◇ Ferns
 - ◇ Mosses
 - ◇ Lichens
 - ◇ Aquatic Plants
 - ◇ Algae
- ◇ Fungi



Your resource inventory data can have many sources.

Above, a geologist leads an education workshop on Sears Island. The information he provides will be added to the geological description of the island in the stewardship plan.

Aspects to describe in detail, continued:

- Biodiversity: This includes natural communities of life, and their ecology. This is a big process and might begin with a professional natural resource inventory and continue with public events, school activities and citizen science.
- Current and potential threats or degradation, including destructive use, environmental degradation, invasive plants or animals.

Describing the Property in Detail:

Abiotic (Non-Living) Features

Often, these descriptions will be a part of any professional natural resource inventory (“NRI”) conducted. However, many elements of an NRI can also be completed as a part of an educational activity for children or adults.

Soils

It is a good idea to create at least a basic description of the soils on your property. This could include creating a general soil type map of the property, or gathering more detailed information through soil sampling.

Resource for Soil Mapping

A map of soil types present on the property is easy to create using the online tool **Web Soil Survey** <https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm?referrer=GettingStarted.htm-map>.

Geology

You may wish to describe the bedrock geology of your property, geological history, and any salient formations that are identifiable features of interest or importance.

Topography

The changes in elevation and the features that result such as hills, gullies, floodplains, streams and wetlands can be described, and will be shown on maps of the property you create.

Describing the Property in Detail:

Natural Communities

Groups of plants that are often found together in specific assemblages are called “plant communities.” **Because the plant community forms the basis for many other life forms being present and reflects other aspects of the site, descriptions of plant assemblages along with other natural features form the basis for describing “natural communities.”** The description of these natural communities is found in state specific documents, and often there is a book available describing these communities for your state. **Natural communities are your basic unit for describing the ecosystem of your site.**

Often, the areas covered by the natural communities are delineated on a map. Maps of natural communities and other land features are created by a combination of ground truthing (looking at the community while walking the site, perhaps marking areas and edges with global positioning systems devices (GPS), and/or using available digital map data. This spatial information on natural communities is often mapped using Geographic Information Systems (GIS) software as a part of your resource inventory.

Describing the natural communities also involves identifying individual plants while on the site and deciding which are dominant in a given area on the site. This is an oversimplification of the process, but it may actually be done at different levels of detail and complexity. For instance, volunteers with knowledge of plants and plant communities can walk the land and give a general description of what is present, and sketch out communities on a map as well as completing an overall list of plant species present. At a more intense scale, a professional botanist can describe and map the plant communities as a part of a professional NRI.



Describing a Significant Natural Community

The photo above shows a professional botanist assisting a college intern in identifying plants found in an S2 (rare) Maine Natural Community know as Coastal Dune Grass that is present on Sears Island. The initial study done during the professional NRI had identified this community on the island.

This day of study allowed the student to expand her skills in botany, and added to our list of plants found on the island.

Describing Natural Communities, continued

On Sears Island we have done both of these things, beginning with a professional NRI, which provided a description of the natural communities found on the island as well as a large list of plants found. We have been adding to our plant species list with students and volunteers adding species during educational events. We also have a citizen science observation program where visitors can observe and add species. This multi-faceted approach is the basis for our effort to have a full description of the biodiversity of the island. Understanding the richness of life present now will be invaluable in being aware of changes in the level of biodiversity and ecosystem health over time.

It is important to note if your property has natural communities of special significance. This could be because rare plants are present, unusual assemblages of plants are found, or the natural community itself is considered rare at the state, national or even global level. A book on the natural communities of your state will have more information to help you determine if you have a community of special significance. Natural community rarity is often signified with an alphanumeric code. Conserving such significant features is an important part of stewardship planning and management.

While studying plants on your site, it is also vitally important to locate and identify invasive plants that are present, and also to create management plans to control their spread. This will be described further in the section on invasives.

Resources for Identifying Plants and Natural Communities

Go Botany <https://gobotany.newenglandwild.org/> The best online site for identifying plants in New England, with question keys to help you identify the plants, and pictures and descriptions of plants including range maps.

Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems, by Susan Gawler and Andrew Cutko. Published in 2010 by the Maine Natural Areas Program, this is the descriptive guide to most of the defined Natural Communities in Maine. This is an essential book for identifying Natural Communities on your property. If you live outside of Maine, you will want to search for the guide to natural communities for your state; it may be a book or a downloadable pdf document.

Contact the state agency responsible for natural resource inventory (such as the Maine Natural Areas Program) to find a professional consultant that can conduct a Natural Resource Inventory. The Nature Conservancy or regional land conservancies can also provide suggestions.

Other Important Aspects of your Property to Understand and Describe

Significant and Sensitive Features

Any aspect of the property that you consider to be important could be considered a significant feature. The importance can be defined by any criteria that your stakeholders want it to be: beauty, historical interest, emotional importance, age, rarity, uniqueness on the site or on a wider scale...the list goes on. If the feature is or could be vulnerable to loss or degradation, it could also be defined as a Sensitive Feature. These are ideally described in the management plan and are geolocated in GIS maps of the site.



Describing a Significant Feature

In the photo above, students are measuring a legacy tree on Sears Island that will also be photographed and located with a GPS unit in order to add it to a GIS map of significant features of the island.

Some examples of significant features we have described and mapped on Sears Island:

- ◇ Intermittent and perennial streams
- ◇ Wetlands including vernal pools
- ◇ Large trees
- ◇ Rare animal and plant locations
- ◇ Areas of unusual plant assemblies or plant species richness
- ◇ Historical remnants of human use
- ◇ Archeological features
- ◇ Rare natural communities

Cultural Features

Cultural Features are any human use feature, either current or defunct. If they are of historical interest, they may also be classified as significant features and studied, documented, and mapped in detail.

Other Considerations in Describing Your Land: Ways to Collect Information

There are many ways you can collect information about the areas we've discussed. You can use any selection of the methods below, or all of them as financial or staffing and volunteer resources allow. Some are qualitative (subjective, descriptive in a general way) and some are quantitative (providing numerical results in a systematic manner). The methods can focus on broader or narrower categories of observation.



Some ways to collect information:

1. A professional Natural Resource Inventory
2. A baseline survey of many characteristics by staff or staff and volunteers.
3. Collecting information during educational activities, from public events to students working with classes, as interns, or completing an individual project.
4. A "meander" survey with a specific focus area such as birds, wildflowers, or butterflies
5. Quantitative sampling, such as collecting plot or transect data
6. Mapping
7. Photography
8. Gathering information through citizen science events or volunteer observations

On Sears Island, we have used all of the above methods to describe characteristics of the island for our Master Natural Resource Database. Currently, our summer series of events are focused on specific natural history topics and during each event, as the expert presenter notes various species or features, these are added to our Database. When a student group has a class activity on the island, data may be collected from them. During the summer, local college interns working with the county Soil and Water Conservation District complete different types of monitoring, including sensitive features, plant species, permanent plot data collection, and invasive plant mapping and monitoring. We also have implemented a Citizen Science Program that encompasses many of these activities, and also allows for visitors to submit observations over time. The Citizen Science Program as well as all of our other information collecting has allowed us to create custom online nature guides to different groups of species that visitors can access at home or while on the island with their phone through the program iNaturalist. We have also created downloadable checklists of species.

Thus, our initial and subsequent assessments of the island have become a means of fostering education and awareness, as well as a way to document trends and changes.

Ways of Collecting Information: Quantitative Sampling

Besides an initial effort to fully describe the features of your land, it will be important to monitor the ongoing conditions of these features. In order to make accurate comparisons between initial and later conditions, it is very important to collect information at each point in time in a consistent manner. Quantitative information offers a more accurate way to compare conditions over time than subjective descriptions, although both are useful and important.



Besides qualitative description of species present, natural communities, significant features and geological conditions, systematic sampling can provide quantitative data which is statistically comparable over time. Sampling is beyond the scope of this guide, but should be used as a method to monitor conditions over time if at all possible. It may also be the best way to establish an initial baseline knowledge of certain types of species. There are many good methods for taking systematic samples in order to describe natural features, including biological monitoring plots, transects (lines) along which observations are collected, and many other methods. A nearby college or university, or a resource inventory professional can help a land stewardship manager to develop a monitoring plan that includes sampling. Often, students at the secondary and post-secondary level can conduct sampling as a part of class studies or individual projects.

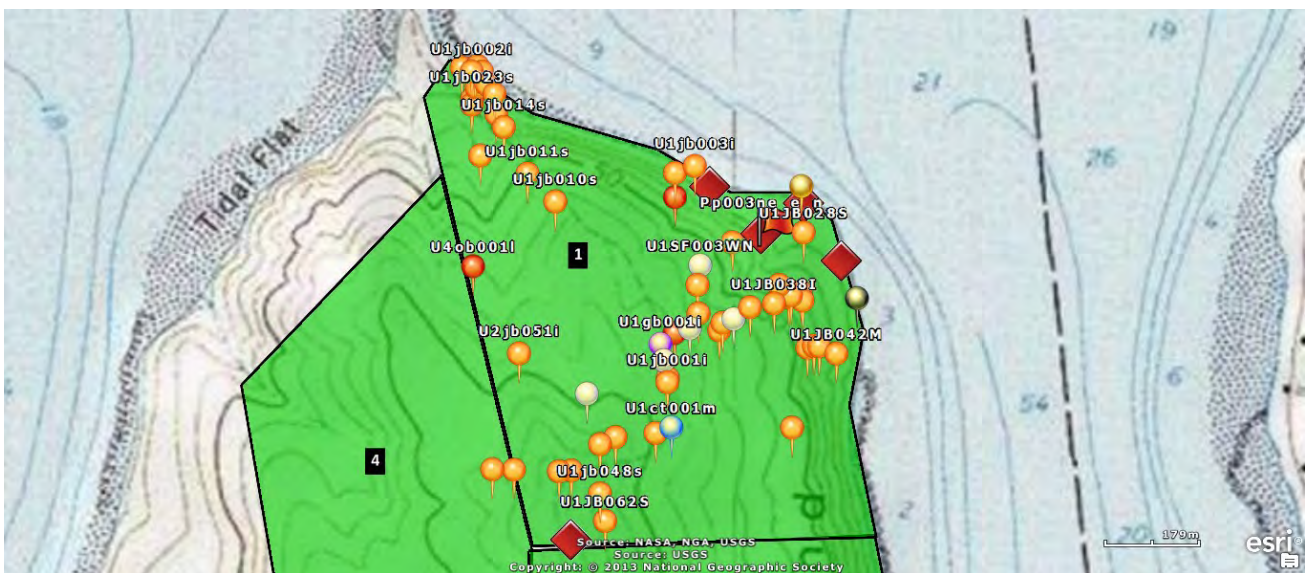
On Sears Island, we addressed quantitative sampling by deciding to replicate the plot sampling done during our professional NRI in order to assess changes over time. This in essence created permanent study plots which we could locate using latitude and longitude data. We hired a professional biologist who helped us develop this strategy for doing quantitative assessment of biodiversity. The biologist then re-sampled the plots with student assisting. It was decided that repeating the NRI sampling using the same method and in the same locations was the simplest way to accomplish long term, quantitative monitoring given the limited resources available. The student interns that assisted with the plot monitoring learned valuable skills and got the work done in a cost-effective manner.

Mapping

Maps are essential for collecting and sharing information about land, and also as a tool for stewardship planning and management. As mentioned previously, descriptive information often includes location and area coverage, which are spatial information often best described with a map. These data can be collected digitally on site using global positioning systems (GPS) technology, and then stored on a computer. Other available data can also be layered into a digital map using geographic information systems (GIS) mapping software. Maps can also be produced by sketching onto printed maps or sketching graphically on computer maps. Or, a combination of all of these!



You may have staff and technology to produce sophisticated maps using professional GIS software such as ArcGIS, which can be used to document all types of spatial description to aid stewardship planning and on the ground management. Another option is to have professional GIS maps produced by a consultant cartographer. It is also possible to use GPS and simple, publicly available free software such as Google Earth or ArcGIS Explorer Desktop to do your mapping, however. Each of these options represent a cost scale that may be most appropriate to your organization.



This Sears Island map shows easement boundaries, topography, land management units and invasive plant stands (pin points), which were generated with a GPS unit. The map was done with the free mapping software ArcGIS Explorer Desktop. Another set of data, documentation photopoints (red diamonds), are shown as well. At a larger scale, the names of each GPS point feature are labeled.

Planning for Stewardship, Part 2: Describing Threats and Planning your Response

Prioritizing Threats for Management

Assessing threats is important in planning for stewardship in both the near and long term. Threats can be present and concrete such as vandalism, encroachment, or invasive plants or animals. They also include less concrete and more insidious impacts that may affect your property in less obvious ways but over a longer time period, such as increased pollution, nearby habitat fragmentation and climate change, to name just a few.

It is important in planning for stewardship management to prioritize these threats and decide which will receive stewardship actions to address them, when, and how those management actions will be implemented. Or in simpler terms, decide what problems you have and how you will begin to solve them.

Threat Areas that Should be Prioritized for Immediate Action

- Invasive Plants and Animals:
 1. New infestations just getting started
 2. Any invasive that is causing serious degradation of ecosystems, biodiversity or habitat
- Vandalism, Theft
- Overuse or misuse creating problems such as erosion or reduced biodiversity
- Non-permitted resource extraction
- Point source or non-point source contamination
- Non-permitted encroachment

Many of these will require detailed plans and subsequent management and monitoring that are specific to the particular threats to your site. Overuse issues can be addressed in infrastructure planning. The other area which merits systematic planning and management are invasive species. On Sears Island, invasive terrestrial plants were determined to be the highest priority for stewardship management, and a detailed plan was developed document the problem, control various species as well as to monitor for new infestations. As we focused on this threat in our initial management, this guide will offer a detailed view of our process of managing invasive plants.



Invasive Plants: A Major Threat

Invasive plants, if left unmanaged, can severely degrade the ecosystems of conservation land.

Stewardship will often involve work to find, document and remove these plants. Above: oriental bittersweet.

Documenting Threats: Invasive Species

In many areas, invasive plants are present on or near a conservation property. These may be upland plants, wetland plants, or aquatic plants. There may also be a threat or presence of invasive animals, including invasive forest pest insects that have the potential to kill all trees of a certain species or group of species. In any case, an important part of stewardship is watching for any new presence of invasive species and acting quickly if one is found. Another important stewardship activity is to look for and document invasive species already present on the property, which in turn informs a stewardship management plan to control them.



Invasive species, like other types of life, can be found and mapped through the varied observation methods mentioned on page 9. If time and resources allow, ideally a full survey of the land for these species should occur early in active stewardship. It is very worthwhile to use GPS technology to mark the locations of invasive species. In the photo above, students are using a GPS unit to mark a stand of invasive plants and to input other data such as the number of plants in the stand. A GIS map of invasive plants, for example, can be used to plan stewardship work days to remove plants, and the GPS unit can help stewards find the plants after the initial survey, as well as to return to the site for follow-up monitoring. The map can also show patterns of infestation that can help stewards to manage effectively, for example, identifying outlier patches to remove first. For invasive animals, check information available from state agencies for methods to search for and document an infestation as well as up-to-date information on threats in your area.

Invasive Plants

Steps to planning for invasive plant management:

1. Research species likely to be present or to infest your property. See the Resources section that follows for online resources. Most states have a list of invasive plant species and accompanying fact sheets.
2. Search the property and map locations of invasive plants. A systematic grid search of the entire property is ideal; but looking for them during stewardship activities and events can be a good start. This is a great activity to do with volunteers or students. Mark invasive plants in the field with bright marking tape if possible. Using a GPS unit or app to mark them as spatial data is highly recommended.

Steps to Planning for Invasive Plant Management, Continued

3. Stewardship managers and volunteers should be trained to spot and mark locations of invasive plants, in order to implement an **Early Detection Rapid Response (EDRR) strategy** to control invasives. In EDRR, visitors, stewards and volunteers should be educated in which species are likely to infest the property, what they look like, and the procedure to inform the stewardship managers. Many states have invasives Watch Lists that can be helpful. For Sears Island, the written plan for stewardship as well as the website contain guides to invasive plants to watch for on the island. There is also an online form to report observations. Many states also have a way to report and map invasive plants such as EDDmapS and ImapInvasives.

4. Plan for removal or control of the most invasive plants if they have not spread so much as to make control impractical. You will want to choose methods as well as priorities by consulting with state invasives specialists or professionals with expertise in invasives. Your organization will need to make a basic choice about whether or not to use chemical controls, which will have a large impact on methods, costs and time to control invasive plants.

These general steps should also be applied to invasive animals, particularly eminent threats such as approaching invasive forest pest insects.

Resources for Invasive Species (some are specific to Maine)

Maine Natural Areas Program Invasive Plant Fact Sheets, at http://www.maine.gov/dacf/mnap/features/invasive_plants/inv sheets.htm Invasive and potentially invasive plants list for Maine, with fact sheets for each. Most states have a similar site with fact sheets on their invasive species.

Invasive.org, at <https://www.invasive.org/index.cfm> A great starting place, with numerous images of each plant, and concise, thorough facts on different species. Many links to other resources for each species.

IMapInvasives, at <https://www.imapinvasives.org/> IMap Invasives is an invasives tracking program now available in Maine and a number of other states, with many tools and data resources to help communities and land owners and managers plan for invasives control.

Maine Volunteer Lake Monitoring Program at <https://www.mainevlmp.org/> **For aquatic invasive plants** – Many opportunities to volunteer, and they offer some excellent training workshops and materials on aquatic invasives.

Waldo County Soil and Water Conservation District website on Invasive Species Resources at <https://waldocountysoilandwater.org/resources-for-invasive-species/> provides a portal to many invasive species links.



First, find and map your invasive plants.

Japanese barberry, pictured above, was found to be the primary invasive plant present on Sears Island. After searching the entire conservation area with student interns mapping this and other invasive plants, we were able to determine where the outermost plants were and to begin to reduce the infested area by removing those bushes first. As Friends of Sears Island has decided to use organic management, the plants were removed by cutting off the stems and digging out the roots.

Mapping Invasive Plants with GPS and GIS Technology: Sears Island Protocol

The following is an excerpt of the Sears Island Stewardship Management Plan which explains the protocol for naming GPS points in a manner that also provides important information. The naming protocol allows for a variety of population assessments and control efficacy analyses. Management Units are generally helpful in planning stewardship activities where invasives are spread over a large area, and the Sears Island protocol includes a code for these units. For other organizations, the initial location code could indicate a preserve or site.

Invasives Mapping

GPS Point Name Protocol for Invasives

When invasive plants or stands are found, they will be marked as a point feature using a GPS unit. The point name will provide important information about the stand, and each point will be name as follows:

2 letter location code	2 letter species code	unique stand #	stand size
U1	gb	002	s

So gps point named “**u1gb002s**” is a small stand of glossy buckthorn in Management Unit 1. Naming gps points with these codes reduces deskwork in data entry and notes and can be used to quantify a range of total population in an area, as well as to plan management, monitor changes and evaluate effectiveness of control management.

Specific codes to use:

Location Code:

Two character code: u1 = u (mgt. unit) 1 (one)

Species Code (codes reference common name, often first letters of name)

gb	glossy buckthorn
jb	Japanese barberry
ob	oriental bittersweet
bh	bush honeysuckles
mr	multiflora rose
ao	autumn olive
gm	garlic mustard
jk	Japanese knotweed
rc	reed canary grass
ct	Canada thistle
gv	garden valerian (heliotrope)
hb	Himalayan balsam
ph	phragmites (common reed)

Stand Size Code:

Stem Count Species

i	individual	1
s	small	2-20
m	medium	21-50
l	large	51-100
v	very large	>100

Plants that cannot be counted (plants like grasses) are characterized by area:

s	small	1-5 sq m (1-50 sq ft)
m	medium	6-20 sq m (50 -200 sq ft)
l	large	21-100 sq m (200 -1000 sq ft)
v	very large	> 100 sq m (> 1000 sq ft)

Beyond Invasive Plants: Other Vegetation and Habitat Management

Often natural landscapes have varied cover, such as fields, grass areas, shrubs and forest. Besides its aesthetic and historic appeal to people, such variety can be very supportive of a diverse ecosystem with healthy wildlife populations. For both of these reasons, it can be a good management choice to maintain different types of landscapes through mowing, cutting, timber harvest, grazing, or other means. If open areas existed historically and you have a goal to maintain a historic appearance coupled with habitat management, then you can develop a mowing or cutting regimen that is supportive of pollinators and wildlife while maintaining open areas.

In its simplest form, vegetation management for wildlife habitat encourages varied sizes and types of vegetation, which in turn support many species. A management regimen that is staggered in terms of area and time frames can produce varied cover, and potentially help control invasive plants as well. A mowing, burning (depending on the habitat) or brush cutting regimen can thus create fields with short and tall grass and forbs and shrub areas depending on the frequency of cutting or burning. Treatments that produce varied edges between open areas and forest land will also enhance habitat. If possible, cutting should occur once per year at most, and between November and March, to promote native plants and protect nesting areas. In the forest, removing trees can create gaps which can increase forest diversity and health. Trees can be removed as harvest, or simply cut and left in place. The choices for how to manage for habitat and biodiversity are best guided by professional resource managers such as foresters or ecologists. In any landscape, a goal of habitat conservation should be a part of stewardship. This is a complex topic that is beyond the scope of this guide, but the resources listed below can be a good start on understanding this topic.

In addition, ongoing vegetation management is needed with almost every type of public access infrastructure, and stewardship managers should plan on devoting time to clearing vegetation near trails and facilities. Plants with potential for contact dermatitis (mostly native plants that can appear near many trails) may need to be managed for containment, spread, or even eradication. Vegetation management should be carefully incorporated in the written management plan and in the seasonal tasks for land stewards.

Resources for Vegetation and Habitat Management

Biodiversity in the Forests of Maine, by Flatebo et. Al. Produced by the University of Maine Cooperative Extension, available online at <http://www.upperstjohnriver.com/BFM.pdf>

Focus Species Forestry, by Robert R. Bryan. Produced by Maine Audubon. Available online at <http://forestsynthesis.com/files/FocusSpeciesForestryMaine.pdf> as of this writing.

Island Press, <https://islandpress.org/books> . This publisher produces many very useful guides to ecological land management.

Your local Soil and Water Conservation District and the Natural Resources Conservation Service, along with the state forest service can be an excellent resource for land management guidance, as can **university cooperative extension offices and state natural areas programs**.

Planning for Stewardship, Part 3: Public Access and Engagement

As we mentioned early in this guide, land stewardship very often includes public engagement, which in turn fosters awareness and concern for the land and its ecosystems. The public can be engaged in many ways, including:

1. **Public access for recreation**
2. **Education and learning activities on and off site**
3. **Volunteering on stewardship projects**
4. **Volunteering for organizational tasks**

Stewardship planning is a prime opportunity to look closely at each of these areas and plan for engaging the public. Public access and recreation dovetail with planning for physical infrastructure such as trails, bathroom facilities and parking. Anytime conservation or public lands can be used for education and outreach, it is possible to plan worthwhile programs that create public support for your organization as well as general environmental awareness.

Public Access: Trails

There are often existing rules or uses on a conservation property that will guide the planning for public access infrastructure. Likewise, if public access is allowed, then it is a very important part of stewardship to guide that access and use through well designed and maintained facilities and trails. Stewardship planning often involves major decisions about trail creation or improvement as well as ongoing maintenance.

The following considerations should inform a decision about construction of new trails:

1. Are there important features that visitor should have access to that would be better protected and safer with a maintained trail? This may include features that are now frequently accessed by visitors regardless of the presence of trails.



Student education can be a part of stewardship.

The high school class pictured above visited Sears Island for a whole semester during a multi-disciplinary course focused on the island.

Public Access and Engagement: Trails

Considerations which should inform a decision about construction of new trails, continued:

2. Are there manpower and material resources available to construct and maintain a trail?
3. Is the planned trail within the permitted parameters of the conservation easement or the permissions granted by the landowner on non-easement lands?
4. Will the planned trail negatively impact natural resources, including scenic, recreational resources, ecological function or diversity?

New Trail Construction Procedure

The following are general steps to follow in constructing a new trail. The actual process is very involved, and will require seasonal goals and significant labor by staff and volunteers to construct a new trail. We highly recommend that staff, hired youth corps or a consultant plan and implement new trail construction. The books listed on the next page can provide an excellent start on understanding how to create well engineered trails.

1. Impact and feasibility assessment
2. Trail corridor mapping and marking (GPS, flagging)
3. Clearing trail right of way
4. Engineer treadway: erosion control, rock structure, benching, bridging, structural elements required for different types of accessibility and use
5. Add permanent directional marking and signage
6. Create spatial data and maps of the trail

Where possible, stewards can develop collaborations between groups as a part of new trail creation, such as involving area environmental or trails groups, local municipalities and schools.

Accessibility and Use

New or existing trails may be constructed or altered to provide for new user groups. These may include:

1. Changes to accommodate skiing, including surface changes and cleared right of way and overhead distances, or groomer access.
2. Changes to accommodate and direct mountain biking traffic.
3. Changes to allow or prevent horse traffic.
4. Changes to accommodate or exclude vehicular traffic.
4. Changes to increase accessibility to disabled persons on selected trail segments, up to and including full ADA construction.

Resources on Trail Building and Maintenance

[AMC's Complete Guide to Trail Building and Maintenance](#), by the Appalachian Mountain Club. 2008.
[Lightly on the Land: the SCA Trail Building and Maintenance Manual](#), Student Conservation Association. 2005.

The following is an excerpt from the Stewardship Management Plan for Sears Island on trail maintenance.

Maintenance of these trails should occur on a yearly basis to complete the following:

1. Early spring inspection and removal of debris. Trails should be formally monitored during this inspection with a Trail Monitoring Report form (Appendix D). On the form, problems with marking and signage, trail surface, trail structures, obstructions, unauthorized activity and evidence of different types of use should be noted. Invasive species or unusual features should be noted on the form as well.
2. The treadway (walking area) and right of way (managed areas adjacent to the treadway) should be cleared to the correct width and height according to its common use. For our 4 current maintained trails, the primary use is hiking. For hiking trails in high use areas with a wide variety of walkers, the cleared trail right of way should be 4 feet in width and 8 feet in height. The right of way should be kept free of woody vegetation and ground cover above 6 inches in height, and should be free of branches to a height of 8 feet. The treadway should be a minimum of 24 inches in width and be free of all debris and plant growth except grass type cover. The treadway can be selectively wider in areas to allow for double file walking; in those areas the treadway should be 36 to 48 inches in width and the right of way should be 6 feet wide including the treadway. On more remote areas such as the Blue Trail, a backcountry type trail may have a treadway width of 16-18 inches and a right of way 36 inches wide.
3. Waterbars made of earth, wood or stone should be added on any trail sloping more than 2 percent or where water flow is erosive.
4. No trail route should be on a grade that exceeds 10 percent. When the trail crosses a side slope, a full bench cut should be made to create a somewhat level treadway.
5. Trail construction should be done following *BMPs for Erosion Control During Trail Maintenance and Construction* (NH Bureau of Trails, 2004) and other resources including the *AMC Complete Guide to Trail Building and Maintenance* and *Lightly on the Land: The SCA Trail Building and Maintenance Manual*. Stewardship managers and others leading volunteer or paid trail crews should be well versed in trail construction methods.
6. Bog bridges should be added to all areas where soil is persistently moist. Widened walk around areas should be brushed in or revegetated where possible. The need for bog bridges can be noted in the spring monitoring survey for each trail.
7. Trail signage should be checked (Can someone follow the trail who is not familiar with it?) and markings, trail head and directional signs fixed, replaced or added.
8. Plants with potential to cause contact dermatitis such as poison ivy and cow parsnip should be removed from the trail right of way. In high use areas, control management may be used on these species. Control of these plants should be done with protective clothing and face protection.

Trail building training with the assistance of stewardship staff of Coastal Mountains Land Trust is another option for guiding trail maintenance and construction on Sears Island.

Public Access and Engagement: Facilities

Facilities are constructed and maintained to ensure safe public access to the a property while safeguarding natural resources. **Stewardship planning should specify inspection of existing facilities and specifics of repair and maintenance. A general management plan or a strategic plan may specify criteria for expanding facilities.**

Facilities can include:

Permanent or portable toilet facilities
Parking areas, bike areas and racks
Entries and barriers
Accessibility features such as stairs, ramps, boat launches
Picnic areas
Shelters
Outdoor classroom structures
Interpretive signs, kiosks, visitor information centers

The following considerations (similar to those for new trails) should inform a decision about construction of additional facilities:

1. Are there important features that visitors should have access to that would be better protected and safer with a structure or facility?
2. Are there resources which need protection that require a structure or barrier to prevent public access?
3. Are their information or interpretive needs or goals that could be met by addition of a facility?
4. Are there resources available to construct and maintain the new facility?
5. Is the planned facility within the permitted parameters of the conservation easement or the permissions granted by the landowner of non-easement lands?
6. Will the planned development negatively impact natural resources, including scenic, recreational or ecological resources?

Public Engagement: Education and Outreach

Friends of Sears Island has developed an outreach and education program which illustrates how conservation land can be used to educate the public about the environment, build community and accomplish stewardship goals.

Here are some guidelines we developed for building public outreach and education around land stewardship:

1. Create specific opportunities for members of the public to volunteer for a variety of stewardship tasks including trail work, clean up, maintenance, invasives management and biological monitoring. Ideally, outreach efforts will work towards developing a core group of dedicated volunteers for stewardship activities.
2. Stewardship efforts should integrate with local schools and colleges in a variety of activities both on and off the site, including basic stewardship tasks as well as on-island and classroom learning activities that further learning goals for students and schools. Special programs for school-age students should be a part of the educational experiences offered.
3. Each year, events can be offered to teach visitors about various aspects of the land or which provide organized recreational opportunities.
4. A program of citizen science can provide many opportunities for public involvement with monitoring and ultimately, provide a resource for people to learn about the land.
5. Providing public outreach will promote public involvement in stewardship. Any activities where volunteers might assist can be communicated through the organization website, local publications, newsletters and social media.



Citizen science is stewardship.

Above, a survey of stream macroinvertebrates on Sears Island is adding to our biodiversity baseline as well as providing information on the water quality of the stream. This sampling occurred as a public volunteer event that also was used to train college interns.

Part 4: Putting It Together: Written Planning and Documentation

Keeping Track: Record Keeping and Evaluation

Land stewardship involves a lot of moving parts, and keeping multiple activities and projects on track and following a management plan requires good planning and routine record keeping on activities. Having a seasonal task list with time frames, leaders, and other information is very worthwhile. The seasonal task list, or work plan, can arise from an evaluation checklist as shown on page 26. It is also a good way to keep volunteers and field managers on track with professionally planned stewardship management.

Besides task completion records, the other essential component of record keeping is documentation of conditions on the land. This begins when the first description of conditions, the baseline, occurs, as described earlier in this guide. As information on biodiversity and ecosystem conditions is collected through study and monitoring, consistent records preserve vital long term data on the ecological and system health of the property.

In summary, some of the records you should plan on keeping include:

1. A record of all stewardship management activities, dates, times, personnel involved (this can also provide a record of volunteer and staff hours). Subsections can be created for invasives management, monitoring, trails, etc.
2. A baseline natural resource inventory document with sections on topography, soils, natural communities, significant or sensitive features, biodiversity lists for various taxa (can include species present, other information on populations), invasives, threats, conservation target species, and more.
3. A master database of all natural resource data, which includes original baseline NRI data but also ongoing data including citizen observations, quantitative sampling data and monitoring data as well as spatial data. Data can be kept in spreadsheet form.
4. Any quantitative monitoring data such as plot sampling should be kept in a consistent format and together with related sampling data. Often, it is good to have a blank form (electronic or paper) that is filled out in the field, that matches a computer record form such as a spreadsheet. This can be archived in the master natural resource database (#3 above).
5. An evaluation checklist that is structured around the goals and objective stated in a written management plan (See page 26).
6. Spatial data records that include GPS data and related files, which may be in GIS software formats.
7. Time sheets for paid staff and interns.

Putting it Together: A Written Management Plan

The previous sections of this guide can form basic components of a written stewardship management plan. The written plan becomes the manual for volunteers and land managers in the field, and can drive seasonal work plans.

The starting point of a plan is to state goals and objectives for your land management. The goals should reflect any land use rules already established, such as an easement requirements. Goals should also follow principles for sustaining and improving the conditions of the property, including its ecosystem health and functionality as well as abiotic features such as soil, wetlands, shoreline, land cover types. It should also include parameters for access and use features and more. The process of assessing your land as outlined earlier in this guide forms the basis for establishing your stewardship goals. Then, objectives can be stated for each goal; these are specific activities and work projects that will take place in order to accomplish the goal. From the Goals and Objectives, an Evaluation Checklist can be developed to document work completed as well as to make seasonal work plans.

As goals and objectives are central to the stewardship planning process, we are including the full set of goals and objectives developed for the Sears Island Stewardship Management Plan below as an example.



An overarching goal for stewardship planning is to maintain or create healthy, diverse, resilient conditions for nature and human communities.

The following goals will be referenced in the detailed management plan that follows. Objectives denote major tasks or projects to be completed to accomplish a goal.

- 1. Stewardship activities will maintain the health and functionality of the natural communities through the preservation of habitat features and species diversity.**
- 2. Stewardship activities will monitor the island for changes over time in both biotic and abiotic factors.**

Objectives for Goals 1 and 2:

2.1 Monitoring protocols will be established and implemented that generate species lists and other data about biodiversity, natural communities, and other factors such as threats to these elements.

Continued

The Written Management Plan: Goals and Objectives

Sears Island Stewardship Plan Goals and Objectives, Continued

3. Stewardship activities will observe and assess the condition of rare communities and sensitive areas and will respond to any threats with management actions that reduce or remediate such threats.

Objectives: Objectives here also apply to Goals 1 and 2.

3.1 Critical habitat features, rare natural communities, rare species and sensitive areas will be identified, mapped and described qualitatively.

3.2 Current conditions of these features will be further documented by photo points.

3.3 Monitoring will include a site conditions index and a threat assessment (Appendix C).

3.4 A threat response matrix will be implemented for existing threats.

4. Stewardship activities will implement a carefully planned, effective, long term campaign to control invasive plant species threats on the island. The plan will include methods for monitoring the island for invasive species, control methods to eliminate invasive species, and a long term plan for systematic monitoring of invasive species, as well as an early detection and rapid response (EDRR) plan for eliminating new infestations.

Objectives:

4.1 A grid survey of entire easement will be completed every 6 years beginning the first year of plan implementation.

4.2 Terrestrial invasive plant stands will be characterized and mapped with GPS and GIS tools according to the protocol outlined in this management plan.

4.3 FOSI stewards and volunteers will complete removal or containment of all invasive plant stands using primarily mechanical and hand methods.

4.4 A long term invasives monitoring plan will be implemented which will include an Early Detection Rapid Response (EDRR) plan, the grid survey, and revisiting infestations using GPS point data.

5. Stewardship activities will create and maintain a network of trails which provide access to the major features of the island. The network of trails will be carefully designed, constructed and maintained in a way that reduces visitor impacts on the island. The trail system will include footpaths, multiple-use trails for hiking, snowshoeing, cross-country skiing, and trails designed for serving those with disabilities.

Objectives:

5.1 Identify trail repair and enhancement needs on existing trails through a survey each year.

5.2 Repair and improve existing trails via regular maintenance volunteer events or via cooperative work with outside organizations.

5.3 Create an over all trails plan to include locations, target users and construction parameters for the entire system, including new trails to be added within the time frame of this Plan.

Sears Island Stewardship Goals and Objectives, continued

6. Stewardship activities will construct and maintain facilities necessary to enable safe public access that is consistent with the protection of natural and scenic resources, including a welcoming entrance for visitors, sufficient parking area, low impact toilet facilities, picnic areas, educational/ informational kiosks, trail signs and beach and water access improvements that protect the fragile resources of the waterfront area and the high quality of the intertidal and marine waters. Additional infrastructure such as an education/visitor/maintenance facility may be considered.

Objectives:

6.1 Maintain existing facilities, with a yearly assessment and plan for repair of any degraded facilities.

6.2 Identify additional needs for facilities, outline plans for construction if any, and proceed with construction or improvement according to seasonal work plans.

6.3 Outline a process for decision and planning regarding additional major infrastructure such as an interpretive or visitor center and education facility. The development of a plan to construct such a facility will require an addendum to this plan.

7. Stewardship activities will include activities designed to enhance public awareness of coastal and island resources through community involvement and environmental education.

Objectives:

7.1 Each year, opportunities for volunteers to participate in stewardship and related learning activities will be offered to the public.

7.2 Stewardship activities will integrate with local schools' core curriculum objectives/ outcomes via workshops on ecology and data literacy that use Sears Island as a learning resource and provide important data about island conditions.

7.3 A program of citizen science will be implemented that provides an opportunity for the public to contribute relevant data about island conditions and biodiversity. Monitoring and citizen science activities will in turn provide information resources for teachers and learners.

8. Our stewardship program will include protocols in written form which will also be presented in public volunteer workshops and field sessions, as well as via a guide or guides to be published to assist others in stewardship planning.

9. Stewardship activities will include collaborative ventures with area non-profits, schools and other groups.

Evaluating Stewardship: An Evaluation Checklist

The goals and objectives in the written stewardship plan can form the basis for evaluating how effectively the plan has been implemented. One method for doing so is to create an evaluation checklist that allows you to set up a schedule and task list based on the objectives. The evaluation checklist forms the basis for a seasonal work plan and a record of activities completed. Here is a section of an Evaluation Checklist based on some of the written goals and objectives in the Sears Island Stewardship Management Plan (These are referenced in the number for each line item). This is generated in a spreadsheet, and rows can easily be added anywhere there are additional tasks or subtasks needed (subtasks not shown here).

Objective Number and Related Actions	Target Start and End Date	Activity	Date Held	Personnel, Notes
Monitoring Actions				
2.1 Post Baseline Monitoring Points				
2.1 Species Presence Observations				
3.1 Special/Sensitive Features Mapping and Description				
3.2 Special/Sensitive Features Photopoints				
3.1 Conservation Targets Mapping and NRI Database entry				
3.1 Cultural Features Mapping and Description				
3.2 Cultural Features Photopoints				
3.3 Threat Assessment				
3.3 Invasive Animals Survey				

In Conclusion: Next Steps

After assessing your land and describing the property, a written stewardship plan should be created that outlines your goals, objectives and tasks to care for the landscape. An overarching goal for stewardship planning is to maintain or create healthy, diverse, resilient conditions for natural and human communities. The next step is to put your plan into action, with on-the-ground stewardship. To begin your practical work planning, we recommend that you use the excellent guides to stewardship work now available through the Stewardship Network of New England, at naturegroupie.org.

Some Useful Resources

Appalachian Mountain Club. 2008. **AMC's Complete Guide to Trail Building and Maintenance.**
This guide teaches the essentials of trail building.

Bryan, Robert R. **Focus Species Forestry.** Produced by Maine Audubon. Available online at <http://forestsynthesis.com/files/FocusSpeciesForestryMaine.pdf> as of this writing.

Bugwood.org. **Invasipedia.** Retrieved from <http://wiki.bugwood.org/Invasipedia>.

Dibble, Alison C. and J. Maier. 2011. **Natural Resource Inventory: Conservation Lands, Sears Island.**

Elzinga, Caryl L., Daniel Salzer and John W. Willoughby. **Measuring and Monitoring Plant Populations.** US Bureau of Land Management.

Flatebo, Gro et. Al. **Biodiversity in the Forests of Maine.** Produced by the University of Maine Cooperative Extension, available online at <http://www.upperstjohnriver.com/BFM.pdf>

Gawler, Susan C., and Andrew Cutko. 2010. **Natural Landscapes of Maine: a classification of vegetated natural communities and ecosystems.** Maine Natural Areas Program.

This guide is indispensable for describing your natural areas as a part of your resource inventory if working in Maine. Books specific to Vermont and New Hampshire are also available.

Maine Department of Agriculture, Conservation and Forestry. **Imap Invasives Program.** Retrieved from http://www.maine.gov/dacf/mnap/features/invasive_plants/imap.htm.

Maine Department of Agriculture, Conservation and Forestry. **Invasive Plant Fact Sheets.** Retrieved from http://www.maine.gov/dacf/mnap/features/invasive_plants/invsheets.htm.

McKeage, Aleta. 2015. **Natural Resource Inventory Methods for Conserved Lands: An Overview.**
Contact GreenWays Consulting Group at www.greenwaysecocenter.org for a copy.

Morrison, Michael. 2014. **Wildlife Restoration: Techniques for Habitat Analysis and Animal Monitoring.** Island Press.

New England Wildflower Society. **Go Botany.** Retrieved from <https://gobotany.newenglandwild.org/>.

Rew, Lisa and Monica Pokorny, eds. 2006. **Inventory and Survey Methods for Nonindigenous Plant Species.** Montana State University Extension.

Sayre, Roger et. Al. 2000. **Nature in Focus: Rapid Ecological Assessment.** The Nature Conservancy.
One of the best short guides to resource inventory.

State of New Hampshire Department of Resources and Economic Development. 1994. **Best Management Practices for Erosion Control During Trail Maintenance and Construction.**

Useful Resources, Continued

USDA Forest Service. **Invasive Plants Index**. Retrieved from <http://www.fs.fed.us/database/feis/plants/weed/index.html>.

Student Conservation Association. 2005. **Lightly on the Land: the SCA Trail Building and Maintenance Manual**. **Another essential guide for trail building and maintenance.**

Organizations

Friends of Sears Island, www.friendsofsearsisland.org

Contact us for further assistance or discussion regarding our stewardship planning and organizational model.

The Stewardship Network of New England, Now known as **Nature Groupie**, www.naturegroupie.org.

Many valuable guides to stewardship available as free downloads. Other online organizing and training tools available. See also **The Stewardship Network** (Great Lakes region), www.stewardshipnetwork.org.

GreenWays Ecology Center and Consulting Group, www.greenwaysecocenter.org.

Non-for-profit consulting services in environmental planning and management in the Midcoast Maine region.

Island Press, <https://islandpress.org/books>

This publisher produces many useful guides to ecological land management and other environmental topics.



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