

MONHEGAN FOREST

Stewardship Management Plan

Monhegan Plantation, Lincoln County, Maine



Shoreline forest near Christmas Cove

prepared for:

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This *Stewardship Management Plan* describes forest conditions on the 380-acre Monhegan Associates ownership on Monhegan Island, Maine, and provides recommendations for its management. It provides the Associates with a tool to better understand the forest, and to make informed decisions to improve forest health.

The plan seeks to: (1) define ownership objectives, (2) evaluate current natural resource conditions; (3) describe desired future conditions, and (4) outline recommended activities to achieve ownership goals.

ACKNOWLEDGEMENTS

Bill Livingston of the University of Maine and graduate student Richard Dyer provided invaluable information and assistance with this plan, including historical background, forest type classifications, and tree and vegetation inventory data.

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EXECUTIVE SUMMARY

A *Stewardship Management Plan* was prepared for the 380-acre Monhegan Associates ownership on Monhegan Island, Maine in January 2005, describing conditions of the Monhegan Forest and presenting recommendations for management.

Background and History

The Monhegan Associates ownership includes most of the undeveloped forestland on Monhegan Island, representing two thirds of the island's total land area. The ownership is comprised of numerous lots acquired over many years, beginning with initial purchases by the Edison family in 1929, and continuing to the present.

Human land use history has played a major role in influencing the makeup and condition of the present Monhegan forest, especially the aggressive clearing of forest for fields and pastures in the 1800s. By 1910 grazing became unprofitable, and open pastures reverted to forest. As this forest aged in the 1980s and 90s its health declined, and trees became increasingly susceptible to wind, insects and disease; invasive exotic species, especially Japanese barberry, took root and spread.

Ownership Objectives

The primary ownership objective is to permanently preserve and protect the “wild-lands” of Monhegan. Natural processes are meant to prevail, and human manipulation of the forest is strictly limited. An invasive species control program was begun in 2003.

Resource conditions

Bill Livingston from the University of Maine studied forest health and land use history in 2002-3. His theory was that today's forests on Monhegan were shaped by the intensity of past agricultural use — how recently a site was open land, and how long it had remained cleared. Livingston's delineation of forest types compared forest cover in the years 1872, 1922, and 2003. A nearly equal proportion of the ownership is in mature spruce, maturing mixedwood, immature mixedwood, and early successional forests. Unforested areas total 70 acres (18%). White spruce mortality and invasive species encroachment are greatest in areas with a long agricultural history (i.e. youngest forests), while the mature red spruce forest is more resilient to these threats.

The desired future condition is for mature red spruce forest to become more widespread, Hardwoods and younger stands should be retained, and streams, wetlands, and other elements of biodiversity should be protected.

Additional findings are presented concerning access and trails, property boundaries, forest health, historic and cultural resources, legal restrictions, Rare and Endangered species, recreation and aesthetics, soils, streams and riparian areas, and wildlife habitat. An appendix includes a tax lot summary, plant species lists, a MNAP natural areas checklist, a MHPC report, and map references.

Recommended Actions

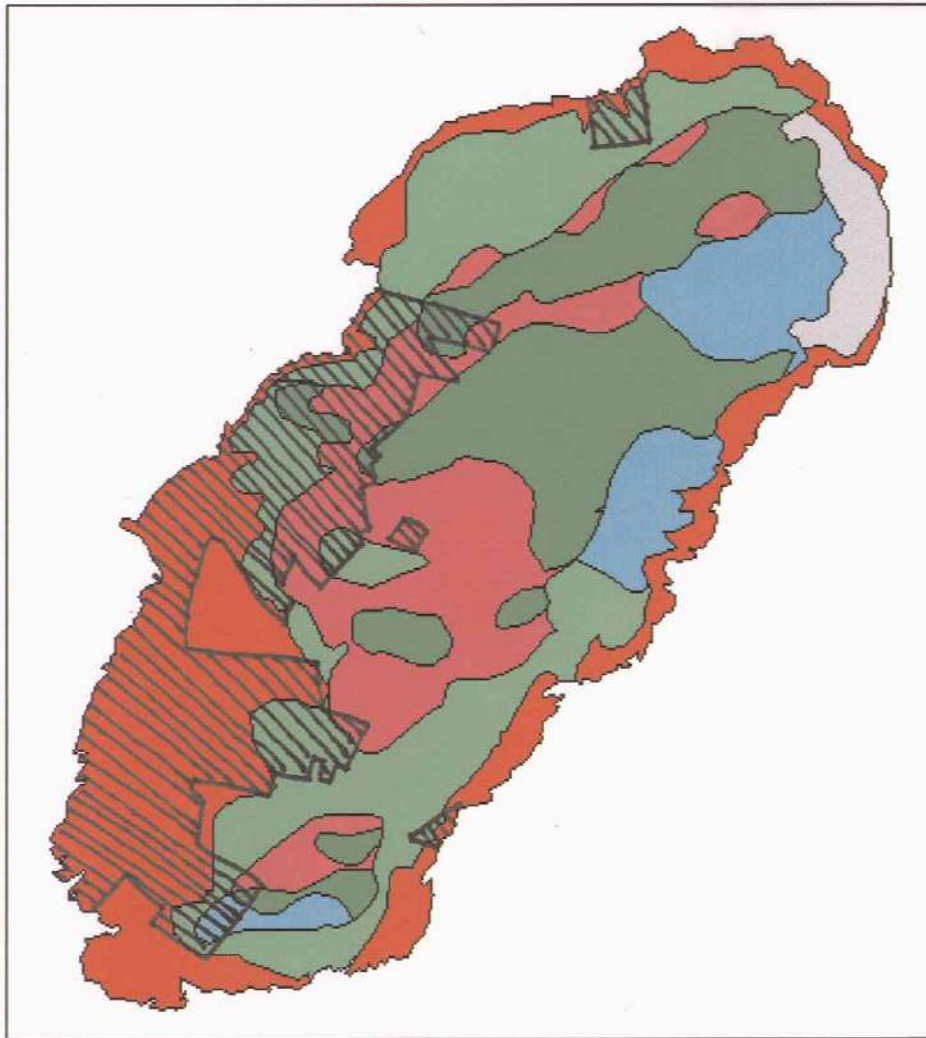
Recommendations include: continued invasive species control; trail maintenance and user education; and marking property boundaries. Operational details and a 10-year schedule of activities are presented. Invasives control should initially target sites with easy and safe access, a large barberry population, and where a component of vigorous native species can quickly reclaim the site after treatment.

Stratified Map

Monhegan Forest
Monhegan Island, Maine



SCALE: 1"= 1425'



Legend

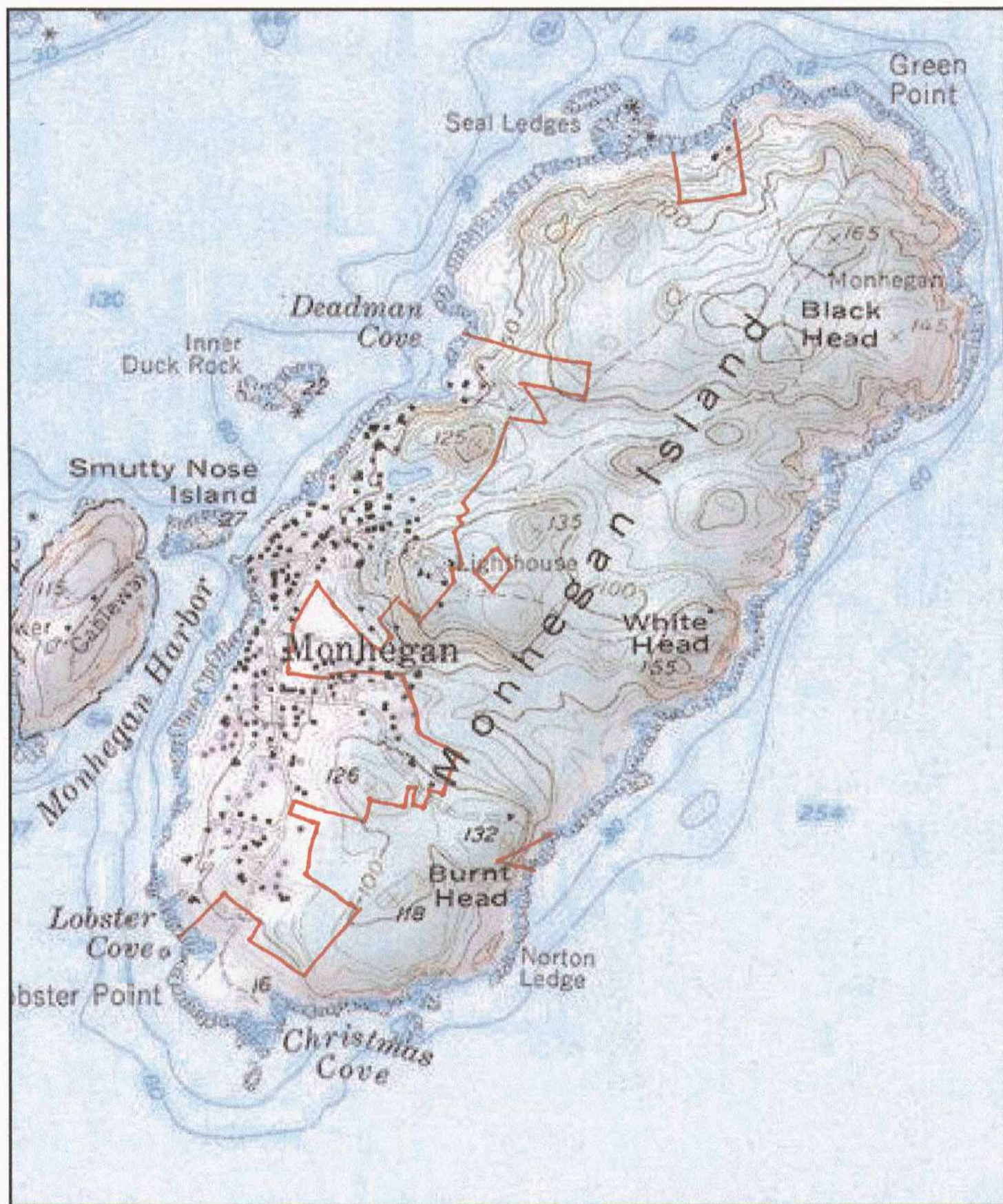
Strata	1873	1922	USGS
1 	forested	forested	forested
2 	forested	cleared	forested
3 	cleared	forested	forested
4 	cleared	cleared	forested
5 	cleared	cleared	cleared
6 	?	?	forested

 other owners

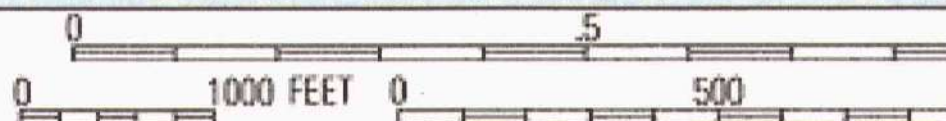
MARK MILLER
CONSERVATION FORESTRY
CAMDEN, MAINE
DECEMBER 2004

Mark Miller

Map detail from Livingston and Dyer, 2003
and Monhegan Tax Maps,



MN 17° ★ TN



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com)

BACKGROUND

The Monhegan Associates ownership includes most of the undeveloped forestland on Monhegan Island, as well as a number of small and mostly unforested nearby islands, rocks, and ledges. The current ownership totals 380 acres, representing nearly 75 percent of the total land area of Monhegan Island.

Monhegan Associates was formed in 1954 to protect the forests and open spaces of Monhegan Island. This organization was the outgrowth of earlier land acquisition efforts by Theodore Edison, who first came to Monhegan as a child in 1908. He purchased his first Monhegan parcel¹ in 1929, and was willed a larger parcel by his aunt in 1946. Property was slowly added to the Associates ownership, with gifts and purchases continuing to the present time.



Stonewalls in the forest attest to a history of agriculture

The land use history of Monhegan has played a major role in influencing the makeup and condition of the present forest. Pollen records show that a spruce-fir forest dominated Monhegan Island for most of the past two thousand years. Human history from the first Native Americans (4000+ years ago), to the first European observations of Monhegan in 1605, and through the 1780s is not well documented, though fishermen and others were likely infrequent visitors to the island. It wasn't until the late 1700s that the first post-Native permanent settlements were established. Island forests were aggressively cleared for fields and pastures throughout the 1800s, and at the dawn of the 20th century little of the original forest remained. By 1910 grazing had become unprofitable, and many open pastures were left to revert to first weeds, then shrubs, and later trees.

The late 1800s also saw the beginning of a new form of use, that of summer residences and recreation. A small summer colony began in 1895, by people who valued the open spaces, natural beauty, and invigorating setting of this remote island outpost. Monhegan's popularity grew steadily over the years, both among families who returned annually for the summer, and increasingly the 1980s and 90s by "day-trippers" and overnight guests.

Other natural factors have shaped the Monhegan Forest. In the 1950s deer were imported to the island. Lacking predators, the herd quickly multiplied. By the 1980s the deer population had exceeded the island's limited carrying capacity — small and emaciated deer had browsed nearly all vegetation down to the ground. The 1990s saw Lyme Disease, carried by deer ticks, become widespread. This human health risk led to the decision to remove the deer herd in 1998. Forest

¹ A strip of land running from the Monhegan Road to Burnt Head and Gull Rock.

health also declined in the 1980s and 90s, as the aging spruce forest became increasingly susceptible to wind, dwarf mistletoe, and spruce beetle. White spruce suffered heavy mortality.

Today, Monhegan enjoys a regional and even national reputation as a premier destination for thousands who come each year to enjoy the island's woods, trails, and spectacular cliff-top ocean views. A year-round population of between 60 and 75 swells in the peak summer months to over 500. Excursion boats operating out of Boothbay, New Harbor, and Port Clyde are capable of bringing an additional 500 day-use visitors.



Hikers on Black Head Trail

Monhegan Island can be divided into three geographic areas:

- Community areas — flat and gently sloping sites around Monhegan Harbor and in the southwest portion of the island, which contain most of the island's residences, businesses, and commerce.
- Highlands and Heads — the heights of Black Head, White Head, Burnt Head, and Lighthouse Hill, which are rocky, dry, and generally unproductive sites, which contain a mix of stunted spruce and hardwood amid rocky outcrops.
- Forested flats and old fields — variable sites of rolling terrain, with productive flats, rock outcrops, and moist lowlands, well suited for spruce and hardwood.

MANAGEMENT OBJECTIVES

Goals for the Monhegan Forest are detailed in Monhegan Associates' Bylaws and Certificate of Organization. The corporation was founded in 1954 to protect Monhegan's natural communities, and to acquire and hold land for this purpose, in perpetuity.

"to preserve for posterity the natural wild beauty, biotic communities, and desirable natural, artificial, and historic features of the so-called "wild-lands" portions of Monhegan Island, Maine, and its environs"

Further, *"an important objective of this corporation is to minimize ... any control measures or artificial 'improvements' in the substantially unimproved portions of the island ..."*

The preferred management approach is to allow natural processes to prevail, and as much as possible to keep the property as a "forever wild" preserve. Commercial timber harvesting is

prohibited, and human manipulation of the forest is strictly limited. Permitted activities have included trail construction and maintenance, minimal signage, and the removal of hazard trees.

The founders of Monhegan Associates wisely understood the need to address unforeseen future situations that might arise, and allowed for departures from the preferred “hands-off” approach to management:

“to make best possible overall progress toward this corporation’s objectives, it may from time to time actually prove advantageous and proper ... to depart in some respects ... from rigid adherence to some of its aims.”

This provision was the basis for a limited timber harvest to reduce fire danger the 1980s, and is the justification for current invasive species control measures. Exotic species were artificially introduced into Monhegan’s natural forest, and left unchecked have the potential to significantly and irreparably alter the island’s forest structure and processes.



Multi-aged spruce on Red Ribbon Trail

The specific goals of forest management are:

- Maintain the forest in a wild and “natural” condition
- Minimize spread of invasive exotic species
- Protect the Monhegan community from excessive wildfire risk

FOREST RESOURCE

Of the 380 total tract acres, 310 acres are currently forested, including mature conifer forest, maturing forest, young mixedwood forest, and early successional shrub/forest communities. The remaining 70 acres are unforested meadows, wetlands, and rocky headlands.

Elevations range from sea level to 165 feet near Black Head. The terrain rises gently from Monhegan Harbor to headlands and cliffs along the eastern shore, which drop precipitously over 100 feet to the sea. A variety of landforms are found in the interior, including wooded wetlands and marshes, rock outcrops, and exposed barrens.

Typical of coastal forests, white and red spruce are the most common trees, found in a variety of ages and stand types. Red maple, striped maple, yellow birch, white birch, quaking and big tooth aspen, mountain ash, balsam fir, white pine, and wild apple are also present. Mature stands comprise 27 percent of the ownership, with a nearly equal acreage of immature and young stands.

A conventional timber inventory was not warranted, since timber management is not an ownership objective. Livingston evaluated vegetation; his findings are summarized in Figure 2 and Table 3. A species list is found in Appendix B.

Table 1: Forest types based on cover in 1872, 1922, and 2003 (Livingston)

Type	1872	1922	2003
1	Forest	Forest	Forest
2	Clear	Forest	Forest
3	Forest	Clear	Forest
4	Clear	Clear	Forest
5	Clear	Clear	Clear
6	?	?	Forest

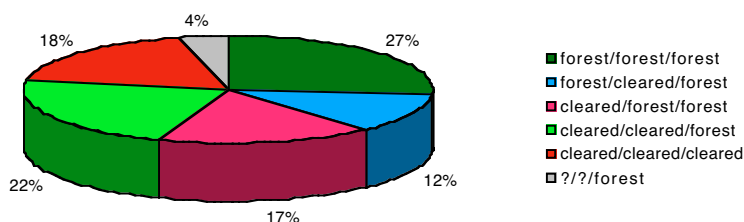
Livingston delineated forest types based on a matrix comparing forest cover in the years 1872, 1922, and 2003. The theory behind this classification is that forests on Monhegan were shaped primarily by the history and intensity of agricultural use — how recently a site was open land, and how long it had remained cleared.

Forest Types (see map on page 4):

1 – *Mature Spruce* (101 acres) – The center of the island and other protected locations have been forested since the mid 1800s. Some areas may have been perpetually forested. Red spruce dominates, except near wetlands where red maple is common. The age of dominant trees ranges from 120 to over 200 years. Patches of wind throw are common; openings are typically well stocked with younger spruce.

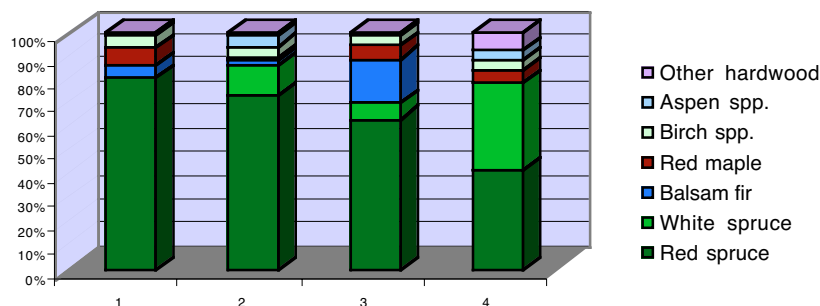
White spruce and balsam fir are uncommon. The sparse understory includes red spruce seedlings, and in many locations little else. Trees are healthy and stable; growth rates are very slow. Invasive barberry is generally absent.

Figure 1: Acreage by Forest Type



2 – *Immature Mixedwood Forest* (45 acres) – Forests that were cleared for pasture briefly between the late 1800s and the early 1900s. Pastures reverted to forest within the past 80 years or less, and are now dominated by white

Figure 2: Species composition by forest type (basal area)



spruce of variable density, and significant hardwood. Red spruce and balsam fir seedlings are increasing. Barberry is present at low levels.

3 – *Maturing Mixed Forest* (66 acres) Conifer and mixed conifer/ hardwood forests surround mature stands in the center of the island. These areas that have been forested for approximately 100 years, following natural reseeding of abandoned fields and pastures. Many areas are dominated by uniform white spruce; others contain a mix of species and ages. Red spruce is increasing in prominence, with seedlings and saplings locally common. Forest health concerns include dwarf mistletoe and spruce beetle mortality, and a variable growth of exotic barberry.

4 – *Early Successional Forest* (99 acres) – Pastures that reverted to forest 1922 and earlier typically regenerated to white spruce, which has suffered heavy mortality from dwarf mistletoe. Now sparsely wooded, with significant brush and shrub growth, trees are slowly regaining prominence. Thickets of persistent, well established barberry are present in several locations.

Table 3: Forest statistics (Livingston)

<i>Type</i>	<i>Basal Area</i>	<i>Avg. Diameter</i>	<i>Trees/acre</i>
1	171	8.6	397
2	137	7.4	434
3	123	8.9	214
4	72	7.7	180
5	n/a	n/a	n/a
6	n/a	n/a	n/a

6 – *Immature Softwood Forest* (15 acres) – Forests between Green Point and Black Head are dominated by spruce less than 80 years old. These stands have an uncertain history, but are generally healthy and well stocked. Windthrow is a persistent threat on this exposed location. Barberry is uncommon.

Non-Forest Areas:

5 – *Pond, wetlands and headland areas* (non-forest - 70 acres) – This type is comprised of various sites, including low-lying ground associated with “the Meadow”, swamps and wetlands, and unforested headlands. Clumps of white spruce may be present (and advancing in some areas), but most areas are dominated by grass, perennials, shrub, and brush. Barberry is scattered throughout upland areas, although plants are typically small.

BIODIVERSITY

The Monhegan Forest supports a relatively wide spectrum of native biodiversity. Due in part to its past history, the resulting variety of stand ages and species is greater than many other coastal Maine sites.

The plant inventory by Livingston and Dyer in 2003 identified 13 tree species, 45 herbs, 19 shrubs, and 8 ferns. Individual grass and sedge species were not identified beyond the family level, and represent many additional species. Animal species were not investigated.

Over time, and as old fields revert to forest; the biological richness of some areas will decrease, unless periodic disturbance retains early successional conditions. Natural disturbance by

wind and weather stress will assure that a rich variety of shrub and herb growth is perpetuated, especially on exposed locations.

Much of the island has old-growth forest attributes, including a closed canopy, large mature trees (120+ years old), and numerous snags and rotten logs. Especially valuable are any “super-dominant” trees, which provide structure, vertical diversity, and possibly nest or den cavities for wildlife. Particularly noteworthy are scattered large hardwoods, which more easily form wildlife cavities than spruce and fir.

Other important biodiversity features are “the Meadow”, Long Swamp and other wetlands and small streams across the ownership. Any year-round source of fresh water serves as a wildlife “magnet”. All wetland features are worthy of special protection.



Japanese barberry along Gull Cove Trail

The Monhegan Forest plays a key role in protecting the island landscape, comprising most of the island’s undeveloped land. Most other land is either developed, or within the island’s development zone.

Invasive Species

A major threat to the integrity of the island’s plant communities and ecosystem dynamics is the presence and spread of invasive exotic plant species. Aggressive exotic invaders often lack the parasites, competitors, and other regulating factors that kept populations in check in their native environment. In the worst cases, invasives have the ability to quickly colonize, spread, and dominate other plant communities, and can permanently alter native forest structure and processes.

Exotic plant species have become established in several island forest types in the past few decades. Japanese Barberry is the greatest threat, and now dominates several old pasture sites in the center of the island. It is also found as seedlings in numerous other locations. Birds readily spread seeds, and the heavily armed stems are unpalatable to most animals. Asiatic bittersweet, black swallowwort, and Japanese knotweed are secondary threats, found in scattered locations across the island. Japanese honeysuckle and deadly nightshade have also been noted on Monhegan².

² However, these were not encountered in the Livingston plant inventory.

DESIRED FUTURE CONDITIONS

Portions of the current Monhegan Forest provide a good model for desired future forest conditions. The property has a long history of conservation, which given ownership objectives, will be perpetuated.

- *Diverse species composition.*

Long-lived trees of all site-adapted species are present across the ownership. Red spruce should dominate most upland sites and well-drained flats, with white and yellow birch and red maple on moist sites. Minor species should be found throughout as appropriate to each site. A balance of age classes will best sustain diverse habitat values.



Spruce regeneration following blowdown, Black Head Trail

- *Resilience to disturbance.*

Wind, salt, drought, fire, and ice are the natural disturbance agents on this exposed island site. With the exception of fire (which must be controlled to protect life and property), all should be accepted as inevitable. A diverse forest can weather natural disturbances, and to which it often responds with renewed vigor and productivity. Disturbance is necessary for the critical functions of regeneration and succession. The relative risk of each forest type to common disturbance threats is detailed in Table 5 on page 17.

- *Biodiversity retained.* All elements of native biodiversity are present, including a rich flora, habitat for all animals, and the associated ecological processes. Invasive species are absent or strictly limited in extent. Snags, cavity trees, and other biological legacies should average at least 6 trees per acre (at least 3 trees/ac > 12" dbh), and be present in all stands. Coarse woody debris, canopy gaps, and perch and nest trees should be common.

- *A healthy forest.* Trees of all ages and sizes are present, from young seedlings to veterans of over 100 years, either within the same forest stand, or in close proximity. This can be achieved either within individual stands (uneven-aged management) or between different stands (even-aged management). Uneven-aged stands will have 2–3 ages present, on either a uniform or group-wise basis. Insects and disease may be present, but in small endemic populations.

- *Infrastructure.* Boundaries are clearly evident. The well maintained trail network protects fragile sites and water quality.

GENERAL RECOMMENDATIONS

Given the Monhegan Associates' objectives, three management concerns are evident:

- *Invasive species.* Well-established and advancing populations of Japanese barberry threaten to permanently alter native ecosystems. Other species may be poised to become similar problems.
- *Heavy trail use.* Trails receive increasingly heavy foot traffic use. Expanding construction of "Fairy Houses" threatens forest health by compacting soil around tree roots and diminishing organic matter levels.
- *Uncertain boundaries.* Most property lines and corners are not evident on the ground. This invites conflicts with abutters and encourages trespass (trail users trespassing onto adjacent ownerships, unauthorized trails created on the forest).

To address these needs, the following management activities are recommended, in general priority order. Operational considerations follow:

1. *Develop an invasive species control and monitoring program.* A comprehensive control strategy and monitoring program should build on past work and that of Livingston and Dyer. Regular monitoring will assess efficacy of treatments, and assist in scheduling and project prioritization. Restoration of degraded plant communities may be needed.
2. *Trail maintenance and user education.* Trails should be maintained for user safety and appreciation, as well as for environmental protection. Heavily used routes should be hardened to protect soil and water quality. Interpretive signing at trailheads should educate trail users about environmental impacts.
3. *Mark boundaries.* Boundary lines should be blazed and painted. Surveying may be required for some segments.

Table 4: Management Priorities 2005-2014

<i>year</i>	<i>area</i>	<i>activity</i>	<i>Who?</i>
2005	all	Conduct trail inventory Develop maintenance and design protocols	Monhegan Assoc. MA &/or consultant
2005-7	4, 3 all	Treat Japanese barberry in high priority sites Monitor effectiveness of treatments Maintain trails, install trailhead kiosks	Monhegan Assoc. MA, Livingston Monhegan Assoc.
2007	as needed	Mark boundary lines	Surveyor or MA
2008-11	4, 3, 5	Treat barberry and other species on priority sites	Monhegan Assoc.
2014	all	Update management plan	Consultant

OPERATIONAL DETAILS

Invasive Species Control

Invasive species are widespread across the ownership, especially within younger forest types (those that have the longest history of agricultural use). Monhegan Associates has begun a trial treatment and eradication program³, which should be continued. Treatment methods should be monitored and modified as necessary. In addition, treatment methods should be devised for honeysuckle and nightshade, with input from Livingston and others.

For best economy, efficiency, and success a system of assigning priority and scheduling areas for treatment is needed. A number of factors should be considered, most of which are subjective in nature:



Restoration volunteers near Underhill Trail

- Access – priority is given to those areas within easy access of town and trails; delay treating areas well off trails or with heavy brush or blowdown
- Population level – priority is given to areas with moderately high concentrations of barberry
- Restoration potential – priority is given to areas with well-established conifer seedlings and/or vigorous shrub growth; delay treating areas dominated exclusively by barberry until proven restoration strategies are developed.⁴
- Plant size – priority given to medium to large plants (> 2 feet tall)
- Safety – priority is given to sites with easy footing on level ground; avoid rocky or steep sites

Trail Maintenance

A trails inventory should determine those trail sections in need of improvements to protect water quality or soil structure. Possible actions include bridging streams (or replacing decayed bridges), constructing boardwalks or “bog bridges”, adding wood chip or gravel fill, or trail rerouting. A good resource for trail design and maintenance protocols, hardening methods, and structure specifications is the “Maine State Trails Manual”, available from the Maine Department of Conservation in Augusta.

³ With advice and guidance from Livingston

⁴ This may be in conflict with the previous factor. Treated sites must have sufficient amounts of desired native species to begin to reclaim the site. Sites absent of native vegetation will require costly planting and ongoing weed control to re-establish a desirable plant community.

PROPERTY FINDINGS

Access, Roads & Trails

Access to Monhegan is by private excursion boat service. Year-round service is available to Port Clyde. Seasonal service is available from New Harbor and Boothbay Harbor. Service is for foot passengers only, with extra fees for freight and equipment. The island's limited road network provides access for the limited number of island cars and trucks throughout the village and to the boundary of the Monhegan

Associates ownership, although motor vehicles are prohibited from most trails on the property.

An extensive network of 8 miles of foot trails crosses the ownership (see map, Appendix F). Greatest use occurs on the White Head, Burnt Head, and Lobster Cove, which are recommended for day users. The Cliff Trail circles most of the island, and is also very popular. Many of the minor trails have very low use. Bicycles are not permitted on foot trails.



Cathedral Woods Trail

Boundaries

Property boundaries are often poorly marked and difficult to follow. However, pins and monuments mark many property corners. Though flagging marks some property lines, most lines have not been maintained in recent years, making most segments difficult to locate and follow. Discussions with abutters may help confirm uncertain lines, but surveying may be required in the case of disputed boundaries.

Forest Health & Protection

Insects and disease

As is common throughout Coastal Maine, spruce stands on Monhegan have become increasingly susceptible to insects, disease, and blowdown as they mature. There is ample evidence on Monhegan of widespread tree loss from dwarf mistletoe, though spruce beetle losses are rare. Epidemic losses from the 1990s have declined, and populations of these pests have stabilized.

Dwarf mistletoe is most common (and infections more severe) in Type 4, though also present in Types 2 and 3. Infections are much less common and typically less severe in red spruce. This native parasite infests branches of individual spruce, resulting in characteristic “witch’s brooms” which weaken and may ultimately kill older host trees. Open, slow growing, and multi-storied stands favor dwarf mistletoe expansion, while dense, uniform, fast-growing, young stands severely restrict its spread.

Spruce beetle populations soared across the Midcoast in the 1990s, attacking trees weakened by dwarf mistletoe, drought, and other climate irregularities. Insect and disease mortality has led to increased insect, small animal, and bird activity, though species and levels have likely fluctuated.

The best protection against these and other disease and insect pests is to promote a healthy, diverse forest with abundant wildlife habitat. Healthy trees are better at resisting disease and insects. Diversity in tree species reduces the chance of insect and disease infestations, and lessens the impact if one tree species is lost. Maintaining a mix of species helps maintain long-term forest health.



Spruce killed by dwarf mistletoe and exposure stress, Shore Trail near Seal Ledges

Blowdown

Blowdown is a persistent threat, especially for tall trees on thin soil or wet sites, for trees of poor health and vigor, or following heavy thinning. Island forests are at risk of damage from hurricane winds, an infrequent but inevitable threat.

Past blowdown is evident primarily in Type 1, and to lesser extent Types 2 and 6. Damage spanning several decades is evident, mostly as small patches (less than 2 acres) that have regenerated to younger spruce. Mature, uniform stands have the suffered greatest losses; stands with more diverse structure (variety in tree species, size and density) are rarely damaged. Windthrow is beginning to advance into the uniform spruce stand along the Evergreen Trail, and will continue to be an increasing problem there.

Fire

Fire is a seasonal threat to island forests. Fire risk increases on ridge tops and dry sites, in softwoods, in young trees, and with proximity to roads and neighbors. Fire risks decreases near streams and wetlands, with hardwoods, and in older timber. The greatest risk in this location is from human caused fire, in late spring (before leaf flush) and late summer. The last significant forest fire on Monhegan was in 1947.

Fire fighting precautions can reduce the severity and damage of an unintentional fire.

Table 5: Disturbance risk by forest type

	1	2	3	4	5	6
Windthrow	high	moderate	moderate	low	low	high
Dwarf mistletoe	moderate	moderate	high	moderate	low	moderate
Barberry	low	low	moderate	high	moderate	low
Forest fire	low	low	moderate	low	low	moderate

This includes visitor education, maintaining trailside fireboxes, and a smoking ban outside of the village.

Historic & Cultural Resources

The property is comprised of several historic ownerships. Much land was used for pasture or farming, its owners residing in the village. The status of original homesteads was not investigated. Aside from stonewalls, no other structures were found on the tract. The remains of a shipwreck are found near the shore at Lobster Cove. Most other island cultural artefacts are located on surrounding lands.

There are two probable archaeological sites on the ownership, one overlooking the shipwreck at the south beach, and one near the east end of “the Meadow.” A report of the Maine historic Preservation Commission is found in Appendix D.



Forest reclaiming meadows near Christmas Cove

Legal Restrictions

Monhegan Island is under LURC jurisdiction. The multiple protection districts that apply to the ownership can be seen on the LURC Land Use Guidance Map, found in the Appendix. Nearly the entire ownership is zoned for “Protection”, and is not able to be developed under local statute. The property is taxed accordingly, at a much-reduced rate. The property is not enrolled in either the Maine Tree Growth or Open Space Tax Law.

The Maine Forest Practices Act requires that a landowner notify the Maine Forest Service before the start of timber harvest operations, although small non-commercial operations are exempt. Other provisions affect clearcut size, slash disposal, crown opening size, and road siting, but pose minimal limits to management.

Rare & Endangered Species

The Maine Natural Areas Program conducted a file review for known critical wildlife habitats, exemplary natural communities, and rare species documentations on Monhegan Island. This review found one recent record of a state listed animal species, and four historic records of rare plant sightings. In addition, three critical wildlife habitats are documented. A report summary and supporting background information are found in Appendix C. Field reconnaissance for this management plan did not attempt to confirm evidence of rare or sensitive species.

The Harlequin Duck (*Histrionicus histrionicus*) was documented on Monhegan Island last in 1991. It is listed as Threatened in Maine, with a ranking of S2S3N (rare to imperilled). Its global rank is G4 (apparently secure). The Atlantic Population of the Harlequin Duck breeds in eastern Canada, Greenland, and Iceland, and the majority winters in the Gulf of Maine. In Maine birds traditionally winter on the remote islands of outer Jericho and Penobscot Bays, returning to the same sites each year. From October to late March they feed in the surf along rocky shorelines and rest on exposed rocky ledges.

Recommendations to protect Harlequin Duck include to avoid disrupting feeding areas (dragging for fish and shellfish, excessive human presence), avoiding large oil spills (and have oil spill contingency plans), and to protect birds from poaching and other human-caused mortality.

Four rare plant species have been historically documented on Monhegan Island: Upright Bindweed (*Calystegia spithamea*), Seabeach Sedge (*Carex silicea*), Garber's Sedge (*Carex garberi*), and Pale Green Orchis (*Platanthera flava*). Little is known about the status or viability of these populations. Habitats may or may not be present for these species on the island.



Mature spruce, Red Ribbon Trail

Recreation & Aesthetics

The Monhegan Forest receives heavy seasonal recreational use by island residents, summer visitors, and day users. The network of scenic hiking trails is a well-known attraction, and has been highlighted in numerous trail guides and periodicals. Aesthetics on all portions of the property are keenly important to the Associates, especially in areas visible from trails. Planned activities will have minimal visual impact.

Soils

Soils are typical of offshore islands of Midcoast Maine, and are typically shallow to bedrock, but include well-drained uplands, poorly drained lowlands, and rock outcrops. Soil information was derived from Knox-Lincoln County soil surveys. A map is found in Appendix E.

Most of the property is comprised of Lyman-rock outcrop-Tunbridge soils. These are shallow, droughty, low productivity soils, with an effective rooting depth of less than 16 inches. Areas of bedrock and pockets of deeper soil are scattered throughout.

“The Meadow” and Long Swamp contain Borasaprist soils, which are level, deep, and very poorly drained. Effective rooting depth is minimal; the water table is at the soil surface most of the year.

Patches of upland are dominated by Tunbridge-Lyman complex soils. These are sloping and well to excessively drained; soil depth and productivity vary considerably. These are the most productive soils on the property.

Streams & Riparian Areas

Monhegan Forest has modest riparian resources, including “the Meadow”, Long Swamp and two unnamed seasonal streams.

“The Meadow” is an open water-shrub wetland complex, and is the source of domestic water wells for much of the island. Long Swamp is a forested wetland principally supporting red maple and wetland shrubs. It drains to the east through a seasonal stream. A second unnamed seasonal stream is located to the south. These features and their associated protection districts are found on the map in Appendix E.



Long Swamp riparian forest, Cathedral Forest Trail

Wildlife Habitat

Monhegan Island supports a rich variety of biological resources. A full range of forest cover types is present, from early successional abandoned fields to mature spruce forest, with an associated assortment of trees and understory vegetation.

Maine Department of Inland Fisheries and Wildlife maps identify three critical wildlife habitats at Monhegan Island. Inland Wading Bird and Waterfowl Habitat is found at “the Meadow”, Shorebird Roosting and Feeding Areas along the bluffs and waters from Black Head to Christmas Cove, and Coastal Wading Bird and Waterfowl Habitat along most of the shoreline of Monhegan and the surrounding islands, rocks, and ledges. The goal of perpetuating mature forest cover is consistent with maintenance and protection of each of these wildlife habitat types.

Cavity trees

Based on visual observations, cavity tree numbers are variable. There is moderate use of the plentiful dead spruce and fir by smaller cavity dwelling species. Larger cavities are confined to hardwoods, but are uncommon across much of the ownership, and are virtually absent in softwoods. Young stands (Types 2 and 4) have generally few cavity trees.

Cavity tree levels are sufficient to sustain populations of many woodpeckers and smaller foraging birds. Adequate cavity numbers can be assured over time by encouraging hardwoods, especially long-lived maple and yellow birch, and restricting cutting of dead and damaged trees to remove only those that are safety risks near popular trails. Tree topping, girdling, cutting cavity “boxes”, and a number of other methods can manually create cavity tree and snags.

Coarse Woody Debris

Down woody debris is an important part of forest wildlife habitat and a future source of organic matter for soil structure and fertility. Woody debris levels were not measured, but observed to be high in Stand 1; they are low elsewhere. Stands deficient in woody debris can be improved over time by: (1) allowing the natural decline of living and dead snags, (2) manually creating snags and down logs.

APPENDICES

Appendix A: Map/Lot List

The Town of Monhegan tax records show the following parcels as comprising the Monhegan Associates ownership:

Map 5, Lot 21
Map 6, Lots 1, 2, 3, & 4
Map 7, Lots 11, 15, 17, 18, 31, & 102
Map 8, Lot 20
Map 10, Lot 102
Map 11, Lot 1, 2A, 3A, 3B, & 4
Map 12, Lot 1

Ownership total: 380.555 acres

No part of the ownership is enrolled in either the Tree Growth or Open Space property tax programs.

Appendix B: Plant Species List

(from Livingston and Dyer, 2003)

Yellow indicates rare/uncommon species
Pink indicates invasive exotics

TREES	Latin name	Common Name
ABBA	<i>Abies balsamea</i> (L.) P. Mill.	balsam fir
ACPE	<i>Acer pensylvanicum</i> L.	striped maple, moosewood, goosefoot maple
ACRU	<i>Acer rubrum</i> L.	red maple, soft maple, swamp maple
AMEL	<i>Amelachier</i> sp.	serviceberry/shadbush/Juneberry
BEAL	<i>Betula alleghaniensis</i> Britt.	yellow birch
BEPA	<i>Betula papyrifera</i> Marsh.	paper birch, white birch
Malus	<i>Malus</i> sp.	apple
PIGL	<i>Picea glauca</i> (Moench) Voss	white spruce, cat spruce
PIRU	<i>Picea rubens</i> Sarg.	red spruce
PIST	<i>Pinus strobus</i> L.	eastern white pine
POGR	<i>Populus grandidentata</i> Michx.	big-toothed aspen
POTR	<i>Populus tremuloides</i> Michx.	quaking aspen, trembling aspen
SOAM	<i>Sorbus americana</i> Marsh.	American mountain-ash
HERBS	Latin	Common
ACHMIL	<i>Achillea millefolium</i> L.	common yarrow, milfoil
ARANUD	<i>Aralia nudicaulis</i> L.	wild sarsaparilla
Arisaema	<i>Arisaema triphyllum</i> (L.) Schott or <i>Arisaema atrorubens</i> (Ait.) Blume	Jack in the pulpit
ASTACU	<i>Aster acuminatus</i> Michx. or <i>Oclemena acuminata</i> (Michx.) Nesom	whorled aster
ASTCOR	<i>Aster cordifolius</i> L. or <i>Symphotrichum cordifolium</i> (L.) Nesom	common blue heart-leaved aster
ASTNOV	<i>Aster novae-angliae</i> L. or <i>Symphotrichum novae-angliae</i> (L.) Nesom; <i>Aster novi-belgii</i> L. or <i>Symphotrichum novi-belgii</i> (L.) Nesom	New England aster; New York aster
ASTUMB	<i>Aster umbellatus</i> P. Mill. or <i>Doellingeria umbellata</i> (P. Mill.) Nees	flat-topped white aster
ASTVIM	<i>Aster vimineus</i> Lam. or <i>Symphotrichum racemosum</i> (Ell.) Nesom	small-headed aster
ATHFEL		
Botrichium		
Cerastium	<i>Cerastium</i> sp. <i>Cerastium vulgatum</i> L. or <i>Cerastium fontanum</i> Baumg. ssp. <i>vulgare</i>	chickweed
CERVUL	<i>Circaea alpina</i> L.	common mouse-ear chickweed
CIRALP	<i>Cirsium</i> sp.	alpine enchanter's nightshade
Cirsium	<i>Coptis groenlandica</i> (Oeder) Fern. or <i>Coptis trifolia</i> (L.) Salisb.	thistle
COPGRO	<i>Cornus canadensis</i> L.	goldthread
CORCAN		bunchberry, dwarf cornel
DRYCAM		
DRYINT		
EQUARV	<i>Equisetum arvense</i> L.	common horsetail, field horsetail
FRAVIR	<i>Fragaria virginiana</i> Duchesne	wild strawberry, thick-leaved wild strawberry
Galium	<i>Galium</i> sp.	bedstraw
Grass	Family Gramineae	grass
Hieracium	<i>Hieracium</i> sp.	hawkweed
IMPCAP	<i>Impatiens capensis</i> Meerb. <i>Lycopus americanus</i> Muhl. ex W.Bart.	jewelweed, spotted touch-me-not
LYCAME		American water-horehound
MAICAN	<i>Maianthemum canadense</i> Desf.	Canada mayflower, wild lily-of-the-valley
MITREP	<i>Mitchella repens</i> L.	partridgeberry
ONOSEN		
OSMCIN		
OXAMON	<i>Oxalis montana</i> Raf.	common wood-sorrel, northern wood-sorrel
POTSIM	<i>Potentilla simplex</i> Michx.	old-field cinquefoil
Prenanthes	<i>Prenanthes</i> sp.	white-lettuce/rattlesnake root
PRUVUL	<i>Prunella vulgaris</i> L.	selfheal, heal-all

Appendix B: Plant Species List
(from Livingston and Dyer, 2003)

Yellow indicates rare/uncommon species
Pink indicates invasive exotics

PYRELL	<i>Pyrola elliptica</i> Nutt.	shinleaf common buttercup, meadow buttercup, tall buttercup
RANACR	<i>Ranunculus acris</i> L. <i>Ranunculus repens</i> L. (not reptans?)	creeping buttercup
RANREP	<i>Rumex acetosa</i> L.; <i>Rumex acetosella</i> L.	garden sorrel, green sorrel; sheep sorrel, common sorrel, red sorrel
RUMACE	Family Cyperaceae	sedges
Sedge		
SOLDUC	<i>Solanum dulcamara</i> L.	bittersweet nightshade, deadly nightshade
Solidago	<i>Solidago</i> sp.	goldenrod
STEMED	<i>Stellaria media</i> (L.) Vill.	common chickweed
	<i>Streptopus roseus</i> var. <i>perspectus</i> Fassett or <i>Streptopus lanceolatus</i> (Ait.) Reveal	rose twisted stalk, rose mandarin
STRROS	<i>Taraxacum officinale</i> Wiggers	common dandelion
TAROFF		
THENOV		
THEPHA		
TRIBOR	<i>Trientalis borealis</i> Raf.	starflower
VEROFF	<i>Veronica officinalis</i> L.	common speedwell
Viola	<i>Viola</i> sp.	violet
0		
SHRUBS		
BERTHU	<i>Berberis thunbergii</i> DC.	Japanese barberry
CORALT	<i>Cornus alterniflora</i> (L.f.) Small <i>Juniperus communis</i> L. var. <i>depressa</i> Pursh	alternate-leaved dogwood, pagoda dogwood common juniper
JUNCOM	<i>Lonicera canadensis</i> Bartr. ex Marsh	fly honeysuckle
LONCAN	<i>Lonicera japonica</i> Thunb.	Japanese honeysuckle
LONJAP	<i>Myrica pensylvanica</i> Loisel.	bayberry, northern bayberry
MYRPEN	<i>Nemopanthus mucronata</i> (L.) Loes.	mountain holly, common mountain holly
NEMMUC	<i>Prunus virginiana</i> L.	choke cherry
PRUVIR		
PYRARB		
ROSMUL	<i>Rosa multiflora</i> Thunb. ex Murr.	multiflora rose
ROSRUG	<i>Rosa rugosa</i> Thunb.	rugosa rose, salt spray rose, Japanese rose
RUBALL	<i>Rubus allegheniensis</i> Porter	common blackberry
RUBFLA	<i>Rubus flagellaris</i> Willd.	northern dewberry
RUBHIS	<i>Rubus hispidus</i> L.	swamp dewberry
RUBIDA	<i>Rubus idaeus</i> L.	red raspberry
TOXRAD	<i>Toxicodendron radicans</i> (L.) Kuntze	poison-ivy
VACANG	<i>Vaccinium angustifolium</i> Ait.	low sweet blueberry, common lowbush blueberry
VACMAC	<i>Vaccinium macrocarpon</i> Ait. <i>Viburnum cassinoides</i> L. or <i>Viburnum nudum</i> L. var. <i>cassinoides</i> (L.) Torr. & Gray	large cranberry, American cranberry witherod, wild-raisin
VIBCAS		
FERNS		
ATHFEL		
Botrichium	<i>Botrychium</i> sp.	grapefern/moonwort
	<i>Dryopteris campyloptera</i> (Kunze)	
DRYCAM	Clarkson <i>Dryopteris intermedia</i> (Muhl. ex Willd.) Gray	mountain wood fern evergreen wood fern
DRYINT		
ONOLEN	<i>Onoclea sensibilis</i> L.	ostrich fern, fiddle-head fern
OSMCIN	<i>Osmunda cinnamomea</i> L. <i>Thelypteris noveboracensis</i> (L.) Nieuwl.	cinnamon fern New York fern
THENOV		
THEPHA	<i>Thelypteris phegopteris</i> (L.) Slosson?	long beech fern, northern beech fern?

MNAP Forest Management Plan Checklist

Date Received: **October 27, 2004**

Forester: **Conservation Forestry**

Contact: **Mark Miller**

Town and/or Landowner: **Monhegan Island (Monhegan Associates)**

Have Rare, Threatened and/or Endangered Plants been documented to occur at site? ☐ Yes ☒ No

Have Rare and/or Exemplary Natural Communities been documented to occur at site? ☐ Yes ☒ No

Have Rare, Threatened and/or Endangered Animals been documented to occur at site? ☒ Yes ☐ No

Have MDIFW Significant Habitats been documented to occur at site? ☒ Yes ☐ No

(If yes, contact MDIFW regional biologist.)

Does the parcel intersect with Atlantic salmon habitat?

(If yes, contact the Atlantic Salmon Commission for potential impacts.)

- ☐ Yes, within salmon watershed
☐ Yes, adjacent to spawning habitat
☐ Yes, adjacent to rearing habitat
☒ No

Summary List of Known Features

Feature Name	Common Name	Last Seen	SRank	GRank	State Status	EO Rank
<i>Histrionicus histrionicus</i>	Harlequin Duck	1991	S2S3N	G4	T	-
Inland Wading Bird and Water Fowl Habitat						
Coastal Wading Bird and Water Fowl Habitat						
Shorebird Roosting and Feeding Area						

Does parcel intersect with MNAP land trust focus area? ☐ Yes ☒ No

Has parcel been targeted by MNAP for inventory? ☐ Yes ☐ No

Four rare plant species (*Platanthera flava*, *Carex garberi*, *Carex silicea*, and *Calystegia spithamea*) have been documented historically from Monhegan Island. Little is known about the status or viability of these populations and there have been no recent efforts to relocate the plants. Habitat may or may not exist for these species on the island. See the enclosed fact sheets for additional information.

Initial review completed by: SLG
 Date: 10/28/04 Time spent: 15 min

Additional review completed by: ARC
 Date: 10/28/04 Time spent: 15 min



MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

JOHN ELIAS BALDACCI
GOVERNOR

EARLE G. SHETTLEWORTH, JR.
DIRECTOR

December 20, 2004

Mr. Mark Miller
Conservation Forestry
P. O. Box 702
Camden, ME 04843

RE: Monhegan Island

Dear Mr. Miller:

There are four known Native American prehistoric sites on Monhegan. Two are on private property, and one may be on private property. The private property sites are all on the west shoreline, one in the village area, one next to a camp (house) at the north end of the island, and one overlooking the wreck on the south beach. The village area site is called the Stanley site, and it contains over a meter of deposits going back to 4000 years old, with (bone) evidence of cod fishing and swordfish hunting. I've communicated much of the background information on prehistoric archaeology on the Island to the Museum (enclosed copy of transcript with Pamela Rollinger. If Monhegan Associates want further background information, the Museum and some residents (including Lexi Krause) would be the place to start. I mentioned these sites in the developed areas simply to illustrate how long (4000+ years) Monhegan has been inhabited.

There are two probable archaeological sites that we know of now that are probably on Monhegan Associates property that deserve management consideration. One is designated site 17.45, and is recorded as a layer for charcoal and burned rock at a depth of 3 or 4 feet, on the margins of the drainage that feeds the eastern end of the water source pond. This site is at the base of the cliff directly south of the lighthouse. It illustrates the probability of archaeological sites in intact soils around the margins of the pond/marsh.

There is a possible colonial site on Kingsbury Hill. We have a third-hand report of someone born in the 1880s who had seen cellar holes (former house locations) on Kingsbury Hill about 1900. I walked the area briefly in 1999 but could not find them. Undoubtedly the residents of Monhegan know more about historic-period occupation on the island than we do.

I have walked along the trail that goes to the north and east side of the island, and am pretty sure that there is no surviving prehistoric archaeology along that rugged shore.

Sincerely,

Dr. Arthur Spiess
Senior Archaeologist

arthur.spiess@maine.gov



PRINTED ON RECYCLED PAPER

DRAFT Monhegan Island Plt. DRAFT

Lincoln County

Land Use Guidance Map

Maine Department of Conservation
Land Use Regulation Commission

Legend

DEVELOPMENT SUBDISTRICTS

- D-GN General
- D-MT1 Maritime 1
- D-MT2 Maritime 2
- D-RS Residential

PROTECTION SUBDISTRICTS

- P-AR Aquifer Recharge
- P-RR Recreation
- P-SG Seashore and Geology
- P-SL1 Shorelands
- P-SL2 75' Shorelands
- P-UA Unimproved Areas
- P-WL1 Wetlands of Special Significance
- P-WL2 Scrub-shrub Wetlands
- P-WL3 Forested Wetlands

MANAGEMENT SUBDISTRICTS

- M-GN General
- M-HP Highly Productive
- M-SC Submerged

Zone boundaries are shown as a solid line (---) where possible. When the protection subdistrict overlaps another protection subdistrict, a dashed line (---) may be used. For example, development of these areas is limited within the various subdistricts, and regulations pertaining thereto are in the Land Use Districts and Standards for the Planning and Zoning Department of the State of Maine, Maine Land Use Regulation Commission, Department of Conservation. Where any subdistricts exist between the district boundaries, as shown on this map, and those described by the Commission's Land Use Districts and Standards, the latter shall govern.

WQL Water Quality Limiting Lake - Refer to Section 101-P(3)(2) of the Commission's Land Use Districts and Standards.
MCL - MCH Lake Management Class - Refer to Section 101-P(3)(2) of the Commission's Land Use Districts and Standards.

For compliance, the applicant must show the Wetland Protection Subdistrict, the area identified pursuant to Section 101-B(5), 2 which is the best of rivers, lakes, and other water bodies, and freshwater wetlands within 25 feet of stream channels, which may be overlapped within P-WL Subdistricts. Also, the applicant must show the Monhegan Protection Subdistrict, which may be overlapped within P-SL Subdistricts.

If the location of standing and flowing bodies of water existing on the ground are in conformity with those shown on the map, then pursuant to 12 M.R.S.A., 405-A(2)(1), P-GP, P-SR, P-SL, P-WL, and other subdistrict boundaries which are based upon the location of such water shall, in appearance, be intended to follow the flowing or standing body of water existing on the ground.

This Land Use Guidance Map was adopted by the Maine Land Use Regulation Commission on _____ and became effective on _____. This map is certified to be a true and accurate copy of the official Land Use Guidance Map of the Maine Land Use Regulation Commission.

By _____, Director, Maine Land Use Regulation Commission.

Location: _____
Drawing number: _____
Effective date: _____
Revised: _____



NOTE: P-UA is established to protect Monhegan and surrounding islands.



Base map compiled from USGS 7.5-minute quadrangle series

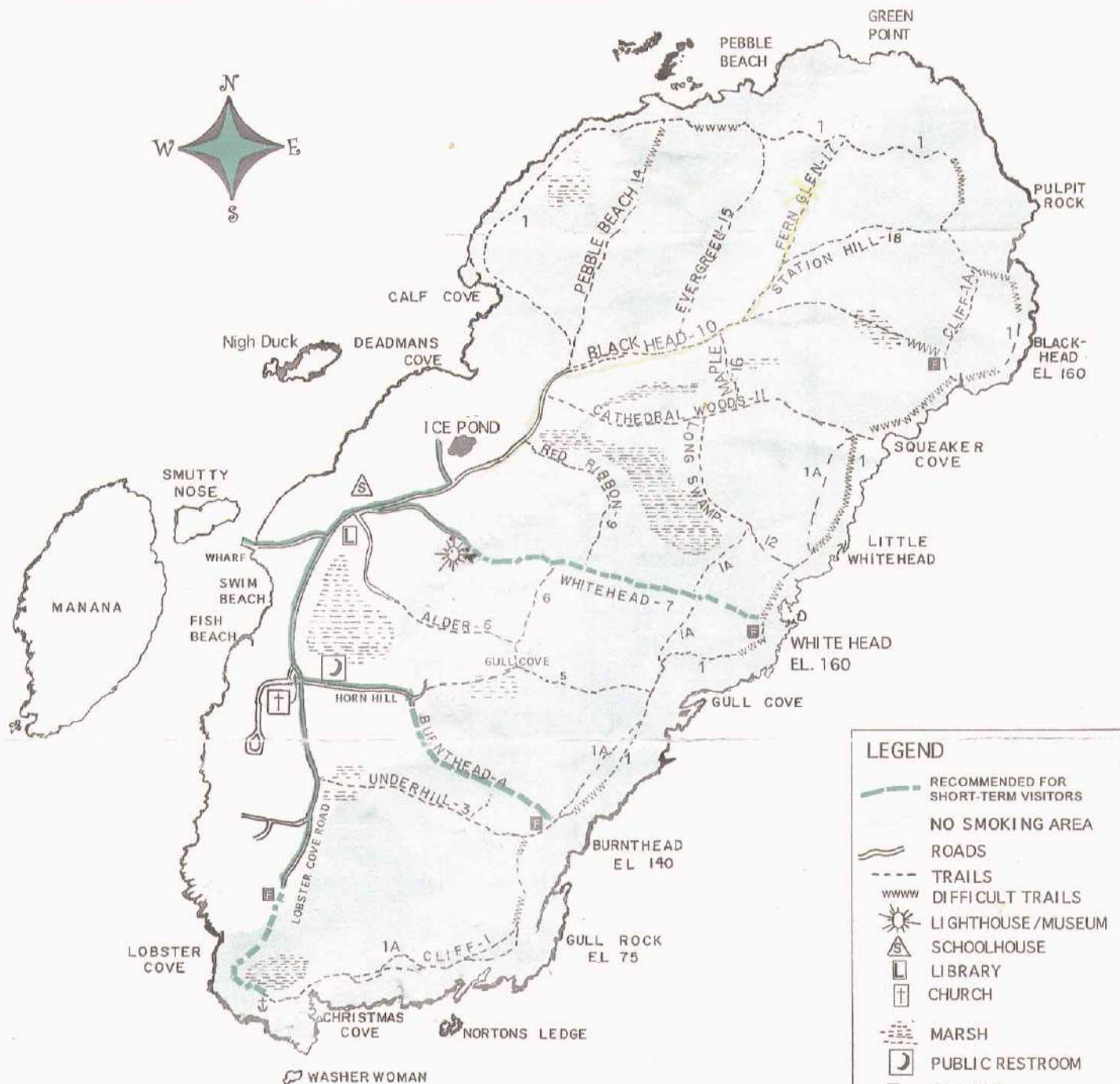
USGS topographic quadrangle maps
1: Monhegan

Point at which a river drains
25 square miles
Symbol points upstream
12 M.R.S.A. Sec. 462-B(4)(i)

MDAS number: Unique
number assigned to each
standing body of water
in Maine.

Monhegan Associates Trail Map

NO SMOKING OR OUTDOOR FIRES
ANYWHERE OUTSIDE THE VILLAGE
THIS INCLUDES THE ROCKS AND CLIFFS



IN AN EMERGENCY
CALL 911 FOR
MONHEGAN EMERGENCY
RESCUE SERVICE
IDENTIFY LOCATION ON MONHEGAN ISLAND

	RECOMMENDED FOR SHORT-TERM VISITORS
	NO SMOKING AREA
	ROADS
	TRAILS
	DIFFICULT TRAILS
	LIGHTHOUSE/MUSEUM
	SCHOOLHOUSE
	LIBRARY
	CHURCH
	MARSH
	PUBLIC RESTROOM
	FIRE BOX
	CLIFF TRAIL INSIDE
	CLIFF TRAIL OUTSIDE
	SHIPWRECK

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