Gay Head Moraine Reservation

Aquinnah, Massachusetts
Draft Management Plan

10/1/2025

Approved by the Martha's Vineyard Land Bank Aquinnah Advisory Board (Click or tap to enter a date.)
Approved by the Martha's Vineyard Land Bank Commission (Click or tap to enter a date.)
Approved by the Secretary of the Executive Office of Energy & Environmental Affairs (Click or tap to enter a date.)

Julie Russell – Ecologist
Bryn Willingham – Ecology Assistant
Winston Bell – Livestock Manager

Executive Summary

Gay Head Moraine Reservation is a 120-acre area of conservation land consisting of coastal woodland (with areas of semi-open canopy), red maple/beetlebung swamp, interdunal marsh/swale, shrub swamp, dune and sandplain grassland. The conservation property is located off State Road and is bisected by Lobsterville Road to the west extending north to Lighthouse Road, and to the east extending to Clay Pit Road. Gay Head Moraine Reservation is a culmination of smaller purchases spanning 27 years and comprises a quarter of the cross-Aquinnah trail spanning from West Basin south to the Atlantic Ocean.

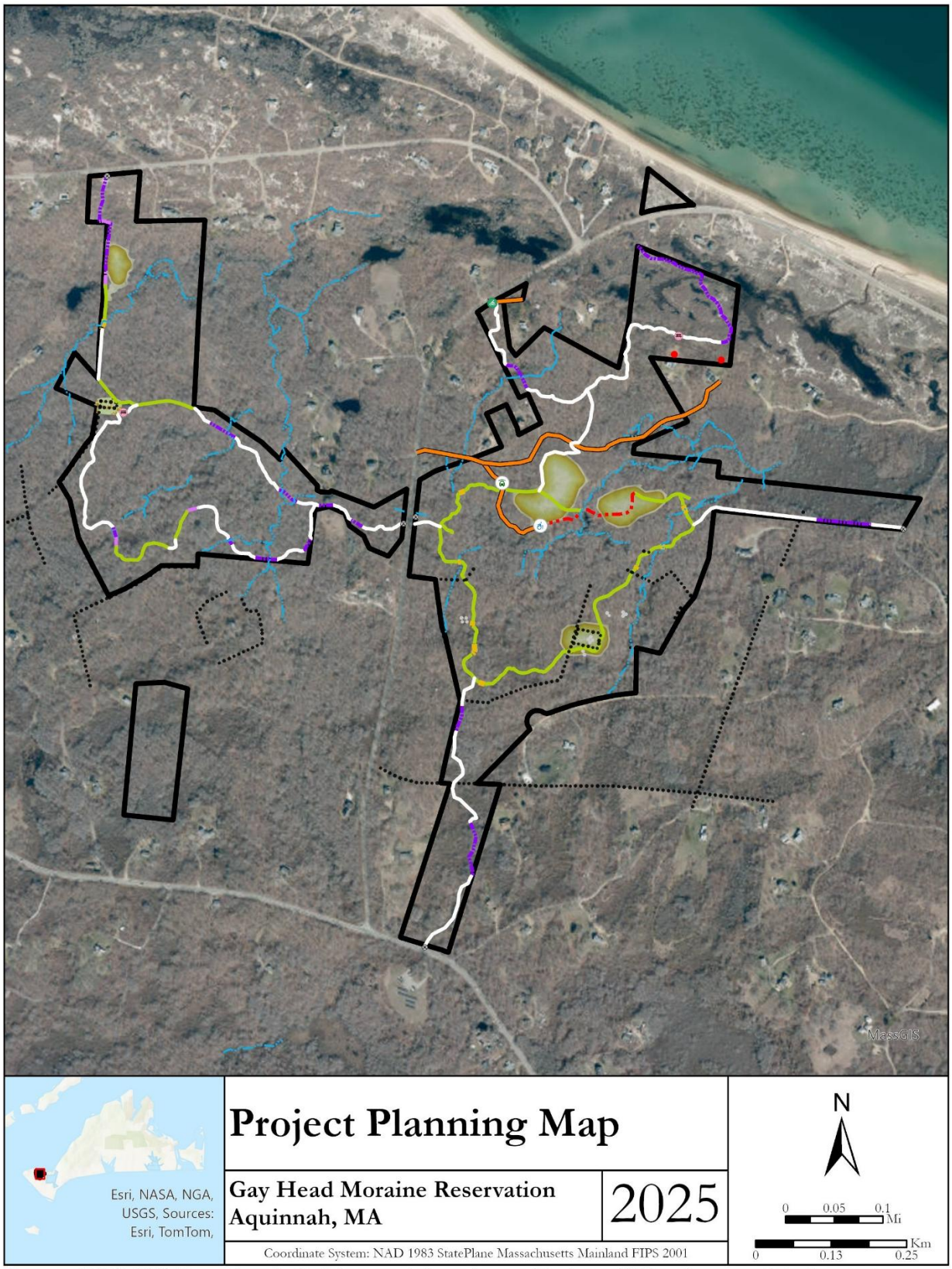
Numerous cultural features are highlighted along the cross-Aquinnah trail as it meanders through Gay Head Moraine Reservation. The area was once a large portion of the Wampanoag North Pasture that is described in setoff descriptions as containing thickets, swamps, meadows and vast bogs of cranberries (Dukes County Registry of Deeds (DCRD) bk49). A visible depression of a road laid out from cranberry bogs to the east around Clay Pit Road and land of Thomas Manning passes through the property to the west through bars by the watering place (DCRD bk49:pg107) and entering the Deacon Thomas Jeffers orchard (DCRD bk170:pg490).

Vegetation and wildlife inventories on the property revealed three commonwealth-listed moth species, three -listed bird species, five -listed mammal species and two -listed plant species. The woodlands, wetlands and grasslands meet primary habitat needs of each of these rare species.

This management plan proposes to create approximately 8,206 linear feet of trail and 3,593 linear feet of boardwalk that connects to 6,808 linear feet of existing trail, all to integrate into a cross-Aquinnah trail linking West Basin and the Atlantic Ocean that will also serve as a cultural heritage trail by identifying Wampanoag landmarks along its route. A total of 1.75 acres of moderately open canopy coastal woodland is proposed to be maintained through mowing and grazing, divided between 0.75 acres west of Lobsterville Road and 1 acre around the Manning homestead on the east side of Lobsterville Road. Additionally, the plan proposes to hand-prune and mow vegetation in and around the stone enclosure (0.3 acres) west of the Lobsterville Road. Existing management in 3.6 acres of open field and moderately open canopy coastal woodland is proposed to continue through mowing and grazing. The property will have several footpath entrances: one from State Road, two from Lobsterville Road, one from Clay Pit Road, and one from Lighthouse Road. The existing general hunting of deer, pheasants, turkey and raccoon is proposed for the entirety of the property. In addition, the plan proposes to address invasive species; prohibit motorized vehicles, bicycles and horses; prohibit dogs between March-August (otherwise allow leashed dogs); and promote rare species habitat where suitable and possible.

The final section of the management plan outlines in detail all planning goals, objectives, and strategies. To be implemented, this plan must be presented at a public hearing and approved by the land bank's

Aquinnah advisory board, the Martha's Vineyard land bank commission, and the secretary of the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA). Additionally, a notice of intent and Massachusetts Endangered Species Act (MESA) review will be filed with the Aquinnah Conservation Commission and Massachusetts Natural Heritage and Endangered Species Program (MA-NHESP) for activity proposed in estimated and priority habitat for rare species and activities proposed in and around wetland resource areas.



Sources: USGS 2023 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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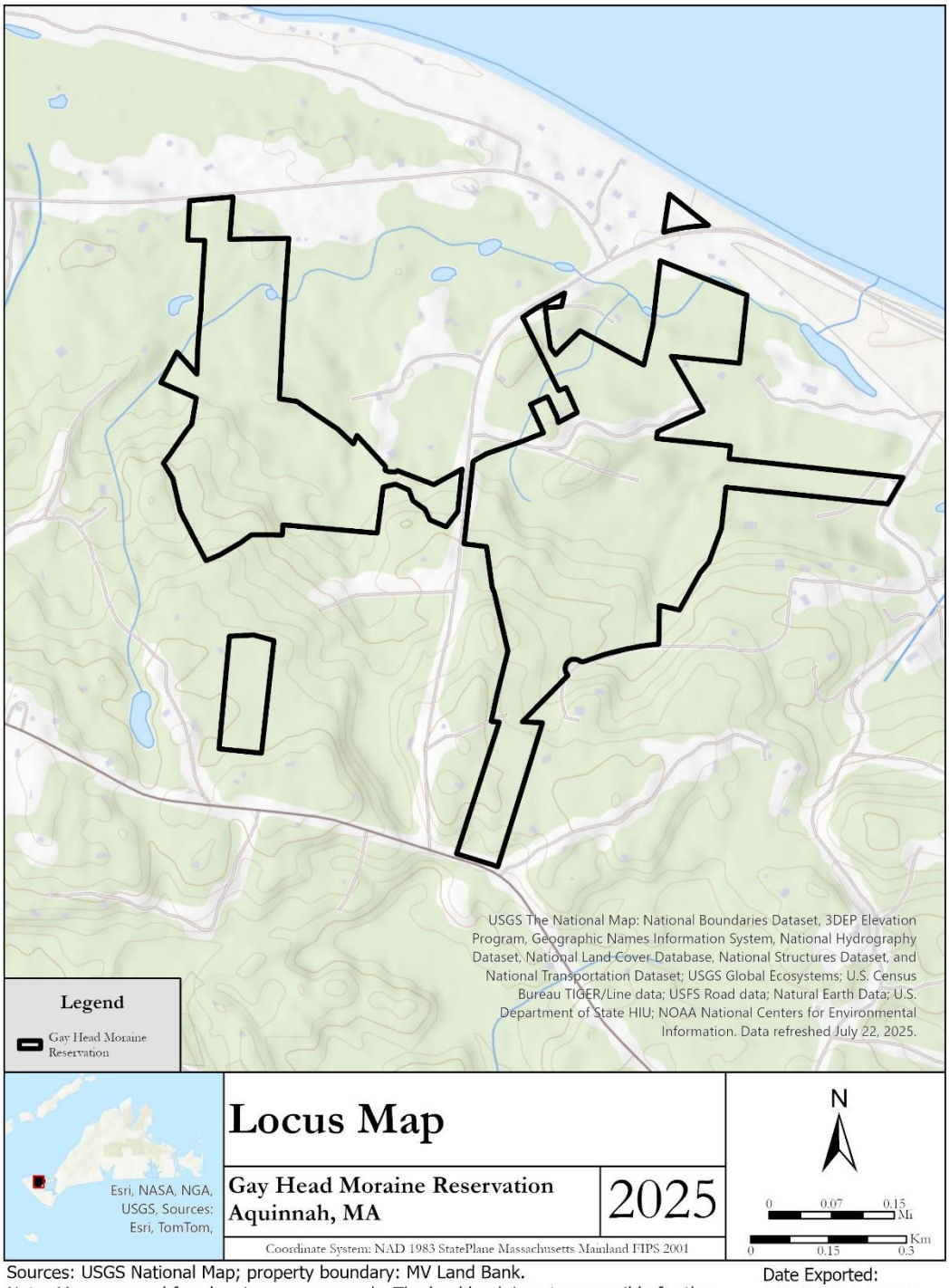
About the authors

Julie Russell is the primary author and has been the land bank ecologist since August 1999. She is certified as a Wildlife Biologist by the Wildlife Society. She holds a Master of Science in zoology from the Cooperative Wildlife Research Lab at Southern Illinois University, Carbondale, and a B.S. in wildlife biology from the School of Natural Resources at the University of Vermont. Bryn Willingham is the coauthor of this management plan. She is the land bank's ecology assistant. Ms. Willingham holds a Bachelor of Science in Natural Resources Conservation from the College of Natural Science at the University of Massachusetts Amherst. Winston Bell assisted with the land use history for Gay Head Moraine Reservation. He is the land bank's livestock manager. He holds a Bachelor of Arts in Environmental Studies from Sterling College, a Master of Fine Arts from Boston University, and a Master of Sociology from the London School of Economics.

This plan is executed under the supervision of the Martha's Vineyard land bank's land superintendent, Harrison Kisiel.

Map 1: Locus map for Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS National Map; property boundary: MV Land Bank.
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Table of Contents

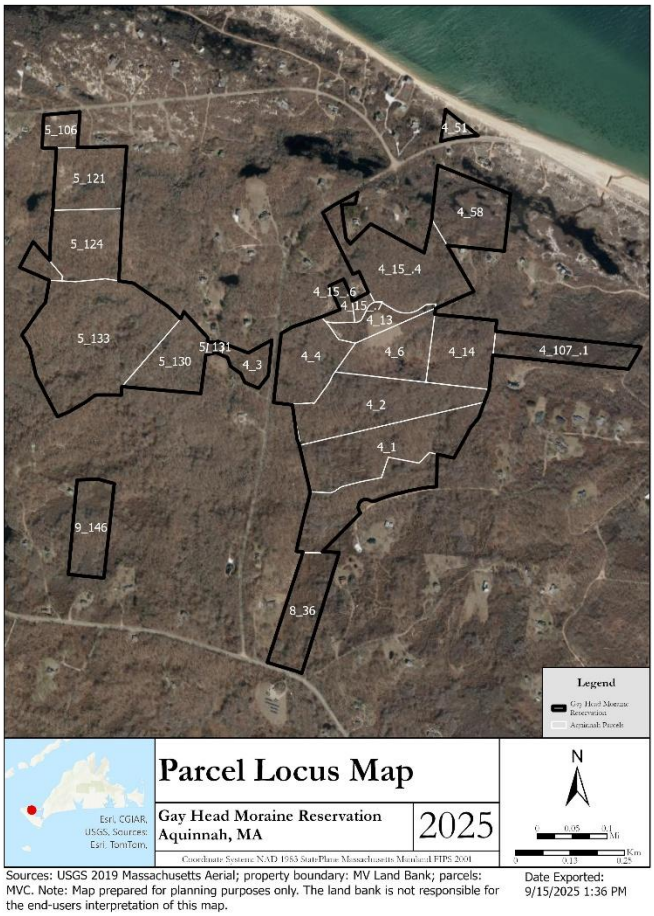
I. Natural Resource Inventory

A. Physical Characteristics

1. Locus

Gay Head Moraine Reservation is located at roughly 41° 20' 30" N, 70° 48' 00" W in Aquinnah, Massachusetts as depicted in the locus map, page 14 . The property comprises two parcels separated by Lobsterville Road amounting to 120 acres of woodland, streams, shrub swamp, coastal dune, interdunal swale, and grassland. The property is accessible by Lobsterville Road and is shown on Aquinnah tax map 4, parcels 1, 2, 3.1, 4, 6, 12.1, 13, 14, 15.4, 15.6, 51, 58, 97, 99, 107.1; map 5, parcels 106, 121, 124, 130, 131.1, 133, 134, 135; map 8, parcel 36; and map 9, parcel 146 (Appendix A. Map 27, page 83).

Map 2: Locus Map of Gay Head Moraine Reservation in Aquinnah, MA



Map 3: Aerial photograph of Gay Head Moraine Reservation in Aquinnah

Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map. Source: MassGIS ortho photos 2023

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2. Survey Maps, Deeds and Preliminary Management Plan Goals

   Larger copies of all surveys are on file at the land bank office and are available for inspection by appointment. Deeds, land bank preliminary management plan goals, and reduced copies of surveys are included in Appendix B, page 90.

3. Geology

   Martha's Vineyard was formed during the most recent ice age. The convergence of the Cape Cod Bay lobe and Buzzards Bay lobe of the Laurentide formed the triangular shape of the island of Martha's Vineyard. The Laurentide ice sheet, a glacier over one-mile thick in places, grew and retreated over

thousands of years, churning and depositing sediments on top of bedrock to form the region's landscape as it is viewed today. Movement of the ice eroded underlying substrates that were absorbed into the base of the ice sheet. The variable sized material called till either stuck to the surface of the advancing/retreating glacier or was deposited by glacial meltwater. Retreating glaciers left behind many features on the land: moraines (large heaps of unsorted sediments); glacial erratics (Figure 1, page 16) (oversized boulders made of rock atypical for the region); and outwash plains (relatively flat, sandy and gravelly deposits from the meltwater of a glacier) (Oldale 1992). Gay Head Moraine Reservation comprises both the Gay Head and Martha's Vineyard moraines (Figure 2, page 16) (SCS 1986). These moraines were deposited during different glacial advances. The Gay Head Moraine Reservation was deposited during a glacial advance in the Pleistocene, about 150,000 years ago. The Martha's Vineyard moraine was deposited approximately 25,000 years ago by the Laurentide ice sheet (SCS 1986).

Figure 1: Glacial erratic

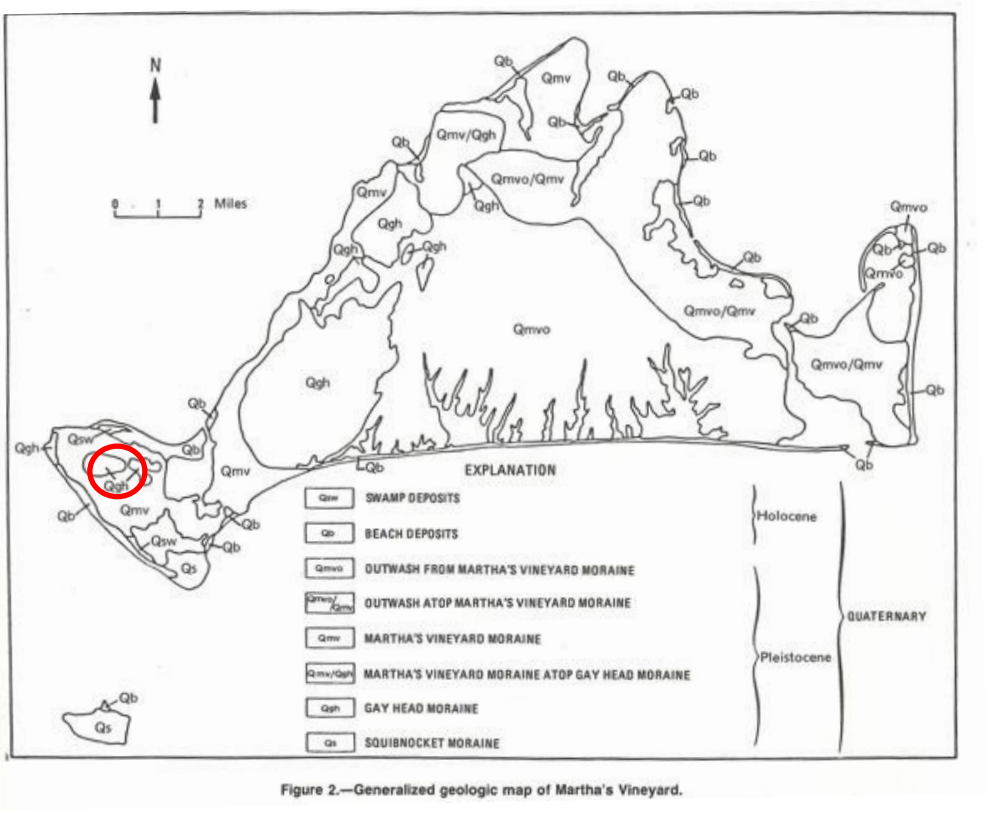


Figure 2.—Generalized geologic map of Martha's Vineyard.

Figure 2: Generalized Geologic Map of Martha's Vineyard (SCS 1986)

4. Soils

The General Soils Map (Figure 3, page 17) depicts general classes of soils across Martha's Vineyard. Gay Head Moraine Reservation is situated predominantly in Eastchop-Chilmark-Nantucket soils and

comprises seven soil series, divided into 14 units differentiated by slope and stoniness. Freetown and Swansea mucks and Eastchop loamy sand dominate the property at 36% and 30% respectively. Freetown and Swansea mucks are most pronounced in the northeastern corner of Gay Head Moraine Reservation in swamps, fens, and marshes. A large swath of Eastchop loamy sand is found in the westernmost portion of the property and is primarily in woodland habitat. A detailed map and discussion of the soil types associated with the property, as described by Fletcher and Roffinoli (1986) can be found in Appendix C (Map 34, page 107).

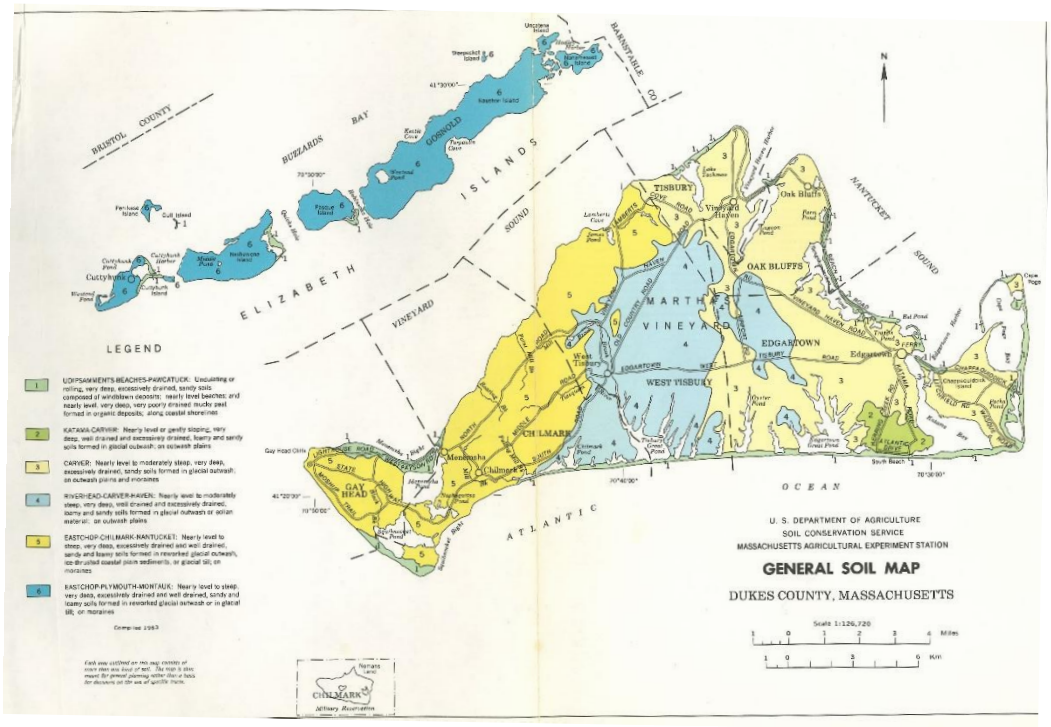


Figure 3: General Soil Map of Martha's Vineyard

5. Topography

The topography of Gay Head Moraine Reservation is illustrated by the contour lines on the Topographic Map in Appendix A, page 84. The elevation of Gay Head Moraine Reservation reaches over 150 feet above sea level on a stone wall near the property's southern boundary and drops northward to sea level in the coastal dunes and marsh north of Lobsterville Road. The contours of the property undulate with streams flowing along the land's folds and creases, upland oaks standing atop dry hills, and swamps and fens spreading across flat lowlands.

Figure 4: Stream valley at Gay Head Moraine Reservation

Perhaps the most distinctive topographical feature of Gay Head Moraine Reservation is neither hilltop nor depression, but rather the stream valley that winds through the eastern portion of the property and ends at the shrub swamp. The banks in the lower reaches of this

stream are, in places, fifteen or so feet high, while the stream itself follows an oxbow course along the valley below (Figure 4, page 17).

A map of the topography of the property is located in Appendix A (Map 28, page 84).

6. Hydrology

Gay Head Moraine Reservation exists almost entirely within the Aquinnah Coastal watershed, a 2,188-acre watershed extending across western Aquinnah (MVC 2020). Approximately 3 acres, at the southernmost part of the property, fall within the Squibnocket Pond major and minor watershed. (Map 29, Page 85).

There are 91 acres of wetland resource area on the property, comprising 58 acres of bordering vegetated wetland and 59 acres of the 200-foot buffer zone, protected through the Aquinnah wetlands bylaw. The 200' riverfront area consists of 39 acres in the 0-100' zone and 29 acres in the 100'-200' zone and has proprietary regulations enforced by the Aquinnah conservation commission (Map 11, page 38, Map 12, page 39).

Streams lace the entire property and feed the hydrology of abutting vegetation that composes bordering vegetated wetlands in the form of shrub swamps, red maple swamps, and interdunal marsh swales. The property has five major stream corridors (Figure 5, page 18). The eastern two corridors end in the shrub swamp, which transitions, along with the remaining three stream corridors, into the interdunal swale and ultimately into Menemsha Bight/Vineyard Sound. The majority of the streams have distinct banks while a small portion of streams are intermittent with water vanishing into the ground only to reemerge downslope where the water table once again reaches the surface.

Figure 5: Stream

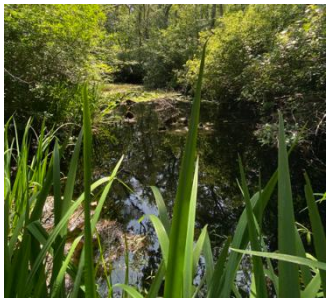


Figure 6: Pond

A small pond has formed where a stream in the north central portion of the property crosses through a culvert that constricts flow (Figure 6, page 18). If approached stealthily, turtles can be observed sunning on logs jutting out from the pond surface. Some depressions in the eastern portion of the property host vernal pools with sphagnum mats that cover the pools in the summer, giving them an emerald hue.

7. Ecological Processes

Ecosystems comprise the physical environment and all the living organisms (biotic components) in a defined area that interact with the abiotic components such as air, water, and mineral soil. Biological, physical, and chemical processes link abiotic and biotic components together. These ecological processes cycle water and nutrients, transfer carbon, produce oxygen, move nutrients, build soils, and enable reproduction. Ecosystems are impacted by external and internal factors over various

temporal and spatial scales from seasonal changes in temperature to climate change and pesticide use to land use changes (EPA 2020).

i. Hydrological Processes

Consideration of the impacts of vegetation communities on the ecosystem water cycle is critical. Vegetation in general controls and sustains evapotranspiration (green water glow) and precipitation in the terrestrial water cycle. Blue water flow consists of surface and groundwater runoff. Green water comes from root-zone soil moisture and supports terrestrial vegetation while blue water supplies recharge stream flow and aquifers that provide water for organisms to consume and societies to utilize (Falkenmark and Rockstrom 2004). Vegetation layers help catch water and aid in soil infiltration whereas development, larger scale cleared woodlands and various heterogeneous agricultural practices can result in decreased evapotranspiration, precipitation, and water table depths and increased runoff by reducing soil infiltration, surface roughness, and root depth, increasing the ability of the surface to reflect sunlight (Bonan et al. 2002).

There are 8,674 linear feet of streams that flow through the property. The undulating topography of the property carved by glacial meltwater results precipitation received in higher elevations running into lower elevation valleys and resulting in streams or vegetated wetlands.

The opposite affect is observed with afforestation (Nosetto et al. 2005). Irrigation of agriculture and rerouting the natural flow of water can reduce groundwater and stream flow; lead to greater soil evaporation; change the ecosystem's resilience to flooding; and alter habitats. Past clearing of the area in the late 18th century likely resulted in a greater water yield in the streams due to reduced interception, evaporation and transpiration. Removal of vegetation in wetlands increases temperatures in streams; this can ultimately alter the oxygen content and increase evaporation at the soil surface, resulting in the drying of hydric soils (Armentano 1980). Maintaining vegetative buffers around wetland habitats and maintaining a diverse structural ecosystem help protect the hydrological patterns of the ecosystem (Gallant and Sadinski 2012).

Stream crossings created for access that impede the natural flow of water can alter the hydrologic pattern resulting in pond formation upstream, reduced flow and increased water temperatures downstream as well as increased erosion resulting in sedimentation downstream and altered macroinvertebrate community (Kidd et al. 2014, McWaters and Murphy 2016, Lehrter et al. 2024). The two earthen dams on the western portion of the property are examples of hydrologic impediments.

ii. Primary Productivity

Primary production reflects the total organic matter produced as a result of photosynthesis and nutrient uptake from the soil (Egunjobi 1969). Important elements such as nitrogen, phosphorous and carbon naturally travel through ecosystems and when combined with water and sunlight determine the productivity of an ecosystem (Gallant and Sadinski 2012). Organic

matter is stored in large quantities in woodland systems as leaf litter. Nutrients are removed from soil by plants and through the biogeochemical cycle are returned to the soil to be reabsorbed into the inorganic-organic system. In some woodland systems more nutrients return to the soil in leaf litter than are taken up by the woodland plants (Ovington 1965). However, communities such as red maple swamps and coastal dunes exist as low-nutrient available habitats. Red maple trees that dominate the swamps of the property are ecological generalists (Abrams 1998). Nutrient cycling in red maple swamps is highly dependent on seasonal hydrology. Additionally, red maple swamps have an efficient nutrient cycle where increased decomposition occurs at a time when plants uptake of nutrients is greatest (Golet and Allen 1993). Coastal dune environments support plants that are adapted to the stress of wind, salt spray and low nutrient availability. The coarse, well-drained, sandy soil of dunes is void of organic matter and drains water rapidly resulting in a low-nutrient environment. Species richness and plant succession increase with increased distance from the foredune as impacts of environmental stressors decrease. This is observed on the property when comparing the sparsely vegetated coastal dune to the shrub-and tree-rich maritime dune community (Hesp 1991).

In comparison, nutrients in pastures are returned to the soil in larger quantities through urine and feces than through the organic system. Movement of animals leads to movement of nutrients from one system to another (Egunjobi 1969). Biodiversity is often positively linked with primary productivity. However, in situations of competitive exclusion that occur when, for example, fertilizer application is stopped, biodiversity increases (Roy 2001). Human activities have major impacts on nutrient dynamics via fertilizers and land-use changes. Crop harvesting interrupts the return of nutrients back into the soil. Certain agricultural practices such as improper manure storage, incorrect application of fertilizers, and inadequate crop and pasture rotation practices can either enrich ground and surface water with nutrients or deplete nutrients in soils. Land-use that causes erosion in combination with fertilizer application can cause excess nutrients to enter watersheds resulting in eutrophication of downstream lakes, ponds, and estuaries. Eutrophication is a process in which nutrient additions cause an overabundance of algae; as the algae die, decomposing bacteria break down the material, decreasing oxygen levels. Low oxygen and acidification (due to excess carbon dioxide) are harmful to fish and other aquatic life (NOAA 2023a). Activities that increase (use of fertilizers) or decrease (erosion) nutrients can alter the nutrient cycle and change the ecological integrity of the ecosystem. Vegetative buffers between open agricultural land and wetland resource areas help reduce nutrient transfer from soils to surface water.

Additionally, human nutrient-enhancing and -depleting practices both lead to increased opportunistic non-native plants that have different nutrient cycling characteristics, resulting in an alteration of the nutrient cycling of the ecosystem (Gallant and Sadinski 2012). The grassland in the eastern portion of the property was maintained as open space abutting a house. The main house burned prior to the purchase of the property by the land bank. However, an extensive population of invasive wisteria exists in the grassland as a reminder of the previously human-occupied landscape.

iii. Climatic Processes

Terrestrial and hydrologic climatic processes are impacting the resilience of habitats at Gay Head Moraine Reservation. Rising temperatures from climate change are resulting in longer growing seasons, earlier breeding seasons and subsequent shifts in vegetation composition and wildlife species that rely on specific habitats (Stenseth et al. 2002). Southern species of plants and subsequently animals are moving north as changing climates meet their needs. In some cases, the species additions increase biodiversity and in other situations the new arrivals are more aggressive and are habitat generalists, resulting in a decline in biodiversity. In woodlands, trees' natural ability to adapt to climate change is not responding as quickly as climatic changes are occurring. Climate change can increase tree vulnerability with the addition of invasive pests as is the case with beech bark disease. The disease is caused by a scale insect – fungus relationship. The scale predisposes the beech tree to a fungus attack; climate changes that result in wildly fluctuating drought and heavy precipitation periods can further exacerbate the impacts (Stephanson and Coe 2017). Additionally, climate change results in the expansion of invasive pest ranges as is the case in the spotted lanternfly. In 2021 the first breeding population of spotted lanternfly was discovered in Massachusetts. It is an invasive pest of agricultural crops, trees and shrubs that has been moving north from Pennsylvania since 2014 (Massachusetts Department of Agricultural Resources 2025). Monitoring for invasive species and managing their growth will help protect biodiversity on the property.

Promoting management practices such as pasturing and native grassland haying that sequester a large yield of carbon in the perennial-grass root system can help slow the pace of climate change, giving local species the opportunity to adapt to the changing climate (Silveira et al. 2013). Adoption of pasture management strategies that improve plant productivity as well as promote soil carbon sequestration such as fertilizer, lime, grazing rotations, fire, and the addition of legumes are also desirable (Silveira et al. 2013). The conservation of grasslands and subsequent use as pastureland and hayfields are essential pieces to the climate change mitigation puzzle, especially as development far outpaces conservation of open land on a global scale.

Climate change and sea level rise impact all coastal communities (Kulp and Strauss 2019), including this property. Gay Head Moraine Reservation's northeastern border is in close proximity to Menemsha Bight/Vineyard Sound, situating approximately 6.7 acres of the property within the 3-10-foot LiDAR sea-level rise projection and 1% annual chance of flooding (500-year flood zone). Acceleration of sea level rise due to anthropogenic climate change puts low-lying coastal areas like the dunes and interdunal marsh of Gay Head Moraine Reservation at risk for ecologically harmful impacts. Coastal wetlands provide important ecosystem functions, including refugia, breeding and foraging habitat for wildlife; run-off filtration; and excess sediment and nutrient storage (NOAA 2023b).

Higher water levels leave dune habitat and interdunal marshes particularly vulnerable to excess flooding and potential drowning (Appendix A: Map 31, page 87). The steep topographical

changes to the south of the interdunal marsh provide little opportunity for inland migration of marsh vegetation and habitat.

The remaining 113 acres of the property is located outside the 10-foot LiDAR sea-level rise projection (Map 20, page 52, Appendix A:, Map 31, page 87) in an area of minimal flood hazard (FEMA Flood Zones) (Map 15, page 52 and Appendix A: Map 30, page 86).

iv. Biophysical habitat complexity

Species diversity and ecological resilience are greatly influenced by the complexity of habitat. Habitat complexity, or heterogeneity in physical habitat structure, allows for a greater number of species to coexist and use available resources differently and with less competition (Smith et. al 2014). Habitat complexity also plays a vital role in promoting ecological resilience to disturbance. Ecological resilience refers to an ecosystem's ability to recover and adapt to changing environmental conditions such as flooding, insect infestation, invasive species, and wind. Greater complexity in ecological communities and landscape can diversify the way species respond to disturbance and offer alternative resources when one ecological community is disproportionately affected (Oliver et. al 2015).

Gay Head Moraine Reservation represents a gradient of habitats from woodland and grassland to dune and wetland that support a variety of plant and wildlife species and subsequently increase ecosystem stability. Within each habitat is a complex structure of plant species. The bulk of Gay Head Moraine Reservation is a mosaic of woodland, dominated primarily by vegetation ranging from low-growing forbs such as Canada mayflower and star flower to a full canopy of oak, American beech, and sassafras trees. Dead trees, if left standing, become snags that provide cavities for woodpeckers. Other long-lived trees growing in moist soils may develop trunk rot that forms cavities at the base of the tree and sometimes further up the trunk. Specific bryophyte and lichen species only occur on bark below a rot hole due to the increased pH resulting from cavity leakage (Bütler et al. 2021). Epicormic shoots on the trunk sprouting from dormant buds under the bark support nests for small birds (Bütler et al. 2021). Not all areas of woodland on the property share the same composition of structure. Depending on soil, slope, and light penetration some areas of woodland support hydric species such as red maple, beetlebung, highbush blueberry, and a variety of ferns.

Natural and anthropogenic disturbance impacts habitat structure. The natural disturbance regime for northeastern deciduous woodlands typically includes fire, wind, and insect damage.

Fire is a less frequent means of natural disturbance, as fire suppression is an active part of forest management. Wind remains an active force of nature, especially along the coast-facing northeast. Hurricanes, microbursts, and blizzards are familiar weather patterns on Martha's Vineyard and are associated with strong winds over 60 mph. Numerous fallen trees litter the woodland floor of the property creating microhabitats for fungi, moss and lichen. American beech groves once covered isolated areas of both the eastern and western portion of the property in the upland areas near stream corridors. The combination of beech leaf disease,

beech bark disease, and extreme weather resulting from climate change have decimated these groves. The young sprouts of dying adult trees are affected by the beech leaf disease stopping the next generation from growing. American beech trees create dense overstories and potentially inhibit other species from germinating though allelopathy. The defoliation of adult beech trees is bringing light to the once-shady woodland floor and opening the door to a new generation of species, namely oaks, to colonize.

Human-induced disturbance in the form of historic land clearing in the upland habitats, in addition to selective cutting as well as the lack of disturbance in the form of mowing and grazing, results in opportunities for different stages of the community to prosper over time. As the stone walls, cellar holes, and stone foundations on Gay Head Moraine Reservation attest, much of this land was agricultural land at one time. Much of the land was used for pasture. However, LiDAR imaging revealed evidence of historic cultivated crops in 4 areas that are now under dense vegetation. Over the last century the process of woodland succession on abandoned agricultural land yielded a forest of oak and beech trees. Many of these oaks are widely-spaced, open-grown specimens with large limbs and spreading crowns. Such trees are typical of abandoned agricultural land where plenty of open sunlight has allowed the oaks to grow outward as well as upward. This abandoned agricultural land has grown into an upland oak cover on dry sites and a mesic hardwood cover, which includes red maple and beetlebung, within the stream corridors.

An area of coastal woodland with moderate canopy cover in the eastern portion of the property results from management by a prior, recent owner of the property. The result was a landscaped setting, with large spreading trees flanked by ponds and surrounding a central belvedere (now removed). Manicured grass covered the ground beneath the trees. The area has been maintained as open habitat through annual spring mowing and more recently growing-season grazing. However, the once grass-dominated “yard” has transformed into a biodiverse vegetated cover of blooming herbaceous plants mixed with graminoid species that hum with the noises of birds and pollinators. Left unmanaged, grasses beneath the trees will ultimately yield to woody vegetation or greenbrier vines, and the landscape will appear much like the surrounding coastal woodland. Preserving open habitats holds the door open for species that depend on the intermittent stages of conversion of land from open to wooded habitats.

v. Biotic interactions

Biotic interactions depend on the characteristics of individual species and the network within which they interact. Species in a network are connected through processes such as predation, competition, and mutualisms. Alterations of these biotic interactions through the introduction of exotic species; over-collection of a species; and disease can cause sweeping cascades in the network depending on the nature and strength of interactions a specific species had within the community (Bennett et al. 2009, Gallant and Sadinski 2012). Pollinators and exotic plants play both positive and negative roles, respectively, in biotic interactions of an ecosystem. Spraying pesticides and introducing exotic pollinators can impact other non-target pollinators, sometimes resulting in a major decrease in species diversity of plants that are reproductively dependent on

native pollinators. Invasive species, for example, can outcompete native species due to some advantage in their life strategy and/or a lack of pests and predators. Asiatic bittersweet (*Celastrus orbiculatus*) is a good case study of these effects; this invasive species was introduced from China as early as 1860. This fast-growing vine impacts native woody species by girdling trunks as it climbs and decreasing the amount of sunlight reaching tree foliage. Infestations of this species can quickly alter the compositions and health of a forest stand.

Protecting species with high community importance values; removing exotic species before they have aggressively invaded; and implementing elastic management strategies that are modified in response to monitoring efforts are all strategies that can reduce effects on biotic interactions.

vi. Population dynamics

Loss of a species has many latent effects on a community depending on the interactions that species had in the community environment. Species dispersion, recruitment, fertility, and mortality compose a species' population dynamics and, along with genetic diversity, play an important role in the success of a species (Ferris and Wilson 1987, Gallant and Sadinkski 2012). Small populations isolated by reduced habitat or habitat fragmentation are vulnerable to extinction, locally and globally. Other species are more widespread but occur in few numbers and are vulnerable due to low genetic diversity. Ecosystems are not static, and species require genetic diversity to adapt to their ever-changing world or risk extinction. It is not all doom-and-gloom for some species when it comes to population dynamics, as is the case for some terrestrial orchid species whose population dynamics can be positively influenced. These adaptive species are able to expand their ranges in response to climate change, resulting in long-term survival benefits of the species (Van der Meer et al. 2016). Conserving contiguous ecosystems and rare habitats, minimizing fragmentation, and taking special care to consider the effects management actions may have on population dynamics of species that occur on the property is important.

B. **Biological Characteristics**

1. Vegetation

Gay Head Moraine Reservation comprises four general ecological communities – woodland; wetland; shrubland; and grassland – further divided into nine specific habitats – coastal woodland; coastal woodland with moderate canopy cover; red maple swamp; shrub swamp; maritime dune; coastal dune; interdunal marsh/swale; sandplain grassland; and cultural grassland. They are described in detail and displayed on the Ecological Communities Map (Appendix D: page 123). A patchwork of coastal woodland and red maple swamp spreads over most of Gay Head Moraine Reservation, with open habitat wetlands and grasslands intermixed. Red maple swamp comprises the greatest area of the property (Table 1, page 25). A total of 311 plant species is known to occur on the property (Appendix D: Table 8, page 115).

Table 1: Plant biodiversity and composition of ecological communities on Gay Head Moraine Reservation

Ecological community	Total # species	Portion of total species on property	Acres	Portion of total acreage of property
red maple swamp	142	46%	46	38%
coastal woodland	89	29%	31	26%
oastal woodland, moderately open canopy	88	28%	3	2%
shrub swamp	50	16%	9	7%
sandplain grassland	111	36%	1	1%
interdunal marsh swale	98	32%	2	2%
coastal dune	23	7%	3	2%
maritime dune	8	3%	5	4%
cultural grassland	NA		0.13	0.11%
Pond/vernal pool	NA		0.1	0.1%

Two commonwealth-listed plant species are present on the property one in the red maple swamp and one in the coastal woodland. Exotic invasive plants – including Asiatic bittersweet, wisteria, and bull thistle – occur in woodlands, along trails, and clearings.

2. Wildlife

Wildlife on the property was recorded using a variety of quantitative survey techniques and through general observations by land bank staff and staff verified observations by individuals using wildlife recording apps such as iNaturalist and local bird alert networks. Direct and indirect (tracks and scat) sightings aided in creating a running inventory of species. The lists of these groups in Table 17-Table 24 (Appendix E: page 137-158) are not exhaustive but provide an assessment of common occupants of Gay Head Moraine Reservation.

i. Birds

Formal avian point-count surveys were conducted at Gay Head Moraine Reservation during spring and fall migration (2000, 2004, 2020), the summer breeding season (2000, 2004, 2017, 2020), and the winter (1999, 2000, 2004). Additional avian observations were on the property were included from local birders in the "Bird News" column in the Vineyard Gazette (Figure 7, page 25). A total of seventy-five bird species were detected on the property during survey periods. Seventy-three bird species were observed during diurnal avian point count surveys between 1999-2020, and two owl species were heard during a nighttime owl survey in February 2000 using a wildlife caller and playback-calls of eight local owls (Appendix E, page 130). Thirteen survey points were established on the preserve from 1999-2020 (Appendix E: Map 37, page 132). All survey points are marked on the Avian Survey Map and their corresponding survey years and habitats are outlined in Table 16, page 131.


Solitary sandpiper. — *Lanny McDowell*

Figure 7: Solitary sandpiper, Lanny McDowell

ii. Invertebrates

Night-flying moth community composition and abundance was assessed using black-light traps during the summers of 2004, 2008, 2009, 2017, and 2018. A total of 339 lepidoptera species

(including three listed species), belonging to fifteen families, was collected between the months of June-September. A total of 11 butterfly species representing 11 families were observed on the property during spring, summer, and fall. Detailed lists of Macrolepidoptera and other invertebrate species observed on the property are included in Table 21 and Table 22 , respectively (Appendix E. page 142).

iii. Mammals

Mammal species were surveyed through the use of camera traps and acoustic monitors. Eight mammal species were detected on the property through direct (sightings, camera trap photos and acoustic recordings) or indirect (tracks, scat) observations. A total of 4 camera traps was deployed between August 5 – September 18 of 2024 (Appendix E: page 135). Bat species were surveyed east of Lobsterville Road in 2020 (Sept 16-October 29) and west of Lobsterville Road in 2023 (April 26-May 21) using acoustic monitors in two locations during each year. Additionally, opportunistic observations of mammals occurred during regular property checks and other ecological surveys. Direct and indirect (tracks and scat) sightings aided in creating a running inventory of mammal species. A full list of mammal species observed on the property is included in Table 24 (Appendix E: page 158).

Figure 9: White-tailed deer fawn

Figure 8: Bat acoustic monitor

iv. Reptiles and amphibians

Figure 10: Pickerel frog

Opportunistic observations of reptiles occurred during regular property checks and other ecological surveys. Spring frog-call surveys were conducted on 5 nights after dusk in May of 2000 and one night in May 2004 near the pond on the portion east of Lobsterville Road. Two transects of 10 cover boards each were used to survey for amphibians in 2000 between April 13 and May 11. Four amphibian and two reptile species were observed on the property and are included in Table 23 (Appendix E: page 157).

v. Fish

No fish were surveyed in compiling this management plan.

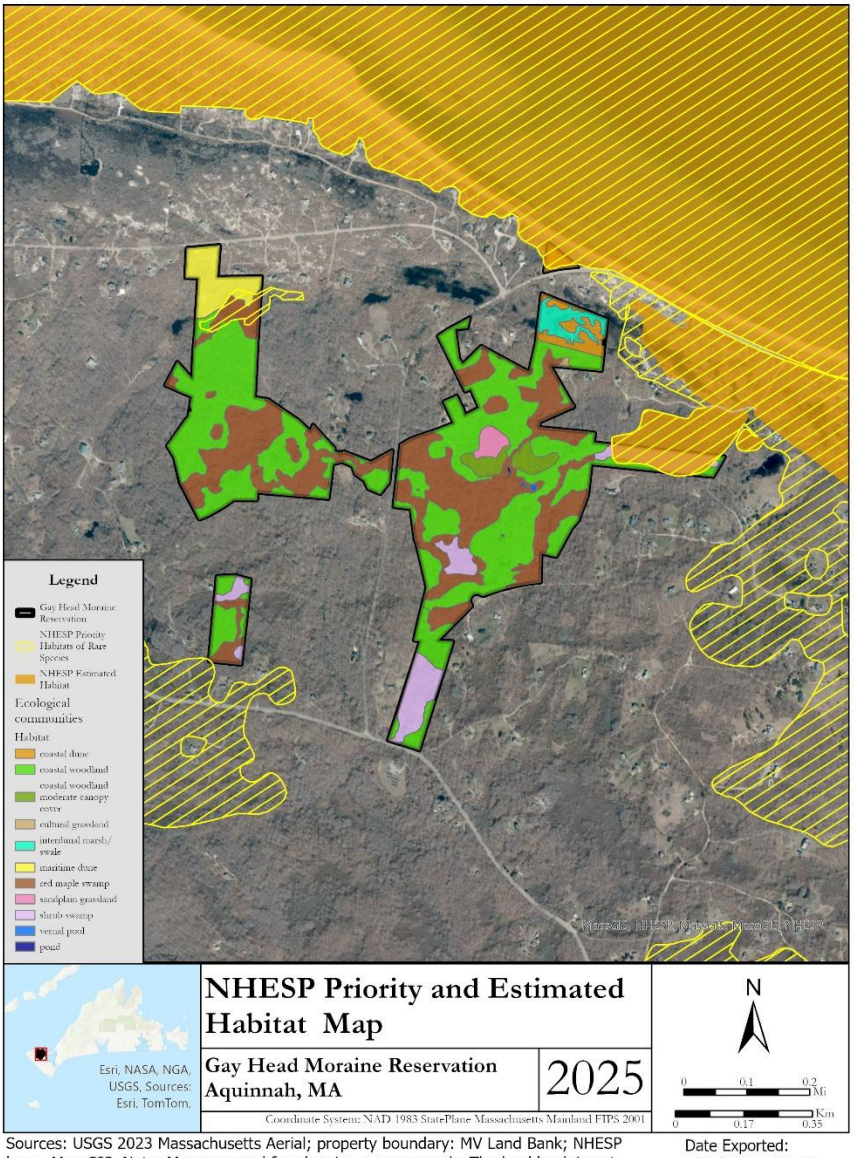
3. Rare and Endangered Species

A total of 4.3% of Gay Head Moraine Reservation is designated as priority habitat for rare species by the Natural Heritage and Endangered Species Program (NHESP 2021) (Map 4, page 27). The designated area encompasses predominantly inland wetland habitats (Table 2, page 27). A select few commonwealth-listed species were observed on the property – three moth, three bird, five mammal, and two plant species. Breeding and foraging habitat requirements are met for some of the observed listed species within the variable habitats of Gay Head Moraine Reservation (Table 3, page 28).

Table 2: Designated priority habitat by habitat type at Gay Head Moraine Reservation, Aquinnah

Habitat	Total acres	Acres designated as priority habitat
Shrub swamp	3.1	2.8
Red maple swamp	37	1.5
Coastal woodland	62	0.51
Maritime dune	4.5	0.39
Total		**5.2**

Map 4: NHESP habitats map and ecological communities on Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2023 Massachusetts Aerial; property boundary: MV Land Bank; NHESP layer: MassGIS. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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Table 3: Listed-species type and corresponding habitat requirements at Gay Head Moraine Reservation, Aquinnah

Type	Habitat Requirements	Present on property
plant	rich deciduous woodland, openings with sparse shrub layer	Yes
plant	woodland, field and edge	Yes
moth	dry open habitats with scrub oak	Yes
moth	scrub oak barrens, pine woodland and coastal woodland	Yes
moth	dune, grassland heathland	Yes
bird	nest in grassland, wet meadow, marshes on ground	Yes
bird	nest in red maple swamp, builds nest with lichen	Yes
bird	spruce fir forest	No
bat	roost in woodland, roost in trees during summer	Yes
bat	roost in woodland, hollow trees, under tree bark	Yes
bat	roost in deciduous trees, tree foliage	Yes
bat	roost in deciduous and coniferous woodlands in foliage	Yes
bat	roost in conifer woodlands, under tree bark	No

C. Cultural Characteristics

1. Land use history

Gay Head Moraine Reservation is situated in what was called North Pasture, an area once used as common land by the Wampanoag Gay Head Tribe. The North Pasture was one of several large tracts of land set aside for community uses including leasing areas of good soil for pasturing livestock from other parts of Martha's Vineyard. The leasing of pasturage was the primary source of revenue for supporting the poor in Aquinnah in the mid-19th century (Earle 1861). Harvesting cranberries and clay were additional sources of revenue. The large cranberry bogs of North Pasture are located very near to the Gay Head Moraine Reservation property.

The area of Aquinnah was described in 1861 by John Milton Earle as "having an uneven surface and somewhat hilly, with a great variety of soil" with the North Pasture described as "rough land and beach" by Richard Pease in 1871. According to the Whiting Map of 1850 much of the present-day red maple swamp at Gay Head Moraine Reservation was wooded and the uplands were used for fields and homesteads composing the southern portion of the property (Map 6, page 31). Earle described Aquinnah in 1861 as having an "abundance of stone for fencing" and in 1848 homes were described in a report from the commissioners under the Resolve of Legislature as being of wood framing or stone (Earle 1861). This is evident on Gay Head Moraine Reservation in the many walls that define the common land boundaries as well as the few homesteads that are visible in the "Map of Gay Head showing the lands of individual owners and the general fields or commons" (Pease 1866) (Map 7, page 32). What was not used for pasturage and enclosed in stonewalls in 1861 was "grown up to bushes" (Earle 1861).

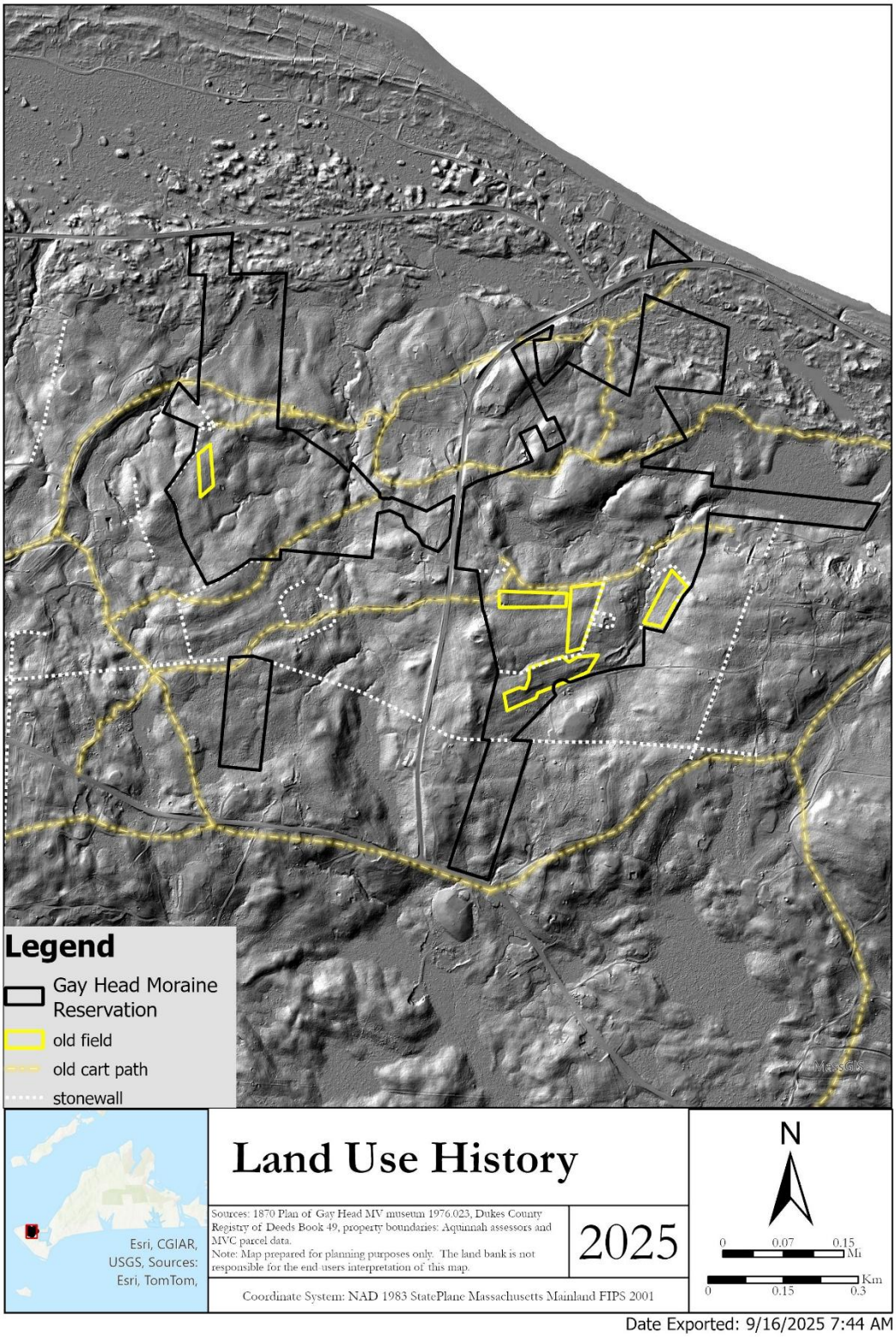
Through the use of Lidar, it was possible to highlight areas that may have been plowed for fields at one time. Four areas have longitudinal markings in the topography that could be attributed to plow lines (Map 5, page 30). Reports from documents found in Thomas Jeffers' house indicate there were

26 framed houses, seven wigwams and 34 families in Aquinnah in 1807 (Vineyard Gazette February 26, 1937). A half a century later, in 1859, the count of the Wampanoags in Aquinnah revealed 258 people, comprising 54 families, who were fencing and improving 450 acres of land in Aquinnah (Earle 1861). However, the area of Gay Head Moraine Reservation was not a very populated one in spite of its being nearly a quarter of the improved land of Aquinnah at the time. Two homesteads occupied land at Gay Head Moraine Reservation, viz., those belonging to Alvin Mannings and Thomas Jeffers.

The common lands of Gay Head, not already taken up, fenced and improved by individual owners as depicted in the 1866 map (Map 7, page 32), were divided and assigned owners according to Dukes County Registry of Deeds Books 49 and 65 (Map 8, page 33 and Map 9, page 34).

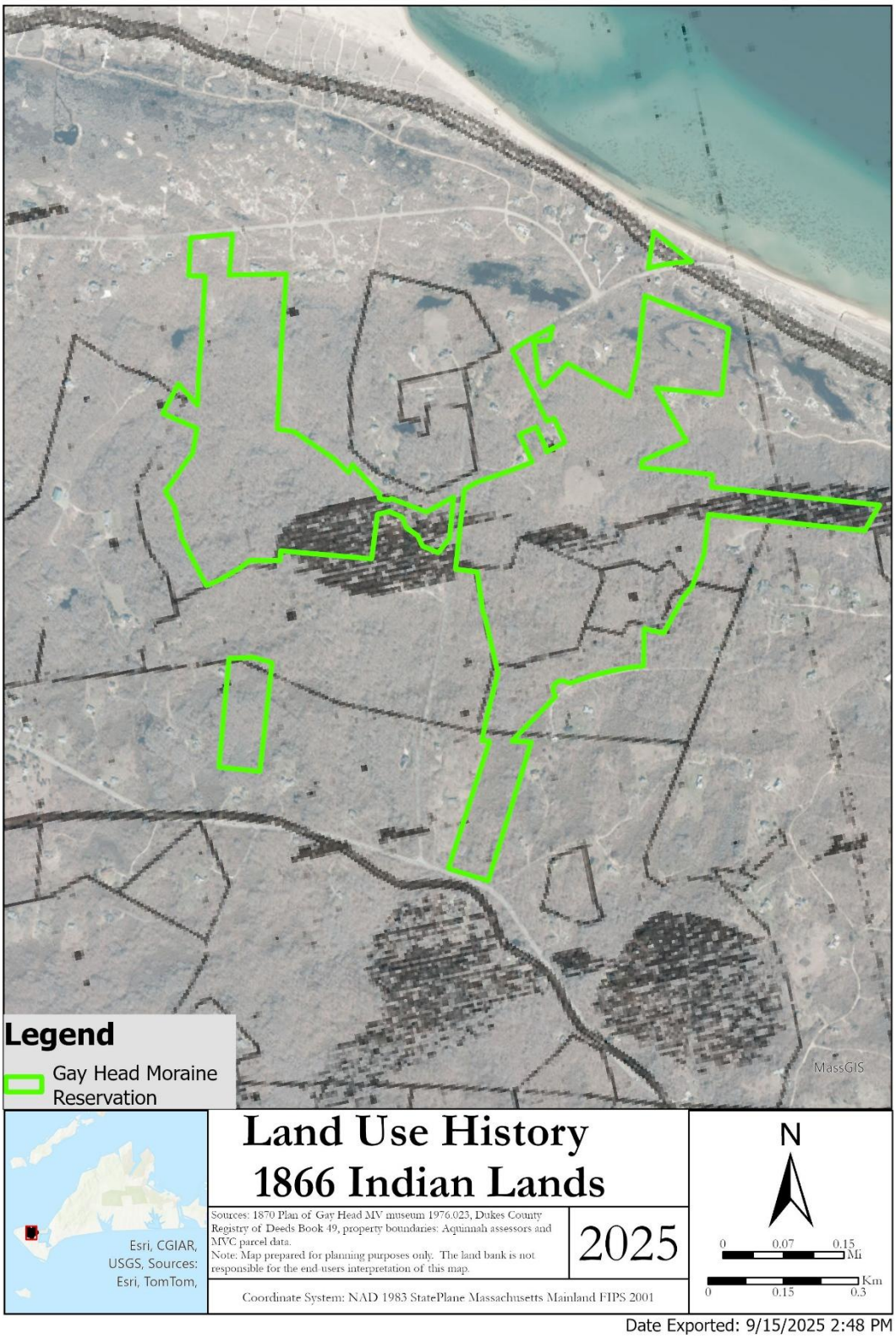
Boundary descriptions of individual owners during the time of land divisions offer a glimpse into the landscape of the property during the mid-19th century. A watering place is mentioned along the southeast boundary of David Nevers and an orchard is mentioned near where the Thomas Manning wall meets the Thomas Jeffers wall. There are several mentions of crossing a swamp and while large rocks and established stonewalls are used to describe corners and lines (DCRD book 49). Depressions of old cartpaths crossing the North Pasture and stonewalls are visible from the Lidar imaging (Map 5, page 30). The bars, once with wooden gates made of American beechwood (Washington 2024, personal communication), controlled passage along portions of the stonewalls of the property where old cartpaths cross from cranberry bogs and homesteads to meadows, orchards and neighboring homesteads. Remnants of open fields surrounding the red maple swamp are still visible in 1937 aerial photographs (Map 10, page 35). A more detailed account of the land use history of the Gay Head Moraine Reservation and surrounding area is located in Appendix F: page 172.

Map 5: Historic land use evidence recreated using Lidar 2013-2021 imaging

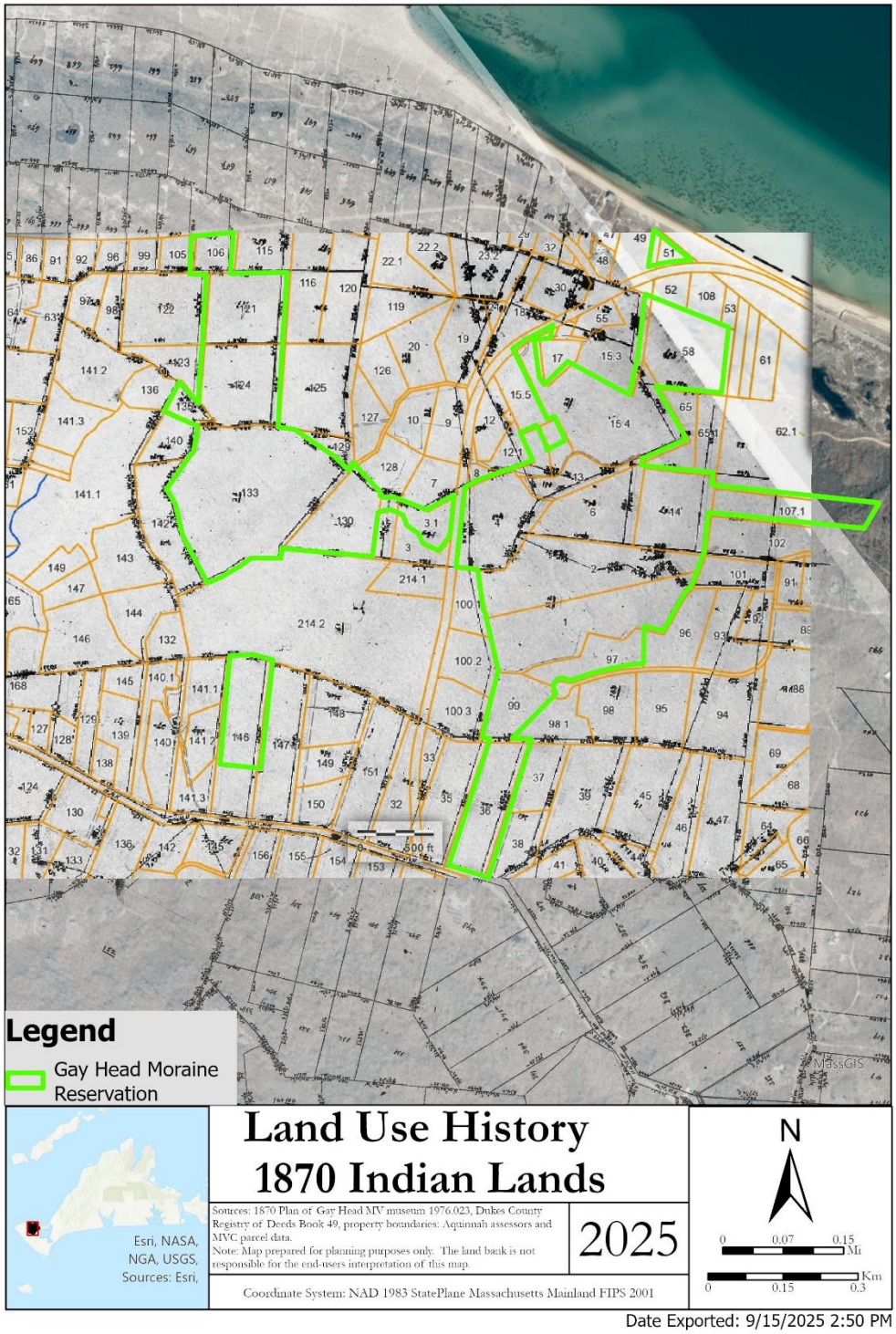


Map 6: Land use history based on 1850 Henry Laurens Whiting map

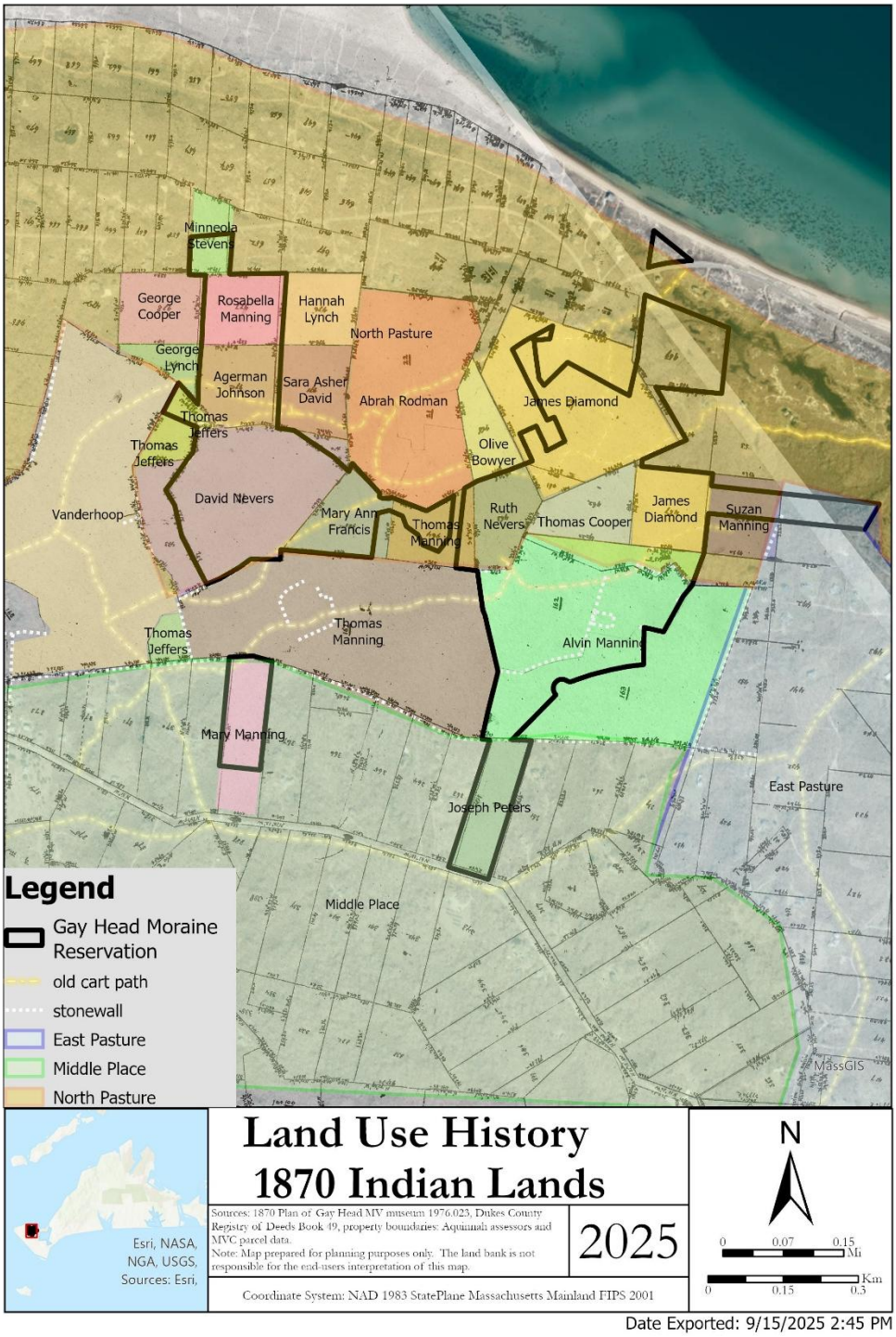
Map 7: Land use history, 1866 Indian lands of Gay Head, Richard L Pease



Map 8: Land use history based on 1870 Sectional plan of Indian lands on Gay Head, Richard and Joseph Pease



Map 9: Land use history with land titles from 1870



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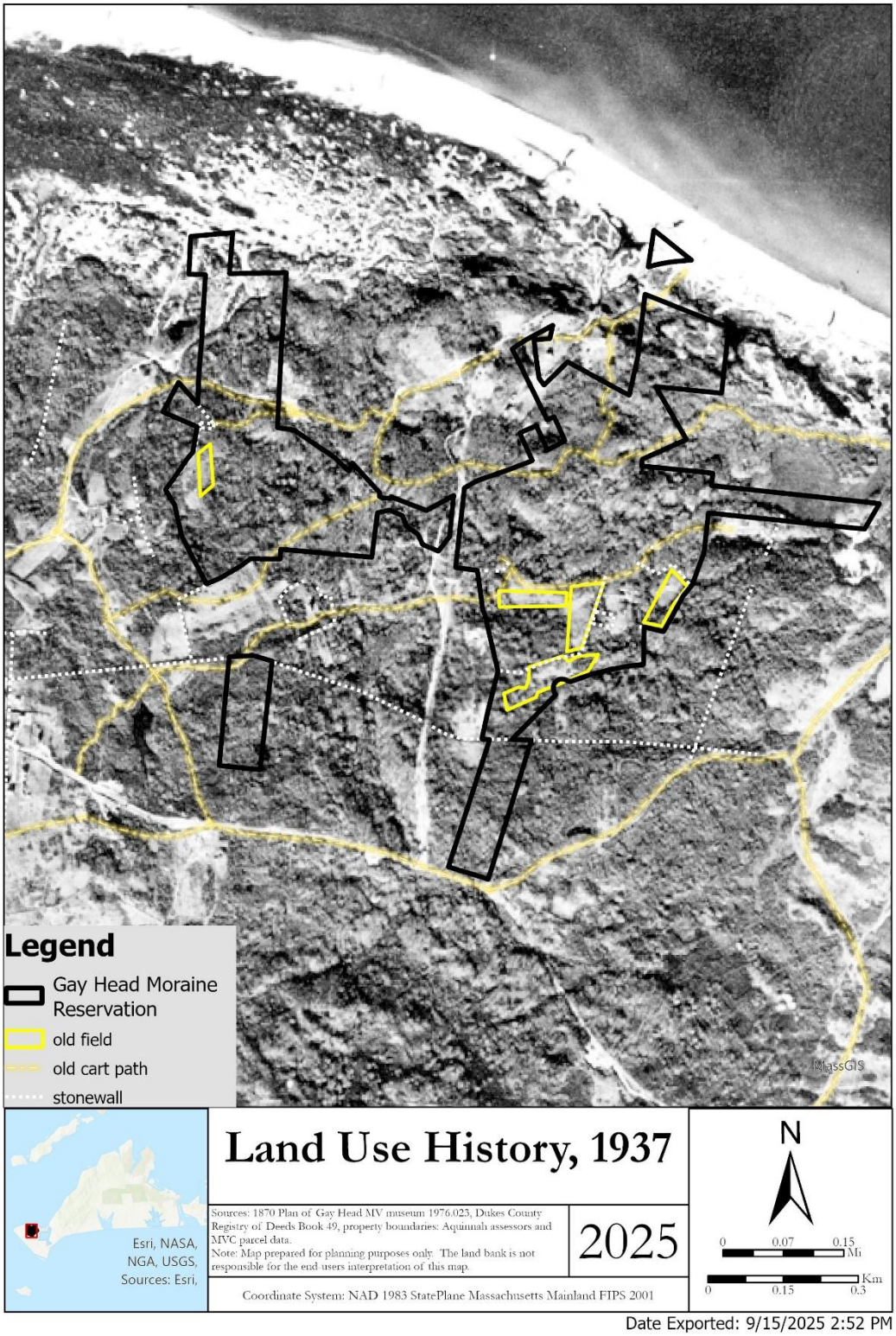
Map 10: Land use map based on 1937 aerial photographs



D. property and Development Characteristics

1. Legal and Regulatory Context

i. Easements, Rights and Restrictions

a) Conservation Restrictions

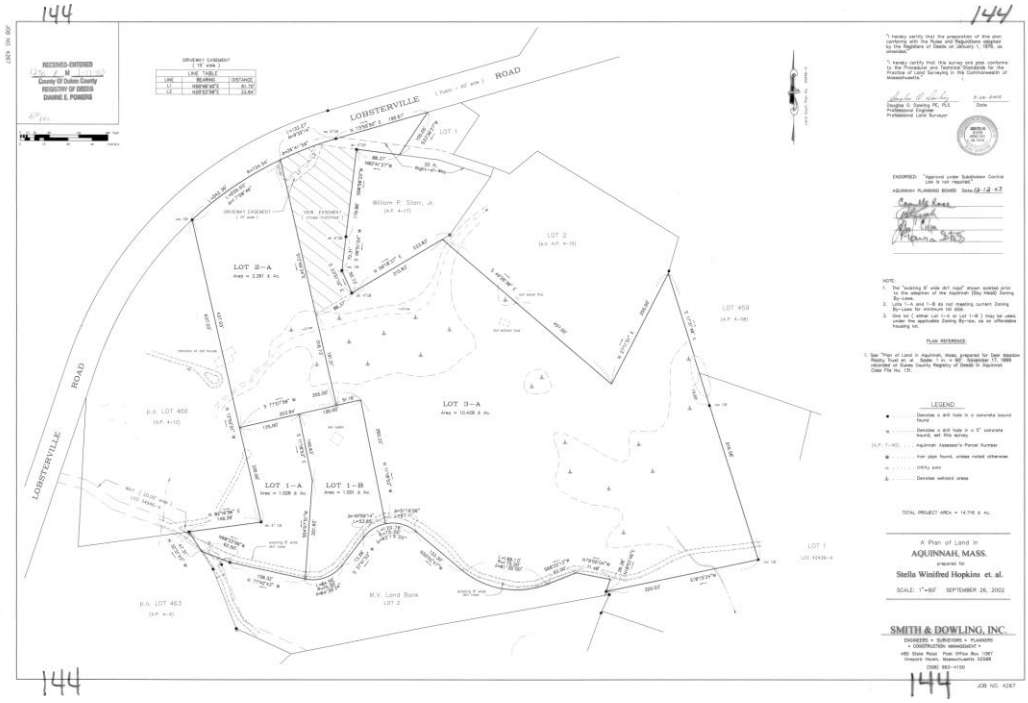
There are no conservation restrictions held over Gay Head Moraine Reservation and none that are held by the Martha's Vineyard Land Bank Commission and included in the property boundaries.

b) Deed Restrictions

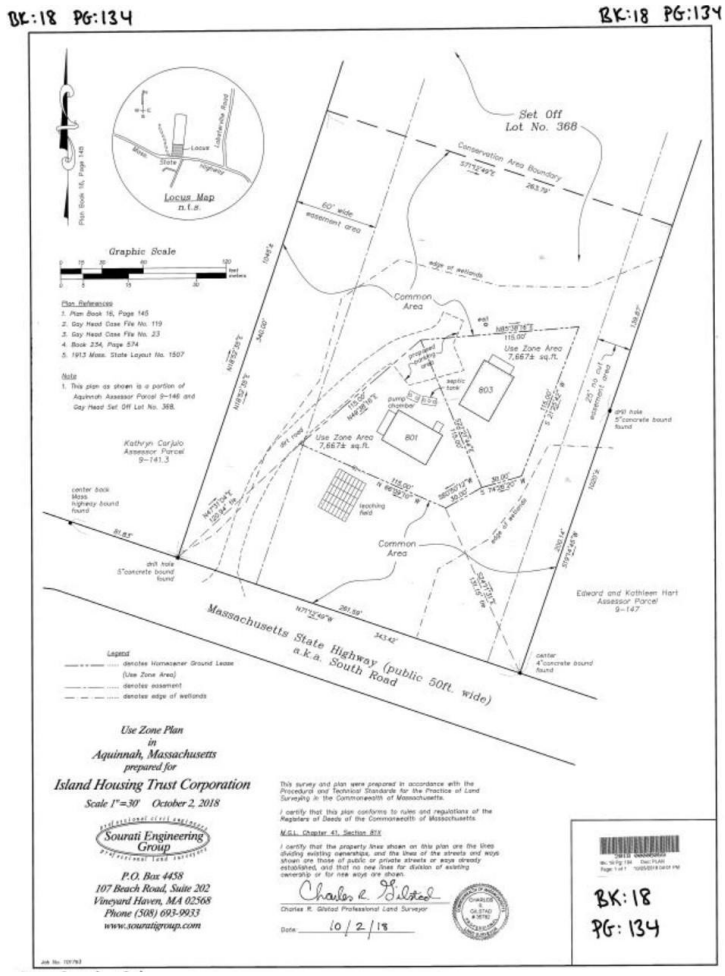
There are no deed restrictions over property included within the boundaries of Gay Head Moraine Reservation.

c) Easements

Abutting lot 15.5 on Aquinnah assessors map 4 has a 15' right of way over a portion of Gay Head Moraine Reservation as well as a view easement over a portion of lot 3A, Map 4. The land bank holds two 60' long and 25' wide no-cut easement areas over a parcel owned by the Island Housing Corporation.



(Hopkins survey, DCRD: Book 000A, page 144).



(Island Housing Corporation survey, DCRD: Book 18, page 134).

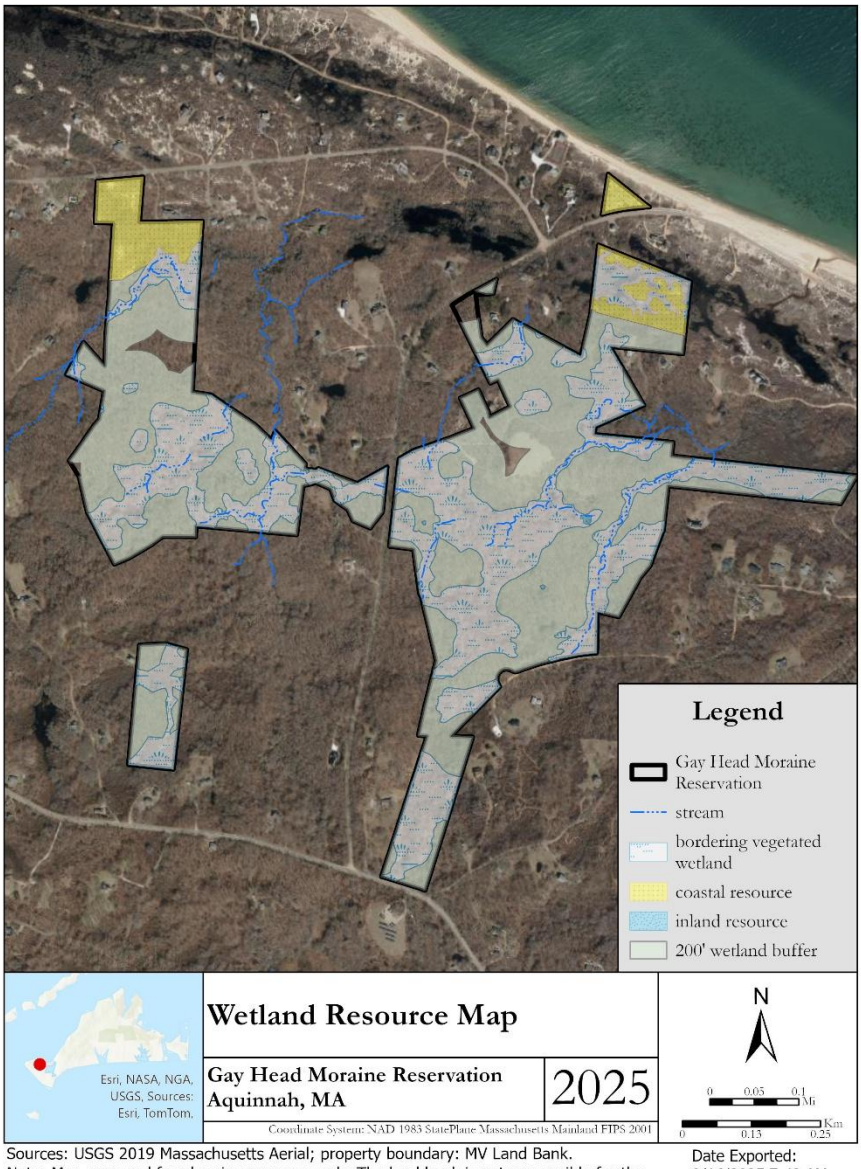
ii. Commonwealth MESA and WPA Filings

Priority habitat is the geographic extent of commonwealth-listed plant/wildlife species that fall under Massachusetts Endangered Species Act (MESA) rulings. Estimated habitat is the extent of listed wetland wildlife species alone and is protected by Wetland Protection Act (WPA) and MESA rulings. Projects proposed within these protected habitats that are not exempt (e.g., agriculture, maintenance of existing roads, rare species habitat management) must be approved by NHESP and, in the case of wetland habitat, additional approval is required from the Aquinnah conservation commission and Department of Environmental Protection (DEP) in order to ensure that activities are not harming protected species or their habitats. This project is not proposed in rare species priority habitat and but is within wetland habitat (Map 13, page 40 and,

Map 40, page 169). Prior to implementation of the management plan a MESA application must be filed with NHESP for the entirety of the project proposed in Priority Habitat along with a Notice of Intent for work proposed in Estimated Habitat under the WPA.

The MESA filing and NOI details located in Appendix G and H include detailed descriptions of management actions proposed in this plan that mitigate any possible impacts to listed-species and wetland habitats (page 170 and 171).

Map 11: Wetland resource and buffer zone map for Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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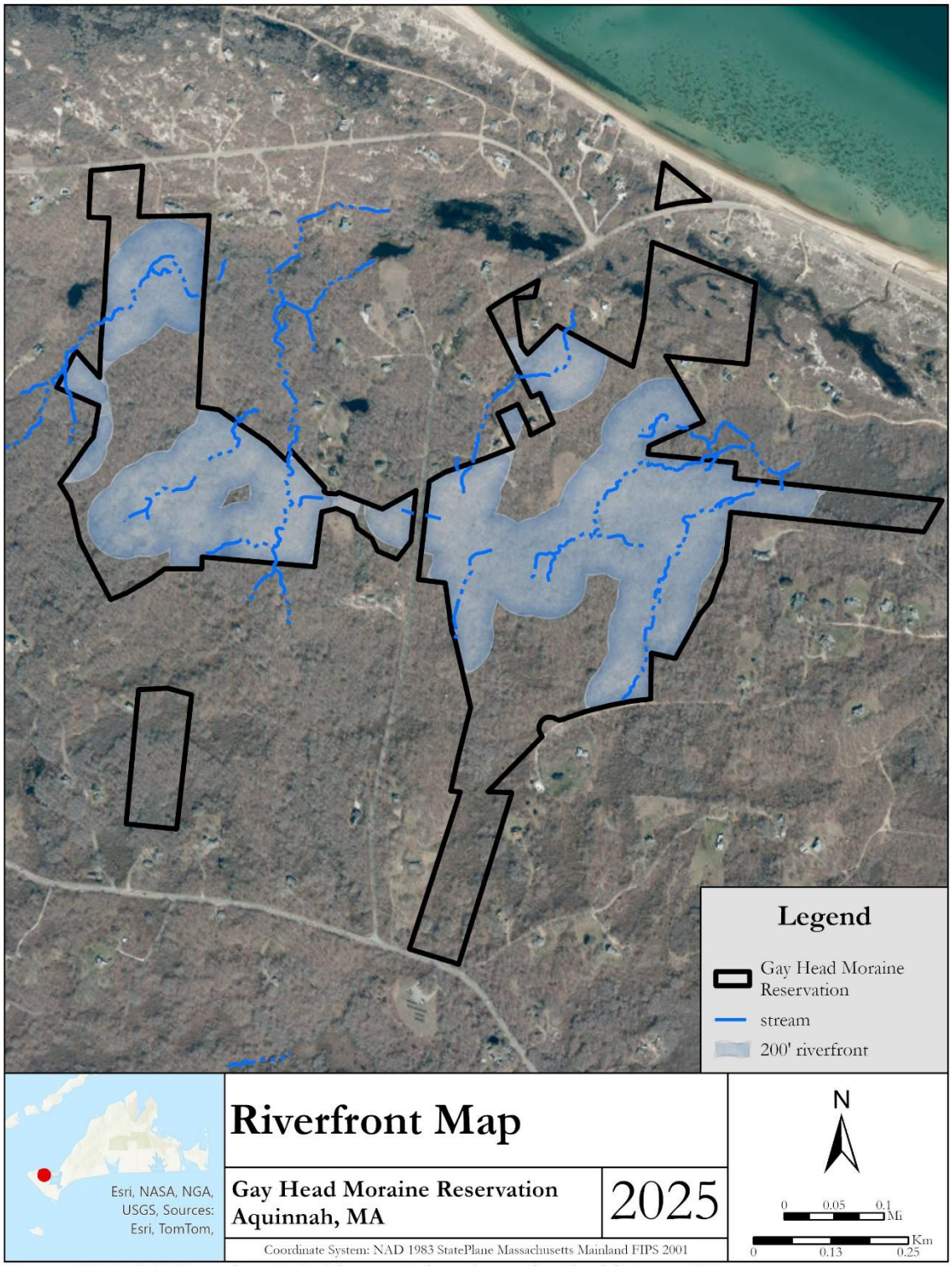
Map 12: 200’ Riverfront Map for Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2019 Massachusetts Aerial; property boundary and wetland features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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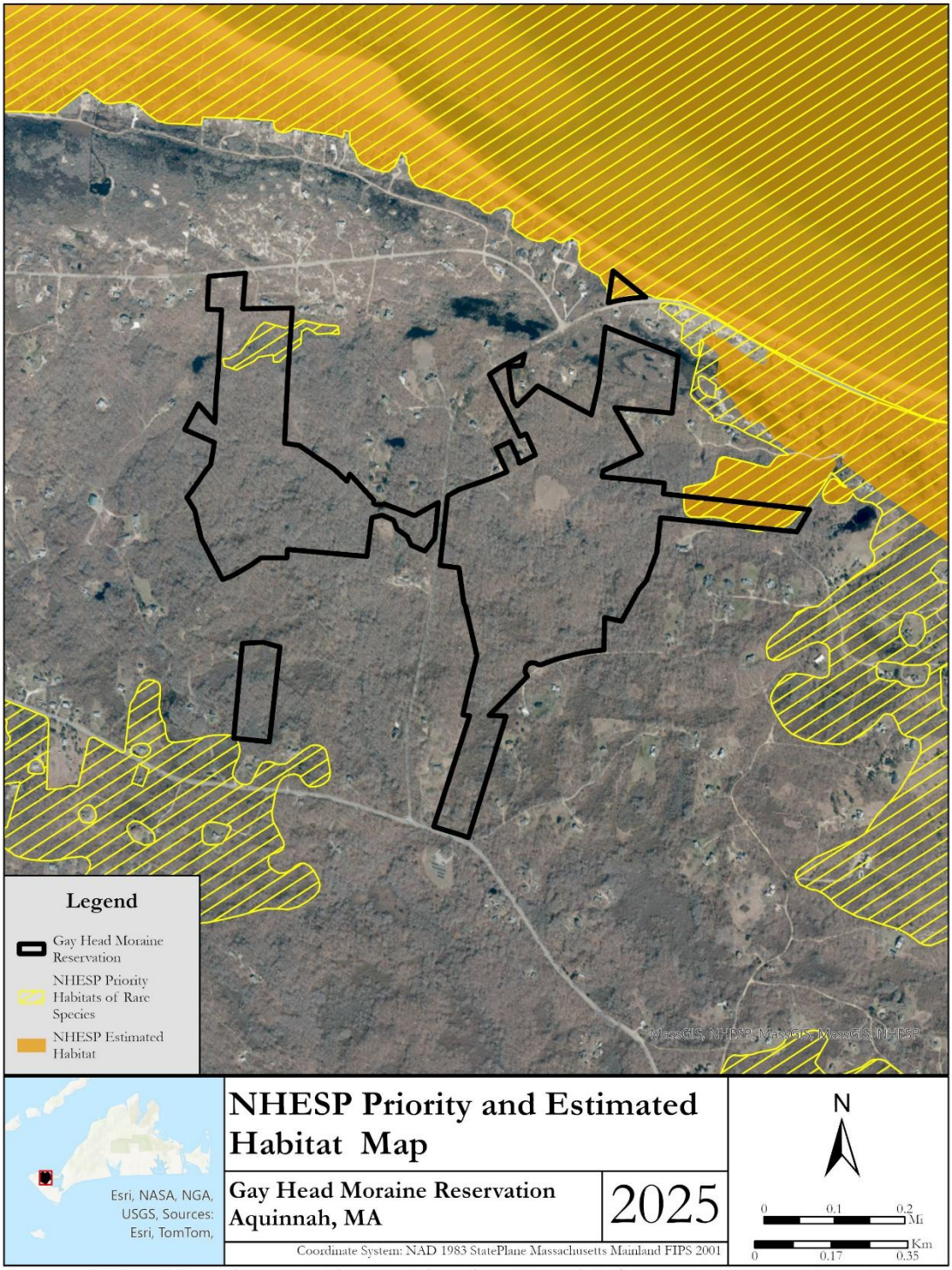
Map 13: NHESP priority and estimated habitat map for Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2023 Massachusetts Aerial; property boundary: MV Land Bank; NHESP layer: MassGIS. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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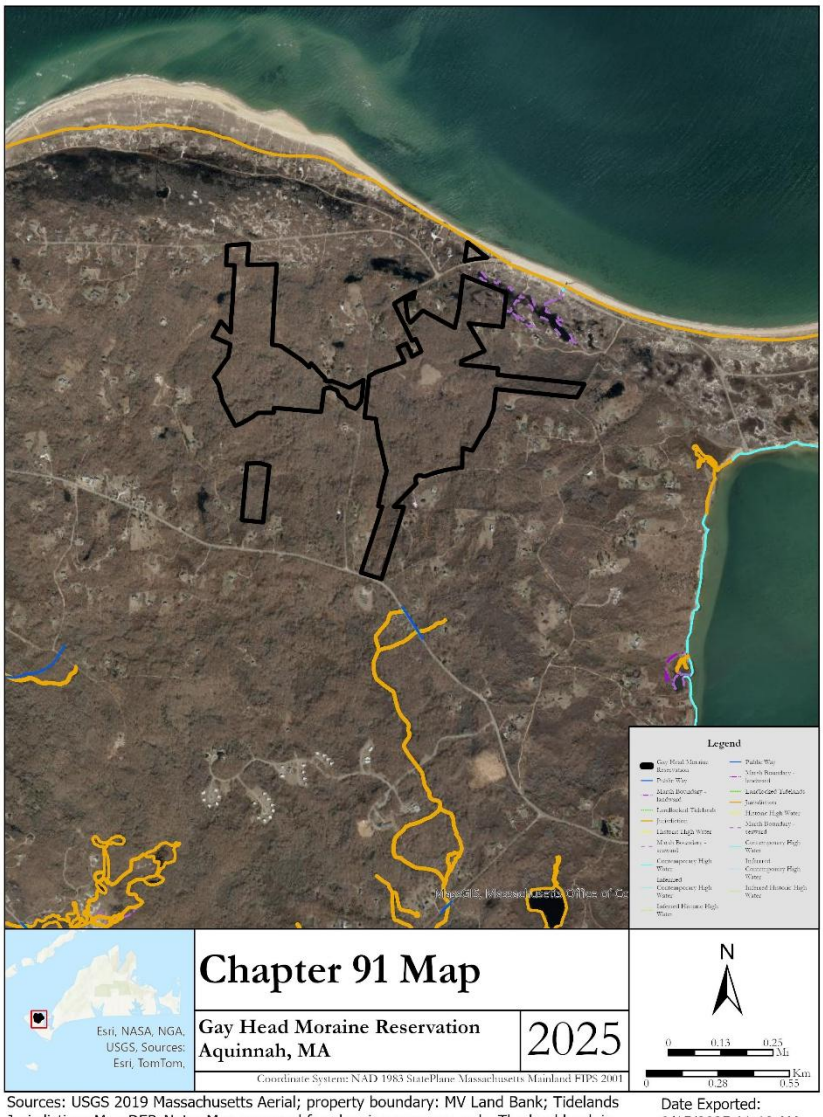
iii. Chapter 91

Gay Head Moraine Reservation is not mapped in the presumed tidelands jurisdiction of MassDEP under M.G.L. c. 91 and the Waterways Regulations in 310 CMR 9.00 (Map 14, page 41).

Map 14: Jurisdiction pursuant to Chapter 91 regulations at 310 CMR 9.04 Map, Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; Tidelands Jurisdiction: MassDEP. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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iv. Districts of Critical Planning Concern and Overlay Districts

The Martha's Vineyard Commission has the power to define and designate districts of critical planning concern (DCPC). Gay Head Moraine Reservation falls within 5 districts within the Aquinnah Overlay Zoning: Building Permit Limitation District, Coastal District, Flood Plain Zone, Island Roads District, and Town of Aquinnah District. (Map 15, page 43). The DCPCs and Overlay

Districts are governed by Aquinnah Zoning Bylaws found in Article V and are described as follows as they relate to this management plan:

a) Coastal District

Within the Coastal District (Article V 5.1) a special permit is required from the Aquinnah planning board review committee for any structure within 200 ft of a resource area, for vehicular access greater than 10 ft in width, and for any installation of aboveground utilities. In addition, groundwater wells and sanitary disposal systems require a permit and must be located 200 feet from saltwater bodies. The boardwalk through the interdunal marsh swale/coastal dune (1,178 linear feet, 4,716 ft^2) and 86 linear feet (688 ft^2) of trail through coastal woodland will require permission from the Aquinnah planning board.

b) Island Roads District

Within the Island Roads District, a special permit is required to alter any stonewalls. All curbcuts must be 1,000 ft from any other vehicular access on the same side of the road. Fences within 200 feet of major roads that are more than 36 inches in height and obstruct the view from the road to the nearest waterway require special permits. The plan does not propose to alter stonewalls on the property; or install fences that would obstruct views from the road.

c) Special Places District

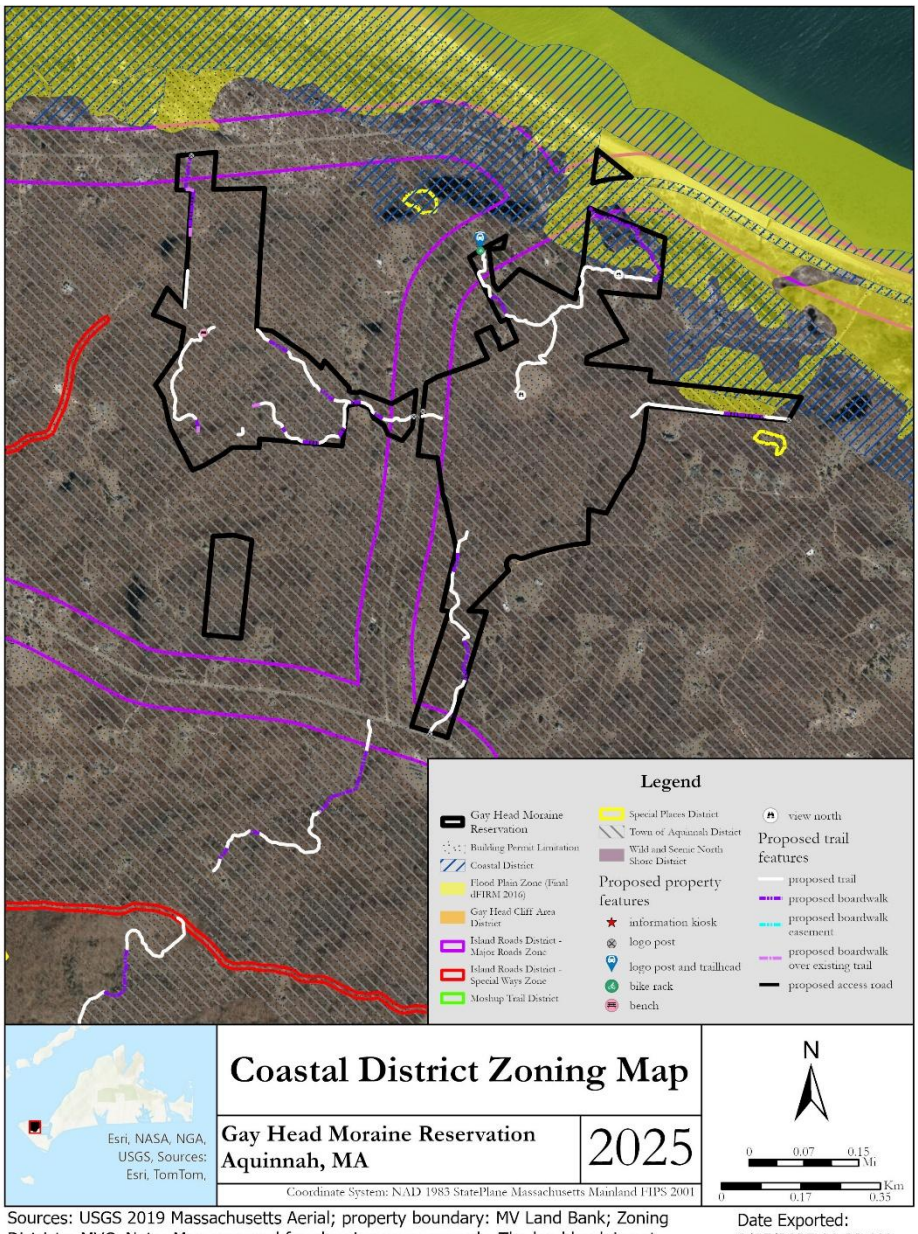
In Aquinnah, any development must be 40 feet from a special place as listed on the register of the Martha's Vineyard Commission. A special permit is required to clear vegetation, develop or construct within 100 feet of Occooch Pond (and high-water marks) Toad Rock, Clay Pits, Mittark's Grave, Silas Paul's Grave, Gay Head Cattle Pound, Cook's Spring, Gay Head Baptists Church/Parsonage, Old Indian Cemetery, Indian Burial Ground Lot1, Indian Burial Ground-Old Lobsterville Road, Gay Head School, and Deacon Simon Johnson House. Permitted uses within the 100 feet include outdoor recreation and actions related to conservation and agriculture. The nearest special place, the clay pits, to the proposed management activities in the plan is 100 feet away. Creation of trails for recreation is a permitted use within the 100-foot area around a special place and would be exempt from requiring a special permit.

d) Town of Aquinnah District

With the Aquinnah Town District of Critical Planning Concern (Article XIII) a special permit is required from the Aquinnah planning board review committee for: any structures; curbcuts; driveways; pedestrian paths over 3ft in width; roads wider than 12 ft; use of any impervious materials; signs; the removal of all living trees over 3 ft diameter at base from an area greater than 200 ft^2; the removal of any living tree over 9 in diameter at base; and any aggressive pruning (removal and pruning of trees requires site-visit and approval from the tree warden). Within coastal areas (500 ft from high watermark), except on municipal lots, no new boardwalks or parking lots are permitted. Prior to any development a project notification form must be submitted to the Massachusetts Historical Commission and the Aquinnah

planning board review committee to determine if a survey is required to protect historical and archeological resources of the property. The entirety of the property is within the Town of Aquinnah District. Although the interdunal marsh swale boardwalk is just shy of 500 feet from the mean high-water mark, it is permittable as a municipal use. The new trails, boardwalks, access driveway, 3-vehicle trailhead, cultural features maintenance, logo markers and view clearings will require a special permit from the Aquinnah Planning Board.

Map 15: Districts of Critical Planning Concerns map, Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; Zoning Districts: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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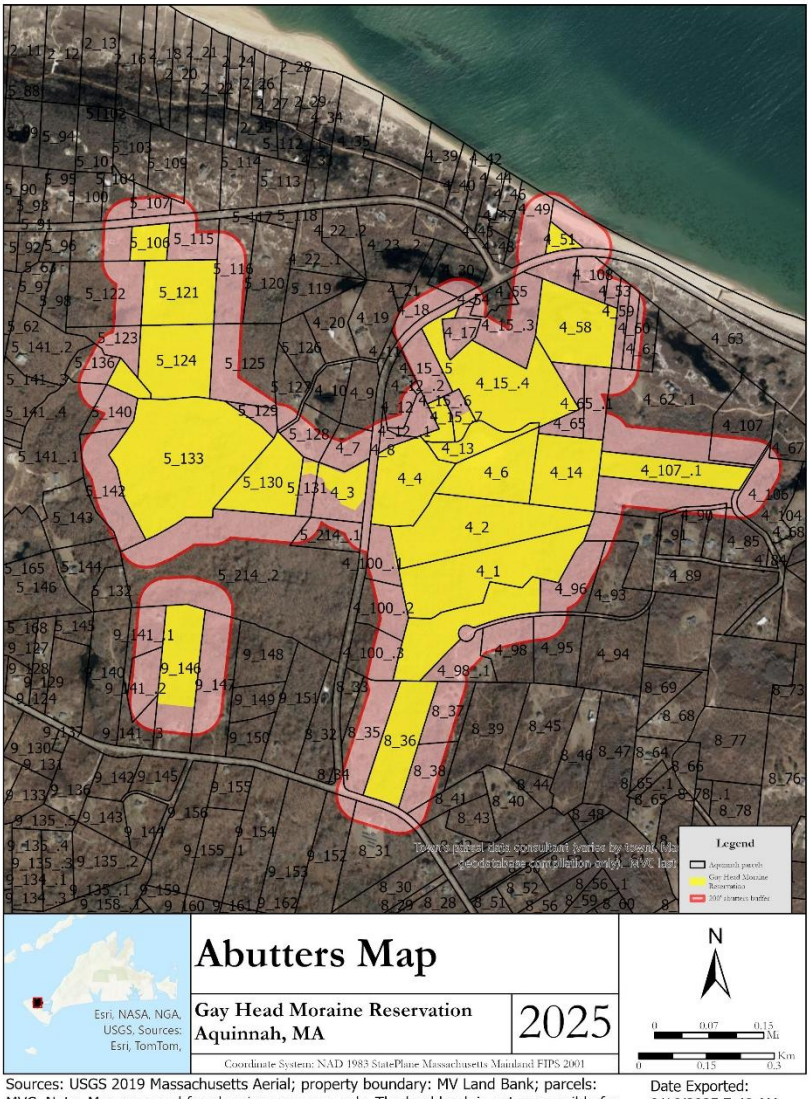
2. Abutters

A list of those owning land abutting or within 200 feet of Gay Head Moraine Reservation was generated based on the Aquinnah 2024 Assessors Map as it appears in the AxisGIS program (Map 16, page 44, Appendix I: Map 43, page 185). Abutters are included in Appendix I: Table 26, page 186.

Map 16: Abutters within 200 feet of the property boundary for Gay Head Moraine Reservation



3. Existing Use and Infrastructure

Gay Head Moraine Reservation is bounded by State Road to the south, Lighthouse Road to the north, Clay Pit Road to the east, and Lobsterville Road bisecting the property in the middle. The property is surrounded by private development. The area has an extensive network of existing trails, some well-trodden and others are overgrown and barely recognizable. The following uses and infrastructure occurring on the property are listed below and depicted on Map 17, page 48.

i. Roads:

Two roads cross through Gay Head Moraine Reservation: Beechwood Way (168') and Beach Rose Way (1,300'). Beechwood Way is within a 20' easement with access to two house lots and Beach Rose Way is a dirt road that services five house lots. Access to the existing Gay Head Moraine Reservation trailheads is over a 20-foot easement that comprises the first 300' of Beach Rose Way and forks to the trailheads (574'). The property has road frontage on four roads – 1,120' on Lobsterville Road, 194' on Clay Pit Road, 273' on State Road, and 275' on Lighthouse Road.

Figure 11: Existing access road and Beach Rose Way (dirt road)

ii. Trails:

There are 17,262 linear feet of existing trails, boardwalks, cartpaths and access roads on the property. The land bank is currently managing 8,873 linear feet of these ways. The balance of the ways are remnants of paths managed prior to land bank acquisition.

a) Trails:

1) Existing loop trail

Of the 9,743 linear feet of existing trails, the land bank currently maintains 4,138 linear feet of a loop trail. The trail loop offers long-distance views of Vineyard Sound and interior views of wetlands and cultural features. A portion of the trail travels through a thicket of sweet pepperbush creating a labyrinth effect (Figure 12, page 45).

Figure 12: Existing trail

Figure 13: Existing UA trail

An additional 638 linear feet of trail is maintained for universal access use (Figure 13, page 45).

2) Unmanaged trails

There are 4,967 linear feet of unmanaged trails on the portion of the property west of Lobsterville Road (Figure 14, page 45).

Figure 14: Existing unmanaged trail

b) Boardwalks:

There are thirteen stretches of boardwalk on the property that cross six streams, a red maple swamp and a coastal dune. Eleven of the boardwalks are raised and two are ground level.

1) Existing trail system

Eight boardwalks are maintained in the existing trail system with pressure treated decking and diamond pier or pin-and-plate footers (Figure 15, page 45).

Figure 15: Existing boardwalk in trail loop

2) Unmanaged trail system

The five boardwalks that are on unmanaged trails are decked with an assortment of wood materials and have wooden footers (Figure 16, page 46).

Figure 16: Existing

c) Cart paths:

Remnants of 5,119 linear feet of antiquated cart paths cross the property from the cranberry bogs to the east through the Manning, Diamond and Nevers homesteads towards Deacon Simon Johnsons homestead and the more developed area of Aquinnah around Old South Road (Figure 17, page 46). Some are well defined and have been incorporated into dirt access roads such as Beach Rose Way while others may be difficult to discern in the densely vegetated landscape. The once familiar paths remain as visible depressions in the woodland floor with open corridors through the trees. However, some are too overgrown with vegetation to be differentiated by the incurious observer. Lidar imaging and mid-19th century maps were used to locate additional paths.

Figure 17: Old cart path

iii. Gates and Fencing:

There is a short section of split rail fence along the property boundary off Lighthouse Road.

iv. Stonewall and Foundations

Approximately 5,416 linear feet of stonewalls outline homesteads, agricultural land, enclosures, historic common lands, and property boundaries. There are six visible foundations including house, barn and root cellars on the preserve (Figure 18, page 46).

Figure 18: Stone foundations and walls

v. Culverts and dams

Two historic earthen dams are located near the southern boundary of the property area west of Lobsterville Road in an area generally described in deeds and the 1870 description of North Pasture as the "Watering Place" (Land Titles and boundary lines of Indian lands at Gay Head, Martha's Vineyard, Mass, Richard Pease 1871) (Figure 19, page 46). The dams had a two-fold effect: water could accumulate

Figure 20: Earthen dam

Figure 19: Culvert and pond

upstream and serve as a reservoir for livestock and crops and the downstream land could dry up and be used for farming or building dwellings.

The culverts on the property are modern water-management structures Figure 20, page 46). Here are three and they all divert water under roads and paths. They are approximately 15-24" in diameter and are undersized, resulting in pooling of water upstream as is the case where the pond has formed.

vi. Trailheads

A five-vehicle trailhead is located off Beach Rose Way. A one-vehicle universal access trailhead is located 430 feet from the primary trailhead east along a vehicle access road (Figure 21, page 47).

Figure 21: Existing 5-vehicle trailhead and UA trailhead

vii. Logo post, information signs and benches

A land bank logo post is located off Lobsterville Road at the entrance to Beach Rose Way. An information kiosk is located at the trailhead providing important information regarding the rules of the property as well as ecological and land use history knowledge. There are three benches on the property (Figure 22, page 47).

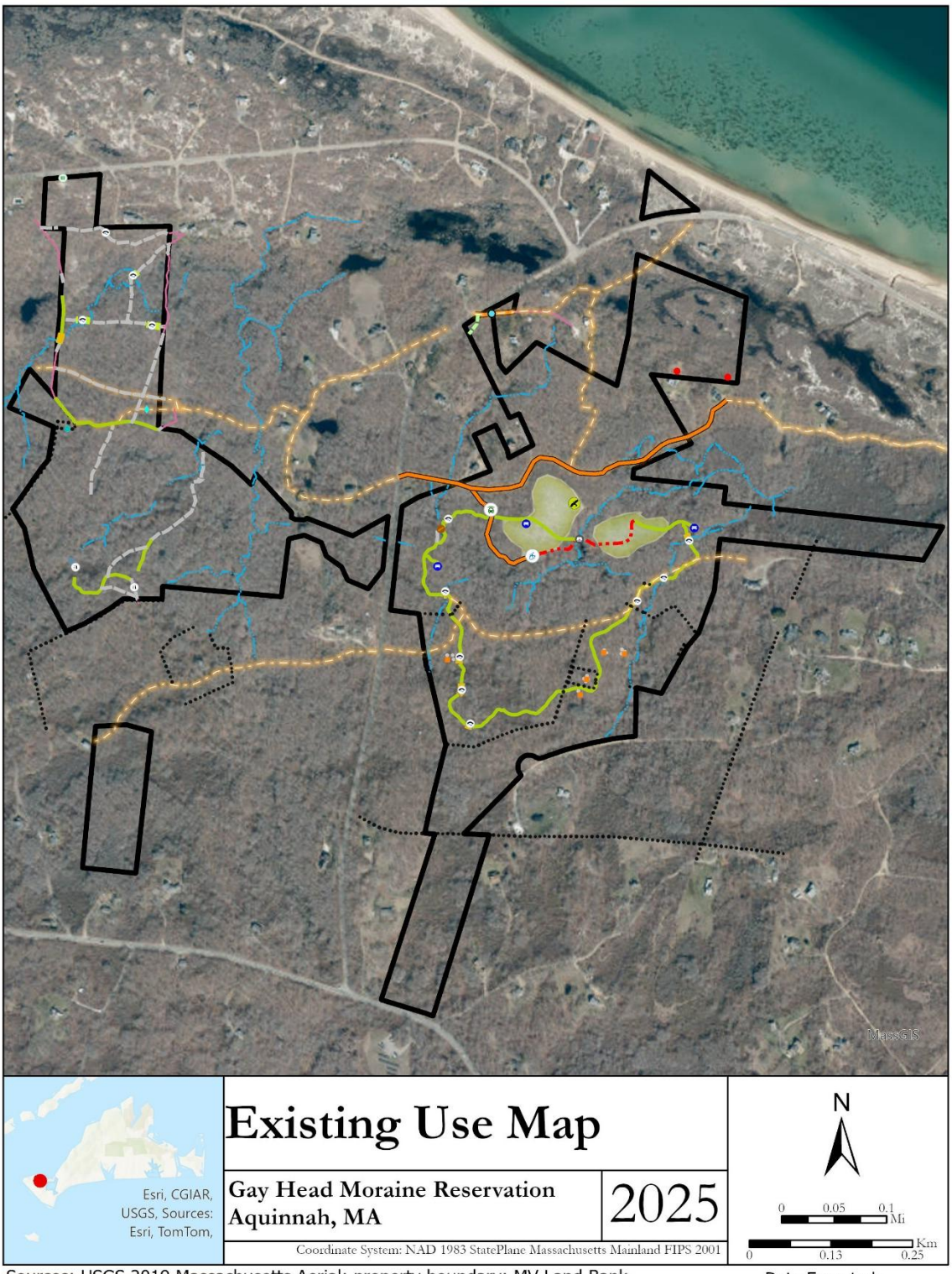
Figure 22: Logo post, information kiosk, and bench

viii. Wildlife features

An osprey pole erected in the sandplain grassland has not been used during survey years 1999-2024 (Figure 23, page 47).

Figure 23: Existing osprey pole

Map 17: Existing use map of Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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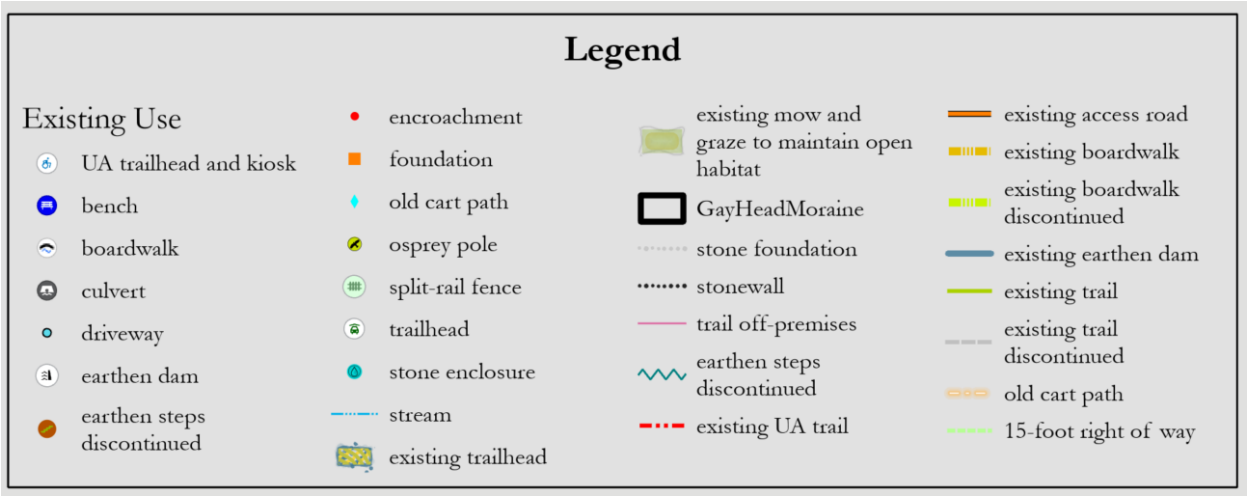


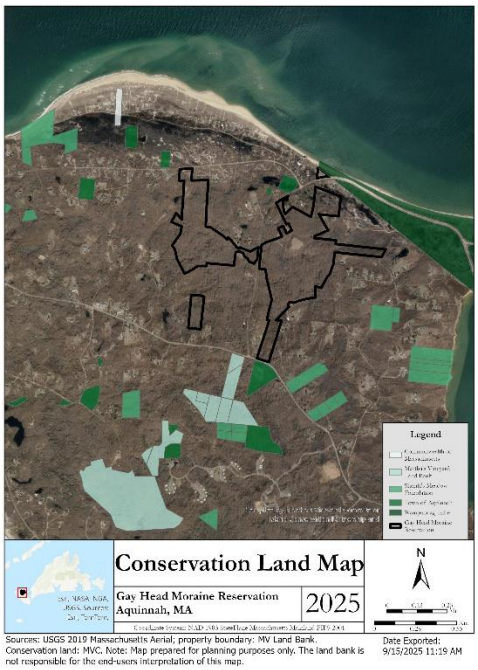
II. Inventory Analysis

A. Constraints & Issues

1. Ecological Context

Gay Head Moraine Reservation is central to many other conserved parcels of land owned by the town of Aquinnah, Wampanoag Tribe, Sheriff's Meadow Foundation and the commonwealth of Massachusetts, not all of which are open to the public (Map 18, page 49). The mosaic of habitats that compose Gay Head Moraine Reservation coupled with large acreages of undeveloped land surrounding the property results in an area of great biodiversity including several commonwealth-listed plants and wildlife species.

Map 18: Private and public conservation land surrounding Gay Head Moraine Reservation, Aquinnah, MA



2. Natural and Cultural Resource Concerns

There are six main areas of concern at Gay Head Moraine Reservation. The impacts of this management plan on each concern are briefly addressed below with mitigation strategies discussed in more detail in the land management section of the plan:

i. Commonwealth-listed rare species

Three commonwealth-listed lepidoptera species, three avian species, five mammal species and two plant species were observed during ecological surveys of Gay Head Moraine Reservation; protection of the wetlands, woodlands and coastal dune habitats, as well as continued monitoring, will benefit these species and are included in this management plan.

A total of 4% of the property is mapped for priority habitat of rare species by NHESP (Natural Heritage and Endangered Species Program) and is designated as such for one moth species, one plant species and two bird species (Table 3, page 28).

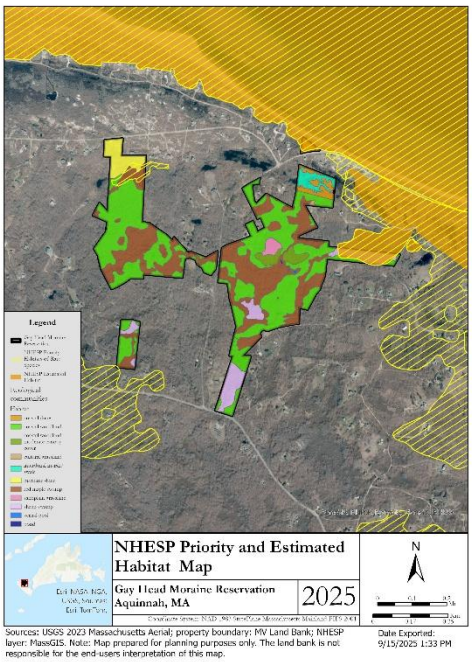
The listed moth species linked to the priority habitat on the property depends on inland marsh habitats with wetland grasses which occurs on 2% of the property in the interdunal swale and shrub swamp. Planned trails in this plan intersect with the priority habitat in the shrub swamp where a proposed trail to Clay Pit Road is located. The moth species was not observed during lepidoptera black-light surveys. However, the plan minimizes impacts in this habitat through avoidance in the interdunal swale and use of light-penetrating boardwalk decking where avoidance is not feasible and by siting the shrub swamp trail on the edge of the habitat and using raised boardwalks with light-penetrating decking. Additionally, protecting hydrological functions of the property by improving culverts and siting boardwalks over stream crossings as management goals will benefit listed species associated with the wetlands of the property.

One of the two bird species designated for the priority habitat on the property was observed flying overhead hunting during regular avian point counts. Breeding surveys for this species were conducted in May of 2008. No observed breeding behavior was reported during the 2008 survey and subsequent point counts during the breeding season. Breeding habitat for this species is limited to the dune area. Requiring dogs to be leashed and maintaining open hunting habitats will help protect this species. The other bird species protected by the priority habitat on the property is a shorebird species. The property does not have any shoreline habitat. Gay Head Moraine Reservation does not provide suitable for breeding or forage for this avian species.

The plant species designated as occurring in the priority habitat for the property was first observed and reported to NHESP in 2018 by land bank staff. Trails are proposed in this management plan well outside of the area where this species occurs in the woodland. Promoting structural diversity as a management goal will benefit this listed species, as well as create opportunities for additional listed species to propagate. Opening parts of the woodland canopy congruent with light rotational grazing of the understory in specific areas of Gay Head Moraine Reservation where the plant does not exist will create opportunities for listed woodland species that are stressed from competing understory vegetation to migrate and expand into.

A complete list of mitigation strategies for listed species is included in Appendix G (page 170).

Map 19: NHESP Priority habitat mapped on and around Gay Head Moraine Reservation, Aquinnah



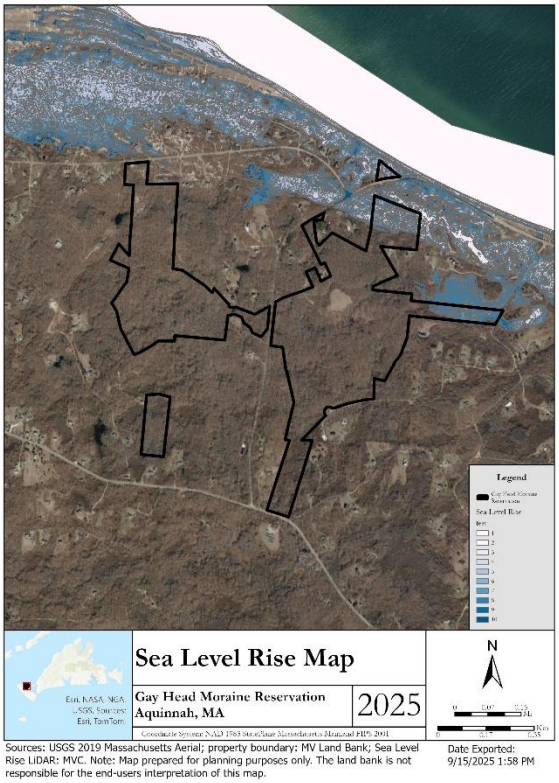
ii. Wetlands

The freshwater wetland, coastal wetland, marsh, swamp, land subject to flooding, streams, pond, and land lying within 200 feet thereof are considered “wetland resource areas” under the Aquinnah Wetlands Bylaw and Massachusetts Wetlands Protection Act (Map 11, page 38). Additionally, 200 feet from any stream is protected by the Massachusetts Riverfront Act of 1996 (Map 12, page 39). The area of impact from installing trails and boardwalks over these resource areas triggers a filing for a Notice of Intent with the Aquinnah conservation commission and Massachusetts Department of Environmental Protection (MA DEP). A total of 4.15 acres is proposed to be impacted with the implementation of this plan. The complete filing is located in Appendix H, page 171.

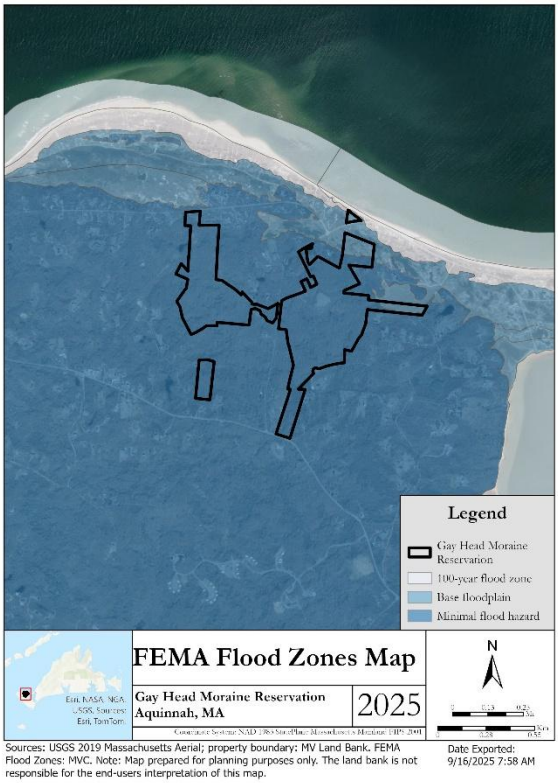
iii. Sea Level Rise

Sea level rise is a concern for any coastal property. A small portion of the property, 6.7 acres, is within the 3-10-foot LiDAR sea level rise projection in the 500-year flood zone (Map 30, page 87). Rising sea levels put delicate habitat, like marshes, at risk for flooding. The boardwalks proposed in these areas will need to be adjustable to accommodate any rise in the water table and migration of coastal habitats. Conserving and/or developing landward areas of the 3-10-foot rise would protect interior habitat by allowing the western portion of coastal dune to retreat inland in response to higher water levels. The coastal dune and interdunal swale areas have a steep bank landward of the flood zone that will hinder any future migration of the habitat. The remainder of the property is not impacted by sea-level rise (Map 20 and 21, page 52).

Map 20: Sea-level rise map



Map 21: FEMA 100-year flood zone map



iv. Invasive species

Invasive species are an increasing concern on all property. Exotic and/or invasive species outcompete and displace native species, altering the composition of natural vegetation communities (Somers 1996). Often without natural enemies, these seedlings compete for nutrients, water, and light with neighboring plants, or even directly kill native plants. Annual monitoring and quick control and removal of invasive species are important to maintain an ecological balance and the integrity of habitats on the property. Invasive species that are known to impact the property can be found in Table 8, page 115 and are highlighted in yellow.

v. Indigenous People's artifacts and historical cultural resources.

Many areas of Martha's Vineyard contain significant archaeological findings from the prehistoric Paleoindian period [12,000-9,000 before common era (BCE)], archaic period (9,000-3,000 BCE) and woodland period (3000 BCE – European contact (1600 CE) as well as historical cultural resources from early European settlement (Griffin 1967, MACRIS https://mhc-macris.net). Aquinnah is an exceptional location for pristine prehistoric archaeological artifacts, especially where seasonal villages were located near freshwater that abuts the coast. Evidence of indigenous people's use of the land is often left behind in the form of tools and

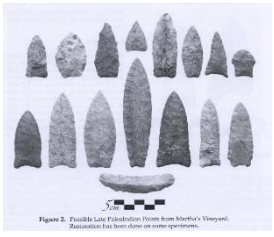


Figure 24: Possible late paleoIndian points from Martha's Vineyard, (Moody 2008)

shell middens or trash piles (Figure 24, page 52). A clear picture of the past can be difficult to rebuild after common era disturbance. Due to the extensive time period of Wampanoag occupation in Aquinnah, disruptions to archaeological artifacts were protected from the typical plowing and development that occurred more commonly in other parts of the island.

The area of Aquinnah is identified on maps as "Indian Settlement (Lands)" until at least 1870 (Figure 25, page 53). The artifacts in Aquinnah represent more than 9,000 years of use by indigenous people (Hufstader 2018 and Moody 2008). At this time 450 acres of Aquinnah were held in individual homesteads and the remaining 2,000 acres were held as common land. The entirety of the property was located in what was North Pasture, a common area described as a "rough piece of land" in the 1871 land division with minimal homesteads according to the sectional plans of 1871 [Dukes County Registry of Deeds (DCRD) bk49:pg106] suggesting it was not cleared extensively for cultivation. For over 100 years the only development on Gay Head Moraine Reservation occurred within the two homesteads (Alvin Manning and Thomas Jeffers) in addition to minimal development to accommodate pasturing. A small area was developed by the Nityananda Institute on the eastern portion of the property in the mid-1990s. Much of the woodland is ancient and any artifacts from past uses are undisturbed on the property. Management strategies such as pounding posts instead of digging; building up universal access trails by adding material; and covering exposed soil on trails with wood chips are proposed to mitigate the exposure and disturbance of archaeological items that are presumed to exist on the property.

Figure 25: Maps of Wampanoag settlement in Aquinnah from 1620-1871

There are no places on the property designated as a Massachusetts historic cultural resource (Map 22, page 54). However, there are several places north of the property that are designated as important cultural resources that are discussed in detail in the land use history section in Appendix F, page 159).

Map 22: Massachusetts Historical Commission cultural resource information system map (https://mhc-macris.net/)

vi. Erosion

A large portion of Gay Head Moraine Reservation is wetland habitat. Recreational use can result in erosion near streams and ponds that increases siltation and eutrophication. Erosion is also a concern for recreation in areas where groundwater is closer to the surface. Use of boardwalks and impact dispersion techniques on the ground at the end of boardwalks will minimize soil displacement into streams and ponds and destabilization of the trail surface.

The property comprises hills as well as lowland wetlands. Siting trails properly to take advantage of cross slopes when traversing hills and pitching trails to move water across trails into neighboring leaf litter will minimize erosion of the trail and prevent rutting. Preventing bicycles and horses on trails through wetland habitats will minimize recreational impacts to the trail surface.

vii. Sociological Context

Gay Head Moraine Reservation is positioned in the town of Aquinnah between State Road and the intersection of Lighthouse and Lobsterville Road. It is bisected by Lobsterville Road. The property is within one mile of Aquinnah center and is surrounded by both private residences. The area is admired for its cultural significance and scenic, recreational value.

viii. Neighborhood Concerns

The land bank considers the concerns of neighbors as part of the planning process. All abutting property owners and the local conservation commission are sent written notice of a public

hearing on the draft plan. All neighbors and all members of the public are invited to review the draft plan, attend the public hearing, and make written or oral comments. Anyone may also express concerns at any public meeting of the Martha's Vineyard land bank commission and Aquinnah town advisory board or may simply contact land bank staff. The land bank's Aquinnah town advisory board and the Martha's Vineyard land bank commission review all comments and can change the draft plan if desired. Some general concerns already incorporated into this management plan include:

a) Trespassing on private property.

b) Hunting near private residences.

B. Addressing Problems and Opportunities

1. Land bank mandate

In 1986, the voters of Martha's Vineyard created the land bank to acquire, hold, and manage land in a predominantly natural, scenic, or open condition. The land bank keeps open space open and allows modest public use. Its "shared-use" policy strives to provide a range of public benefits, from low-impact recreation and aesthetics to wildlife conservation and watershed protection. Protection of natural resources is the land bank's highest priority, yet "shared-use" demands the balancing of the public use of natural resources with protection of the same.

2. Goals at Purchase

The purchase of Gay Head Moraine Reservation meets six of the land bank's nine criteria for property acquisition: forest land conservation; wetland conservation; pond frontage and wetland conservation; protection of scenic vistas; wildlife habitat conservation; easements for trails and for publicly owned lands; and sites for passive recreation.

Preliminary management plans were adopted by the land bank commission and its Aquinnah town advisory board (Appendix B: page 90).

3. Opportunities

The 120 acres of Gay Head Moraine Reservation provide several opportunities for the public to access these scenic landscapes and interact with nature. They are as follows:

i. Access:
An existing five-vehicle trailhead located on Beach Rose Way serves as the primary trailhead for access to the property. Future expansion of the trailhead could be accomplished if demand warrants additional vehicle access.

ii. Trails:
An additional loop trail is proposed for the Gay Head Moraine Reservation on the west side of Lobsterville Road that will connect to the existing loop trail located on the portion of the property east of Lobsterville Road. Five spoke trails are proposed that lead from the figure-eight loop trail

circuit to vehicular ways for a total of 11,799 linear feet (2.2 miles). The proposed trail includes 3,593 linear feet of raised boardwalk through wetlands.

iii. Views:

The property offers roadside views of the coastal dune from Lobsterville Road; interior views of cultural features and varied landscapes; and long-distance views of Vineyard Sound and Menemsha. Two new bench locations are proposed for Gay Head Moraine Reservation, one at the terminus of the universal access trail and one overlooking the stone enclosure (Figure 26, page 56).

Figure 26: Views of Menemsha and Vineyard Sound

iv. Gatherings of natural products:

The property provides ample opportunities for gathering for household use. There are berries harvestable from the trail environs as it meanders through woodlands and wetlands. All gathering must be conducted according to the land bank public use policy: Section 1.0 Permitted uses, 1.2 Household-based harvesting (https://www.mvlandbank.com/properties/all-public-use-policies).

All indigenous people have the right to hunt and fish the wildlife for sustenance in the usual places as was customary according the Resolutions filed in 1982 that reaffirmed the Indian treaty (Falmouth Treaty, Executive Order 126) and Aboriginal rights (MCIA 1982).

v. Fishing:

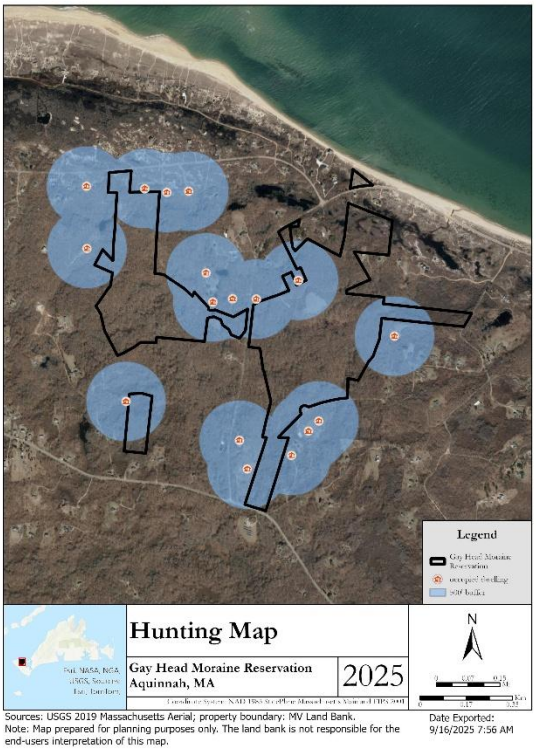
The ocean shorefront of Lobsterville Beach, owned by the Wampanoag tribe and managed by the town of Aquinnah, is a prime spot for reeling in striped bass, especially on a fly-rod, according to legendary island fisherman Cooper Gilkes of Edgartown (Sigelman 2017). Vehicle parking access to Lobsterville Beach is restricted to town residents. The proposed trail through the interdunal swale, when installed, will provide fishermen with walking access to the beach from the trailhead.

Figure 27: Fly-fisherman at Lobsterville Beach, Cooper Gilkes, Sigelman 2017

vi. Hunting:

Nearly half the acreage of Gay Head Moraine Reservation is huntable. The property east of Lobsterville Road is open for general hunting (raccoon, pheasant, turkey and deer) with four hunters allowed on the property at one time during deer-shotgun weeks. The property west of the Lobsterville Road doubles the huntable area of the property. The Lobsterville Road bisection of the property duplicates the huntable area rather than expands it to accommodate more hunters (Map 23, page 57).

Map 23: Huntable area with a firearm at Gay Head Moraine Reservation and zone of no discharge of a firearm 500' from occupied dwellings Map.



vii. Passive recreation:

The property is well-suited for passive recreational.

a) Birdwatching

The variety of habitats provides excellent birdwatching especially during the migratory seasons in April and early September.

b) Hiking

The proposed trails provide an opportunity for 3.5 miles of hiking and will connect to a future trail system to the south.

c) Bicycling and horseback riding.

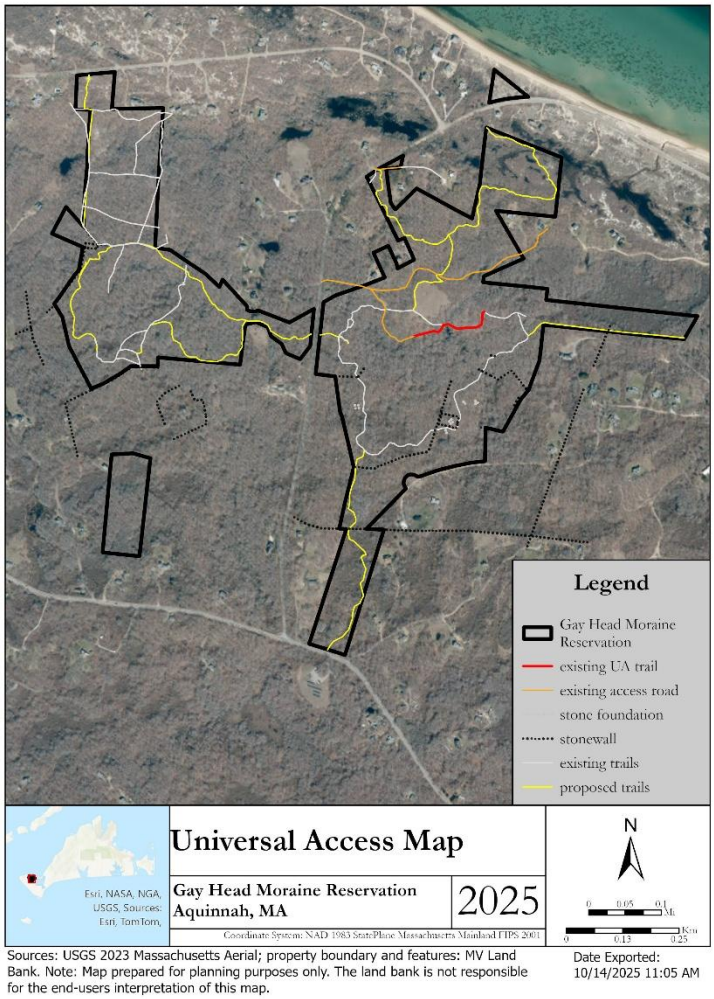
Bicycles and horses cannot be accommodated on the trail system due to the increased erosion concerns on trails and impacts to boardwalks that are located in the wetland habitats throughout the property.

4. Universal Access (UA)

A short stretch (638 linear feet) of universally-accessible trail exists from the universally-accessible vehicle trailhead, over the culvert with view of the pond, and through the grassy understory of the moderately open canopy woodland to the terminus where a long-distance view of Menemsha can be experienced during the winter. The minimal slope and readily-accessible views of Menemsha explain why this location was chosen for universal access (Map 24, page 58). Additional universal access is not feasible elsewhere on the property due to distance from the trailhead, topography and abundance of wetlands.

The property's ROS (Recreation Opportunities Spectrum) classification is "Semi-Primitive Non-motorized". Further details are included in Appendix J, page 191 .

Map 24: Universal access opportunities map for Gay Head Moraine Reservation, Aquinnah, MA



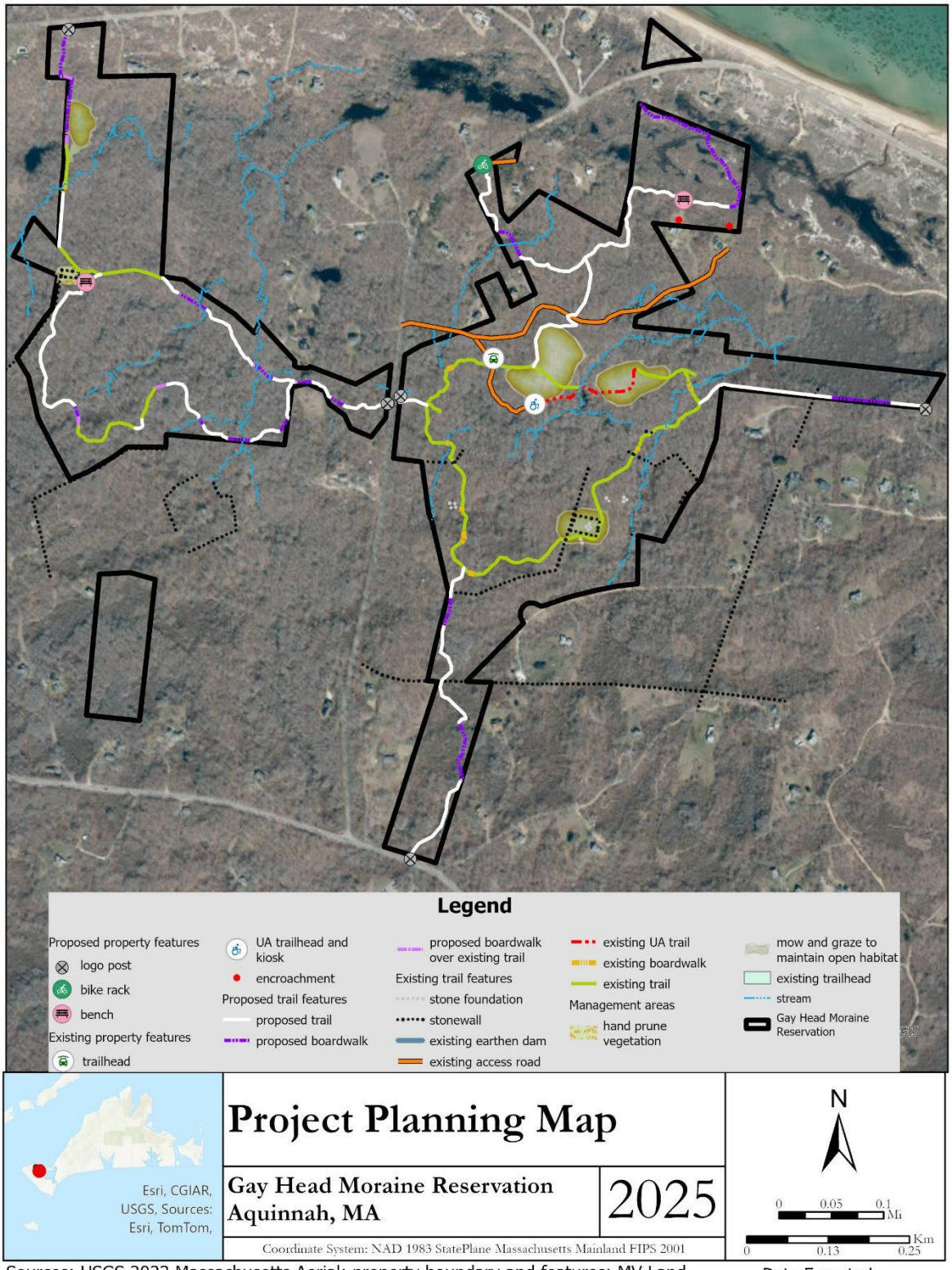
III. Land Management Planning

This final section of the management plan states goals for Gay Head Moraine Reservation and outlines MVLB strategies for achieving them. The plan addresses five areas of planning concern: nature conservation; recreation and aesthetics; natural products; community interaction; and land administration. These goals and strategies are designed to fit within the social and ecological constraints defined previously and, apart from matters under the control of the NHESP, apply to members of the general public. The project plans for the property are shown on Map 25, page 60 and Map 33, page 89 (Appendix A).

A. Planning Process

1. Initial field surveys.
    i. Habitat delineation.
    ii. Wildlife and vegetation inventories.
    iii. Wetland delineation.
    iv. Create soil and topography maps.
2. Pre-consultation with NHESP in regards to Priority Habitat mapping.
3. Incorporate preliminary management plan goals into field survey results.
4. Determine points of interest.
5. Assess habitat management needs.
6. Assemble public input.
7. Identify areas to be avoided.
8. Site trailhead and trails.
    i. Flag initial trail and trailhead.
    ii. Assess trail for grade and management issues.
    iii. Walk the trail in both directions.
9. Perform alternative analysis of uses, management areas, trails and trailhead to ensure the management plan reflects best practices in regards to wetlands, rare species, erosion and visitor experience.

Map 25: Proposed uses for Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2023 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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B. Nature Conservation Goals

Provide long-term protection for plants, wildlife, and natural processes occurring at Gay Head Moraine Reservation.

Objective 1: Protect rare and endangered species and habitats on the property.

Strategies:

A. Monitor the property for rare plants and wildlife during regular property checks; report new observations to the proper commonwealth authority.
B. Develop and implement a strategy with proper commonwealth authority approval to protect any additional rare species observed on the property.
C. Reroute or close trails if recreational use interferes with a rare species.
D. Protect dune habitat north of Lobsterville Road abutting listed coastal species breeding and foraging habitats.
    1. Follow NHESP protocol prohibiting kites on the property between April and September for shorebird nesting season.
    2. Restrict dog use of the property (See C, Objective 7 for additional details on property dog policies).
E. Protect listed breeding birds observed through breeding bird surveys on the property.
    1. Mow fields between September 1 and March 1.
    2. Reduce grazing intensity during March-May by 50% to reflect management mitigation for early-season ground-nesting birds.
    3. Site trails around woodland thickets where possible.
    4. Prohibit dogs on the property from April 1 – August 31, with leashing required otherwise (September 1-March 31) (See C, Objective 7 for additional details on property dog policies).
    5. Site trails outside of contiguous shrublands that support breeding and activity by listed birds of prey.
        a. Conduct management activities in shrublands prior to March 1 and after June 30 providing these actions do not conflict with other listed species management.
    6. Retain snags that do not create a hazard to the public on the property.
F. Promote habitats and protect specific host plants that support rare moth species on the property.
    1. Minimize cutting trees in trail and trailhead creation.
    2. Utilize selective cutting to increase the complexity of the woodland's vertical structure.
    3. Retain pockets of scrub oak; and limit pruning and cutting of scrub oak in view clearings and habitat management areas.
    4. Maintain vegetated boundaries and screen abutting light-pollution where necessary and feasible.
    5. Limit trails through the interior of shrub swamp and dune habitats.
    6. Utilize light-penetrating decking and raised boardwalks where proposed trails cross coastal dune, maritime dune, interdunal swale and shrub swamp habitat.
    7. Limit herbicide applications to direct application and prohibit aerial application.

G. Protect and promote robust habitats of rare plants by removing invasive species, promoting biodiversity and managing competing vegetation where necessary.
   1. Prohibit the collection of rare plants.
   2. Discourage off-trail excursions on the property through signage.
   3. Prohibit unauthorized trails on the property and close such trails as they are discovered.
   4. Mow and graze proposed management areas to reduce mid-story layer and increase disturbance in the understory for rare plant expansion opportunities.
   5. Prune competing shrubland species around listed shrub species to promote adequate airflow and space for expansion.
   6. Conduct botanical surveys by land bank qualified botanist (for known rare plants in proposed management areas and within 20 feet of proposed management areas with appropriate rare plant habitat) 12 months prior to implementing management activities.
      a. Report all findings to NHESP through the Heritage Hub prior to implementation of work.
      b. Create a detailed protection plan and submit to NHESP for approval for any protected plant found within the proposed management areas or 20-foot buffer of suitable habitat to avoid a take.

H. Protect rare bats and their habitat observed on the property through acoustic surveys.
   1. Prohibit cutting of known roost trees and trees within a 150-foot radius between June 1 and July 31.
   2. Monitor culverts for bat roosting activity prior to conducting repairs or other disturbance. If bats are present conduct repairs outside of breeding season.
   3. Protect woodland habitat continuity around any confirmed northern long-eared bat hibernacula by establishing a 0.25-mile radius no-cutting area.
   4. Conduct any tree clearing between November and April.

Objective 2: Encourage rare species and their habitats on the property.

Strategies:

A. Manage 2.2 acres of sandplain grassland.
   1. Mow between November and March 1 and graze during June-November.
      a. Use rotational grazing with livestock.
      b. Vary grazing intensity to promote sandplain grassland species.
      c. Plant native seed and plugs in disturbed areas to increase dominance of sandplain grassland species.
   2. Remove invasive species by hand-pulling or small-scale intensive in-season grazing.
   3. Retain pockets of highbush blueberry and scrub oak.
   4. Thin the woodland of trees below 10 dbh and remove saplings.
   5. Maintain the open nature of the restoration area through annual mowing, spot tree removal and seasonal rotational grazing.
   6. Stump-grind cut trees where feasible.

B. Manage coastal woodland understory in 4 management areas (1.4 acres of existing managed area; 1.0 acres around the Manning homestead; 0.75 acres of historically managed area; and 0.3

acres around the stone enclosure) to highlight cultural features and promote rare plant propagation, dispersal and expansion.

1. Use silvopasture methods with cattle to promote understory diversity, vertical variety and manage understory vegetation.
2. Limit use of machinery near the stone enclosure; hand-prune and cut vegetation.
3. Prune branches below 25' and cut trees < 5 dbh.
4. Survey for rare plants annually in management areas.
5. Consult with NHESP and create a plan that complements rare plant propagations and expansion that addresses mowing time and intensity and protection strategies such as fencing in management areas or the 20' buffer.

C. Implement dune stabilization management actions.

1. Close unauthorized trails.
2. Discontinue trails and boardwalks that are not proposed to be part of the trail network.
3. Maintain fencing to prevent unauthorized use of the dune.
4. Plant dune-stabilizing vegetation after disturbance events.
5. Install raised boardwalks with light-penetrating decking to traverse dunes.

Objective 3: Implement ecological connectivity goals to support biodiversity of the property.

Strategies:

A. Expand habitat corridors by rerouting existing trails as additional acreages are added to the property to create larger contiguous ecological communities that promote movement of species for breeding, foraging and range shifts in response to climate change, plus genetic exchange where feasible.

B. Site trails and roads to avoid the disruption of species movement between breeding, foraging and shelter spaces; where roads exist or installation is unavoidable install road passages, guide fencing and turnarounds at important wildlife crossing areas designed specifically for the species of concern.

C. Partially graze or mow open spaces during different times of year to create disturbed areas for seed dispersal and promote pollinator pathways.

D. Avoid siting trails within riparian corridors to allow for the natural expansion of streams during periods of heavy precipitation; where such siting is unavoidable, install raised boardwalks with minimal vegetation disturbance and at appropriate heights to accommodate free-flowing water in floodplains.

E. Improve fish movement along streams by exploring and implementing strategies to improve upstream and downstream passage such as culvert expansion and maintenance where feasible and appropriate.

F. Identify areas of significant sensitive biodiversity value (red maple swamp, interdunal swale, shrub swamp) and site trails along habitat-transition zones where feasible to avoid impacting the interior of these areas.

Objective 4: Reduce and control erosion on the property.

Strategies:

A. Trails

1. Utilize soil-retention techniques, such as rock retaining walls and wooden crib walls to stabilize a trail cut into the slope or leveled with material, as necessary.
2. Install steps (stone, earthen, fabricated metal adjustable) to traverse slopes where switchbacks are not feasible or practical.
3. Site trails on appropriate grades following the natural topography, when possible.
4. Use switchbacks on side slopes between 15 and 45 percent.
5. Reroute trails as necessary.
6. Prohibit use of motorized vehicles such as dirt bikes, electric bikes, and all-terrain vehicles as well as horseback-riding on the trail system.
7. Site trails with views of the water and other amenities to prevent unauthorized trail creation.
8. Cover trails with appropriate materials if needed to manage unforeseen erosion issues and prevent further surface soil erosion.
9. Direct runoff using water bars, troughs, banking and other methods fitting to the soil substrate and topography.

B. Boardwalks
1. Utilize light-penetrable decking on boardwalks and platforms in wetland resource areas.
2. Utilize soil-retention techniques, such as steps and large stones at the base of boardwalks, as necessary.
3. Use appropriate footers for the soil and moisture composition of the area
   a. Diamond pier
   b. Pin-and-plate
   c. Butterfly bracket

C. Open habitat and moderate open canopy woodland understory management
1. Use low stock densities and rotational grazing during the growing season.
2. Mow between November and March, targeting times when the ground is frozen.
3. Maintain vegetative cover on slopes.
4. Explore alternative erosion control measures as such methods are discovered.

Objective 5: Protect the value of the property as migratory and breeding habitat for wildlife species.

Strategies:

A. Retain select snags in woodlands where these trees do not pose unacceptable safety or fire hazard.
B. Retain known bat roost trees and hibernacula.
C. Limit the use of aerial herbicides.
D. Maintain bordering vegetated wetland shrublands surrounding wetland resources and water sources.
E. Minimize trail impacts to wetland resource areas
1. Site trails outside wetland resource areas and their buffers where feasible.
2. Use boardwalks with light-penetrating decking and no-dig footers within wetland resource areas.

F. Site trails outside of prime breeding habitat where feasible.
G. Provide distant views of bird habitat from trails and install benches.

H. Install educational signs regarding wildlife and their habitat on the property.
I. Enforce and post pet rules on the property as defined in Section B. Objective 8.
J. Monitor changes in vegetation cover during regular property checks and by updating ecological inventory in 2035.

Objective 6: Create and manage open habitats.

Strategies:

A. Manage 2.2 acres of sandplain grassland habitat and maintain through annual mowing and grazing (see B. Objective 2: A).
    1. Retain open growth trees, scrub oak pockets and highbush blueberry thickets in restoration area.
    2. Retain low-growing understory vegetation and manage as a mosaic of graminoid, herbaceous and low shrub species.
    3. Limit soil disturbance in the restoration process to allow nitrogen that is released through the cutting of trees to be taken up by retained vegetation, soil microorganisms and soil immobilization.
B. Use rotational grazing to manage understory in moderate open canopy woodland and proposed woodland management areas (see B. Objective 2: B).
    1. Use a variety of livestock (i.e., cattle, goats, sheep) to control woody vegetation, highlight cultural features and maintain grass-dominated habitats.
    2. Limit grazing to the growing season with the exception of cattle used in silvopasture.
    3. Feed cattle native hay while grazing in woodland with limited understory vegetation.
    4. Follow best practices for compaction, soil depletion and nutrient management.
    5. Provide shelter for livestock in the form of canopy cover and artificial structures.
    6. Prohibit grazing within wetland resource areas and their buffers.
    7. Create conservation buffers between wetlands and agricultural fields.
        a. Mow the buffer multiple times during a growing season to absorb transient nutrients.
    8. Protect listed plants and host plants of listed species from grazing livestock using fencing and dormant period grazing.
    9. Limit soil disturbance in the restoration process to allow nitrogen that is released through the cutting of trees to be taken up by retained vegetation, soil microorganisms and soil immobilization.

Objective 7: Monitor for and control the spread of exotic and invasive species.

Strategies:

A. Use appropriate methods such as hand-pulling, repeated in-season mowing and grazing, weed-wrench removal, and girdling as time and funding allow.
B. Monitor and manage vegetation along and under fence rows through frequent mowing and trimming.
C. Monitor for re-growth and continue to manage invasive/exotic species.
D. Explore other control methods and implement them if physical control methods fail.
E. Dispose of invasive species following approved protocols.
F. Clean maintenance equipment between properties to avoid the spread of invasive species.

G. Rotate livestock through invasive plant areas after grazing non-invasive plant areas on the property.
H. File with the Aquinnah Conservation Commission for planned treatments of exotic and invasive species that occur within wetland resource and buffer zones.
I. File with NHESP for planned treatments and modifications thereof that occur in priority habitats.
J. Prohibit the release of non-native species on the property.

Objective 8: Reduce forest-fire danger on the property.

Strategies:

A. Prohibit open fires on the property, including firepits.
B. Enforce local bylaws regarding smoking in public recreation areas.
C. Follow the recommendation of the Martha's Vineyard Commission Community Wildfire Protection Plan, providing recommendations do not preclude attainment of natural conservation objectives.
D. Limit woodchip pile storage to no more than a year on property.
E. Remove down-trees when they occur simultaneously in one area and pose a fire risk and otherwise retain individual down-trees as habitat.
F. Explore the use of controlled burns to manage understory woodland fuels.
G. Thin woodlands in targeted areas following a forestry management plan created by a certified forester to reduce fire fuel where woodlands meet development and within large tracts.
H. Use silvopasture methods with rotational grazing to reduce understory fuel in management areas and elsewhere if deemed necessary.
I. Provide Aquinnah fire department with keys and combinations to any locked gates with access to interior woodlands.

Objective 9: Protect natural processes on the property.

Strategies:

A. Encourage native plants that support native pollinators.
    1. Convert lawn encroachment areas into native grassland and forb habitat.
        a. Reach out to encroaching abutter and request a stop to maintenance mowing.
        b. Fence encroachment area and use signage, if necessary.
    2. Plant native wildlife host plants to increase diversity.
    3. Use island-grown native plants and/or seed for any restoration or screening projects.
    4. Implement mowing and grazing regime around flowering times of dominant vegetation and rare plants where possible.
B. Wetland resource areas.
    1. Protect wetland resources areas and buffer zone of wetland resource areas by limiting access and siting trails outside these areas where possible.
    2. Manage habitat behind coastal wetlands to promote landward migration of wetland habitat
        a. Manage understory in moderate canopy woodland that occurs in maritime dune to create opportunities for landward migration of dune habitat.
        b. Selectively cut trees in maritime dune to maintain moderate to open canopy nature of habitat.

3. Utilize light-penetrating decking on all raised boardwalks and platforms within wetland resource areas.

Objective 10: Plan for climate change adaptation

Strategies:

A. Minimize soil disturbance property-wide.
   1. Conduct annual mowing when ground is frozen or dry.
   2. Utilize rotational grazing to manage woody vegetation.
   3. Cut trees for moderate canopy woodland restoration work during the winter.

B. Protect wetland resource area boundaries.
   1. Plan management areas, trails and trailheads around protected wetland resource areas following regulations as they are described in the Aquinnah wetland bylaw and relevant DCPCs.
      a. Aquinnah
         (1) Wetland by-law - prohibits removal, fill, dredge, build upon, or alteration of the following resource areas and buffer zones
            i. 200’ buffer from
               (a) Freshwater wetland, coastal wetland, marsh, wet meadow, bog, swamp
               (b) Lake river pond stream estuary, ocean or land there under
               (c) Land subject to flooding or inundation by groundwater, surface flow, tidal action or coastal storm flowage
            ii. The plan proposes to alter 0.64 acres of resource area and 3.5 acres of riverfront area.
         (2) Zoning by-law IV. Conservation regulations
            i. Special permit uses required for this management plan
               (a) Removal of all vegetation over 3” diameter at base from areas greater than 200 ft^2.
               (b) Removal of any tree over 9” diameter at base.
               (c) Removal of any tree between 3’ and 9” diameter at base when there is no other tree within 25’ radius.
   2. Create wetland buffers around grazing areas that act as carbon sinks through in-season mowing where appropriate.
   3. Site waterview trails on the highest elevation possible away from wetland resource boundaries, where possible, while maintaining good views of the water from the trail.

C. Promote carbon sequestration in management practices.
   1. Promote habitat resilience by planting native species.
   2. Promote multi-age woodlands and tree species with variable lifespan potentials.
   3. Thin woodlands to open the canopy and restore understory with native grassland species to create a savanna-like habitat in three small areas of the property.
   4. Protect wetlands from water-level loss and promote native species.
   5. Promote and restore open understory where historic grasslands occurred.

C. Recreation and Aesthetics

Allow limited, low-impact recreational use of the area and create and/or maintain attractive views and landscapes, provided that these uses do not preclude attainment of nature conservation objectives.

Objective 1: Maintain the property open for low-impact recreation.

Strategies:

A. Open the property for passive recreational uses between dawn and dusk with the exception of star-gazing and nighttime fishing that occur after dusk (see project map).
B. Provide access for passive land recreation (hiking, birdwatching, photography etc.).
    1. Prohibit horseback-riding and bicycles from trails.
        a. Install a bike rack at trailheads and entrance from Lighthouse and State Roads to accommodate visitors arriving via bicycle.
    2. Encourage pet walkers, through signage, to bag and remove excrement from the property.
    3. Use signage to enforce the pet policy on the property as defined in B. Obj. 8.
    4. Prohibit the launching and landing of drones on the property.
    5. Limit recreational use to the authorized trails provided.
C. Protect the significant archaeological nature of the property.
    1. Utilize surface coverings on trails to minimize exposure of artifacts where necessary.
    2. Prohibit digging or disturbance of the surface, removal of any artifacts from the property, and metal detecting by visitors.
        a. Use signage to educate the public on laws regarding archeological artifacts and the land bank's policy.
    3. Implement non-digging methods for management implementation in areas of known historic Wampanoag settlements or as recommended by Massachusetts Historical Society and the Wampanoag tribe on Martha's Vineyard.
    4. If digging is unavoidable consult with a designated representative of the tribe on site.
D. Monitor impact of passive recreational use on the property annually and manage accordingly.
    1. Use passive methods for assessing use such as trail counters and wildlife cameras.
    2. Evaluate trails and recreational use impacts through monthly (winter)/weekly property checks and maintenance performed by field staff.
E. Provide Aquinnah emergency management departments with key and combination to locked gates on the property.
F. Recommend changes to recreational uses that impact natural conservation objectives and property management goals to the land bank commission and implement accordingly.
G. Host a portion of the cross-Aquinnah trail linking West Basin and the Atlantic Ocean that will also serve as a cultural heritage trail by identifying Wampanoag landmarks along its route.

Objective 2: Manage existing roads and trails.

Strategies:

A. Maintain approximately 5,618 linear feet (44,944 ft^2) of the existing trail, 850 linear feet of access driveway and dirt road (Beach Rose Way and Beechwood Way) and 553 linear feet of boardwalks, and 638 linear feet of universal access trail on the property.

1. Re-grade roads once per year or as needed.
2. Use mounding and rolling techniques.
3. Add hardener to holes as needed.
4. Create water run-off ditches and maintain annually.
5. Mow and use hand tools to manage vegetation along roadsides to maintain a road corridor of 12 feet (minimum 10 feet).

B. Incorporate appropriate existing trails not already managed into the trail system for the property and manage all trails per the methods outlines in B. Obj. 5.

Objective 3: Designate existing 5-vehicle and 1-vehicle universal-access trailhead on Beach Rose Way as the property trailhead.

Strategies:

A. Instruct visitors in the land bank map and website to use Beach Rose Way trailheads as the primary access to the property.
B. Maintain land bank logo marker on Beach Rose Way to indicate the trailhead location.
C. Expand 5-vehicle trailhead to accommodate 2 additional vehicles if need warrants.
D. Install land bank trail sign off Lobsterville Road at Beechwood Way entrance and install a bicycle rack near the start of the trail in this location on the property.

Objective 4: Create new trails as shown on the Proposed Project Maps.

Strategies:

A. Create approximately 8,277 linear feet (66,216 ft^2) of proposed trail.
    1. Make trail corridors eight feet wide with a maintained tread of six feet.
    2. Use ride-on or walk-behind mower (as determined by dbh of understory vegetation) and hand tools to create trail.
    3. Maintain one-foot buffer along trail edge by cutting annually in early spring unless additional vegetation management is needed to maintain an eight-foot corridor at 36” from the ground.
    4. Use sustainable trail principles in trail planning and siting on hills and side-slopes.
        a. Site trail on the contour and use grade reversals.
        b. Prohibit bicycles, motorized vehicles and horses on trails.
        c. Employ the “half rule” and limit the trails’ grade to half the grade of the side-slope.
        d. Limit grade to no more than 15% with an average grade of less than 10% (6°).
        e. Install stairs where a slope of greater than 15% exists and cannot be avoided.
        f. Avoid siting trails on the fall-line of the hill and avoid flat areas (site or create trails with a minimum of 2% cross or running slope).
        g. Use existing trails where possible and appropriate.
B. Close 4,125 linear feet of existing trails and 226 linear feet of existing boardwalk not targeted for use in the trail system using fencing and/or brush.
    1. Remove boardwalk materials.
    2. Use fencing, vegetation and signage to indicate trail is closed.
    3. Monitor trail closure and re-assess if necessary.
C. Avoid siting trails through wetland resource areas and associated buffer zones where possible.

1. Install raised boardwalk as use dictates when siting trails through a wetland resource area.
    a. Use light-penetrating decking that allows for 50% light penetration where possible (minimum light penetration of 18% when using wooden decking).
    b. Create framing using ACQ pressure-treated lumber.
    c. Use pin-and-plate, diamond pier or butterfly bracket for footers.
    d. Raise boardwalks in coastal dunes 2' above the grade of surrounding dune system to allow for free movement of sand.

D. Site trails that are unobtrusive in the landscape, provide an interesting user experience and minimize long-term management.
    1. Fit the trail into the topography of the land and limit use of prominent high areas to those that offer the best views.
    2. Site ambling and loop trails to increase the visitor's engagement with the trail environs and curiosity regarding what is ahead.

E. Use trail erosion strategies to minimize displacement, compaction and water collection.
    1. Create large crested dips with a dip outflow grade that is greater than the trail inflow grade.
    2. Minimize trail surface watershed by siting trails, when appropriate, through habitats with overhead vegetation.
    3. Construct adequately-sized outflow channels to prevent clogging.
    4. Add material to the dip to increase soil surface resistance to compaction and displacement.
    5. Site trails on loamy, loamy-sand and firm clay soils and avoid peat, soft clay, sand and silty soils.
    6. Use other water management techniques in addition to dips such as cross-trail pipe drains, crowns (center to side slope 2%) and trail inslopes of 2% (avoid trail outslopes).

F. Minimize the cutting of trees in the creation of trails.

G. Allow staff discretion to close or relocate trails or add new trails, such as spur trails for off-property trail connections.

H. Deter unauthorized trail formation.
    1. Site trails to interesting destinations and views.
    2. Install symbolic fencing such as split-rail fence sections to close or prevent unauthorized off-trail use.

I. Discourage trespassing into abutting private property
    1. Use native plant screening in collaboration with abutters where feasible
    2. Site trails out of view of abutter property
    3. Close unauthorized trails that lead to private abutting property using vegetation, fencing and signage as necessary.

J. Mark trails with directional signs.

K. Check and maintain trails monthly.

L. Maintain existing trail system in good condition to discourage visitors from creating unauthorized trails.

M. Install trail markers where trails exit onto Lobsterville Road, State Road, Lighthouse Road and Clay Pit Road or any future vehicle-traveled way.

Objective 5: Highlight and maintain existing views; expand as fitting.

Strategies:

A. Site trails to maximize existing views of water, topography and open spaces.
B. Maintain and create interior views through tree removal and annual trimming, mowing and limbing of branches at the Alvin Manning homestead and the stone enclosure.
    1. Trim vegetation creating pockets of shrubs at undulating heights, minimum height of 36".
    2. Flush-cut trees and limb branches for view expansion.
    3. Limit soil disturbance when managing vegetation on slopes greater than 8% by maintaining ground cover where possible and installing erosion-control measures if necessary.
C. Maintain two long-distance views of Vineyard Sound and one of Menemsha.
    1. Top or trim branches on select trees to create long distance winter views.
    2. Trim nearby shrubs at an undulating height (minimum height 36")
D. Install rustic benches and view platforms where appropriate.
E. Maintain existing open spaces through mowing and grazing.
F. Manage vegetation along stonewalls and fences using hand equipment and grazing.
G. Plant native vegetation to screen houses that diminish views.

Objective 6: Entertain possibilities for other trail links.

Strategies:

A. Create new trails, as necessary, to connect the property to future conservation land and trail easements and public roads.
B. Relocate trails if needed to connect to existing future trails and ways on abutting properties.
C. Install signage indicating start and end of trail easements over private property and other conservation land.
D. File for the necessary permits with local and state agencies prior to creating any new trails.

Objective 7: Manage pets on the property.

Strategies:

A. Prohibit dogs on the property April 1 – August 31, otherwise require dogs be leashed (September 1 – May 31).
B. Escalate permitted dog rule to a prohibition against dogs as needed in response to breeding wildlife behavior monitored through annual property surveys and targeted wildlife surveys as well as the interaction of dogs with other visitors.
C. Work with the local animal control agent to facilitate the enforcement of documented repeat offenders of property rules regarding pets.
D. Encourage pet owners to bag and remove excrement from the property and if necessary and appropriate.
    1. Use signage to discourage visitors from leaving waste bags hanging in trees and thrown in the woods.
E. Post rules and educational signage regarding dogs and wildlife in appropriate locations.
F. Post pet rules on land bank website.

Objective 8: Prohibit camping on the property.

Strategies:

A. Prohibit camping on the property unless special permission is granted for scouting and like groups, and if in compliance with appropriate Aquinnah bylaws.
B. Monitor the property for unauthorized campers.
    1. Work with police to remove squatters and their belongings from the property promptly.
    2. Re-survey a known squatting location more frequently after unauthorized camping is located.
    3. Post signage at the camping location to inform individuals of the no-camping policy and where their equipment and personal items are located.

Objective 9: Protect the natural essence and tranquility of the property.

Strategies:

A. Prohibit amplified music, group reveling, nudity, alcohol, and glass containers on the property.
B. Encourage quiet voices.
C. Promote a carry-in-carry-out policy for trash using signage.
D. Remove trash collected voluntarily by visitors during weekly property checks.

D. Natural Products

Allow limited collection, use and hunting of certain natural products provided that these uses do not preclude attainment of nature conservation objectives.

Objective 1: Allow raccoon, deer, turkey and pheasant hunting at Gay Head Moraine Reservation by permission following the land bank hunting policy.

Strategies:

A. Allow general hunting (deer shotgun [2 weeks; 4 hunters per day]; black powder; archery; turkey [spring and fall]; pheasant and raccoon).
    1. Close properties to the public during the two-week deer shotgun season; post closure signs one week prior to the start of deer-shotgun and remove day after deer-shotgun season ends.
    2. Post trail easements
B. Monitor hunter use of property.
    1. Patrol property by land bank staff.
    2. Require hunters to display permit on vehicle.
    3. Remove deer-stands with expired permission.
    4. Provide local police with a list of deer shotgun hunters and hunters with special permission.
C. Require hunters remove all deer by foot using the proposed trail system.
D. Allow the dressing of deer on-premises providing the viscera are disposed of away from the trail and trailhead.
E. Advise permitted hunters of their rights and regulations by directing them to the mass.gov/hunting-regulations website (https://www.mass.gov/hunting-regulations).
F. Direct hunters to the land bank hunting policy located on the land bank website (https://www.mvlandbank.com/properties/hunting) for maps and land bank rights and regulations.

G. Notify the public of the hunting policy and hunting season dates for the property through the land bank website.
H. Install signage to clearly mark hunting boundary and property boundaries.

Objective 2: Allow low-impact gathering of natural products such as berries, tree sap, herb snips, mushrooms, seaweed, and the like according to the land bank public use policy (https://www.mvlandbank.com/properties/all-public-use-policies).

Strategies:

A. Positive identification of plants is required prior to collection through keys and knowledgeable individuals.
B. Prohibit collecting of rare plants and wildlife on the property.
    1. Prohibit the collection of plants in red maple swamp to protect known rare plant population from unintentional damage.
C. Allow the collection of plant parts; prohibit whole plants from being uprooted and removed.
D. Follow MA-NHESP plant collection guidelines
    1. Collect from populations with >100 plants.
    2. Collect no more than 10% of flowers, seeds and berries from an individual plant.
E. Encourage the permitted gathering of materials to occur within the immediate environs of the trail system, to avoid social trails and trampling of vegetation.
F. Monitor property for wrongful collecting and use signage to educate visitors.

Objective 3: Open the property to research pending recommendations by the land bank staff and approval of the land bank commission.

Strategies:

A. Require researchers submit a research request and attain written permission from the land bank commissioners per staff recommendation prior to conducting formal surveys and collections of flora and fauna on the property. Require researchers to:
    1. Describe the purpose of the research, methods used and strategies used to avoid or minimize negative impacts to target and non-target organisms.
    2. Include pertinent state and federal collection permits in their research request and comply with all local, commonwealth and federal laws and regulations regarding transport, storage, use and disposal of hazardous materials and treatment of living wildlife.
    3. Submit a schedule of dates and times when research will be conducted.
B. Remove all equipment and markings from the property at the end of the project.
C. Prohibit the posting of rare plant and animal locations on web-based data servers such as iNaturalist.
D. Submit final reports of data collection results within a year of project completion.
E. Follow the MA-NHESP guide to collecting rare plant species (https://www.mass.gov/doc/guidelines-for-collecting-rare-plants/download).

Objective 5: Provide pedestrian access to Lobsterville Beach for fin-fishing through the proposed trail system addition on the area of the property east of Lobsterville Road.

Strategies:

A. Direct pedestrian fishing access to the water via designated trails and beach path access.
B. Post the link to local and commonwealth rules and regulations regarding fishing at vehicle trailhead.
C. Work with town health departments and environmental police officer to post accurate fishing closures at fishing access locations and on the land bank website.

Objective 6: Create a community woodlot program, otherwise prohibit harvesting of trees from the property.

Strategies:

A. Conduct a forest survey to establish baseline data for the woodland and determine the dominant trees, basal area and understory vegetation.
B. Consult with a forester to determine the percentage of wood to be harvested and mark trees accordingly with paint or flagging.
C. Advertise the woodlot program on the land bank website and collect names of recipients in the order that they are received.
D. Conduct a firewood lottery in the event of a land bank habitat restoration project that results in a surplus of trees removed.
E. Harvest wood outside of bat roosting season (June and July) and conduct all harvesting with the oversight of the land superintendent or designee.

E. Community Interaction

Provide helpful and interesting information about the property to visitors; promote cultural resource conservation; and allow educational use of the property.

Objective 1: Help visitors find the property and avoid trespassing.

Strategies:

A. Mark the property on the land bank website and provide directions to the trailhead or trail.
B. Mark property access points with land bank logo posts.
C. Provide the property location, boundaries and trails to Sheriff's Meadow Foundation so that the property can be included in the TrailsMV app; and update accordingly.
D. Install adequate land bank boundary signs.
E. Discourage trespassing
    1. Close existing and unauthorized trails not intended for use.
    2. Install gates and fences as needed
    3. Erect signs, as needed, to provide clarification of location of public easements, private exclusive-use easements and other conservation land.
    4. Provide downloadable maps on the land bank website that indicate trail, trailhead and shoreline access locations.

Objective 2: Permit guided tours of the property by individuals and organizations following the land bank public use policy (Section 1.0 Permitted uses, 1.3 Tours) https://www.mvlandbank.com/properties/all-public-use-policies.

Strategies:

A. Require guides and attendees follow property rules outlined in this management plan, particularly that attendees stay on designated trails.
B. Prohibit the charging of a fee for the tours.
C. Require guides to notify land bank staff in advance of dates and times of tours.
D. Limit parking for the event to the trailhead.

F. Land Administration

Oversee the property on a regular basis; develop and maintain good relationships with residential neighbors, members of the community, visitors, and the town of Aquinnah.

Objective 1: Maintain good relations with abutters, neighbors and local boards.

Strategies:

A. Communicate with neighbors, the town of Aquinnah, and its conservation commission regarding plan implementation and changes.
B. Respond promptly to public input provided at regular land bank commission meetings regarding this property.

Objective 2: Keep property well-maintained.

Strategies:

A. Monitor public use and management issues (i.e., downed trees, erosion, failing infrastructure) on the property weekly (May-September) and monthly (October-April) and address concerns and violations promptly.
    1. Trim vegetation.
    2. Remove litter.
    3. Regrade access roads and trailhead.
    4. Report unauthorized activities to the appropriate authorities.
B. Revisit the plan by the staff in the event that management and natural conservation goals and objectives are not being met and report recommendations to the land bank commission and town of Aquinnah advisory board for approval followed by filings with MA-NHESP and local boards as required.
C. Employ adequate staff to effectively implement land management goals and natural conservation objectives.

Objective 3: Keep well-maintained boundaries.

Strategies:

A. Locate, GPS, and stake corners of property in the event surveys are available.
B. Install split-rail fence to define boundaries where needed in the event of encroachments.
C. Consult current aerial photographs regarding boundary encroachments
    1. Walk boundaries to confirm a potential encroachment violation.
    2. Correct encroachments as they occur.
        a. Communicate with encroaching land owner(s) regarding the encroachment and planned resolution.
        b. Correct the encroachment in the event that land owner is incompliant.

Objective 4: Keep good records of all land management activities and natural events.

Strategies:

A. Record all significant events, natural or otherwise by land management staff.
B. Continue to update plant and wildlife inventories.
C. Maintain photographic record of landscape appearance before and after management implementation.

Objective 5: Comply with all applicable regulations and agreements.

Strategies:

A. Comply with Massachusetts endangered species act and file a MESA project review in the event rare species are mapped for the property.
B. File with the Aquinnah conservation commission for activities proposed within resource areas and buffer zones of wetlands.
C. File with the Aquinnah planning board for activities proposed within districts of critical planning concern zones.
D. Request recommendations from the Massachusetts Historical CNHESP
E. ommission regarding the proposed activities in the plan with regards to historic landmarks and artifacts.
F. Follow deed restrictions attached to the parcels at Gay Head Moraine Reservation.
G. Contribute the land bank's share to property's road associations to cover matters managed by such associations, e.g., surface maintenance, speed-limit postings and other postings as to use rules, insurance, etc.

Objective 6: Engage the community in cultural and natural features of the property.

Strategies:

A. Work with the Wampanoag tribe to create signage highlighting the cultural features that occur on the property along the cross-Aquinnah trail.
B. Install interpretive signage at the trailhead informing visitors of various unique flora and fauna that inhabit the property.
C. Post the land bank management plan for Gay Head Moraine Reservation on the land bank website.

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Appendix A: Locus, Topography, Site Planning and Project Maps

Map 26: Aerial image of Gay Head Moraine Reservation, Aquinnah, MA.

Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map. Source: MassGIS ortho photos 2023

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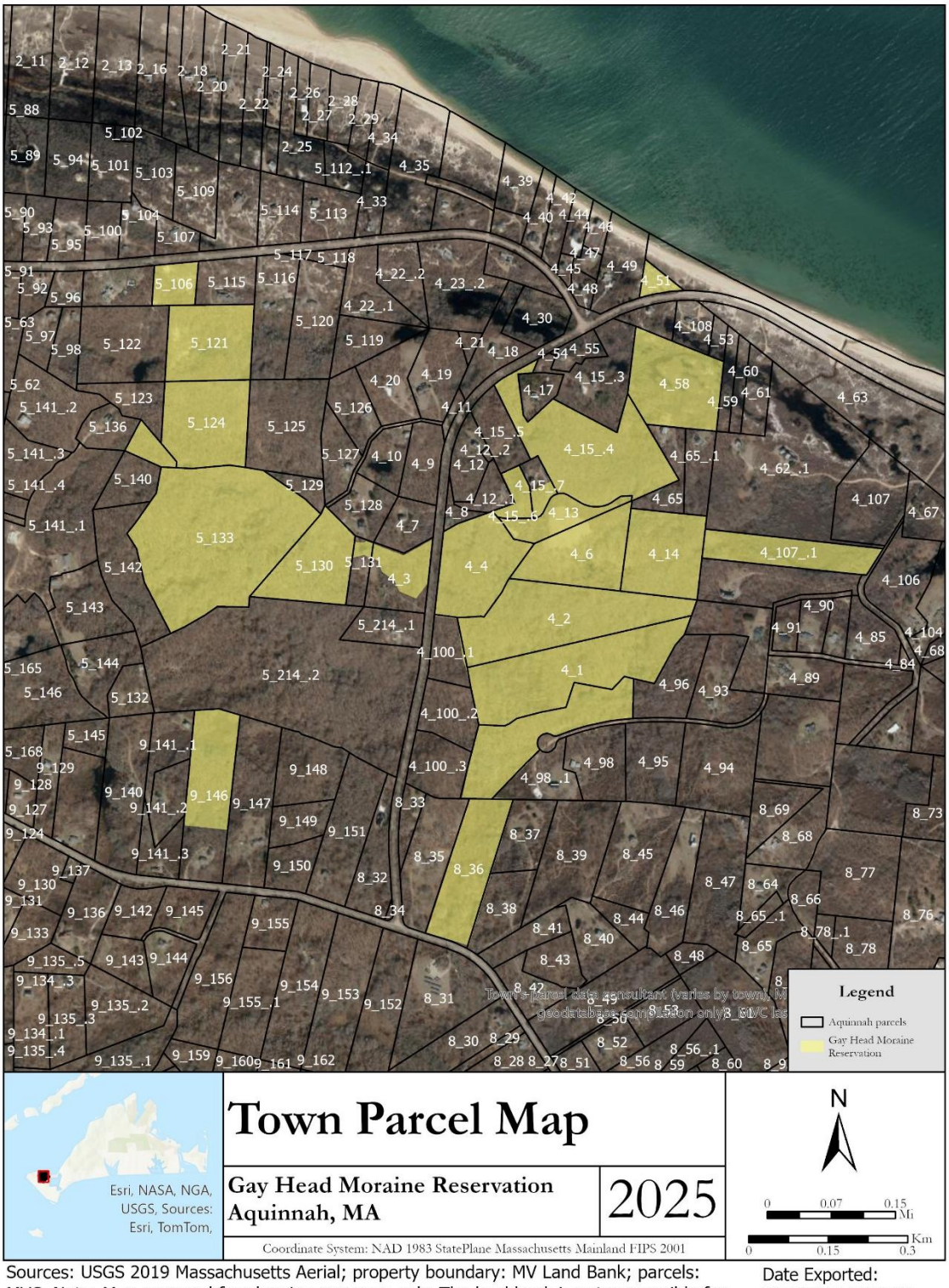
Map 27: Town parcel map of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; parcels: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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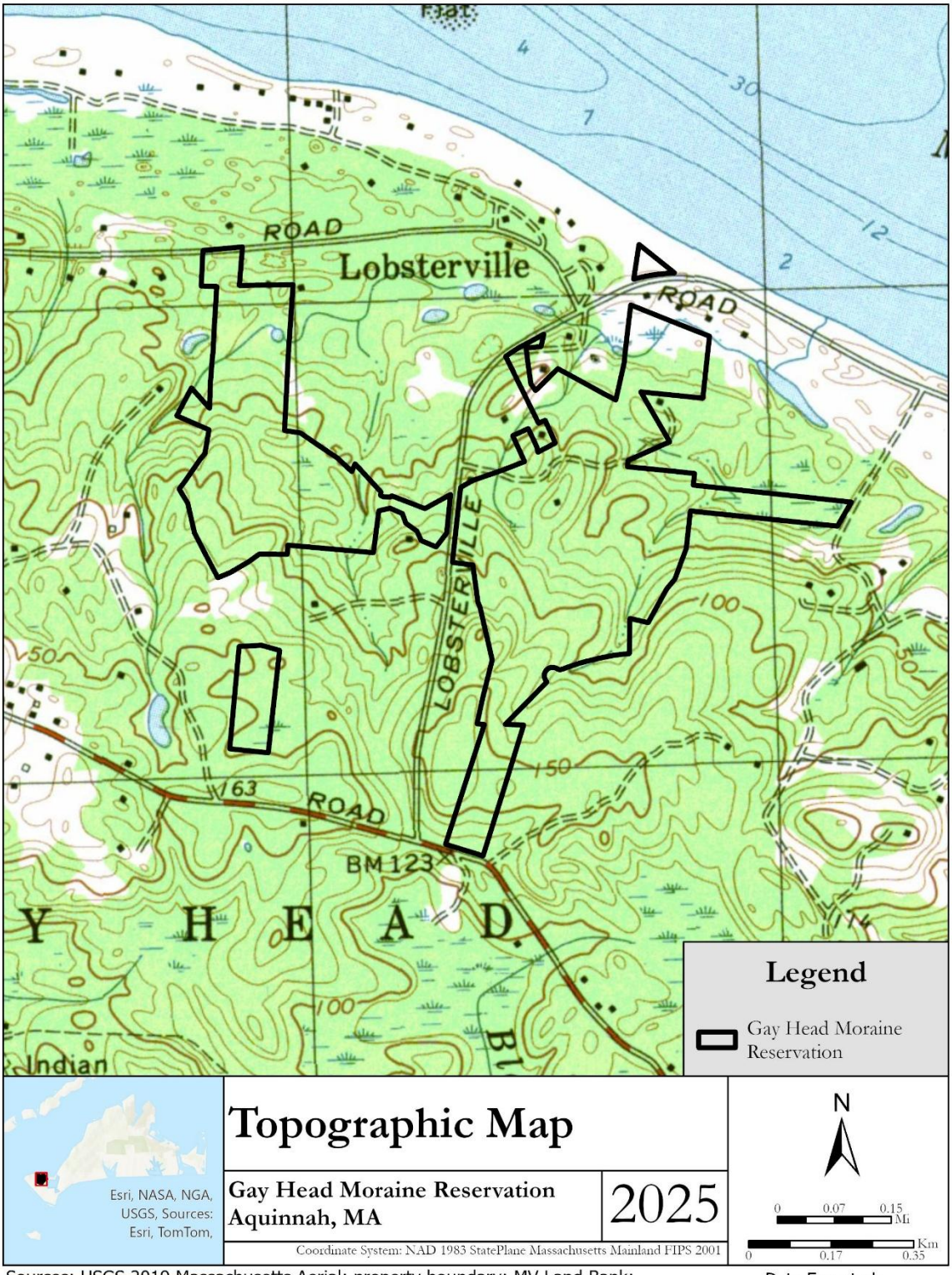
Map 28 Topographic map of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; Topography: USGS. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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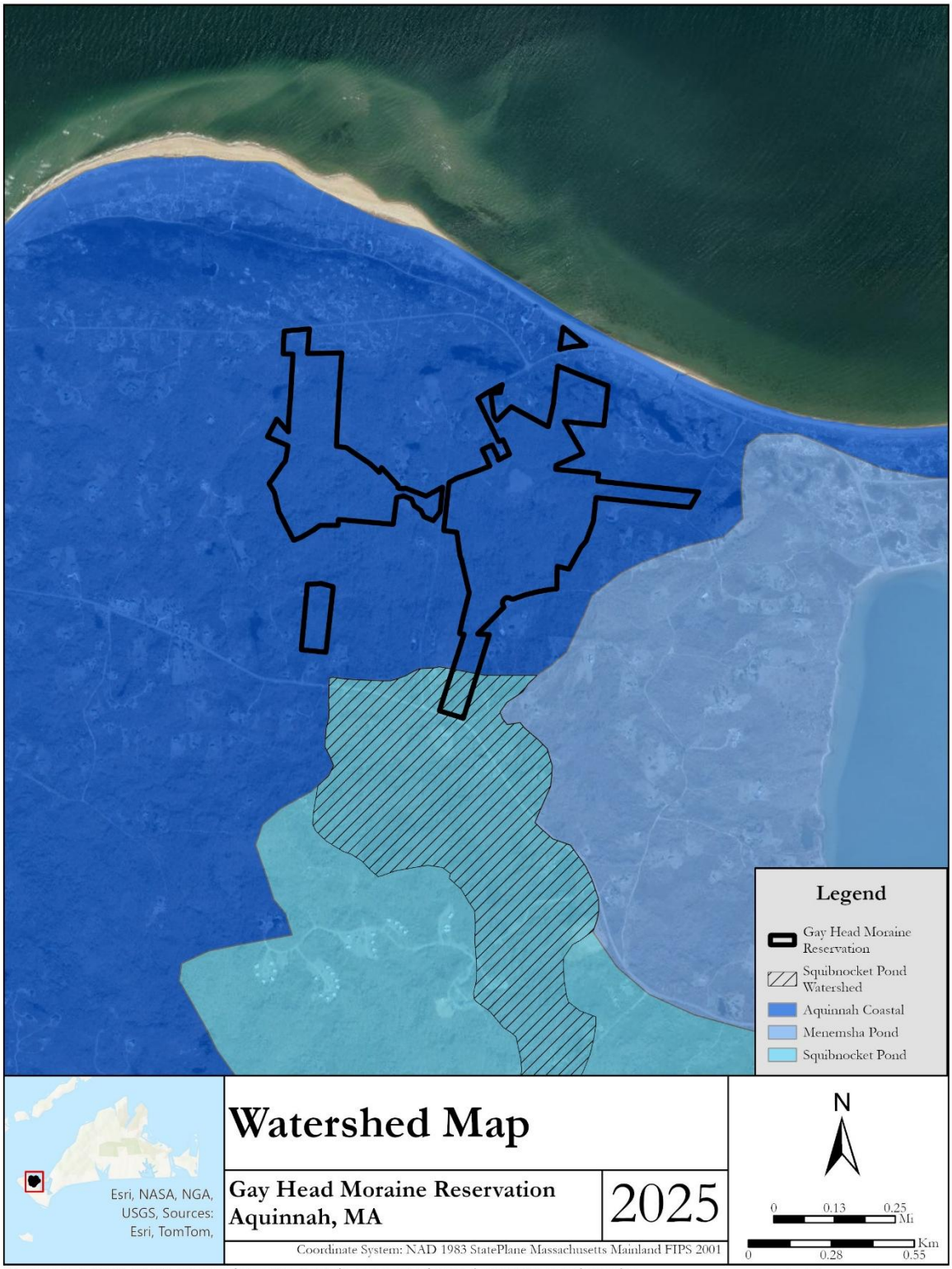
Map 29: Watershed boundaries map of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; watersheds: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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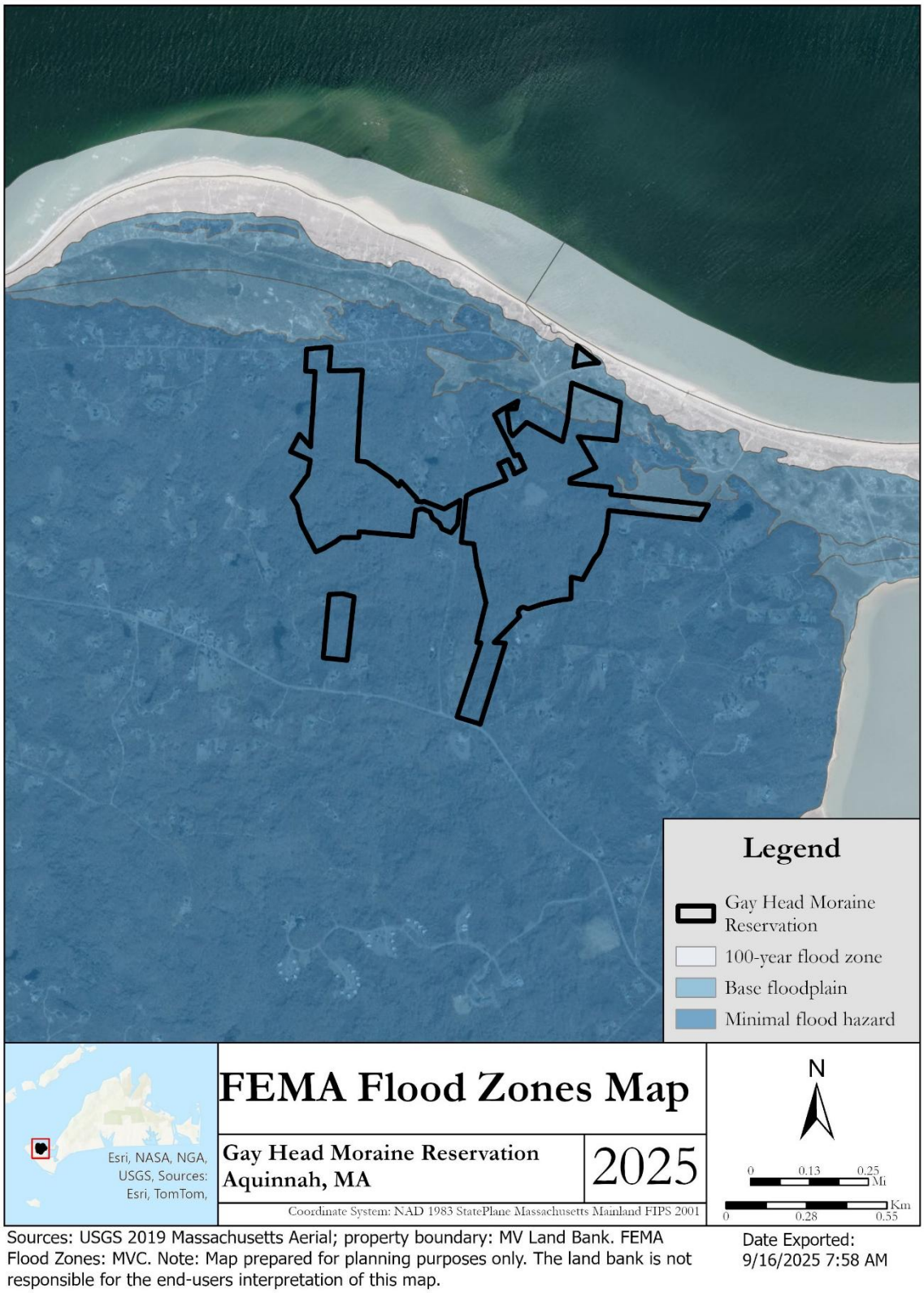
Map 30: Flood zones (FEMA 2016) of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank. FEMA Flood Zones: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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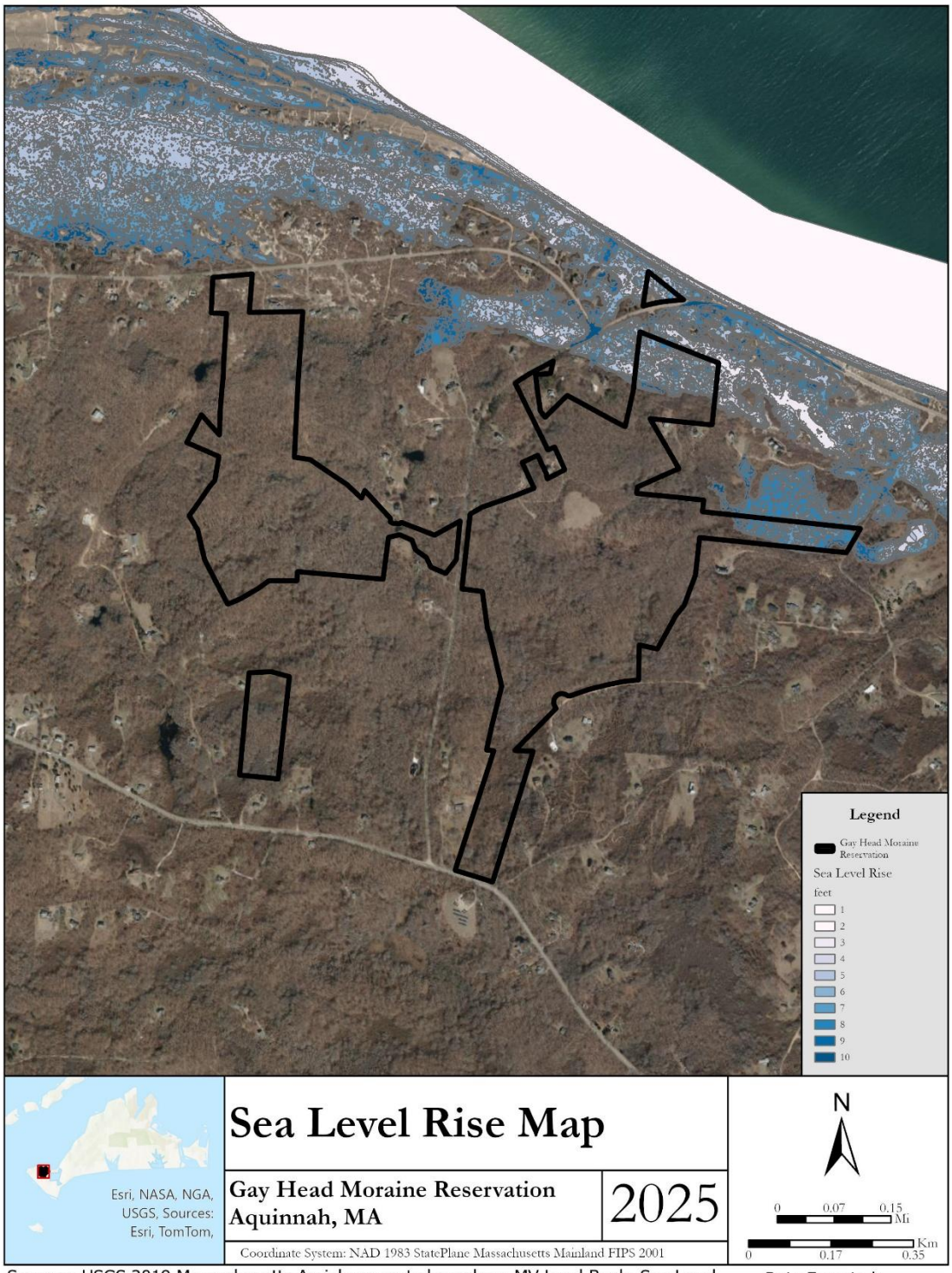
Map 31: Sea level rise scenarios and the resulting impact zones of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; Sea Level Rise LiDAR: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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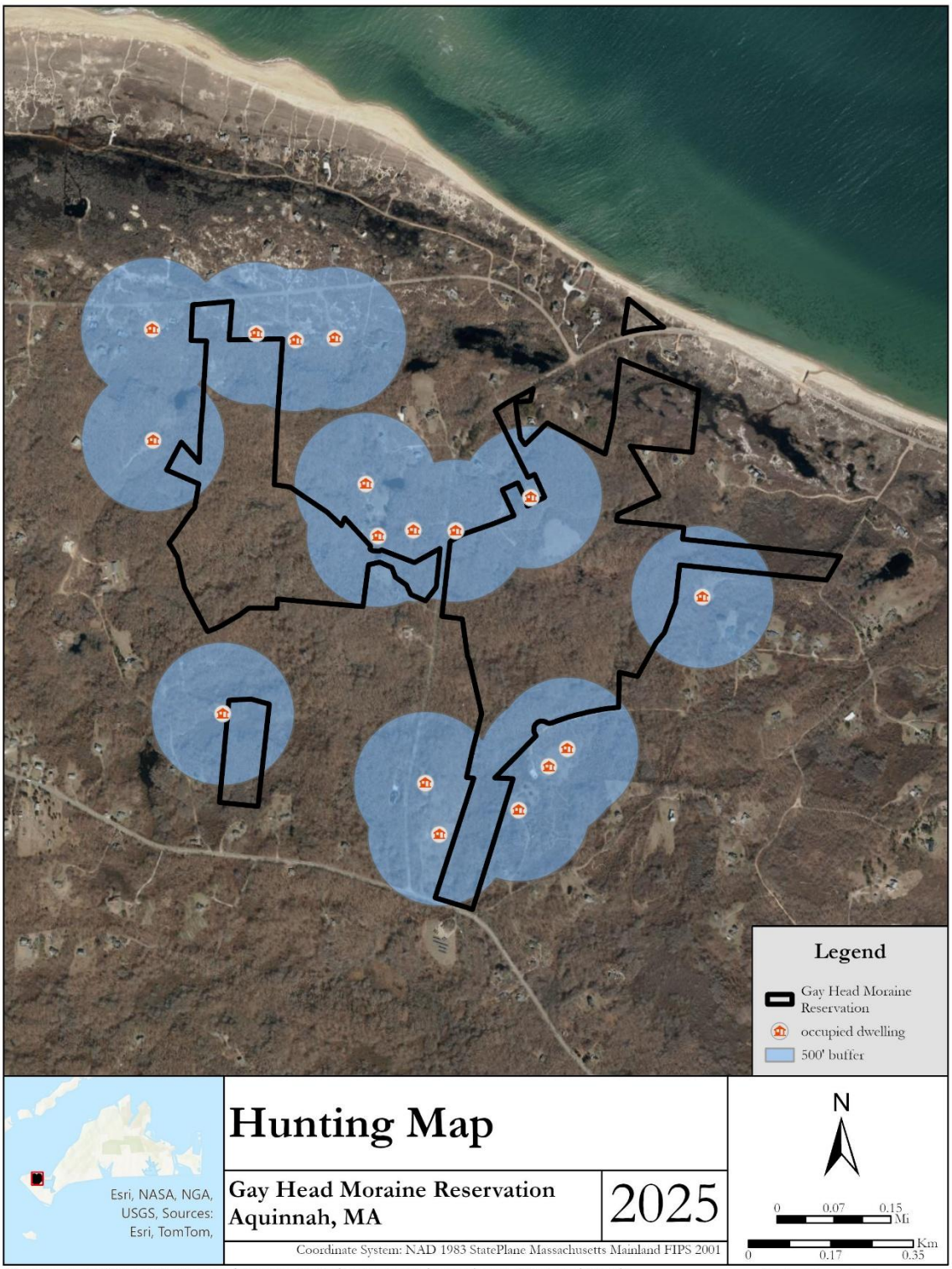
Map 32: Huntable areas of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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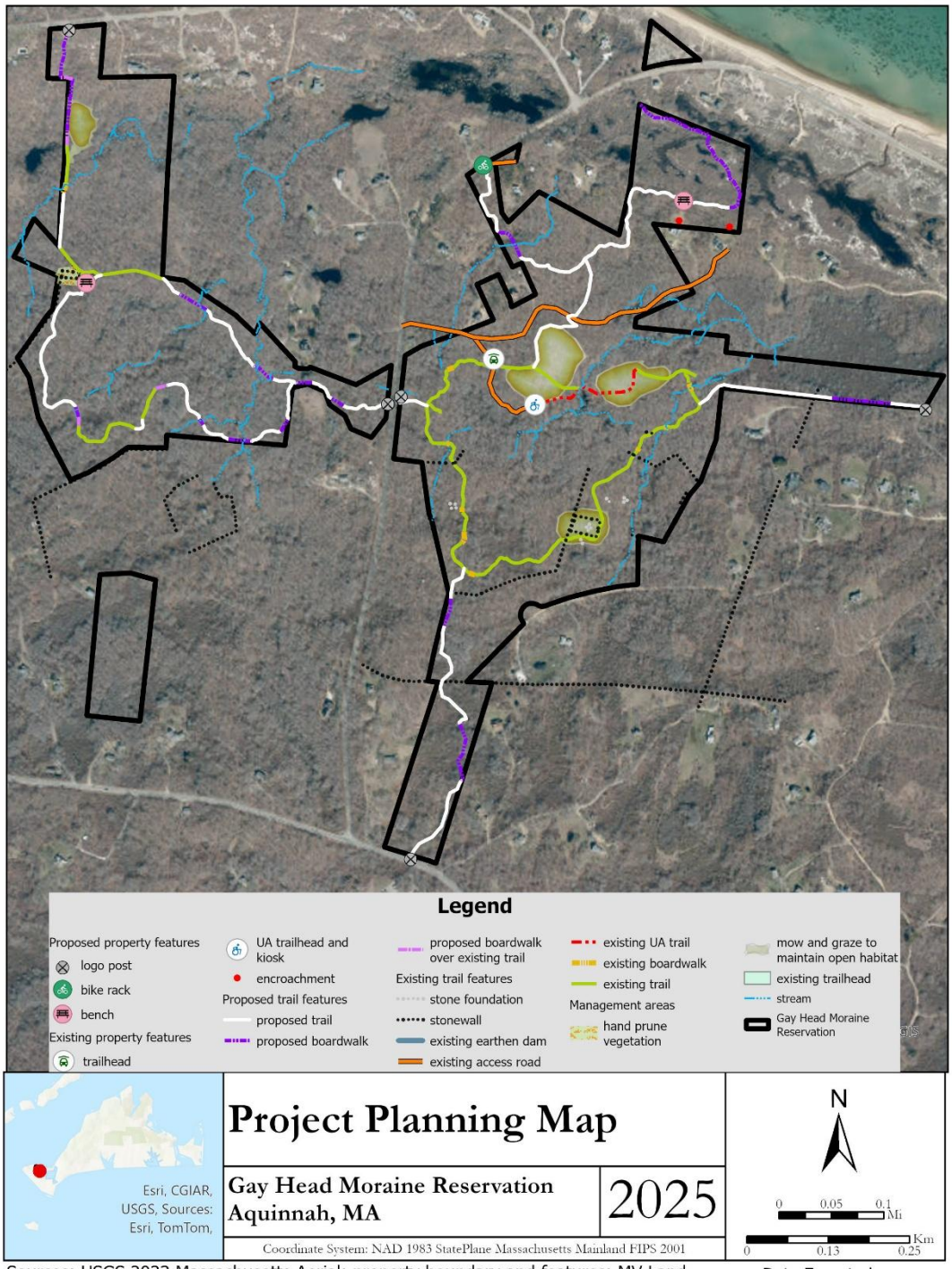
Map 33: Proposed project planning map of Gay Head Moraine Reservation, Aquinnah, MA.



Sources: USGS 2023 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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Appendix B. Preliminary Management Plan Goals, Deeds, and Surveys

A. **Preliminary Management Plan Goals for Gay Head Moraine Reservation follow.**

November 15, 1999

Martha's Vineyard Land Bank Commission

unnamed
preliminary management plan

acreage	44.0 acres
tax parcel nos.	4-1, 4-2, 4-5, 4-6, 4-13, 4-14, 4-97, 4-99 and 4-107.1
nature conservation goals	(1) conduct biological survey of property to serve as base for formulation of management objectives.
	(2) identify rare and endangered species, if any, and create plan to protect and encourage their populations.
natural products goals	(1) designate property as a category "b" property in the land bank's hunting policy, which means that general hunting will be allowed (eligible species in category "b" properties are deer, ducks, geese, pheasant, rabbit and raccoon).
recreational goals	(1) open property for hiking, non-motorized biking and horseback-riding and other passive uses; maintain existing trails and install new trails, as needed and appropriate.
	(2) work to connect property with other conservation areas and neighborhoods by means of trails and nearby roads.
	(3) choose appropriate location for trailhead at a location which is

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as close as possible to the intersection of the Lobsterville and Lighthouse Road, with space for ten vehicles and with nighttime parking permitted. This ceiling may change if additional abutting land is brought into conservation.

administrative goals

(1) remove existing shed, by conducting a public process for awarding it to the best bidder; allow existing gazebo to remain

(2) oversee and police land on regular basis in order to maintain property as an attractive conservation area

(3) complete management plan before December of 2002

approved by vote of the Aquinnah town advisory board: November 8, 1999

approved by vote of the land bank commission: November 15, 1999

May 20, 2002

Martha's Vineyard Land Bank Commission

Gay Head Moraine [expansion]
preliminary management plan

acreage	12.2 acres
tax parcel nos.	4-15.4 [portion]
nature conservation goals	(1) conduct biological survey of property to serve as base for formulation of management objectives.
	(2) identify rare and endangered species, if any, and create plan to protect and encourage their populations.
natural products goals	(1) designate property as a category "b" property in the land bank's hunting policy, which means that general hunting will be allowed (eligible species in category "b" properties are deer, ducks, geese, pheasant, rabbit and raccoon; turkey hunting to be permitted if likewise permitted elsewhere on existing preserve).
recreational goals	(1) open property for hiking, non-motorized biking and horseback-riding and other passive uses; maintain existing trails and install new trails, as needed and appropriate.
	(2) work to connect property with other conservation areas and neighborhoods by means of trails and nearby roads.
	(3) choose appropriate location for

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trailhead at a location which is as close as possible to the intersection of the Lobsterville and Lighthouse Road, with space for ten vehicles and with nighttime parking permitted. This ceiling may change if additional abutting land is brought into conservation.

administrative goals

(1) oversee and police land on regular basis in order to maintain property as an attractive conservation area

(2) complete management plan before December of 2003

approved by vote of the Aquinnah town advisory board: May 20, 2002

approved by vote of the land bank commission: September 25, 2000

December 16, 2002

Martha's Vineyard Land Bank Commission

Gay Head Moraine [expansion]
preliminary management plan

acreage	26.3 acres
tax parcel nos.	8-36, 9-152, 9-153 [portion], 9-161, 9-162, 9-163
nature conservation goals	(1) conduct biological survey of property to serve as base for formulation of management objectives.
	(2) identify rare and endangered species, if any, and create plan to protect and encourage their populations.
natural products goals	(1) allow archery hunting on this property, in accordance with the land bank hunting policy.
recreational goals	(1) open property for hiking, non-motorized biking and horseback-riding and other passive uses; maintain existing trails and install new trails, as needed and appropriate.
	(2) work to connect property with other conservation areas and neighborhoods by means of trails and nearby roads.
	(3) site a trailhead as close as possible to the State Road which will accommodate several vehicles.
administrative goals	(1) oversee and police land on regular basis in order to maintain

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property as an attractive conservation area

(2) complete management plan before December of 2004

approved by vote of the Aquinnah town advisory board: December 9, 2002

approved by vote of the land bank commission: December 16, 2002

March 20, 2018

Martha's Vineyard Land Bank Commission

Gay Head Moraine [expansion]
preliminary management plan

acreage	±40.0 acres	
tax parcel nos.	4-3 [portion], 5-121, 5-124, 5-130, 5-131, 5-133, 5-134 and 5-135	
nature conservation goals	(1)	conduct biological survey to serve as base for formulation of management objectives
	(2)	identify rare and endangered species, if any, and create plan to protect their populations; manage any exotic and/or invasive species
natural products goals	(1)	extend to locus the hunting policy already in effect on the balance of the land bank preserve, unless otherwise recommended by the land bank hunting subcommittee
scenic goals	(1)	highlight stonewalls, streams and like interesting features of locus
recreational goals	(1)	site trails that loop through property and connect to public roads
	(2)	decline to site on-premises trailhead; direct visitors instead to use existing trailhead on Beach Rose Way
administrative goals	(1)	oversee and police land on regular basis in order to maintain property as an attractive conservation area

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approved by vote of the Aquinnah town advisory board: March 20, 2018

approved by vote of the land bank commission: March 12, 2018

B. Deeds for Gay Head Moraine Reservation

The complete deeds to Gay Head Moraine Reservation are attached below. These deeds can also be found in the Dukes County office of Recorded and Registered Lands (https://www.masslandrecords.com/Dukes/).

Table 4: Documentation of deeds for Gay Head Moraine Reservation, Aquinnah, MA

Guarantor	Date	Citation
Nityananda Institute, Inc.	10/15/1998	743-755
		42737
		54-253
		186-121
Joan M. Wallen et al., trustees	11/24/1999	45550
		210-259
		56-345
Witold K. Urbanowicz	11/24/1999	783-112
Charles W. Vanderhoop III et al.	10/31/2002	907-037
Stella Winifred Hopkins et al.	1/17/2003	921-829
Stella Winifred Hopkins et al.	1/17/2003	921-834
Renée Metell	4/15/2003	940-202
Karen A. Van Brakle	4/15/2003	940-204
Island Affordable Housing Develop. Corporation	5/27/2003	948-660
Island Affordable Housing Develop. Corporation	7/16/2003	958-065
Ruth E. Van Brakle	7/31/2003	960-763
Gilbert R. Silvia	8/13/2003	962-1047
Jylene Manning	9/4/2003	967-221
Judith L. Milavsky	9/4/2003	967-223
Gladys Widdiss	9/15/2003	968-888
Grace Frye Reeves	9/25/2003	971-325
David Lynch et al.	10/3/2003	972-533
David J. Harris	10/3/2003	972-538
Edward H. Harris	10/3/2003	972-541
Edward H. Harris	10/3/2003	972-543
June Manning	10/15/2003	974-262
David J. Harris	10/27/2003	975-723
Sylvia Browne	12/8/2003	980-688
Joanne Robey	12/8/2003	980-690
Beth S. Vages, trustee	1/30/2004	986-989
Michele Howwaswee Lee	3/25/2004	993-300
Brenda Hamilton Martin	4/16/2004	996-036
Glen G. Gamboa	5/13/2004	1000-525
Carmela E. Stephens, trustee et al.	7/1/2004	1007-138
Charles W. Vanderhoop III	4/7/2005	1036-922
Martha H. Vanderhoop	4/7/2005	1036-924
Stella Winifred Hopkins	6/14/2005	1044-611
Kristine K. Kaleohano et al.	7/14/2005	1048-229
Vickie Lea Maddela	8/8/2005	1050-1045
University of North Carolina at Chapel Hill Foundation, Inc.	7/13/2018	1471-896
William D. Kirchick, trustee	7/20/2018	1472-422
Peter M. Nicholson, comm.	8/10/2020	1538-326

Peter Lynch et al., trustees	12/30/2021	1609-478
Island Housing Trust Corporation	7/14/2023	1659-247
Island Housing Trust Corporation	7/14/2023	1659-252

C. Surveys of Gay Head Moraine Reservation

Surveys are attached as follows in reduced format and can also be found in the Dukes County office of Recorded and Registered Lands (https://www.masslandrecords.com/Dukes/).

Table 5: Documentation of surveys for Gay Head Moraine Reservation, Aquinnah, MA

Guarantor	Date	Book	Page
Charles Vanderhoop	1962		
Arnold Zack	6/23/1981		43
Frank J. Nuovo et al.	11/10/1995	G	116
Deer Meadow Realty Trust et al.	11/17/1999	A	131
Stella Winifred Hopkins	1/17/2000	A	144
Arnold Zack	2/18/2013		
Martha's Vineyard Land Bank Commission	9/1/2020	19	110

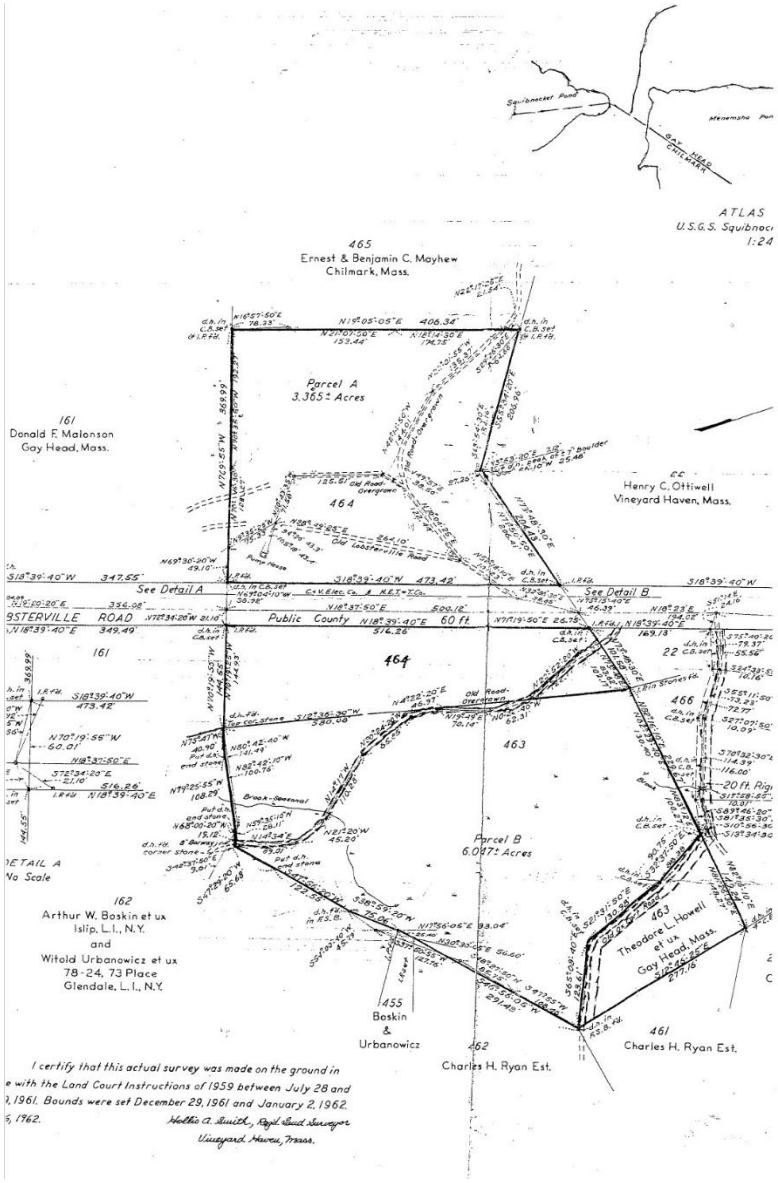


Figure 28: Charles Vanderhoop 1962 Survey

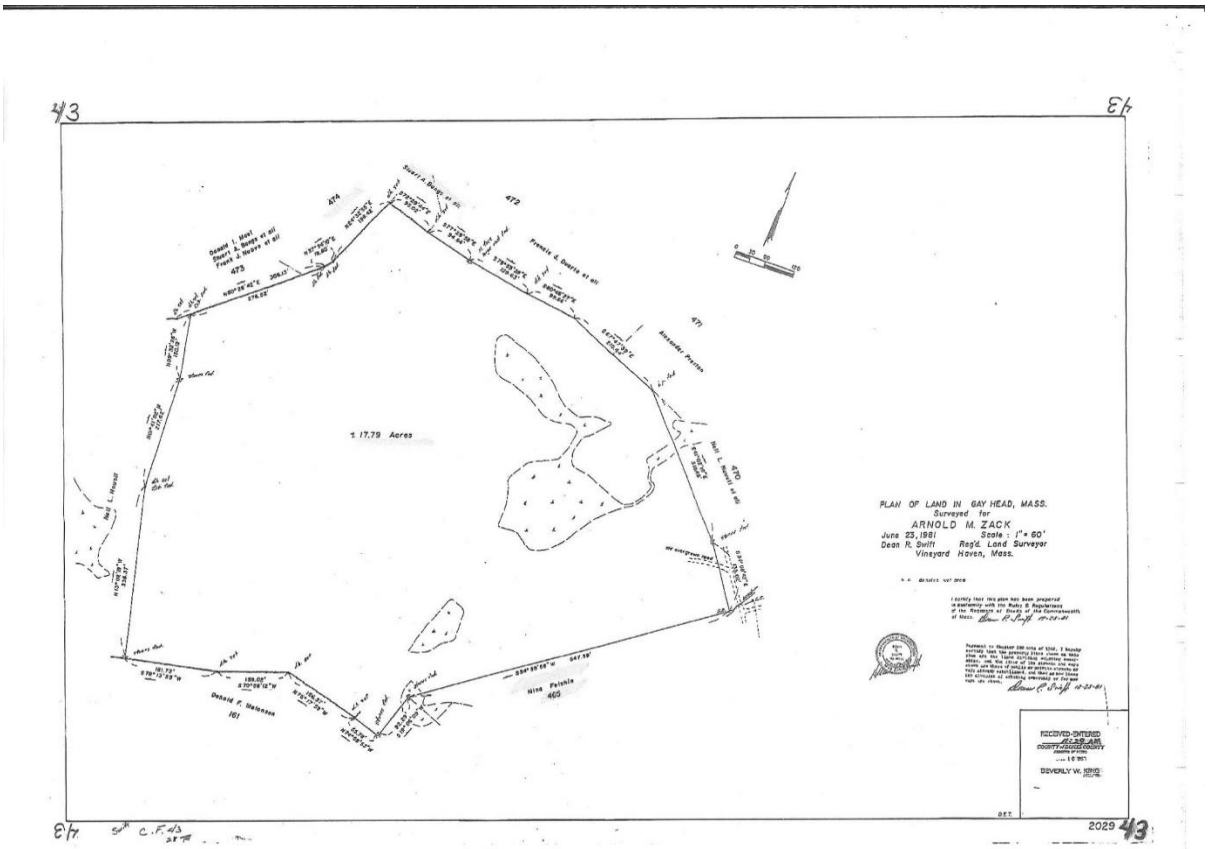


Figure 29: Arnold Zack 1981 Survey

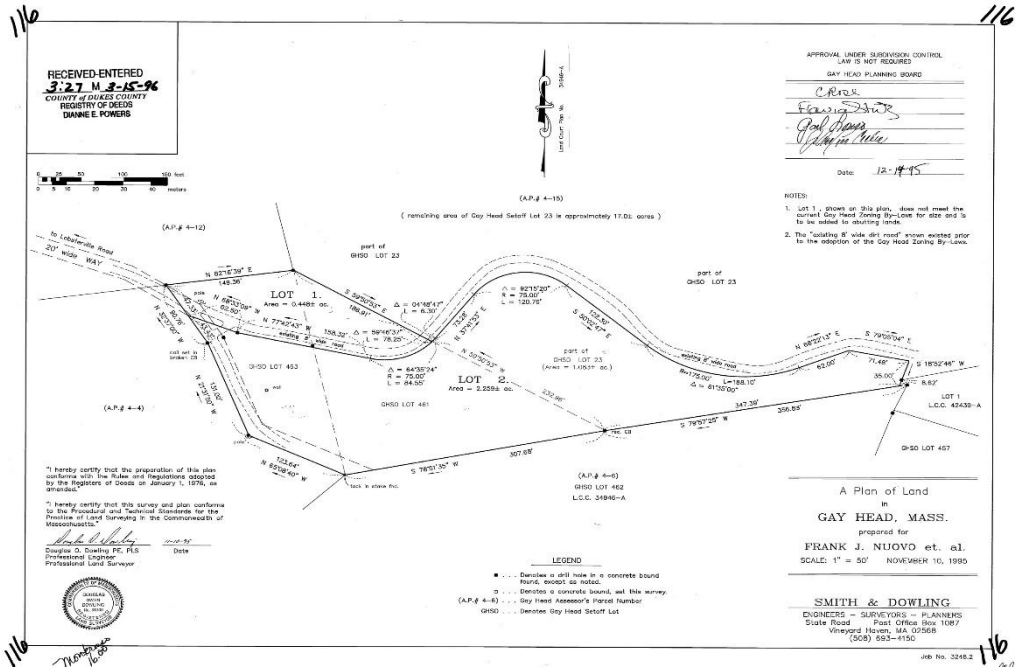


Figure 30: Frank Nuovo 1995 Survey

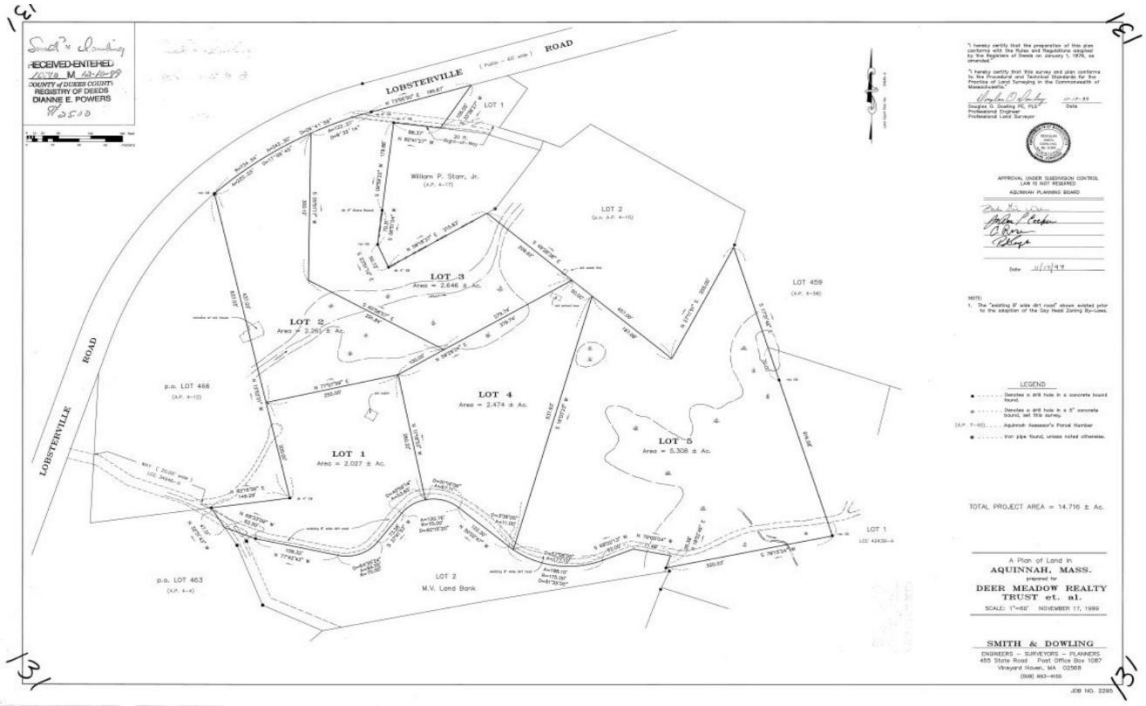


Figure 31: Deer Meadow Realty Trust 1999 Survey

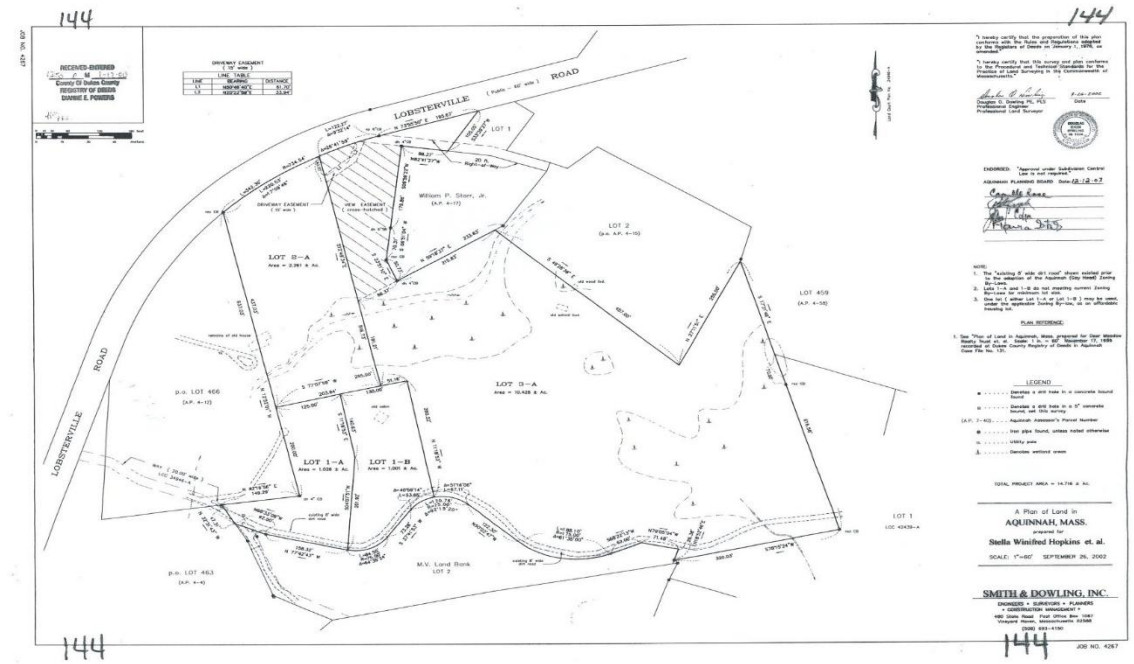


Figure 32: Hopkins 2000 Survey

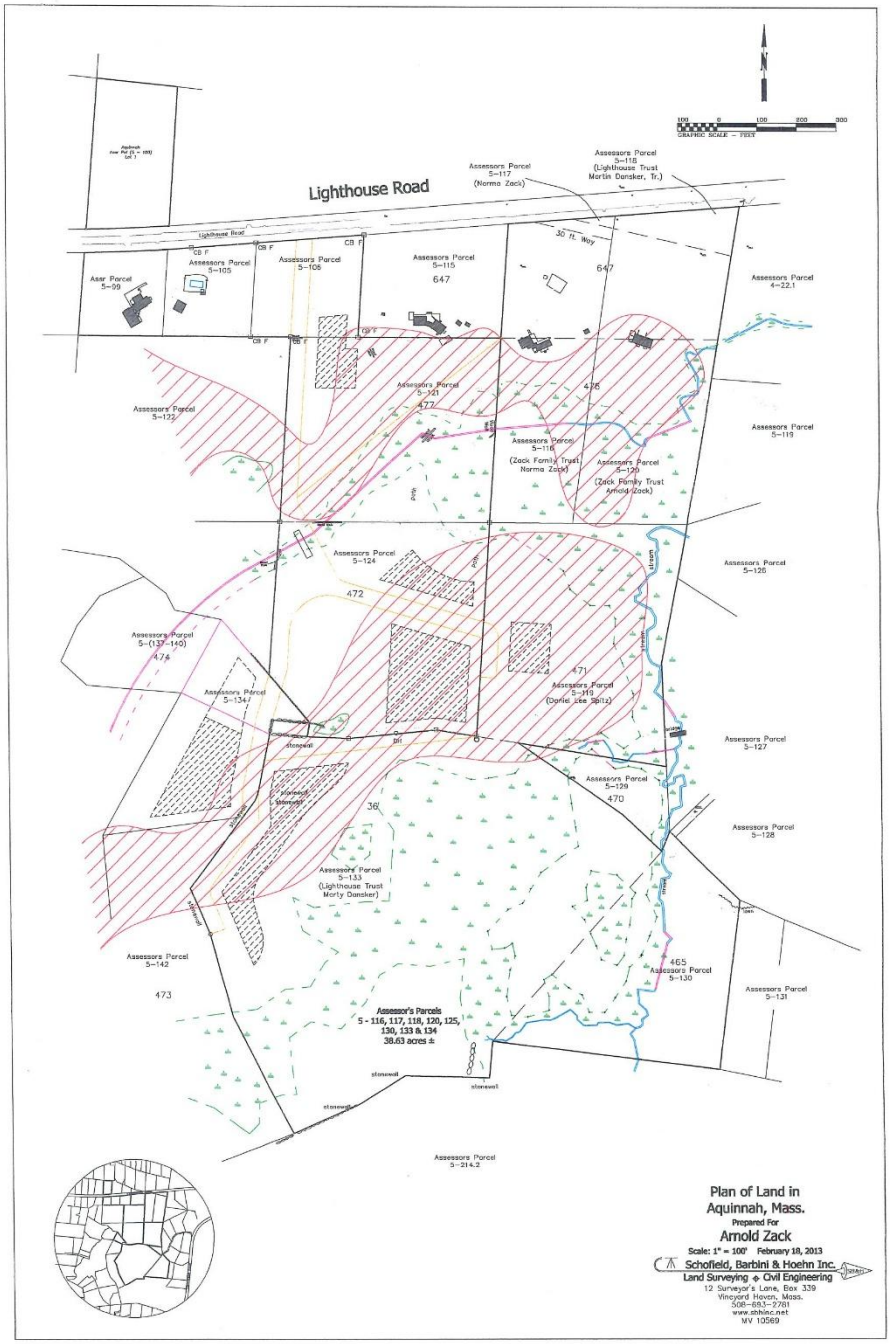


Figure 33: Arnold Zack 2013 Survey

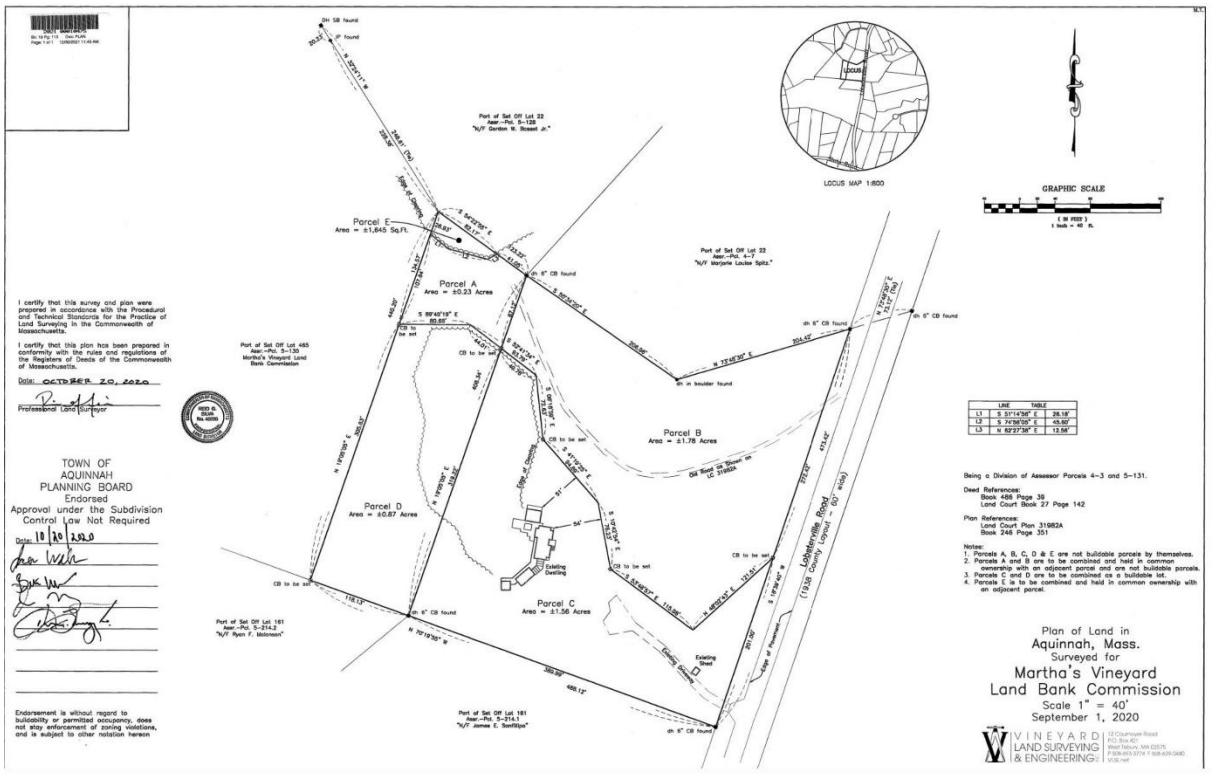


Figure 34: Martha's Vineyard Land Bank 2020 Survey

D. Easements and Restrictions

Easements and Restrictions pertaining to Gay Head Moraine Reservation are attached as follows and can also be found in the Dukes County office of Recorded and Registered Lands (https://www.masslandrecords.com/Dukes/).

Table 6: Documentation of easements and restrictions pertaining to Gay Head Moraine Reservation, Aquinnah, MA

Guarantor	Date	Citation	Type
Stella Winifred Hopkins et al.	1/17/2003	921-829	transfer of premises subject to (1.) a right-of-way across abutting land; (2.) an easement to site a well or septic system on such abutting land; and (3.) a covenant that the premises will be used for affordable housing only (land bank became successor-in-title at 921-834)
Stella Winifred Hopkins et al.	1/17/2003	921-834	100% fee-simple interest in 11.5-acre premises; subject to view and driveway easements
Island Affordable Housing Develop. Corporation	5/27/2003	948-660	trail easement
Island Affordable Housing Develop. Corporation	7/16/2003	958-065	conservation restriction, architectural restriction and easement over 0.5-acre premises; easement allows land bank to use premises as if it owned it in fee-simple; no payment
Island Housing Trust Corporation	7/14/2023	1659-247	100% fee-simple interest in 4.5-acre premises, plus easement

Island Housing Trust Corporation	7/14/2023	1659-252	trail easement

Appendix C. Soils Maps and Descriptions

Gay Head Moraine Reservation is located in till and frontal moraine on Martha's Vineyard according to the N.S. Shaler map of 1888.

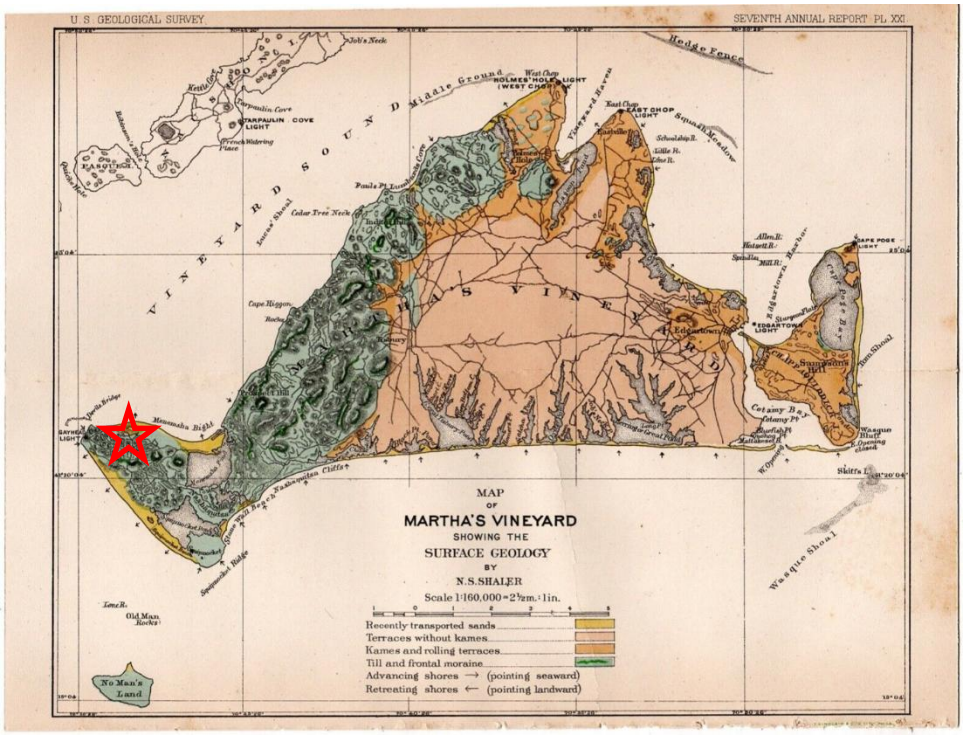


Figure 35: Surface geology map by N.S. Shaler (1888) with Gay Head Moraine Reservation location marked with a red star.

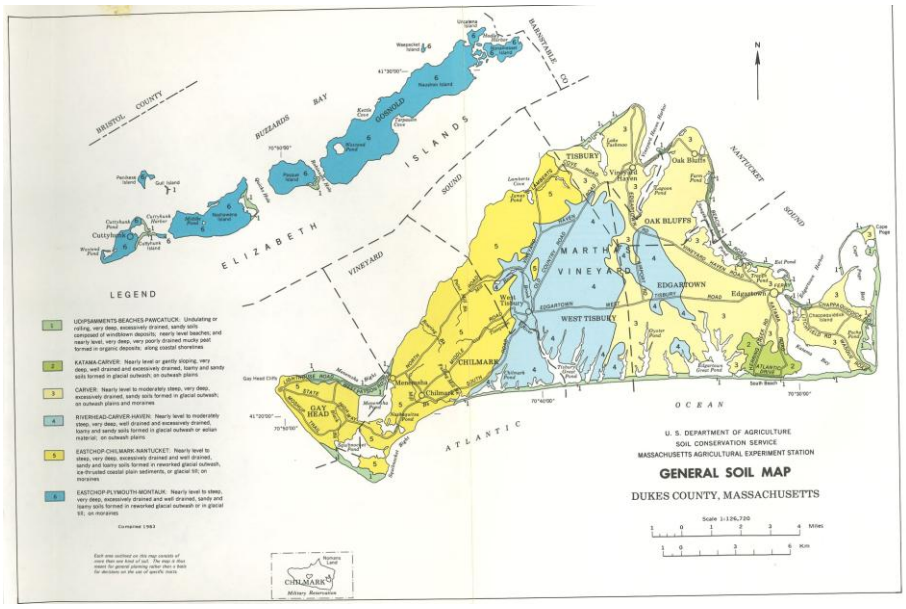


Figure 36: General soil as mapped by Soil Conservation Service (1986)

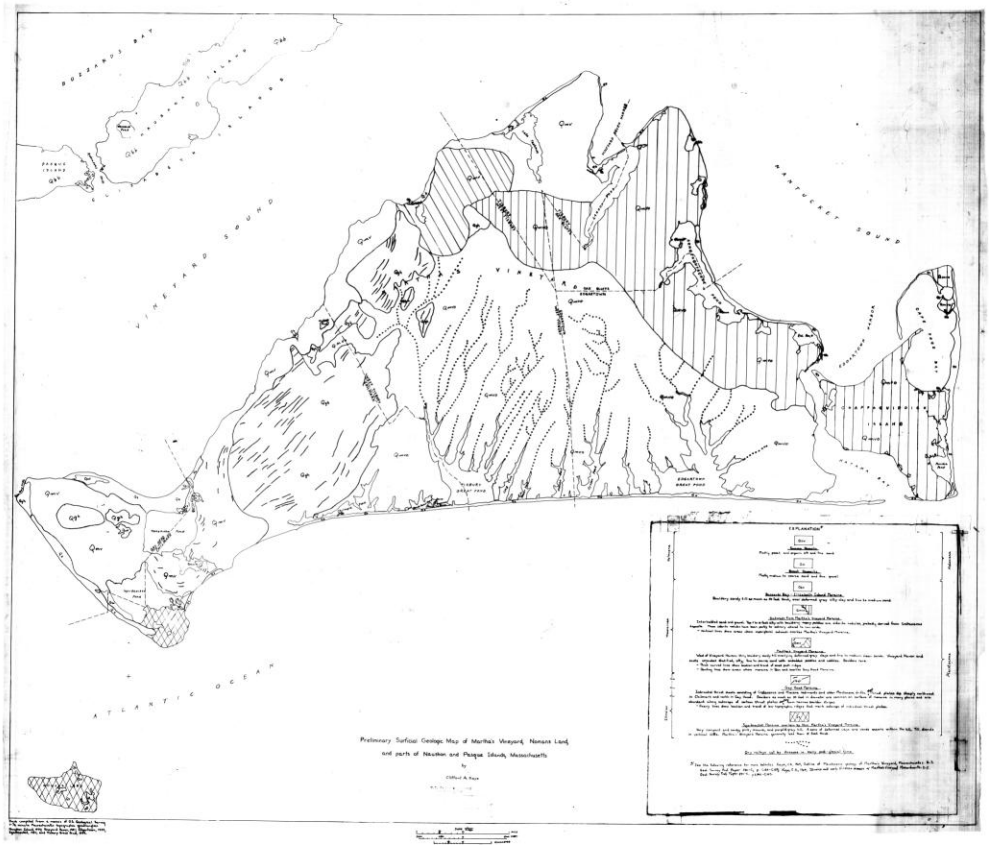
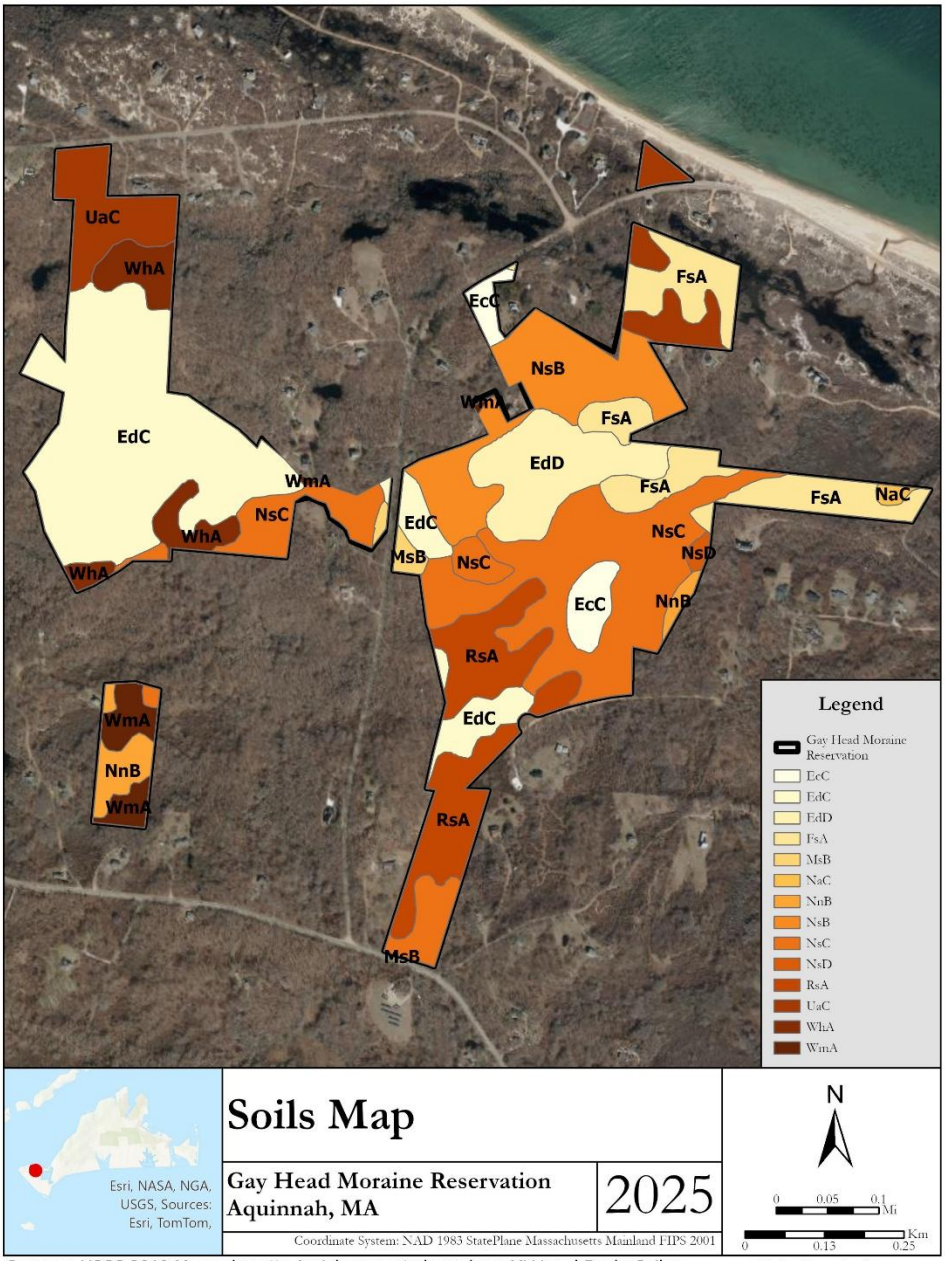


Figure 37: Preliminary surficial geologic map of Martha's Vineyard, Nomans Land, and parts of Naushon and Pasque Islands, Massachusetts, 1972 by C.A. Kaye 72-205

Map 34: Soil units on Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; Soils: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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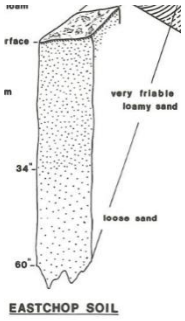
A. Soil Type Descriptions

The soils found in Gay Head Moraine Reservation include Eastchop loamy sand and Freetown and Swansea mucks. The following summaries of each soil type are derived from Fletcher & Roffinoli (1986) Dukes County Soil Surveys.

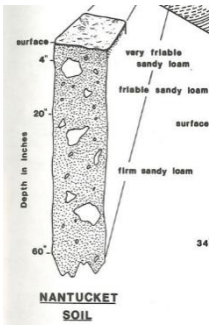
1. Eastchop Soil
    i. Eastchop loamy sand
        a) EcC 8-15% slope
        b) The eastchop loamy sand soils are excessively drained low available water capacity and rapid water permeability. The soils droughtiness creates an environment that is unsuitable to agriculture and woodland productivity. Augmenting soils with manure and thinning crown density would improve the productivity of the soil.



EASTCHOP SOIL

    ii. Eastchop loamy sand, very stony
        a) Edc 8-15% slope, EdD 15-35% slope
        b) The addition of boulders and stones to the already drought intensive Eastchop soil limits productivity further by restricting the use of equipment in this area. Areas with intense slopes require water bars and other erosion control methods to retain the soil on trails and roads.
2. Freetown and Swansea mucks
    i. Freetown and Swansea muck
        a) FsA 0-1% slope
        b) This mucky soil occurs in depressions and areas near water. They are poorly drained and have a 19-inch surface layer of muck. The high water table and moderate permeability render this soil suitable for primarily wetland wildlife habitat.
3. Moshup loam
    i. Moshup loam, very stony
        a) MsB 0-8% slope
        b) The stones and boulders in addition to the high water table create an environment unsuitable for cultivated crops. However, pasturing remains a viable option on Moshup very stony soils.

4. Nantucket Soil



   i. Nantucket sandy loam and Nantucket sandy loam, very stony
      a) NaC 8-15% slope
   ii. Nantucket sandy loam, very stony
      a) NnB 3-8% slope
   iii. Nantucket-Plymouth complex rolling and very stony
      a) NsB undulating, very stony, NsC rolling, very stony, NsD hilly, very stony
   iv. The Nantucket soils are as a group well drained and moderately permeable. They are often occurring in abandoned pastures and are suitable for agriculture and woodland productivity with little to no limitations excepting slope in some occasions.

5. Ridgebury Variant
   i. Ridgebury Variant fine sandy loam
      a) RsA 0-3% slope
      b) This soil is typically found in flat uplands. It is deep and poorly drained with a high water capacity. It is not well suited for agriculture, woodland productivity, or development due to its seasonal high water table and often stony surface.

6. Udipsamments
   i. Udipsamments, rolling
      a) UaC, rolling
      b) Udipsamments are found on coastal sand dunes. They are deep and very well drained, generally taking a narrow, long shape. Rapid permeability of this soil make it poorly suited to woodland or farming.

7. Whitman Variant
   i. Whitman Variant silt loam
      a) WhA 3-8% slope
   ii. Whitman Variant silt loam, very stony
      a) WmA 0-3% slopes
   iii. The Whitman Variant soils are flat, deep, and very poorly-drained soils typically found in low-lying areas and depressions. They have a moderate water holding capacity, however are considered unsuitable for crops, haying, and pasture due to the seasonal high water table. The wetland habitat accompanying these soils is well suited for wildlife.

Appendix D: Vegetation and Fungi

A. Survey methods

During the fall of 1999, 2000 and 2018, quantitative vegetation surveys were conducted in woodland, shrubland, and grassland habitats of Gay Head Moraine Reservation (Map 35, page 112 and Table 7, page 113). Qualitative meandering surveys of the entire property were conducted in spring, summer and fall of 1999-, 2001, 2003, 2004, 2007, 2017, 2018, 2021-2024.

1. Woodland

i. Closed canopy woodland

The woodland was surveyed following the point sampling method using a basal area factor of 10 as described by Avery and Burkhart (2002). This method captures tree species composition, canopy density, and diameter at breast height (DBH) of trees within the plot. Total number of points sampled was calculated based on total acreage of woodland and a plot ratio of 1 plot per 2 acres for the first 10 acres and 1 plot per 5 acres thereafter using the formula feet between points = *sqrt*(acres/point*43,560). A total of 26 points was randomly located in the woodland using ArcGIS Pro 3.4 and plotted on the ground using a handheld GPS or located on a paper map and plotted onsite with a handheld compass. At each point a 10BAF wedge prism was used to located trees to be measured. Species, dbh and growth form were recorded for each tree measured. Height of tallest tree in the plot was recorded using a SUUNTO clinometer. In addition to canopy measurements, 3-m2 circular plots were used to inventory the understory at each woodland point. Density and percent cover of understory vegetation was recorded for each species and over percent overstory and understory cover was recorded using a GRS densitometer for all plots. Additionally, visible down trees and snags were recorded for each point.

ii. Moderate open canopy woodland

The grass understory of the moderate open canopy coastal woodland area on the Gay Head Moraine Reservation was surveyed, following modified methods described by Dunwiddie (1986). Individual 1-m^2 circular plots were samples. Number of plots sampled was calculated based on total acreage of area, plot size of 1-m^2, and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 5 plots was randomly located on one transects using a random numbers table for distance between plots. Points were located in the field using a tape measure and handheld compass. Percent cover and total stem counts for each species was recorded for each plot. Importance values (relative cover + relative percent + relative frequency) were calculated for each species sampled.

2. Open habitats

i. Grassland

The 1.2-acre sandplain grassland on the Gay Head Moraine Reservation was surveyed, following modified methods described by Dunwiddie (1986). Individual 1-m^2 circular plots were samples. Number of plots sampled was calculated based on total acreage of grassland, plot size of 1-m^2, and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 13 plots was

randomly located along four transects (west-east) using a random numbers table for distance between plots and transects. Points were located in the field using a tape measure and handheld compass. Percent cover and total stem counts for each species was recorded for each plot. Importance values (relative cover + relative percent + relative frequency) were calculated for each species sampled.

ii. Maritime dune

A 0.75-acre open-canopy area of the 4.5-acre maritime dune on the Gay Head Moraine Reservation was surveyed, following modified methods described by Dunwiddie (1986). Individual 2-m^2 circular plots were samples. Number of plots sampled was calculated based on total acreage of area, plot size of 2-m^2, and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 14 plots was randomly located on three transects (north-south) using ArcGIS Pro 3.4 and located in the field using a handheld GPS. Percent cover and total stem counts for each species was recorded for each plot. Importance values (relative cover + relative percent + relative frequency) were calculated for each species sampled.

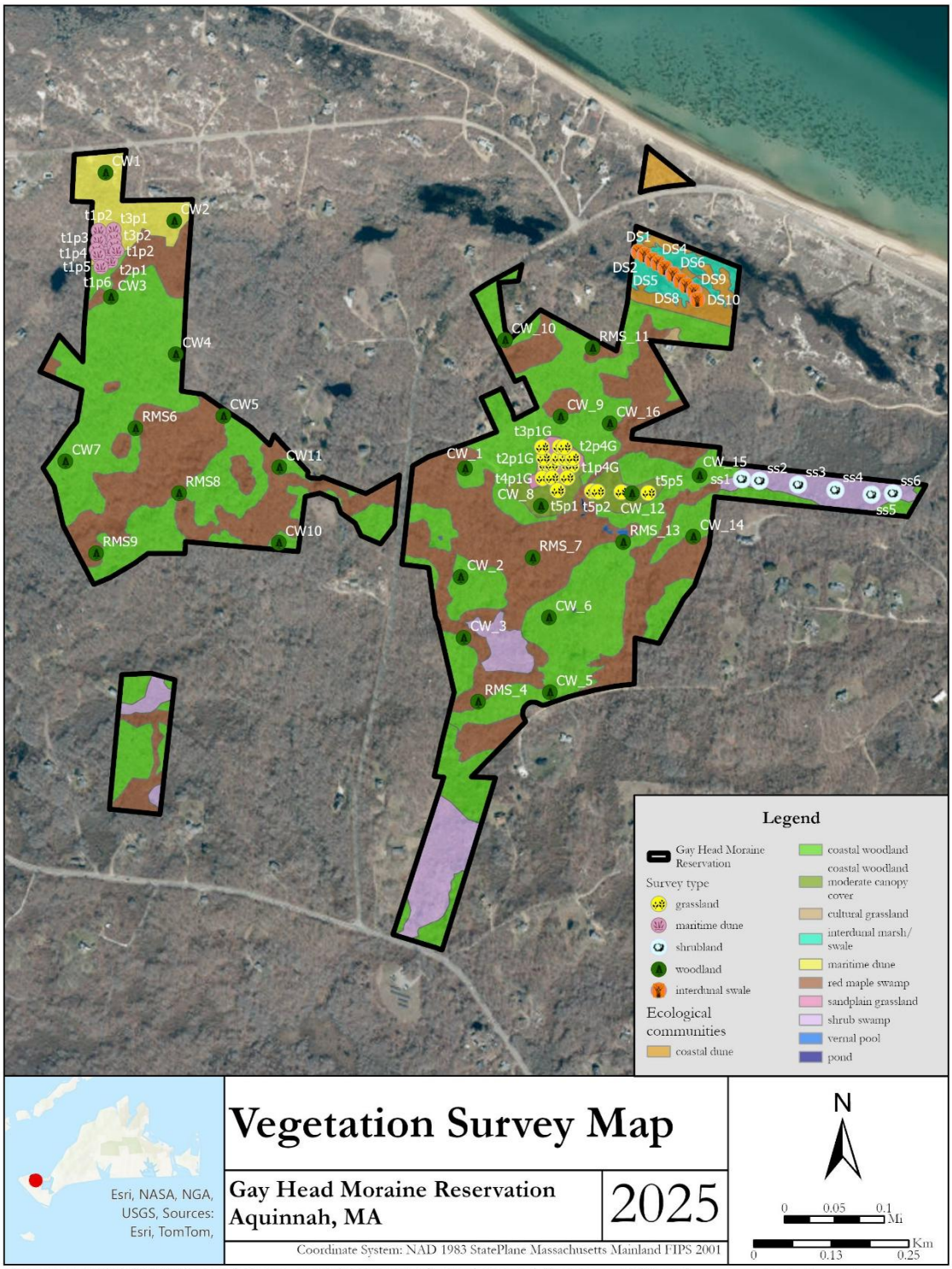
iii. Interdunal swale/coastal dune

A 2.9-acre interdunal swale woven within a 2.2-acre coastal dune on the Gay Head Moraine Reservation was surveyed, following modified methods described by Dunwiddie (1986). Individual 2-m^2 circular plots were samples. A total of 10 plots, each circular and 2-m^2, was randomly located on a single transect starting at the northwestern corner of the habitat and stretching towards the southeastern corner. Points were plotted on the ground using a tape measure and handheld compass. Percent cover and total stem counts for each species was recorded for each plot. Importance values (relative cover + relative percent + relative frequency) were calculated for each species sampled.

3. Shrubland

A 3.1-acre area of an 8.9-acre shrub swamp located of Clay Pit Road was inventoried following modified methods described by Dunwiddie (1986). Individual 2-m^2 circular plots were samples. Number of plots sampled was calculated based on total acreage of shrubland, plot size of 2-m^2, and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 6 plots was randomly generated along a centrally located west-east transect using a random numbers table, tape measure, and compass in the field. Percent cover and total stem counts for each species was recorded for each plot. Importance values (relative cover + relative percent + relative frequency) were calculated for each species sampled.

Map 35: Vegetation survey points and transects on Gay Head Moraine Reservation, Aquinnah



Sources: USGS 2019 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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Table 7: Vegetation survey identification, habitat and survey year for Gay Head Moraine Reservation, Aquinnah, MA

Vegetation surveys				
ID	Habitat	Year	Longitude	Latitude
CW_1	coastal woodland	1999	41.34677	-70.7992
CW_10	coastal woodland	1999	41.34863	-70.7984
CW_12	coastal woodland	1999	41.34639	-70.796
CW_14	coastal woodland	1999	41.34575	-70.7948
CW_15	coastal woodland	1999	41.34664	-70.7947
CW_16	coastal woodland	1999	41.34741	-70.7964
CW_2	coastal woodland	1999	41.3452	-70.7993
CW_3	coastal woodland	1999	41.34431	-70.7992
CW_5	coastal woodland	1999	41.34351	-70.7976
CW_6	coastal woodland	1999	41.3446	-70.7976
CW_8	coastal woodland	1999	41.34622	-70.7977
CW_9	coastal woodland	1999	41.34751	-70.7973
CW1	coastal woodland	2018	41.35111	-70.8061
CW2	coastal woodland	2018	41.3504	-70.8048
CW3	coastal woodland	2018	41.3493	-70.806
CW4	coastal woodland	2018	41.34846	-70.8047
CW5	coastal woodland	2018	41.34756	-70.8038
CW7	coastal woodland	2018	41.34692	-70.8069
CW10	coastal woodland	2018	41.34571	-70.8028
CW11	coastal woodland	2018	41.34681	-70.8028
t4p1G	grassland	2000	41.34662	-70.7977
t4p2G	grassland	2000	41.34662	-70.7975
t4p3G	grassland	2000	41.34662	-70.7972
DS1	interdunal marsh swale	2004	41.3499	-70.7958
DS10	interdunal marsh swale	2004	41.3492	-70.7947
DS2	interdunal marsh swale	2004	41.34985	-70.7957
DS3	interdunal marsh swale	2004	41.34978	-70.7955
DS4	interdunal marsh swale	2004	41.34973	-70.7954
DS5	interdunal marsh swale	2004	41.34966	-70.7953
DS6	interdunal marsh swale	2004	41.34956	-70.7951
DS7	interdunal marsh swale	2004	41.34947	-70.795
DS8	interdunal marsh swale	2004	41.3494	-70.7949
DS9	interdunal marsh swale	2004	41.34932	-70.7947
t1p2	maritime dune	2018	41.34997	-70.8059
t1p2	maritime dune	2018	41.35027	-70.8062
t1p3	maritime dune	2018	41.35012	-70.8062
t1p4	maritime dune	2018	41.34999	-70.8063
t1p5	maritime dune	2018	41.34992	-70.8062
t1p6	maritime dune	2018	41.34974	-70.8062

t2p1	maritime dune	2018	41.34983	-70.806
t2p3	maritime dune	2018	41.34997	-70.806
t2p4	maritime dune	2018	41.3501	-70.8061
t2p5	maritime dune	2018	41.35019	-70.806
t3p1	maritime dune	2018	41.35028	-70.8059
t3p2	maritime dune	2018	41.35015	-70.8059
t3p3	maritime dune	2018	41.35005	-70.8059
t5p1	moderate cover coastal woodland	2000	41.34644	-70.7974
t5p2	moderate cover coastal woodland	2000	41.34642	-70.7967
t5p3	moderate cover coastal woodland	2000	41.34642	-70.7966
t5p4	moderate cover coastal woodland	2000	41.34641	-70.7962
t5p5	moderate cover coastal woodland	2000	41.34639	-70.7957
RMS_11	red maple swamp	1999	41.34859	-70.7969
RMS_13	red maple swamp	1999	41.34568	-70.7961
RMS_4	red maple swamp	1999	41.34338	-70.799
RMS_7	red maple swamp	1999	41.34547	-70.7979
RMS6	red maple swamp	2018	41.34739	-70.8055
RMS8	red maple swamp	2018	41.34645	-70.8047
RMS9	red maple swamp	2018	41.34558	-70.8063
t1p1G	sandplain grassland	2000	41.34681	-70.7976
t1p2G	sandplain grassland	2000	41.34681	-70.7975
t1p3G	sandplain grassland	2000	41.3468	-70.7972
t1p4G	sandplain grassland	2000	41.3468	-70.7971
t2p1G	sandplain grassland	2000	41.34691	-70.7977
t2p2G	sandplain grassland	2000	41.34691	-70.7974
t2p3G	sandplain grassland	2000	41.34691	-70.7972
t2p4G	sandplain grassland	2000	41.34691	-70.7971
t3p1G	sandplain grassland	2000	41.34707	-70.7977
t3p2G	sandplain grassland	2000	41.34707	-70.7974
t3p3G	sandplain grassland	2000	41.34707	-70.7973
ss1	shrub swamp	2000	41.34659	-70.7938
ss2	shrub swamp	2000	41.34656	-70.7935
ss3	shrub swamp	2000	41.34649	-70.7928
ss4	shrub swamp	2000	41.34641	-70.792
ss5	shrub swamp	2000	41.34634	-70.7914
ss6	shrub swamp	2000	41.34636	-70.7909

B. Species Diversity

A total of 311 plant species and 8 fungi/lichen species were observed within Gay Head Moraine Reservation. Results from qualitative and quantitative vegetation surveys were used to create the species list for Gay Head Moraine Reservation (Table 8, page 115, and Table 9, page 122).

Table 8: Plant species of Gay Head Moraine Reservation, Aquinnah, MA

Kingdom Plantae	
Scientific Name	**Common Name**
Non-vascular	
Bryophyte	
Aulacomnium palustre	ribbed bog moss
Leucobryum glaucum	pincushion Moss
Lophocolea heterophylla	various-leaved crestwort
Mnium hornum	horn calcareous moss
Odontoschisma sp	leafy liverwort
Pellia epiphylla	overleaf pellia
Plagiomnium cuspidatum	woodsy thyme-moss
Polytrichum ohioense	haircap moss species
Shpagnum teres	rigid bogmoss
Sphagnum recurvum	recurved peatmoss
Vascular	
Fern	
Athyrium angustum	northern lady fern
athyrium aspleniodes	southern lady fern
Cystopteris sp.	fragile fern
Dennstaedtia punctilobula	hayscented fern
Dryopteris carthusiana	spinulose woodfern
Dryopteris marginalis	marginal wood fern
Dryopteris spp.	wood fern
Onoclea sensibilis	sensitive fern
Osmunda claytoniana	interrupted fern
Osmunda regalis	royal fern
Osmundatrum cinnamomeum	cinnamon fern
Parathelypteris simulata	Massachusetts fern
Phegopteris hexagonoptera	broad beech fern
Polystichum acrostichoides	christmas fern
Pteridium aquilinum	bracken fern
Thelypteris noveboracensis	New York fern
Thelypteris palustris	marsh fern
Woodwardia areolata	netted chainfern
Woodwardia virginica	Virginia chainfern
Graminoid	
Agrostis gigantea	redtop bentgrass
Agrostis hyemalis	winter bentgrass
Agrostis perennans	autumn bentgrass
Agrostis scabra	rough bentgrass

Andropogon gerardii	big blue stem
Andropogon glomeratus	bushy bluestem
Andropogon virginicus var. virginicus	broomsedge bluestem
Anthoxanthum odoratum	sweet vernal grass
Aristida dichotoma	churchmouse threeawn
Brachyelytrum erectum	bearded shorthusk
Bromus secalinus	rye brome
Carex atlantica	prickly bog sedge
Carex blanda	woodland sedge
Carex crinita	awned sedge
Carex echinata	star sedge
Carex intumescens	greater bladder sedge
Carex lupulina	hop sedge
Carex lurida	sallow sedge
Carex pensylvanica	Pennsylvania sedge
Carex scoparia	pointed broom sedge
Carex stipata	awl-fruited sedge
Carex swanii	Swan's sedge
Carex virescens	ribbed sedge
Carex vulpinoidea	fox-sedge
Cladium mariscoides	smooth saw sedge
Cyperus lupulinus	great plains flatsedge
Dactylis glomerata	orchard grass
Danthonia spicata	poverty grass
Deschampsia flexuosa	crinkled hairgrass
Dicanthelium cf. acuminatum	panic grass
Dichanthelium clandestinum	deer tongue hairy rosette-panicgrass
Elymus repens	quack grass
Eriophorum virginicum	tawny cottonsedge
Festuca filiformis	fine-leaved sheep fescue
Festuca ovina	sheep fescue
Festuca rubra	red fescue
Festuca trachyphylla	hard fescue
Glyceria obtusa	Atlantic mannagrass
Holcus lanatus	velvet grass
Juncus bufonius	toad rush
Juncus canadensis	Canada rush
Juncus effusus	soft rush
Juncus greenei	Greene's rush
Juncus pylaei	Pylaei's soft rush
Juncus tenuis	path rush
Leersia oryzoides	rice cut grass

Lolium perenne var. perenne	perennial rye grass
Luzula bulbosa	bulbous wood rush
Luzula campestris	field wood rush
Luzula luzuloides	oak-forest wood rush
Miscanthus sinensis	Chinese silvergrass
Panicum virgatum	switch panicgrass
Phleum pratense	timothy
Puccinellia pallida	false manna grass
Rhynchospora alba	white beaksedge
Rhynchospora capitellata	brownish beaksedge
Schedonorus arundinacea	tall rye grass
Schedonorus pratensis	meadow rye grass
Schizachyrium scoparium	little bluestem
Schoenoplectus pungens	three-square club-bulrush
Scirpus cyperinus	wool grass
Vulpia myuros	rat-tail six-weeks grass
Vulpia octoflora	eight-flowered six weeks grass
Herbaceous	
Achillea millefolium	yarrow
Agalinis purpurea	purple garardia
Ambrosia artemisiifolia	common ragweed
Anaphalis margaritaceae	pearly everlasting
Anemone quinquefolia	wood anemone
Aralia nudicaulis	wild sarsaparilla
Arisaema triphyllum	jack-in-the-pulpit
Artemisia vulgaris	common wormwood
Asclepias incarnata	swamp milkweed
Asclepias syriaca	common milkweed
Asclepias tuberosa	butterfly milkweed
Aureolaria flava	smooth false foxglove
Bartonia virginica	Virginia screwstem
Bidens frondosa	devil's beggar-ticks
Brickellia eupatorioides	false boneset
Caltha palustris	marsh-marigold
Centaurea stoebe	spotted knapweed
Cerastium vulgatum	mouse ear chickweed
Chimaphila maculata	spotted wintergreen
Chrysanthemum leucanthemum	oxeye daisy
Cichorium intybus	chicory
Circaea canadensis	broad-leaved enchanters' nightshade
Cirsium vulgare	bull thistle
Daucus carota	queen anne's lace

Decodon verticillatus	water willow
Dianthus armeria	deptford pink
Drosera rotundifolia	roundleaf sundew
Epifagus virginiana	beech drops
Epigaea repens	trailing arbutus
Epilobium coloratum	eastern willow-herb
Erechtites hieraciifolia	American burnweed
Erigeron annuus	annual fleabane
Erigeron strigosus	daisy fleabane
Eriophorum vaginatum	tussock cottonsedge
Eupatorium hyssopifolium	hyssopleaf boneset
Eupatorium perfoliatum	common bonset
Eurybia divaricata	white wood aster
Eurybia spectabilis	eastern showy aster
Euthamia graminifolia	grass-leaved goldenrod
Euthamia tenuifolia	slender-leaved goldenrod
Fallopia scandens	climbing false buckwheat
Fragaria vesca	wood strawberry
Fragaria virginiana	wild strawberry
Galium asprellum	rough bedstraw
Galium mollugo	hedge bedstraw
Galium palustre	marsh bedstraw
Gaultheria procumbens	wintergreen
Geranium maculatum	spotted crane's-bill
Geum canadense	white avens
Hedyotis caerulea	little bluet
Hieracium caespitosum	yellow hawkweed
Hieracium pilosella	mouse ear hawkweed
Hieracium scabrum	rough hawkweed
Hieracium venosum	rattlesnake hawkweed
Hudsonia tomentosa	woolly beach heather
Hypericum canadense	Canadian St. John's Wort
Hypericum mutilum	dwarf St. John's wort
Hypericum perforatum	common St. Johnswort
Hypochaeris radicata	cat's ear
Impatiens capensis	common jewelweed
Ionactis linariifolius	stiff aster
Iris pseudacorus	yellow iris
Iris versicolor	blue flag iris
Juncus canadensis	Canada rush
Kalmia angustifolia	sheep laurel
Lechea maritima	beach pinweed

Lespedeza capitata	round-headed bush-clover
Lilium philadelphicum	wood lily
Linaria vulgaris	butter-and-eggs toadflax
Ludwigia palustris	common water primrose
Lycopus uniflorus	northern bugleweed
Lycopus virginicus	sweet bugleweed
Lysimachia borealis	starflower
Lysimachia quadrifolia	whorled loosestrife
Lysimachia terrestris	swamp yellow-loosestrife
Lythrum salicaria	purple loosestrife
Maianthemum canadense	Canada mayflower
Medeola virginiana	Indian cucumber root
Melampyrum lineare	cow-wheat
Melilotus albus	white sweet clover
Mentha canadensis	American wild mint
Monotropa uniflora	one-flowered Indian pipe
Muscari botryoides	grape hyacinth
Nabalus trifoliolata	three-leaved rattlesnake root
Nuttallanthus canadensis	oldfield-toadflax
Nymphaea odorata	American white waterlily
Oenothera biennis	common evening primrose
Orobanche uniflora	one-flowered broomrape
Oxalis stricta	yellow wood sorrel
Papaver sp.	poppy
Persicaria hydropiper	water-pepper smartweed
Persicaria sagittata	arrow-leaved tearthumb
Plantago lanceolata	English plantain
Plantago major	common plantain
Platanthera clavellata	little club-spur bog orchid
Pogonia ophioglossoides	rose pogonia
Polygala cruciata	cross-leaved milkwort
Polygonum articulatum	sand jointweed
Polygonum hydropiperoides	mild water pepper
Pontederia cordata	pickerelweed
Potentilla canadensis	dwarf cinquefoil
Potentilla simplex	common cinquefoil
Proserpinaca palustris	marsh mermaid-weed
Prunella vulgaris	common selfheal
Pseudognaphalium obtusifolium	sweet everlasting
Pyrola americana	roundleaf pyrola
Ranunculus acris	common buttercup
Rudbeckia hirta	black-eyed susan

Rumex acetosella	field sorrel
Rumex crispus	curly dock
Rumex obtusifolius	bitter dock
Salix myrtilloides	swamp willow
Scilla mischtschenkoana	scilla
Scutellaria lateriflora	mad dog skullcap
Senega golygama	racemed milkwort
Sisyrinchium montanum	common blue-eyed grass
Smilacina racemosa	false solomon's seal
Solidago erecta	slender goldenrod
Solidago latissimifolia	Elliott's goldenrod
Solidago odora	sweet goldenrod
Solidago rugosa	rough-stemmed goldenrod
Solidago speciosa	showy goldenrod
Solidago uliginosa	swamp goldenrod
Soliva sessilis	burrweed
Sparganium americanum	American bur-reed
Spiraea tomentosa	steeplebush
Stachys byzantina	lamb's ear
Symphyoptrichum ericoides	heath aster
Symphyotrichum dumosum	bushy aster
Symphyotrichum lateriflorum	calico aster
Symphyotrichum novi-belgii	New York aster
Symphyotrichum racemosum	small white aster
Symphyotrichum undulatum	wavy-leaved aster
Symplocarpus foetidus	skunk cabbage
Taraxacum officinale	common dandelion
Triadenum virginicum	Virginia marsh-St. John's-wort
Trifolium arvense	rabbit foot clover
Trifolium pratense	red clover
Trifolium procumbens	low hop clover
Trifolium repens	white clover
Typha latifolia	common cattail
Uvularia sessilifolia	wild oats
Verbascum thapsus	great common mullein
Viburnum dentatum	smooth arrow-wood
Vicia cracca	cow vetch
Vicia sativa	common vetch
Viola cucullata	marsh blue violet
Viola nova-angliae	New england violet
Viola pallens	northern white violet
Viola species	violet species

Xyris torta	slender yellow-eyed grass
Clubmoss	
Dendrolycopodium obscurum	ground pine
Shrub	
Alnus incana ssp. rugosa	speckled alder
Amelanchier canadensis	oblongleaf shadbush
Amelanchier laevis	smooth shadbush
Aronia floribunda	purple chokeberry
Cephalanthus occidentalis	buttonbush
Clethra alnifolia	sweet pepperbush
Corylus americana	American hazelnut
Gaylussacia baccata	black huckleberry
Gaylussacia frondosa	dangleberry
Ilex glabra	inkberry
Ilex verticillata	winterberry
Lindera benzoin	spicebush
Lyonia ligustrina	maleberry
Morella pensylvanica	northern bayberry
Myrica gale	sweet gale
Quercus ilicifolia	scrub oak
Rhododendron viscosum	swamp azalea
Rhus copallinum	shining sumac, winged sumac
Ribes hirtellum	hairy-stemmed gooseberry
Rosa carolina	Carolina rose
Rosa multiflora	multiflora rose
Rosa palustris	swamp rose
Rosa rugosa	beach rose
Rosa virginiana	Virginia rose
Rubus occidentalis	black raspberry
Toxicodendron vernix	poison sumac
Vaccinium angustifolium	lowbush blueberry
Vaccinium corymbosum	highbush blueberry
Vaccinium pallidum	hillside blueberry
Tree	
Abies balsam	balsam fir
Abies fraseri	fraser fir
Acer rubrum	red maple
Carya tomentosa	mockernut hickory
Cornus florida	flowering dogwood
Fagus grandifolia	American beech
Hamamelis virginiana	common witch-hazel
Ilex opaca	American holly

Nyssa sylvatica	black tupelo
Ostrya virginiana	hop hornbeam
Picea pungens	blue spruce
Pinus strobus	eastern white pine
Prunus serotina	black cherry
Prunus virginiana	choke cherry
Quercus alba	white oak
Quercus coccinea	scarlet oak
Quercus velutina	black oak
Salix sp.	willow
Sassafras albidum	sassafras
Vine	
Celastrus orbiculatus	Asiatic bittersweet
Cuscuta spp.	dodder
Mikania scandens	hempvine
Parthenocissus quinquefolia	Virginia creeper
Rubus allegheniensis	common blackberry
Rubus flagellaris	prickly dewberry
Rubus hispidus	bristly dewberry
Rubus idaeus	wild red raspberry
Rubus phoenicolasius	wine raspberry
Smilax glauca	sawbrier
Smilax rotundifolia	common greenbrier
Toxicodendron radicans	poison ivy
Vaccinium macrocarpon	large cranberry
Vaccinium oxycoccos	small cranberry
Vitis aestivalis	summer grape
Vitis labrusca	fox grape
Vitis palmata	cat grape
Wisteria floribunda	Japanese wisteria

* Proper nomenclature cited according to GoBotany.NativePlantTrust.org (2025).

Exotic Invasive highlighted in yellow.

Table 9: Fungi and lichen of Gay Head Moraine Reservation, Aquinnah, MA

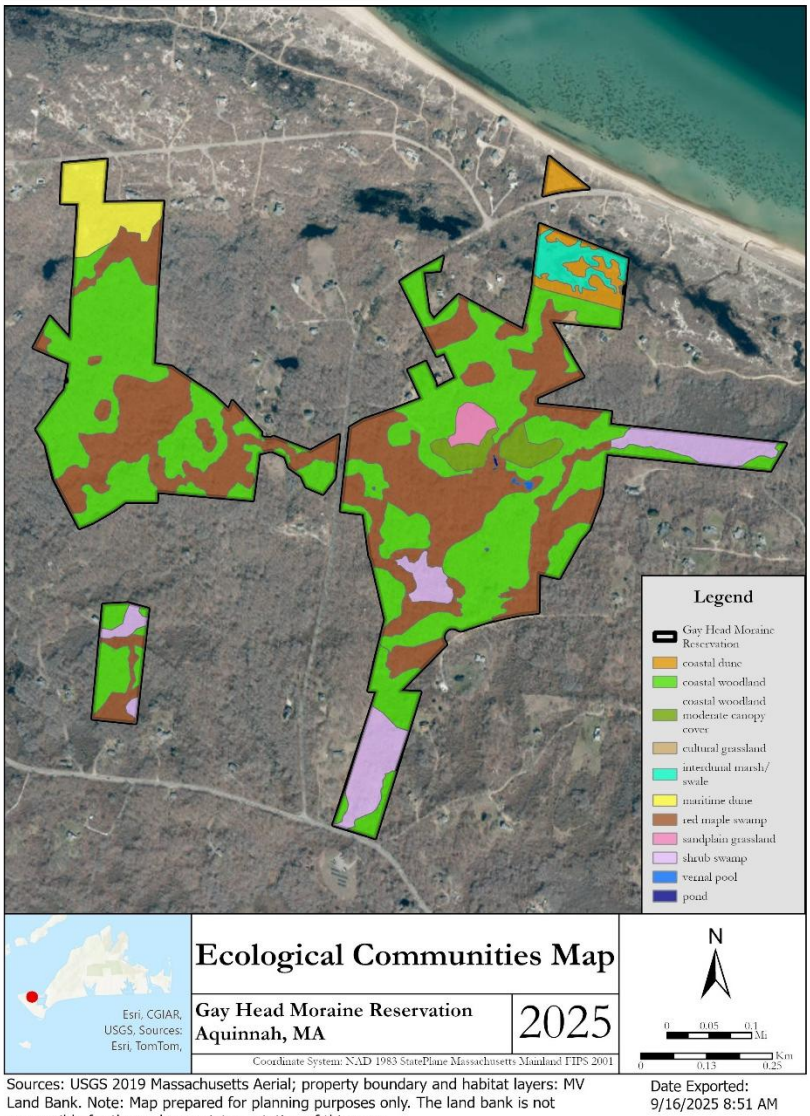
Kingdom Fungi	
Scientific name	**Common name**
Lichen	
Xylobos frustulatus	ceramic parchment
Fungi	
Boletus bicolor	two-colored bolete
Laetiporus sulphureus	sulphur shelf fungus
Ramariopsis kunzei	white coral

Ramiria spp.	coral fungus spp.
Russula emetica	emetic russula
Sebacina sp.	coral jelly fungus
Strobilomyces sp.	old man of the woods

C. Ecological Communities

There are nine ecologically unique natural communities within Gay Head Moraine Reservation (Map 36, page 123). Classification of habitat types was made for the property using the "Classification of the Natural Communities of Massachusetts" by Swain (2020), in parallel with standardized vegetation surveying methods.

Map 36: Ecological communities of Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2019 Massachusetts Aerial; property boundary and habitat layers: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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1. Coastal woodland (31 acres):

The coastal woodland is the dominant ecological community at Gay Head Moraine Reservation, totaling 59.2 acres and representing 28% of plant species known to occur on the property. The trees form a relatively dense crown with 74% canopy cover. In sample areas, the woodland overstory is dominated by black oak (79%) and white oak (73%) with sassafras throughout (47%). Trees in the woodland reach heights of up to 65 feet, though the average is closer to 45 feet. The average diameter at breast height (dbh) in the stand is 10 inches, with a few tree diameters measuring at over 24 inches. The basal area is 119 square feet per acre. More than half the plots surveyed contained snags, offering habitat in the form of food and housing to local wildlife.

Figure 38: Coastal woodland

The understory of the coastal woodland is predominantly populated with three understory vegetation layers: moderate ground cover of dewberry and mayflower; ubiquitous low huckleberry and greenbrier; and thick mid story prolific with sweet pepperbush and tree saplings. During the summer months the fragrant pepperbush flowers attract pollinators and provide good cover for birds to build their nests in. The 2.5-acre portion of the woodland near the sandplain grassland, east of Lobsterville Road, still bears the marks of past human presence and has an open understory of low-growing herbaceous and graminoid plants with scattered trees resulting in a savanna-like appearance.

Figure 39: Moderate open canopy coastal woodland

Table 10: Dominant understory plant species of coastal woodland of Gay Head Moraine Reservation, Aquinnah, MA.

Scientific name	Common name	Layer	Importance value
Clethra alnifolia	Sweet pepperbush	shrub	50
Gaylussacia frondose	Dangleberry	shrub	16
Gaylussacia baccata	Black huckleberry	shrub	13
Viburnum dentatum	Arrowood	shrub	9
Rubus flagellaris	Prickly dewberry	vine	36
Smilax rotundifolia	Common greenbrier	vine	15
Toxicodendron radicans	Poison ivy	vine	10
Sassafras albidum	Sassafras	sapling	15
Fagus grandifolia	American beech	sapling	13
Quercus alba	White oak	sapling	11
Maianthemum canadense	Canada mayflower	ground	8

2. Red maple swamp (46 acres):

The balance of the woodland on Gay Head Moraine Reservation is mesic and occurs in the lowlands and along stream corridors. Although nearly half the acreage of coastal woodland on the property, the mesic woodland host 46% of species known to occur on the property due to the complex structural diversity of the swamp and niche habitat requirements provided by the nuanced hydrologic influences.

Figure 40: Red maple swamp

Maple and black gum (locally known as beetlebung) trees compose the overstory. Both species can tolerate acidic soils and a range of hydrologic conditions including inundation. However, red maples are more opportunistic and can colonize disturbed areas more readily than beetlebung that is more often associated with stable environments reaching upwards of 300-600 years old in some rare cases (Swain 2020). It is not surprising that the mesic woodland east of the Lobsterville Road, where the homestead is located, is dominated by red maple.

Figure 41: Hydric feature

A balance of beetlebung and red maple occupy the canopy in the remaining acres of mesic woodland. Sassafras, white oak and black oak occur in the elevated areas of the mesic woodland and highbush blueberry, sweet pepperbush and huckleberry form an especially dense mid-canopy beneath the maple and beetlebung trees in the swamp habitats. Spice bush or fever bush has aromatic twigs, leaves and fruit and is used in teas. The berries may be dried and used as a substitute for allspice (Coon 1974). Bright green ferns bring a softness to the swamp understory. The well-developed shrub layer of sweet pepperbush and highbush blueberry intertwined with greenbrier is a defining feature that differentiates the red maple swamp from being a red maple-black gum swamp. However, the presence of areas with dominant black gum indicates the mesic woodland is more in line with the description of a red maple-black gum swamp. The habitats are closely related and, in this case, may be overlapping.

Trees in the swamp can reach a height of up to 65 feet, though the average is closer to 50 feet. The average diameter at breast height (dbh) in the stand is 11 inches, with a few tree diameters measuring at over 30 inches. The basal area is 157 square feet per acre. The canopy of the swamp is nearly closed with an 84% canopy cover allowing some light to filter through to the understory. More than half the plots surveyed contained snags that house insects for birds to discover and downed logs with colorful fungi that appear overnight and habitat for salamanders and insects below.

Figure 42: Large dbh tree

Table 11: Dominant understory plant species of red maple/tupelo swamp of Gay Head Moraine Reservation.

Scientific name	Common name	Layer	Importance value
Clethra alnifolia	Sweet pepperbush	shrub	43
Gaylussacia baccata	Black huckleberry	shrub	10
Vaccinium corymbosum	Highbush blueberry	shrub	8
Parathelypteris simulata	Massachusetts fern	ground	41
Dennstaedtia punctilobula	Haysecented fern	ground	16
Osmunda cinnamomeum	Cinnamon fern	ground	13
Maianthemum canadense	Canada mayflower	ground	8
Toxicodendron radicans	Poinson ivy	vine	34
Smilax rotundifolia	Common greenbrier	Vine	12
Parthenocissus quinquefolia	Virginia creeper	vine	10
Sassafras albidum	Sassafras	sapling	12
Quercus velutina	Black oak	sapling	8

3. Cultural grassland (0.13 acres):

The cultural grassland comprises 0.13 acres of cleared land in Gay Head Moraine Reservation abutting a neighboring home. This small patch of cultural grassland is surrounded by coastal woodland and red maple swamp with the dominant ground cover being herbaceous plants and sedges. The area is maintained as a lawn and provides minimal habitat for wildlife species.

Figure 43: Cultural grassland

4. Shrub swamp (8.9 acres):

Approximately 7% of the preserve comprises shrub swamp, a community dominated by hydrophilic shrub species (<5' in height) with a water table at or above the surface for most of the year (Swain 2020). The shrub swamp areas are dominated by sweet pepperbush, highbush blueberry, swamp azalea, and maleberry with overhanging beetlebung and the occasional

Figure 44: Shrub swamp

white oak fixing the perimeter on the preserve. Some areas are dominated by sweet pepperbush while others are a mix of wetland shrubs. Intermittent streams and high-water tables quench the water needs of the habitat. Dense blankets of fox grape and common greenbrier fuse the shrubs into an impenetrable wall in areas while openings of ferns and weak-stemmed plants such as water willow and low creeping cranberry vines offer a respite from thorns for the through traveler. Areas of inundation contain deep mucky soils and hummocks of skunk cabbage and sedges emerge beyond the varying shades of green sphagnum. Poison sumac is easily spotted by the long branches of compound leaves that reach above the dominant layer of shrubs and the drupes of white berries contrasting smooth grey bark in the winter.

Table 12: Dominant vegetation in shrubswamp of Gay Head Moraine Reservation.

Scientific name	Common name	Layer	Importance value
Clethra alnifolia	Sweet pepperbush	shrub	62
Rhododendron viscosum	Swamp azalea	shrub	28
Lyonia ligustrina	Maleberry	shrub	19
Rosa palustris	Swamp rose	shrub	18
Vaccinium corymbosum	Highbush blueberry	shrub	10
Fallopia scandens	Climbing bindweed	vine	43
Sphagnum sp.	moss	ground	26
Thelypteris noveboracensis	New York fern	ground	17
Symplocarpus foetidus	Skunk cabbage	ground	14

5. Sandplain grassland (1.2 acres):

Figure 46: Sandplain grassland

A small area of sandplain grassland is located on one of the three hilltops on the property east of Lobsterville Road. The sandplain grassland consists mainly of agricultural grasses dominated by fescue species. Narrow-leaved vetch, slender-leaved goldenrod, rough-stemmed goldenrod, poison ivy and red raspberry out compete grasses in dense patches. Other opportunistic plants that bring an interesting element to the grassland include dwarf cinquefoil, chicory, English plantain, rabbit foot clover, and white sweet clover. Wisteria that once grew around the housesite unfortunately is expanding into the grassland. Goats have been used to manage this invasive species between 2019-2024.

Figure 45: Wisteria

Table 13: Dominant vegetation in sandplain grassland of Gay Head Moraine Reservation.

Scientific name	Common name	Layer	Importance value
Vulpia octoflora	Six-weeks grass	ground	109
Festuca rubra	Red fescue	ground	62
Phleum pratense	Timothy	ground	19
Potentilla canadensis	Dwarf cinquefoil	ground	12

Vicia sativa	Common vetch	ground	10

6. Maritime Dune Community (4.5 acres):

There are 4.5 acres of maritime dune community along Lighthouse Road that were once connected to the ridges of dune extending north to the sound. Due to the extreme beach accretion occurring north of the property the maritime dune community is moving further from the influences of salt and wind. The dominance of woody trees and shrubs in areas of the dune suggests the maritime dune is transitioning into a maritime shrubland. Stunted oaks and black cherry encroach on the open areas where woolly beach heather, mosses and lichen grow in the exposed sandy soils. Opportunistic species that are tolerant of xeric conditions such as flat sedge, little blue stem, pinweed, sand joint weed, Pennsylvania sedge and switch grass create a sparse ground cover under the oaks. Poison ivy, black huckleberry and bayberry create pockets of moderately dense understory.

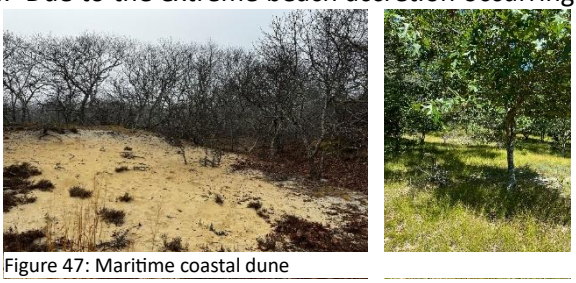


Figure 47: Maritime coastal dune

Table 14: Dominant vegetation in maritime dune of Gay Head Moraine Reservation.

Scientific name	Common name	Layer	Importance value
Carex Pennsylvanica	Pennsylvania sedge	ground	147
Polytrichum juniperium	Haircap moss	ground	18
Cladonia sp	Raindeer lichen	ground	8
Hudsonia tomentosum	Wooly beach heather	ground	7
Quercus velutina	Black oak	canopy	9

7. Interdunal marsh/swale (2.4 acres):

The interdunal marsh swale occurs within the coastal dune community in low areas with water levels at or above the surface in some areas year-round and in others intermittently. The swales are open in the center with emergent vegetation and surrounded by densely packed shrubs thick with poison ivy. Water lilies float on the surface of open water areas while less hydric areas are dominated by cranberry and in some cases dominated by a variety of rushes and sedges.

Figure 48: INterdunal marsh swale/ coastal dune

Table 15: Dominant vegetation in interdunal marsh swale and coastal dune of Gay Head Moraine Reservation

Scientific name	Common name	Layer	Importance value
Carex pennsylvanicus	Pennsylvania sedge	ground/dune	48.8
Gaylussaccia baccata	Black huckleberry	shrub/dune	39.5
Quercus ilicifolia	Scrub oak	shrub/dune	30.5
Morella pennsylvanica	Northern bayberry	shrub/dune	10.8
Juncus bufonius	Toad rush	ground/swale	29.5
Scirpus cyperinus	Wool grass	ground/swale	18.9
Hypericum mutilum	Dwarf St. John's wort	ground/swale	16.4

Decodon verticillatus	Waterwillow	ground/swale	14.3
Sphagnum sp.	moss	ground/swale	10.2

8. Coastal dune (3 acres):

There is a 0.7-acre coastal dune on the property north of Lobsterville Road and abutting Lobsterville Beach as well as the 2.2-acre coastal dune mentioned above in the interdunal marsh swale habitat description. The coastal dune habitat comprises an exposed, low-lying dune with scattered shrubs, herbs, and graminoid species. Plants such as northern bayberry, woolly beach heather, goldenrods, and beach grass are mixed among areas of open, unvegetated sand.

Appendix E. Wildlife

Gay Head Moraine Reservation provides a variety of habitats for nesting, roosting, and foraging wildlife. property characteristics such as soil type and moisture, plant composition, and vegetation structure combine to create habitat niches used by different species of wildlife.

A. Wildlife Habitat Descriptions

1. Woodlands

The woodlands provide vertical structure for bird species that prefer to nest in tree cavities and among branch forks while the woodland floor provides basic amenities in the leaf litter for ground nesters; the productive soils with high input of decomposition materials support invertebrate species and fungi; and acorns, berries and lush vegetation support the rodent and larger mammal community. A variety of plants found on the property (red maple, oak, blueberry, blackberry, huckleberry, sumac, viburnum, witch-hazel, cherry, serviceberry, hazelnut, sassafras) are suitable food sources for deer (Martin et al., 1961). During the summer, bats such as the big brown bat are known to feed in the woodland stream corridors of the property.

2. Grasslands

Grasslands are an important habitat type for many types of wildlife, due to a mixture of both graminoid and forb (herbaceous flowering plants) species. Flowering plants support native pollinators and other invertebrate communities. Milkweed and other important host plants provide suitable habitat for several species of butterflies, including the monarch, eastern tiger swallowtail, and the American copper butterfly. These can be seen fluttering about the various habitats. These insects as well as seeds from grassland species support birds and small mammals; and the open structure provides easy hunting grounds for raptor species.

3. Wetlands

Wetland habitats, especially those with standing water are ideal for waterfowl, as well as breeding reptiles and amphibians. Various frogs such as the spring peeper and pickerel frog may be seen or heard near the small ponds, streams, and interdunal swale of the property. Frogs utilize wetland habitat for breeding and feeding and are indicators of a healthy wetland. Turtles sun on logs protruding from the pond and feed on vegetation such as berries and leaf matter, as well as small fish and invertebrates.

Figure 49: Green frog

Dense shrublands provide shelter and protection for nesting songbirds, small mammals, reptiles and amphibians to avoid predation. Often these shrubs produce significant densities of fruit (e.g., fox grape) that feed a variety of wildlife. Deer and deer fawn may use shrubs and dense vegetation for shelter and deer fawns have been observed feeding discreetly in shrubby vegetation.

4. Coastal community

The dunes community provide breeding and feeding grounds for several species. Beetles and other sand-dwelling invertebrates such as sand fleas, shoreline wolf spiders, and other insects and arachnids may be seen while on the dunes. Various mammals may use these habitats for breeding, foraging or hunting.

B. Wildlife Surveys

Formal avian point count surveys; lepidoptera black-light trap surveys; and acoustic bat surveys were conducted on the property. Incidental observations of additional wildlife species were made while conducting formal wildlife surveys.

1. Avian

Land bank staff conducted formal five-minute avian point-count surveys at Gay Head Moraine Reservation during spring and fall migration (2000, 2004, 2020), the summer breeding season (2000, 2004, 2017, 2020), and the winter (1999, 2000, 2004). Gay Head Moraine Reservation was created through a series of purchases spanning over two decades, resulting in variations in the number of surveys performed and the seasons surveyed depending on the year (Table 16, page 131). In total, thirteen survey points were established throughout the different habitats on the property (Map 37, page 132).

All birds seen or heard during the 5-minute period, including birds flying overhead were recorded. Birds seen or heard outside of the count period by land bank staff and local birders via the Vineyard Gazette “Bird News” column were noted as present (P) on the property but were not included in quantitative analyses.

Two owl surveys were performed during February of 2000 east of Lobsterville Road in the sandplain grassland and February of 2020 west of Lobsterville Road in the maritime dune. Using a wildlife caller and speaker, owl calls were broadcasted for 30 seconds, rotating the speaker 90° in each

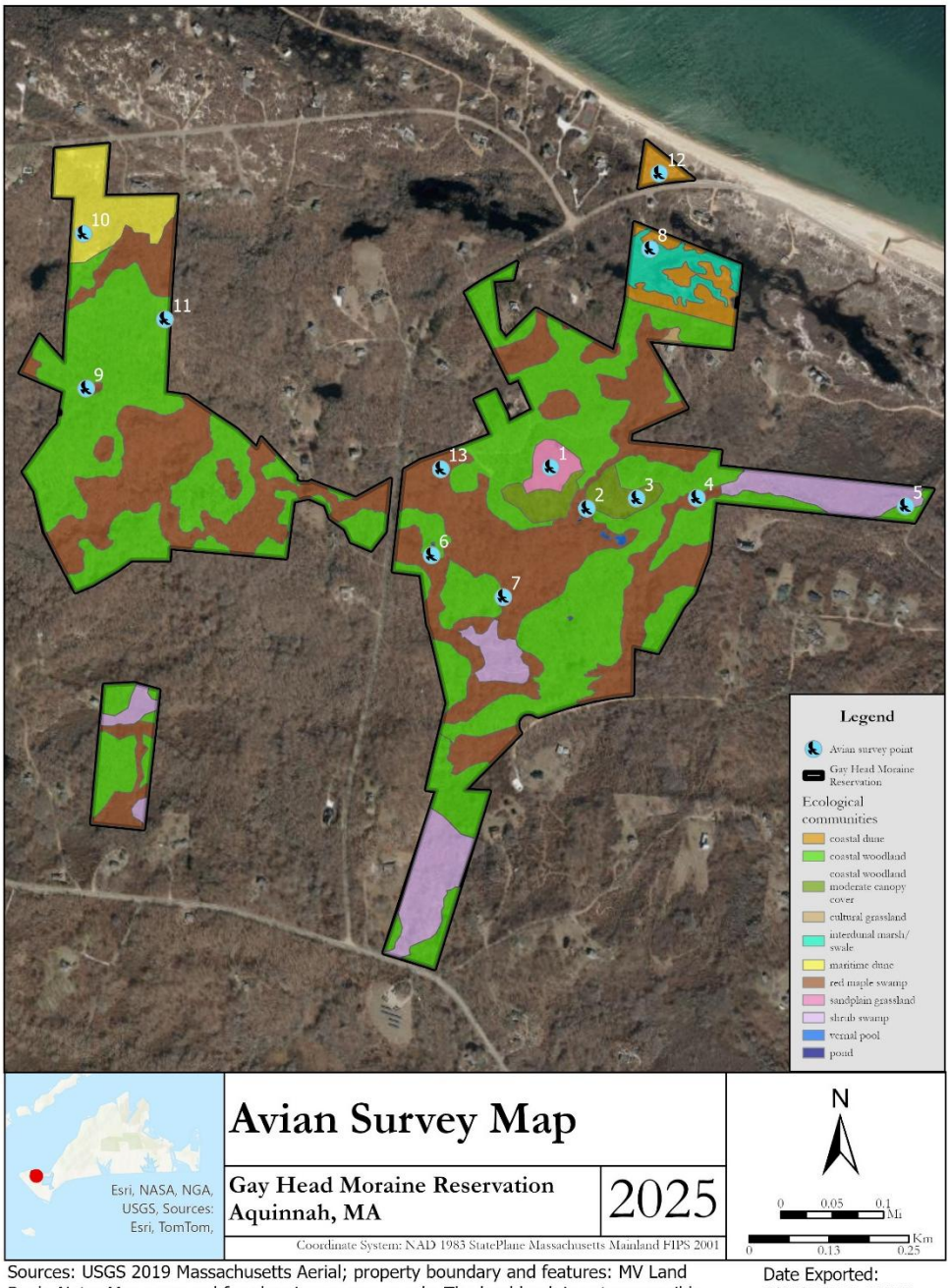
direction, followed by a 2-minute period of listening. Seven owl species (eastern screech owl, northern saw-whet owl, short-eared owl, long-eared owl, barn owl, barred owl, and great horned owl) vocalizations were broadcasted in order from smallest to largest. Responding owl calls, individual numbers, intensity, and direction of call were recorded.

Aside from one owl survey performed in February 2000, the remaining surveys were conducted in the morning so nocturnal species were not likely to be detected.

Table 16: Avian survey points, survey years, and habitats for Gay Head Moraine Reservation, Aquinnah, MA

Point Number	Habitat	Years surveyed
1	Sandplain grassland	1999, 2000, 2017, 2020
2	Coastal woodland	1999, 2000
3	Coastal woodland moderate canopy cover	1999, 2000
4	Red maple swamp	1999, 2000, 2017, 2020
5	Shrub swamp	1999, 2000, 2017, 2020
6	Coastal woodland	1999, 2000, 2017, 2020
7	Red maple swamp	1999, 2000
8	Interdunal marsh/swale	2004, 2017, 2020
9	Red maple swamp	2020
10	Maritime dune	2020
11	Coastal woodland	2020
12	Coastal dune	2004
13	Red maple swamp	2004

Map 37: Avian point count survey locations at Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2019 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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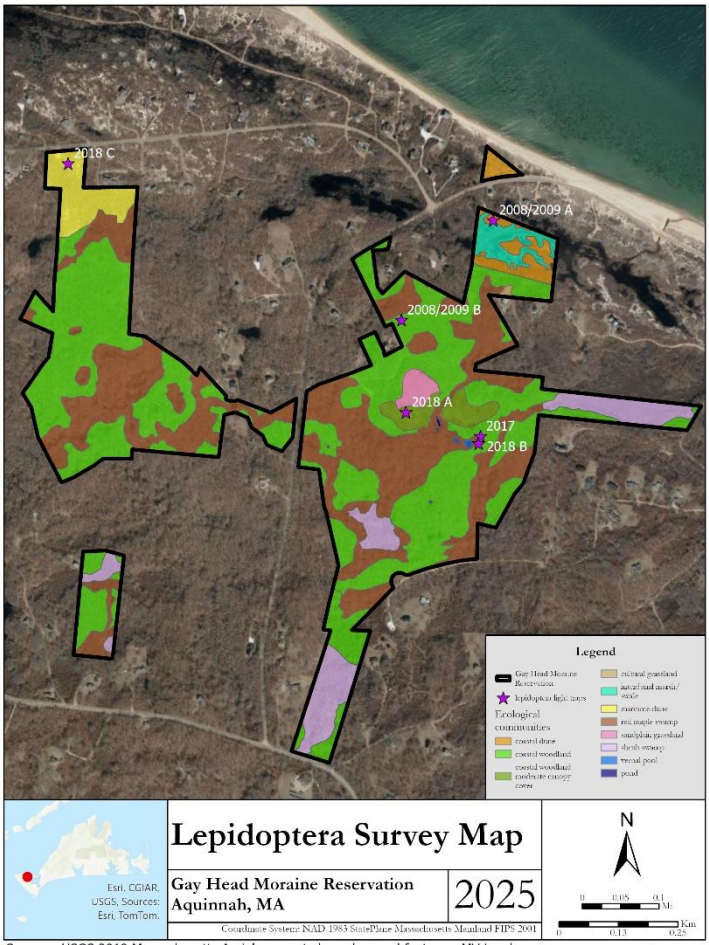
2. Invertebrate

Nocturnal moth species were surveyed using a stainless-steel rigid vein 18-24 inch “leptrap” with a 32–40-Watt quantum black-light. Bucket traps with aluminum vanes were set using photoelectric switches from dusk to dawn in summer 2008, 2009, 2017, and 2018 on the property. A kill jar of ethyl

acetate was use to euthanize invertebrates in the trap and perforated tin cans were placed at the mouth of the funnel to sort larger beetles from flying invertebrates to preserve moth species for identification. Species were collected, processed, and sent to Mark Mello, an entomologist with the Lloyd Center for the environment, in New Bedford, MA for positive identification.

Dip net surveys of the vernal pools south of the moderately open coastal woodland were conducted during June 13, 2000 and April 5, 2001.

Map 38: Invertebrate black-light trap survey locations at Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2019 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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3. Amphibian

An acoustic monitor was used to survey frogs during August of 2023. A wildlife acoustics song meter mini was fastened to a tree or pole in the wetland and set to record for three minutes every 24hours with a sample rate of 24,000Hz. The recording was manually analyzed for frog calls from which species were identified and recorded. Five frog call surveys were conducted in 2000 and one frog call survey were conducted 2004 near the pond in the property east of Lobsterville Road. Frog call

surveys were conducted 30 minutes after dusk. All species heard during a 5-minute period were recorded with call index values and direction. All other species were observed during property visits.

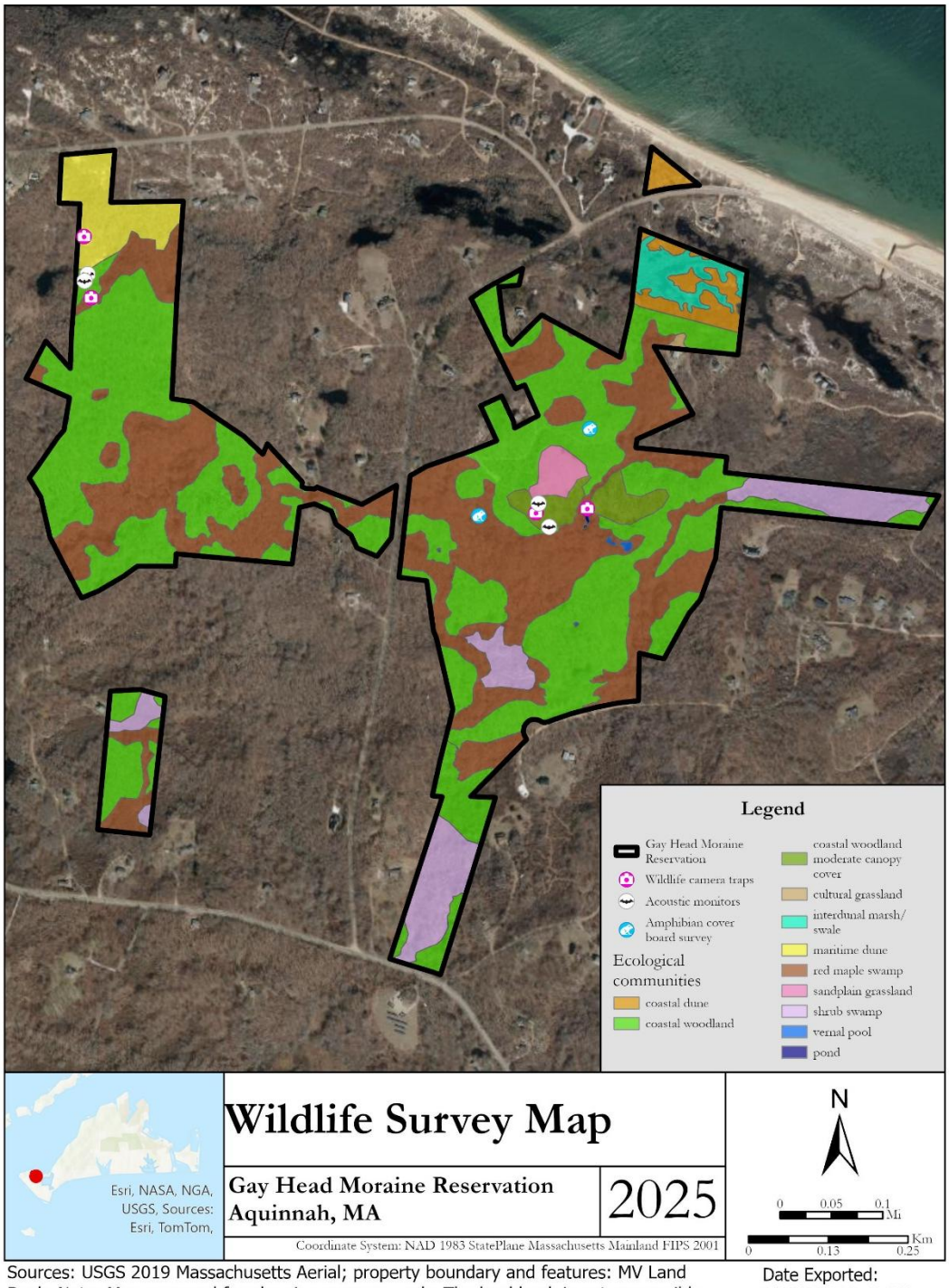
The terrestrial stage of amphibians was surveyed for using cover boards in 2000 in the woodland east of Lobsterville Road. Two transects with 10 evenly spaced boards, 20 feet apart, were deployed on April 6, 2000 in the coastal woodland surrounding the sandplain grassland. Each board was made from ¾ inch plywood and measured 1x2 feet. Boards were checked once a week for amphibians.

4. Mammal

Wildlife cameras with diurnal and nocturnal activity sensors were used to record terrestrial mammal species. Four cameras were positioned at a height less than 4 feet in three habitat types in the property – maritime dune; red maple swamp; and coastal woodland (closed and moderately open canopy). Cameras were deployed during August for 19 days west of Lobsterville Road and two cameras were deployed for 13 days east of the Lobsterville Road (Map 39, page 135). Additionally, mammals were documented on the property through track and scat observations.

Bats were surveyed using ultrasonic wildlife recorders from Wildlife Acoustics. Song meter SM4Bat and song meter mini bat were deployed spring and summer of 2023 (April 26-May 21) west of Lobsterville Road and in fall of 2024 (September 26-October 29) east of Lobsterville Road. Recorders were set to record from 0.5 hour before sunset to 0.5 hour after sunrise at a 256 kHz sample rate with a recording length of fifteen seconds, minimum trigger frequency of 16 kHz and a three second trigger window. Data was analyzed using Kaleidoscope with auto ID. All identifications were manually vetted.

Map 39: Wildlife survey locations at Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2019 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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C. Wildlife diversity

1. Avian

A total of 92 bird species was observed on the property between 1999-2020, including two owl species that were heard during the nighttime owl survey conducted in February 2000. Three bird species observed are commonwealth-listed species and are not identified in the table. However, the habitat requirements of listed species are described in the endangered species section (Appendix G: page 171).

Bird species on the property are seasonally-dependent. Some birds occur in more than one survey point and during more than one season. Total species counts do not include multiple sightings of an individual species and dominant species varied among seasons. Summer breeding season yields the greatest richness of bird species on the Preserve (Table 20, page 141). The majority of birds that occur on the property during the breeding season are tree/shrub nesters, though some are cavity- and ground-nesting species.

The probable and possible breeding birds on Gay Head Moraine Reservation are associated with various habitats, each of which provides specific nesting requirements as described by the Cornell Ornithological Laboratory in All About Birds (https://www.allaboutbirds.org). Warblers such as common yellowthroat, yellow warbler, prairie warbler, and other familiar year-round residents such as northern cardinal and American goldfinch may nest in the shrublands. Common yellowthroat nest in ground that is supported by greenbrier, sedges and grasses, cattails, and other low plants. They may also nest in marshy areas and sometimes on emerging aquatic vegetation. A confirmed yellow warbler nest was recorded on the property in the shrub swamp in early fall 2004. The dense vegetation in the shrub swamp provides superb nesting structure for birds such as northern cardinals that wedge their nests into forks of small sapling and shrub branches, or vine tangles. Blackberry, greenbrier, and grape in the shrublands offer a bountiful array of forage for hungry parents. A cooper's hawk nest was observed in a tree crown of the moderate open canopy coastal woodland in May 2016. The property provides ample smaller birds as prey for this daredevil of a hawk that is known for tricky maneuvers through dense woodland understories (All About Birds 2024).

Lanny McDowell, Cooper's hawk, island

Woodland trees provide suitable nesting options for birds such as the familiar American robin, blue jay, and mourning dove. American robin and blue jay nest in tree branches while black-crowned night heron and great blue heron nest in trees as well as marsh vegetation. The trees and snags of the woodland habitats are important for cavity-nesting species such as Carolina wrens and tree swallows. Tree swallows often nest in old woodpecker cavities, therefore suitable year-round habitat for woodpeckers is important for breeding tree swallows. The woodlands support other less commonly observed

Blue winged warbler, Lanny McDowell

species, such as eastern kingbird, eastern wood-pewee, red-eyed vireo, wood thrush, and a great variety of warblers such as the bright yellow, blue-winged warbler. September is an especially busy month for warblers in the woods at Gay Head Moraine Reservation as they bulk up for their migration flight.

Table 17: Bird species observed on Gay Head Moraine Reservation during fall with % frequency values.

Fall **1999, 2000, 2004, 2020**	**Sandplain grassland**	**Coastal woodland**	**Coastal woodland moderate canopy cover**	**Red maple swamp**	**Shrub swamp**	**Interdunal marsh/swale**	**Maritime dune**	**Coastal dune**
Point ID	**1**	**2, 6, 11**	**3**	**4, 7, 9, 13**	**5**	**8**	**10**	**12**
Sample size (n)	*10*	*16*	*8*	*19*	*10*	*9*	*2*	*3*
Year-round residents	**% Frequency**							
American crow	60	13	13	26	50	44	50	0
American goldfinch	10	0	0	0	0	22	0	0
American robin	10	6	13	0	20	11	0	0
Belted kingfisher	0	6	0	0	0	0	0	0
Black-capped chickadee	20	31	63	42	70	44	100	0
Blue jay	80	50	63	53	60	44	100	0
Brown creeper	0	0	0	P	0	0	0	0
Carolina wren	40	13	25	11	0	22	100	0
Chipping sparrow	0	0	0	0	10	11	0	0
Downy woodpecker	0	6	25	16	10	11	0	0
Eastern screech owl	0	0	0	P	0	0	0	0
Eastern towhee	20	25	25	11	20	0	0	0
European starling	0	0	0	0	0	11	0	0
Hairy woodpecker	10	0	0	21	0	0	0	0
Herring gull	10	0	0	0	0	0	0	33
Northern cardinal	10	13	0	11	20	0	0	0
Northern flicker	30	19	13	11	10	11	0	0
Northern mockingbird	0	0	0	0	0	11	0	0
Red-bellied woodpecker	0	13	13	0	10	0	0	0
Red-tailed hawk	0	0	0	11	0	11	0	0
Song sparrow	0	0	13	0	0	11	0	0
Tufted titmouse	0	0	0	11	0	11	0	0
Unknown sparrow	0	0	0	0	0	11	0	0
White-breasted nuthatch	0	0	13	47	30	11	50	0
Wood duck	0	25	0	0	0	0	0	0
Yellow-bellied sapsucker	0	0	0	0	0	0	0	0
Cedar waxwing	10	6	0	0	0	0	0	0
Gray catbird	30	0	13	21	60	22	0	0
Tree swallow	0	0	0	0	10	0	0	0

Winter residents								
Golden-crowned kinglet	0	0	0	0	0	11	0	0
Pine siskin	0	0	0	0	10	0	0	0
Ruby-crowned kinglet	0	0	0	P	0	0	0	0
White-throated sparrow	0	0	25	5	0	0	0	0
Yellow-rumped warbler	0	0	0	11	10	22	0	0
Summer breeders								
American redstart	0	6	13	P	0	0	0	0
Black-and-white warbler				P				
Black-throated blue warbler	0	6	0	0	0	11	0	0
Black-throated green warbler	0	0	0	0	P	0	0	0
Blue-headed vireo	0	0	0	0	P	0	0	0
Blue-winged warbler	0	0	0	0	P	0	0	0
Brown thrasher	0	0	13	0	0	0	0	0
Chestnut-sided warbler	0	0	0	P	0	0	0	0
Common yellowthroat	0	0	25	0	30	22	0	0
Connecticut warbler	0	0	0	P		0	0	0
Eastern phoebe	20	0	0	0	0	0	0	0
Eastern wood pewee	0	0	13	0	0	0	0	0
Hooded warbler	0	0	0	P	0	0	0	0
House wren	0	0	0	5	0	0	0	0
Magnolia warbler	0	0	0	P	10	0	0	0
Northern waterthrush	0	0	0	P	0	0	0	0
Nashville warbler	0	0	0	P	0	0	0	0
Osprey	10	0	0	0	0	11	0	0
Ovenbird	0	0	0	P	0	22	0	0
Palm warbler	0	0	0	P	0	0	0	0
Philadelphia vireo	0	0	0	P	0	0	0	0
Red-eyed vireo	0	0	0	P	0	0	0	0
Red-headed woodpecker	0	0	0	P	0	0	0	0
Scarlet tanager	0	0	0	P	0	0	0	0
Solitary sandpiper	0	0	0	P	0	0	0	0
Swainson's thrush	0	0	0	P	0	0	0	0
Tennessee warbler	0	0	0	P	0	0	0	0
Veery	0	0	0	P	0	0	0	0
Warbling vireo	0	0	0	P	0	0	0	0
Wilson's warbler	0	0	0	P	0	0	0	0
Wood thrush	0	0	0	P	0	0	0	0
Worm-eating warbler	0	0	0	5	0	0	0	0
Yellow-billed cuckoo	0	0	0	P	0	0	0	0

*A value of P indicates a species observed outside the survey period.

Table 18: Bird species observed on Gay Head Moraine Reservation during winter with % frequency values.

Winter **1999, 2000, 2004**	**Sandplain grassland**	**Coastal woodland**	**Coastal woodland moderate canopy cover**	**Red maple swamp**	**Shrub swamp**	**Interdunal marsh/swale**	**Maritime dune**	**Coastal dune**
Point ID	**1**	**2, 6, 11**	**3**	**4, 7, 9, 13**	**5**	**8**	**10**	**12**
Sample size (n)	*5*	*10*	*5*	*13*	*5*	*3*	*0*	*3*
Year-round residents	**% Frequency**							
American crow	0	20	0	15	20	0	0	33
American goldfinch	0	0	0	8	0	67	0	33
American robin	0	0	20	0	0	0	0	0
Black-capped chickadee	20	60	60	85	80	133	0	0
Blue jay	20	20	0	31	0	100	0	33
Brown creeper	0	10	20	0	0	0	0	0
Carolina wren	0	0	20	31	60	0	0	33
Downy woodpecker	0	0	0	15	20	0	0	0
Eastern bluebird	0	10	0	0	0	0	0	0
Gray catbird	0	0	0	0	0	33	0	0
Herring gull	20	0	0	8	0	0	0	0
House finch	0	0	0	0	20	0	0	0
Mourning dove	0	0	0	8	20	33	0	0
Northern cardinal	20	0	0	46	40	67	0	0
Northern flicker	20	40	40	8	0	0	0	0
Northern saw-whet owl	0	0	P	0	0	0	0	0
Red-bellied woodpecker	0	0	0	15	0	0	0	0
Red-tailed hawk	20	0	0	0	0	0	0	0
Red-winged blackbird	0	0	0	0	20	0	0	0
Song sparrow	0	0	0	8	0	0	0	0
Turkey vulture	0	0	0	0	0	0	0	0
White-breasted nuthatch	0	0	20	46	0	0	0	0
Winter residents								
Golden-crowned kinglet	0	0	20	0	0	0	0	0
Summer breeders								
Eastern phoebe	0	0	20	0	0	0	0	0
Eastern wood pewee	20	0	0	0	0	0	0	0
Osprey	0	0	0	0	0	0	0	33

*A value of P indicates a species observed outside the survey period.

Table 19: Bird species on Gay Head Moraine Reservation during spring with frequency values.

Spring **2000, 2004, 2020**	**Sandplain grassland**	**Coastal woodland**	**Coastal woodland moderate canopy cover**	**Red maple swamp**	**Shrub swamp**	**Interdunal marsh/swale**	**Maritime dune**	**Coastal dune**
Point ID	**1**	**2, 6, 11**	**3**	**4, 7, 9, 13**	**5**	**8**	**10**	**12**
Sample size (n)	*6*	*12*	*5*	*15*	*6*	*4*	*1*	*3*
Year-round residents	**% Frequency**							
American crow	0	0	20	7	17	25	100	0
American goldfinch	0	0	0	7	17	50	0	0
American robin	33	17	0	13	17	0	100	0
Black-capped chickadee	17	25	100	60	50	25	0	0
Blue jay	17	17	40	20	33	0	100	0
Brown-headed cowbird	33	8	0	13	17	0	0	0
Canada goose	0	0	0	0	17	0	0	0
Carolina wren	50	17	80	20	0	50	0	0
Chipping sparrow	0	0	0	0	0	0	0	33
Common grackle	0	0	20	0	17	25	0	0
Downy woodpecker	0	17	0	7	0	0	0	0
Eastern towhee	67	67	40	40	50	75	0	33
European starling	0	0	0	0	0	25	100	0
Gray catbird	33	25	20	53	67	75	100	0
Hairy woodpecker	0	0	0	0	0	0	0	0
House finch	17	8	0	20	0	0	0	0
House sparrow	0	0	0	0	0	0	0	33
Mourning dove	17	0	20	13	0	25	100	33
Northern cardinal	17	17	60	20	67	0	0	0
Northern flicker	33	0	0	7	0	0	0	0
Red-bellied woodpecker	0	33	20	13	0	0	0	0
Red-tailed hawk	17	8	20	0	17	0	0	0
Red-winged blackbird	0	0	0	0	0	100	0	33
Song sparrow	0	0	0	0	0	0	0	33
Tufted titmouse	17	0	0	0	0	0	0	0
Unknown gull	0	0	0	0	0	25	0	0
White-breasted nuthatch	0	17	20	13	0	0	0	0
Pine warbler	0	0	0	0	33	25	0	0
Winter residents								
White-throated sparrow	17	0	0	7	33	0	0	0
Summer breeders								
Brown thrasher	0	0	0	0	0	0	0	33
Eastern phoebe	33	17	20	7	0	0	0	0

Great crested flycatcher	33	33	40	27	0	0	0	0
Barn swallow	0	0	0	0	0	0	0	33
Black-and-white warbler	0	17	0	13	17	0	0	0
Blue-headed vireo	0	0	0	7	0	0	0	0
Common yellowthroat	33	25	0	27	17	0	0	0
Eastern wood pewee	0	0	0	20	0	0	0	0
Hooded warbler				P				
Magnolia warbler	17	0	0	7	0	0	0	0
Osprey	0	8	0	0	0	25	0	100
Ovenbird	50	58	20	47	0	0	0	0
Prairie warbler	0	0	0	0	33	25	0	0
Red-eyed vireo	17	8	0	7	0	0	0	0
Rose-breasted grosbeak				P				
Scarlet tanager	0	0	0	7	0	0	0	0
Wood thrush	0	8	0	13	0	0	0	0
Yellow warbler	0	0	0	0	0	25	0	0
Tree swallow	33	0	0	0	0	0	0	33

*A value of P indicates a species observed outside the survey period.

Table 20: Bird species on Gay Head Moraine Reservation during summer breeding season with % frequency values.

Summer **2000, 2004, 2017, 2020**	**Sandplain grassland**	**Coastal woodland**	**Coastal woodland moderate canopy cover**	**Red maple swamp**	**Shrub swamp**	**Interdunal marsh/swale**	**Maritime dune**	**Coastal dune**
Point ID	**1**	**2, 6, 11**	**3**	**4, 7, 9, 13**	**5**	**8**	**10**	**12**
Sample size (n)	*13*	*22*	*5*	*26*	*15*	*15*	*4*	*5*
Year-round residents	**% Frequency**							
American crow	8	5	20	12	13	7	0	0
American goldfinch	0	0	0	4	13	20	0	60
American robin	15	18	20	8	33	13	25	0
Black-capped chickadee	38	5	0	42	27	13	25	0
Blue jay	23	27	60	65	53	20	50	0
Brown-headed cowbird	8	0	0	4	0	7	25	0
Canada goose	0	0	0	0	0	0	0	0
Carolina wren	38	18	0	19	33	27	50	0
Cedar waxwing	8	0	0	8	0	7	0	0
Chipping sparrow	8	0	0	0	0	13	0	0
Common grackle	0	0	0	0	0	7	0	0
Double-crested cormorant	8	0	0	0	0	0	0	0
Downy woodpecker	8	5	0	8	13	0	50	0
Eastern towhee	62	23	60	46	53	80	75	0

European starling	0	0	0	0	0	20	0	0
Gray catbird	46	55	20	58	87	47	0	20
Hairy woodpecker	8	0	0	0	0	0	25	0
Herring gull	0	0	0	0	0	0	0	20
House finch	8	0	0	0	0	7	0	0
House sparrow	0	0	0	0	0	13	0	20
Mourning dove	0	0	0	31	33	40	25	0
Northern cardinal	8	23	20	38	7	0	25	0
Northern flicker	8	5	0	4	0	7	25	0
Northern mockingbird	0	0	0	0	0	27	0	0
Red-bellied woodpecker	15	0	0	0	0	0	0	0
Red-tailed hawk	8	0	0	0	7	0	0	0
Red-winged blackbird	0	0	0	0	7	33	0	0
Song sparrow	0	0	0	0	0	33	0	20
Tree swallow	15	0	0	0	0	40	0	20
Tufted titmouse	8	0	0	0	7	0	50	0
Unknown gull	0	0	0	0	0	13	0	20
White-breasted nuthatch	0	0	0	19	20	0	50	20
Summer breeders								
American redstart	0	0	20	8	0	0	0	0
Baltimore oriole	0	5	0	0	0	0	25	0
Barn swallow	0	0	0	0	0	7	0	0
Black-and-white warbler	0	0	0	0	0	7	0	0
Brown thrasher	0	0	0	0	0	0	0	0
Common yellowthroat	23	27	60	27	33	0	0	0
Cooper's hawk			P					
Eastern kingbird	8	0	0	0	0	0	0	0
Eastern phoebe	0	0	20	4	0	0	0	0
Eastern wood pewee	23	27	0	31	7	0	0	0
Great crested flycatcher	31	27	40	27	20	13	0	0
Osprey	23	0	0	8	0	20	0	60
Ovenbird	54	45	40	50	13	0	0	0
Prairie warbler	0	5	0	0	7	0	0	0
Red-eyed vireo	31	0	0	38	0	0	25	0
Scarlet tanager	0	0	0	12	0	0	0	0
Least tern	0	0	0	0	0	0	0	40
Yellow warbler	0	0	0	0	7	7	0	0

*A value of P indicates a species observed outside the survey period.

2. Invertebrate

Gay Head Moraine Reservation provides suitable habitat for many invertebrate species. Although not often seen, moths play a vital role in the environment in a variety of ways. Moths are important pollinators for many flowering plants. Additionally, moths provide a valuable source of food for many animals, particularly bats and birds. In addition, caterpillars are an important source of food for diurnal birds, particularly nestlings. A total of 339 species was observed across all trap sites (Table 21, page 143); Three of these are commonwealth-listed species and are not identified in the table.

However, their habitat requirements are described in the endangered species section (Appendix G: page 171). Some moth species are generalists, utilizing a large variety of host; other species are specialists and require specific host plants. These specialist species can be easily threatened with changes to host plant populations.

A host of moth species observed during surveys utilizes vegetation present on the property for some portion of their life cycles. Some of the more recognizable macrolepidoptera that were found on the property are from the Saturniidae family: the Luna, Io, Polyphemus, and Rosy Maple moths. Species such as maple, oak, black berry, hazelnut, hickory, grape and plum provide food for the newly hatched caterpillars. Traps did not exclusively attract moth species. The toe-biter or giant water bug and the leggy, giant crane fly were always startling finds.

Figure 50: Giant water bug


Figure 51: Cyclops

Dip net surveys of the ponds in 2000 and 2001 revealed 14 species of aquatic invertebrates and no fish. Some organisms were identified to species, although, most were identified to genus (Table 22, page 154).

Passive observations of the property indicate a variety of other invertebrates utilize the property, including dragonflies, damselflies, beetles and grasshoppers. Cicadas may be heard in wooded habitats such as the mixed oak woodland during the summer months (Table 22, page 154).


Figure 52: Eastern amberwing

Table 21: Summary of macrolepidoptera species recorded from Gay Head Moraine Reservation, Aquinnah, MA.

MONA #	ZOOK. #	Species	# Moths
DEPRESSARIIDAE			
955		*Psilocorsis quercicella*	1
TORTRICIDAE			
Olethreutinae			
		Pelochrista sp.	1
Torticinae			
	3748	*Amorbia humerasana*	1
CRAMBIDAE			
Crambinae			
5378		*Crambus laqueatellus*	1
5451		*Parapediasia teterrellus*	1
PYRALIDAE			
Pyralinae			
5533		*Hypsopygia olinalis*	1

DREPANIDAE			
Oretinae			
6255		*Oreta rosea*	3
GEOMETRIDAE			
Ennominae			
6270		*Protitame virginalis*	1
6272		*Eumacaria madopata*	1
6273		*Speranza ("Itame") pustularia*	12
6283		*Speranza ("Itame") argillacearia*	1
6326		*Macaria aemulitaria*	11
6342		*Macaria bisignata*	3
6353		*Macaria multilineata*	2
6362		*Digrammis continuata*	1
6386		*Digrammia ocellinata*	1
6443		*Glenoides texanaria*	5
6449		*Glena cribrataria*	1
6588		*Iridopsis larvaria*	4
6590		*Anavitrinelia pampinaria*	2
6597		*Ectropis crepuscularia*	10
6598		*Protoboarmia porcelaria*	4
6599		*Epimecis hortaria*	2
6620		*Melanolophia canadaria*	8
6621		*Melanolophia signataria*	1
6640		*Biston betularia*	1
6654		*Hypagyrtis unipunctata*	10
6667		*Lomographa vestaliata*	4
6677		*Cabera erythemaria*	3
6711		*Ilexia intractata*	2
6720		*Lytrosis unitaria*	4
6724		*Euchlaena serrata*	1
6725		*Euchlaena muzaria*	3
6739		*Euchlaena irraria*	3
6743		*Xanthotype sospeta*	1
6754		*Pero ancetaria*	6
6755		*Pero morrisonaria*	5
6763		*Phaeoura quernaria*	3
6796		*Campaea perlata*	4
6798		*Ennomos subsignaria*	2
6815		*Gueneria similaria*	2

6819		*Metanema inatomaria*	1
6822		*Metarranthis duaria*	1
6823		*Metarranthis angularia*	3
6825		*Metarranthis indeclinata (?)*	3
6826		*Metarranthis hypochraria*	5
6837		*Probole alienaria*	5
6840		*Plagodis serinaria*	3
6843		*Plagodis fervidaria*	11
6844		*Plagodis alcoolaria*	2
6884		*Besma endropiaria*	4
6885		*Besma quercivoraria*	12
6888		*Lambdina fiscellaria*	5
6892		*Lambdina pellucidaria*	2
6894		*Lambdina fervidaria*	3
6941		*Eusarca confusaria*	9
6963		*Tetracis crocallata*	6
6964		*Tetracis cachexiata*	8
6966		*Eutrapela clemataria*	8
6974		*Patalene olyzonaria puber*	1
6982		*Prochoerodes lineola*	16
6987		*Antepione thiosaria*	6
7009		*Nematocampa resistaria*	10
Geometrinae			
7046		*Nemoria bistriaria*	9
7048		*Nemoria mimosaria*	1
7053		*Dichorda iridaria*	4
7084		*Thalera pistasciaria*	1
Sterrhinae			
7094		*Lobocleta ossularia*	1
7126		*Idaea dimidiata*	1
7132		*Pleuroprucha insulsaria*	5
7136		*Cyclophora packardi*	6
7139		*Cyclophora pendulinaria*	14
7157		*Scopula caecuminaria*	2
7159		*Scopula limboundata*	5
7169		*Scopula inductata*	1
Larentiinae			
7196		*Eulithis diversilineata*	11
7206		*Eulithis explanata*	4

7292		*Rheumaptera prunivorata*	1
7414		*Orthonama obstipata*	3
7416		*Costaconvexa centrostrigaria*	6
7420		*Hydrelia condensata*	1
		Eupithecia spp.	12
7625		*Psaphida rectangulata*	2
MIMALLONIDAE			
7659		*Lacosoma chiridota*	3
LASIOCAMPIDAE			
Macromphalinae			
7663		*Apatelodes torrefacta*	5
Lasiocampinae			
7698		*Malacosoma disstria*	6
7701		*Malacosoma americana*	4
SATURNIIDAE			
Ceratocampinae			
7715		*Dryocampa rubicunda*	6
7716		*Anisota stigma*	1
Hemileucinae			
7746		*Automeris io*	7
Saturniinae			
7757		*Antheraea polyphemus*	4
7758		*Actias luna*	5
SPHINGIDAE			
Sphinginae			
7784		*Dolba hyloeus*	1
7810		*Sphinx gordius*	3
7817		*Lapara bombycoides*	1
Smerinthinae			
7824		*Paonias excaecata*	12
7825		*Paonias myops*	5
7826		*Paonias astylus*	8
7827		*Amorpha juglandis*	1
Macroglossinae			
7870		*Sphecodina abbottii*	1
7871		*Diedamia inscripta*	2
7885		*Darapsa myron*	3
7886		*Darapsa choerilus*	9
NOTODONTIDAE			

Notodontinae			
7917	930010	*Paraeschra georgica*	13
	930012	*Pheosia rimosa*	1
Phalerinae			
7902	930033	*Datana ministra*	1
7903	930034	*Datana angusii*	3
7904	930035	*Datana drexelii*	8
7906	930037	*Datana contracta*	5
7915	930046	*Nadata gibbosa*	20
7920	930049	*Peridea angulosa*	10
Heterocampinae			
7975	930067	*Macruocampa marthesia*	15
7983	930075	*Heterocampa obliqua*	9
7990	930082	*Heterocampa umbrata*	14
7994	930086	*Heterocampa guttivitta*	7
7995	930087	*Heterocampa biundata*	5
7998	930090	*Lochmaeus manteo*	3
8005	930098	*Schizura ipomoeae*	13
8006	930099	*Schizura badia*	9
8007	930100	*Schizura unicornis*	4
8011	930104	*Schizura leptinoides*	4
8012	930105	*Oligocentria semirufescens*	4
8017	930110	*Oligocentria lignicolor*	3
Nystaleinae			
7951	930127	*Symmerista albifrons*	8
7958	930134	*Dasylophia thyatiroides*	2
EREBIDAE			
Lymantriinae			
8302	930154	*Dasychira obliquata*	5
8318	930141	*Lymantria dispar*	4
8314	930166	*Orgyia definita*	2
8316	930168	*Orgyia leucostigma*	5
Arctiinae			
8045.1	930219	*Crambidia pallida*	7
8196	930246	*Grammia parthenice*	1
8169	930278	*Apantesis phalerata*	5
8171	930280	*Apantesis nais*	10
8171.1		*Apantesis carlotta*	1
8118	930297	*Virbia opella*	8

8121	930299	*Virbia aurantiaca*	6
8134	930309	*Spilosoma congrua*	9
8133	930311	*Spilosoma latipennis*	4
8137	930316	*Spilosoma virginica*	7
8140	930319	*Hyphantria cunea*	3
8146		*Hypercompe scribonia*	1
8129	930335	*Pyrrharctia isabella*	8
8203	930360	*Halysidota tessellaris*	12
8211	930370	*Lophocampa caryae*	8
8230	930404	*Cycnia tenera*	5
8238	930412	*Euchaetes egle*	4
Herminiinae			
8322	930469	*Idia americalis*	16
8323	930471	*Idia aemula*	17
8326	930474	*Idia rotundalis*	7
8327	930475	*Idia forbesi*	3
8328	930476	*Idia julia*	3
8329	930477	*Idia diminuendis*	5
8334	930482	*Idia lubricalis*	2
8340	930489	*Zanclognatha literalis*	3
8341	930490	*Zanclognatha theralis*	9
8345	930492	*Zanclognatha laevigata*	3
8352	930499	*Zanclognatha marcidilinea*	4
8353	930500	*Zanclognatha jacchusalis*	11
8355	930502	*Chytolita morbidalis*	6
8356	930503	*Chytolita petrealis*	1
8360	930511	*Macrochilo orciferalis*	2
8364	930514	*Phalaenostola larentioides*	3
8370	930520	*Bleptina caradrinalis*	12
8378	930529	*Renia salusalis*	9
8379	930530	*Renia factiosalis*	5
8381	930532	*Renia discoloralis*	6
8384.1	930536	*Renia flavipunctalis*	2
8385.1		*Renia "larvalis" (larger. Like salisalis)*	1
8386	930538	*Renia adspergillus*	11
8387	930539	*Renia sobrialis*	2
8393	930547	*Lascoria ambigualis*	1
8397	930551	*Palthis angulalis*	3
8398	930552	*Palthis asopialis*	2

Pangraptinae			
8490	930559	*Pangrapta decoralis*	13
8491	930560	*Ledaea perditalis*	7
Hypeninae			
8441	930561	*Hypena manalis*	2
8442	930562	*Hypena baltimoralis*	7
8444	930565	*Hypena palparia*	2
8465	930588	*Hypena scabra*	5
	930591	*Melanoma auricinctaria*	1
Rivulinae			
8404	930592	*Rivula propinqualis*	3
Scolecocampinae			
8514	930637	*Scolecocampa liburna*	5
8522	930643	*Gabara subnivosella*	4
Hypenodinae			
8427	930670	*Dyspyralis puncticosta*	1
8428	930671	*Dyspyralis nigellus*	1
Boletobiinae			
8499	930679	*Metalectra discalis*	1
8500		*Metalectra quadrisignata*	1
Phytometrinae			
8481	930717	*Phytometra rhodarialis*	1
9035	930727	*Hyperstrotia nana (=villificans)*	2
9038	930730	*Hyperstrotia villificans*	2
9039	930731	*Hyperstrotia flaviguttata*	1
Erebinae			
8618	930891	*Drasteria graphica*	6
8689	931023	*Zale lunata*	1
8697	931032	*Zale minerea*	4
8699	931034	*Zale obliqua*	1
8717	931053	*Zale horrida*	11
8719		*Euparthenos nubilis*	1
8721	930962	*Allotria elonympha*	13
8727	930961	*Parallelia bistriaris*	2
8738	930923	*Caenurgina crassiuscula*	1
8745	930944	*Mocis texana*	4
8764	930956	*Argyrostrotis anilis*	5
8774	930765	*Catocala muliercula*	1
8777	930767	*Catocala badia*	2

8792	930782	*Catocala vidua*	1
8801	930792	*Catocala ilia*	6
8801.1		*Catocala* undescr. sp. nr. *ilia*	1
8847	930833	*Catocala gracilis*	9
8849	930835	*Catocala andromedae*	3
8857	930841	*Catocala ultronia*	5
8864	930845	*Catocala grynea*	1
8865	930847	*Catocala praeclara*	8
8867	930851	*Catocala blandula*	3
8873	930855	*Catocala similis*	7
8876		*Catocala micronympha*	1
8878	930859	*Catocala amica*	5
8878.1	930860	*Catocala lineella*	5
8878.2		*Catocala* undescr. sp. nr. *lineella*	1
9818	931060	*Amolita fessa*	2
9821	931063	*Amolita roseola*	2
Eulepidotinae			
8587	931089	*Panopoda rufimargo*	11
8588	931090	*Panopoda carneicosta*	2
8525	931101	*Phyprosopus callitrichoides*	2
EUTELIIDAE			
Euteliinae			
8955		*Marathyssa inficita*	1
8957	931106	*Paectes oculatrix*	2
8968		*Marathyssa pulcherrimus*	1
NOLIDAE			
Nolinae			
8983	931121	*Meganola minuscula*	3
8983.1	931122	*Meganola phylla*	9
8983.2	931123	*Meganola spodia*	1
8989	931129	*Nola pustulata*	1
8996	931136	*Nola clethrae*	3
NOCTUIDAE			
Plusiinae			
8924		*Anagrapha falicfera*	1
Bagisarinae			
9169	931241	*Bagisara rectifascia*	5
Eustrotiinae			
9044	931284	*Marimatha nigrofimbria*	2

9046		*Deltote bellicula*	1
9049	931295	*Maliattha synochitis*	1
Pantheinae			
9189	931406	*Charadra deridens*	3
Raphiinae			
9193	931412	*Raphia frater*	2
Amphipyrinae			
9638		*Amphipyra pyrimidoides*	1
Balsinae			
9662	931417	*Balsa malana*	1
9664	931419	*Balsa labecula*	3
Acronictinae			
9200	931421	*Acronicta americana*	2
9209	931430	*Acronicta radcliffei*	2
9211		*Acronicta tritona*	1
9281	931442	*Acronicta ("Agriopodes") fallax*	6
9226	931443	*Acronicta superans*	1
9227	931444	*Acronicta laetifica*	1
9228	931445	*Acronicta hasta*	1
9237	931454	*Acronicta interrupta*	2
9238	931455	*Acronicta lobeliae*	5
9246	931460	*Acronicta clarescens*	3
9243	931463	*Acronicta ovata*	7
9244	931465	*Acronicta modica*	9
9245	931466	*Acronicta haesitata*	4
9249	931467	*Acronicta increta (+"inclara")*	7
9247	931469	*Acronicta tristis*	3
9251	931470	*Acronicta retardata*	2
9254	931471	*Acronicta afflicta*	12
9257	931474	*Acronicta impleta*	3
9259	931476	*Acronicta noctivaga*	4
9264	931478	*Acronicta longa*	1
9266	931480	*Acronicta lithospila*	9
9272	931485	*Acronicta oblinita*	5
9281	931494	*Agriopodes fallax*	7
9285	931497	*Polygrammate hebraeicum*	17
9286	931498	*Harrisimemna trisignata*	4
8104	931499	*Comachara cadburyi*	4
9062	931501	*Cerma cerintha*	1

Agaristinae			
9301	931966	*Eudryas grata*	3
Condicinae			
9690	931989	*Condica videns*	4
9057	932025	*Homophoberia apicosa*	5
9065	932026	*Leuconycta diphtheroides*	4
Heliothinae			
11055	932039	*Derrima stellata*	1
11135	932091	*Schinia rivulosa*	1
11149	932096	*Schinia trifasciata*	2
11177	932156	*Schinia nundina*	1
Eriopinae			
9631	932192	*Callopistria mollissima*	7
9633	932194	*Callopistria cordata*	1
Noctuinae			
9053	932205	*Pseudeustrotia carneola*	3
9404		*Olgia modica*	1
9415.1	932375	*Oligia strigilis*	1
9449	932438	*Capsula oblonga*	1
9454	932358	*Loscopia velata*	1
9525	932517	*Bellura obliqua*	2
9545	932290	*Euplexia benesimilis*	5
9547	932292	*Phlogophora periculosa*	1
9556	932713	*Chytonix palliatricula*	10
9582	932283	*Nedra ramosula*	1
9618	932208	*Phosphila turbulenta*	8
9619	932209	*Phosphila miseloides*	14
9629	932749	*Fagitana littera*	3
9647	932266	*Proxenus miranda*	2
9650	932269	*Athetis tarda*	8
9666	932216	*Spodoptera frugiperda*	1
9669	932219	*Spodoptera ornithogalli*	1
9678	932228	*Elaphria versicolor*	2
9681.1	932233	*Elaphria alapallida*	1
9688	932249	*Galgula partita*	5
9815	932672	*Cosmia calami*	6
10266	932907	*Sideridis congermana*	1
10288	933146	*Orthodes detracta*	8
10291	932805	*Morrisonia latex*	5

10300	932882	*Lacanobia grandis*	5
10301	932883	*Spiramater lutra*	1
10397	933044	*Lacinipolia renigera*	8
10431	932928	*Dargida diffusa*	4
10436	932933	*Mythimna oxygala*	1
10438	932935	*Mythimna unipuncta*	8
10439	932937	*Leucania extincta*	1
10440		*Leuania linita*	1
10444	932943	*Leucania phragmatidicola*	3
10445	932944	*Leucania linda*	1
10456	932960	*Leucania adjuta*	1
10459	932963	*Leucania inermis*	1
10461	932965	*Leucania ursula*	1
10524	932810	*Nephelodes minians*	1
10532.1	933089	*Homorthodes lindseyi*	5
10585	933136	*Orthodes majuscula*	6
10587	933138	*Orthodes cynica*	9
10627		*Tricholita signata*	1
10663	933528	*Agrotis ipsilon*	3
10674	933501	*Feltia subgothica*	1
10676	933503	*Feltia herilis*	3
10680	933495	*Feltia geniculata*	2
10870	933232	*Dichagyris acclivis*	3
10878	933228	*Striacosta albicosta*	1
10891	933529	*Ochropleura implecta*	5
10902	933222	*Anicla forbesi*	1
10903	933216	Anicla illapsa	2
10942	933588	*Xestia c-nigrum*	1
10942.1	933589	*Xestia dolosa*	3
11006	933649	*Protolampra brunneicollis*	8
11010	933547	*Lycophotia phyllophora*	4
11012.2	933551	*Noctua pronuba*	7
11024.1	933663	*Abagrotis benjamini*	1
11029	933680	*Abagrotis alternata*	10
Total # species:			339

Table 22: Invertebrate and worm species observed on Gay Head Moraine Reservation, Aquinnah, MA

Scientific Name	Common Name
Phylum Platyhelminthes	
Class Tubellaria	
Family Dugesiidae	
Girardia dorotocephala	
Phylum Arthropoda	
Class Copepoda	
Order Cyclopida	
Family Cyclopidae	
Cyclops sp.	
Class Collembola	
Order Entomobryomorpha	
Family unknown	
unknown	
Class Malacostraca	
Order Isopoda	
Family Asellidae	
Asellus sp	
Class Brachiopoda	
Order Anomopoda	
Family Daphniidae	
Daphnia sp.	
Class Arachnida	
Order Araneae	
Family Ixodidae	
Amblyomma americanum	Lone star tick
Ixodes scapularis	Deer tick
Dermacentor variabilis	American dog tick
Family Lycosidae	
Gladicosa gulosa	wolf spider
Family Araneidae	
Argiope amoena	Orb-weaver spider
Class Insecta	
Order Ephemeroptera	
Family unknown	
unknown	mayfly nymph
Order Coleoptera	
Family Coccinellidae	

Coccinella septempunctata	seven-spotted lady beetle
Family Dytiscidae	
Dytiscus sp.	predaceous diving beetle
Family Carabidae	
Poecilus chalcites	ground beetle
Order Diptera	
Family Tipulidae	
Tipula abdominalis	giant crane fly
Order Hemiptera	
Family Belostomatidae	
Lethocerus americanus	giant Water Bug
Family Cicadidae	
unknown	Cicada spp.
Family Cicadellidae	
Paraulacizes irrorata	speckled sharpshooter
Graphocephala coccinea	red-banded leafhopper
Family Gerridae	
Garris sp.	water strider
Family Corixidae	
unknown	water boatman
Order Hymenoptera	
Family Cynipidae	
Callirhytis seminator	wool sower gall wasp
Family Vespidae	
Dolichovespula maculata	bald-faced hornet
Family Apidae	
Bombus impatiens	common eastern bumblebee
Ammophila sp.	thread-waisted wasp
Order Lepidoptera	
Family Lycaenidae	
Celastrina ladon	spring azure
Family Lycaenidae	
	duskywing
Order Odonata	
Family Nymphalidae	
Danaus plexippus	monarch
Megisto cymela	little wood satyre
Cyercyonis pegala	common wood nymph
Nymphalis antiopa	mourning cloak

Vanessa virginiensis	American painted lady
Polygonia interrogationis	question mark
Family Lycaenidae	
Strymon melinus	gray hairstreak
Family Pieridae	
Colias eurytheme	orange sulphur
Eurema lisa	little yellow
Family Libellulidae	
Sympetrum rubicundulum	ruby meadowhawk
Libellula pulchella	tenspotted skimmer
Sympetrum obtrusum	white-faced meadowhawk
Perithemis tenera	eastern amberwing
Family Aeshnidae	
Anax junius	green darner
Order Orthoptera	
Family Acrididae	
Melanoplus femurrubrum	red-legged grasshopper
Family Gryllidae	
Gryllus veletis	field cricket
Order Diptera	
Family Culicidae	
Melanoplus femurrubrum	mosquito
Family Tabanidae	
Tabanus nigrovittatus	greenhead fly
Chrysops sp.	deer fly
Order Megaloptera	
Family Corydalidae	
Corydalus cornutus	dobsonfly

3. Amphibians, reptiles, and fish

Four amphibians and three reptiles are known to occur on the property. Two snake species may be encountered by visitors sunning on trails or swimming through in the pond or a stream. Likewise, painted turtles can also be observed sunning on rocks or logs in the pond. Acoustic monitors recorded spring peepers and pickerel frogs on the property and passive observations revealed green frogs in the small pong by the sandplain grassland (Table 23, page 157). A chorus of frogs is a delightful sound that can be heard by visitors during the spring, especially after a heavy rain. Frogs use their vocalization to communicate with each other; rain

Figure 53: Eastern ribbon snake

events create ideal opportunities for frogs to lay eggs. Frogs spend their early growth in water as tadpoles before transforming into land animals. Fish species were not surveyed.

The redback salamander was observed under the cover boards used to survey amphibians. The redback is a woodland salamander that does not depend on water for its larval stage. Eggs are laid in damp logs, moss, or other moist woodland environments. It is the most common salamander throughout the eastern United States (Conant and Collins 1998).

Figure 54: Red-backed salamander

Table 23: Amphibian and reptile species observed on Gay Head Moraine Reservation, Aquinnah, MA

Scientific Name	Common Name
Class Amphibia	
Order Anura	
Family Ranidae	
Lithobates palustris	pickerel Frog
Pseudacris crucifer	spring peeper
Lithobates clamitans	green frog
Order Urodela	
Family Plethodonitidae	
Plethodon cinereus	Red-backed salamander
Class Reptilia	
Order Testudines	
Family Emydidae	
Chrysemys picta	Painted turtle
Order Squamata	
Family Colubridae	
Coluber constrictor	Black racer
Thamnophis saurita saurita	Ribbon snake

4. Mammal

Eight species of mammals were observed on Gay Head Moraine Reservation (Table 24, page 158).


Figure 56: Coyote scat

Coyote scat was observed on multiple trails throughout the property. Although prolific in the majority of Massachusetts and New England, coyotes are uncommon on Martha's Vineyard. They periodically swim ashore to the island from their closest population on Naushon Island (Humphrey 2023). Occasionally they are found dead washed up on island beaches in attempts to migrate from the


Figure 55: White-tailed deer

Elizabeth Islands. Despite estimates of approximately six coyotes living on the island, there is currently no evidence of a breeding population. As the number of coyotes increases, a population is expected to become established in the coming years (Proulx 2023). Coyotes are omnivorous and opportunistic in their feeding, eating a variety of food including berries, roadkill, rabbits, small deer, reptiles, and birds (MassWildlife 2017). Pups are born from April-May with up to nine in a litter. Adults observed on the island are estimated to be between 45-50 pounds, though large coyotes can weigh up to 60 pounds (Proulx 2023). Coyotes are usually elusive and avoid humans, however conflict can arise if livestock, garbage, or small pets are not secured properly (MassWildlife 2017).

White-tailed deer was the most common mammal observed on the camera trap. Does, bucks and fawns were all observed quietly foraging in the grassy areas along the trails. Sleeping fawns have been surprised from their hideouts in the coastal dune.

Five bat species were documented traveling through the property, four of which are NHESP listed species. The bats that occur on the property are all insectivores. However, where they hunt for their prey is somewhat species-specific.

Table 24: Mammal species observed during on Gay Head Moraine Reservation, Aquinnah, MA

Scientific Name	Common Name
Class Mammalia	
Order Artiodactyla	
Family Cervidae	
Odocoileus virginianus	White-tailed deer
Order Carnivora	
Family Canidae	
Canis latrans	Eastern coyote
Family Mephitidae	
Mephitis mephitis	Striped skunk
Family Procyonidae	
Procyon lotor	Raccoon
Order Eulipotyphla	
Family Talpidae	
Salopus acquaticus	Eastern mole
Order Lagomorpha	
Family Leporidae	
Sylvilagus spp.	Cottontail rabbit
Order Rodentia	
Family Sciuridae	
Sciurus carolinensis	Gray squirrel
Family Chiroptera	
Eptesicus fuscus	Big brown bat

Appendix F. Land Use History in Detail

The idea of nature contains, though often unnoticed, an extraordinary amount of human history.

-Raymond Williams, **Ideas of Nature**

The Geological Formation of Aquinnah

As the last ice sheets of the Wisconsin glaciation retreated 12,000 years ago, the land beneath them—long-compressed by immense glacial weight—was pried upwards, exposing soils deposited in layers by meltwater streams. Pine-dominant forests first emerged from these soils 3,000 years later, thriving in their cool, post-glacial clime. As the climate began to warm, oaks started to succeed the pine stands, and their broad canopies shaded the understory where new species could emerge. White-tailed deer, wild turkey, and other small mammals thrived on the forage they found in the changing understory (Foster 1999).

Paleo-Americans began passing through these lands as they followed game trails and seasonal resources, having adapted their movements to the patterns of the land and seasons. (Manning and Eccher 2001). When sea levels finally stabilized from glacial melt, the landmass which encompasses Aquinnah rose from the mainland to form the island we now call Martha's Vineyard (Railton 2006).

Wampanoag Stewardship, English Arrival

Before the arrival of the English settlers, the Wampanoag, descendants of the early Paleo-Americans, thrived in four primary schamships – Chappaquiddick, Gay Head (Aquinnah), Takemmy and Nunnepaug – throughout Martha's Vineyard (Banks 1911). Each sachemship was an independent political unit controlled by a sachem or leader. The membership in a sachemship was inherited and came with land-use rights that were distributed by the sachem (Bragdon 1986). The sachemship of Gay Head was named for the cliffs. Gay Head translates to "Oetachukutcho" in Wampanoag and means "the high place of the colored soil" (Travers 1960).

The island Wampanoag people subsisted on seasonal resources found in coastal ecosystems, forests, and open meadows. During spring and early summer, a time of much food scarcity, Wampanoags would have eaten fish, shellfish (pond scallop, soft shell clam, oyster, blue and ribbed mussel, and sea clam), birds (dukes, turkey, geese) and wild plants supplemented by stored grains, dried legumes and squash. Fish consumption along with shellfish would have extended into the summer months. Meat from deer and small game, birds, harvested corn, beans, fish and shellfish would have filled bellies well into the winter according to research into the food economy of New England paleo-Americans (Bragdon 1986) and archeological evidence from Martha's Vineyard (Huntington 1962). This is not to say the Wampanoag "left no trace" on the land—southern New England's pre-colonial forests were not untouched wilderness, but cultural landscapes: a mosaic of woodlands, scrublands, and meadows which still serves as a record of pre-colonial human intervention (Cronon 1983, p. 116).

The extent to which Wampanoags and their predecessors on Martha's Vineyard cleared land and performed agricultural activities is unclear. However, palynological evidence contradicts the common idea that Paleo-Americans used fire to clear large areas of land pre-European settlement (Foster et al. 2002). The 1807 accounts of Dukes County by James Freeman describe an abundance of subsistence farming on Martha's Vineyard and

describe Gay Head as "the best land on the island". The context within which Mr. Freeman is valuing the land of Gay Head is not obvious in his written accounts. Mr. Freeman does not mention Gay Head when describing crop yields, acreages of cleared grasslands and orchards. The only crop mentioned in Gay Head is cranberries. In the same description, Mr. Freeman describes Gay Head as "destitute of trees; but there are many swamps, some of which afford peat, and other springs of good water" (Freeman 1971, p. 32). In fact, much of Gay Head is wooded swamp land with upland woodlands occurring on hilltops and the entirety surrounded by coastal ecological communities and clay cliffs. There were, according to Mr. Freeman, no roads and only three barns in Gay Head during the time of his assessment (Freeman 1971). Mr. Freeman's account and evidence from early records also suggest Wampanoag families kept a horse, a few cows and perhaps a pig in addition to maintaining small gardens (Bragdon 1986). Unlike the land management practices of later European settlers, Wampanoag land use was fluid, and primarily governed by the seasonal availability of resources rather than static ownership of land and stockpiling of resources. The Wampanoag and European settlers' disparate conceptions of land ownership would prove to be mutually confounding. European settlers viewed the New World's landscape only through its perceived economic potential: the endless commodification of inexhaustible bounty. The lives of the Wampanoag revolved around fishing, shellfish harvesting, foraging, and hunting—the land was not seen as a commodity, but rather as an extension of life itself (Wyatt Oswald et al. 2007): "What the Indians owned—or, more precisely, what their villages gave them claim to—was not the land but the things that were on the land during the various seasons of the year (Cronon 1983, p. 65)."

In 1641, Thomas Mayhew, Sr. purchased Martha's Vineyard, and began proselytizing the Wampanoags through missions established by his son, Thomas Mayhew, Jr. On July 8, 1671, with many of the Wampanoag already Christianized, Thomas Mayhew formalized agreements that concentrated them into de facto reservations in Gay Head and Chappaquiddick, dispossessing them of much of their ancestral commons (Weinstein-Farson 1989; Manning & Eccher 2001). In 1685, Matthew Mayhew became "Lord of the Manor" of Martha's Vineyard and shortly thereafter purchased the Gay Head peninsula from Joseph Mittark, Sachem of the Gay Head Wampanoag (Banks 1911). The sale was contested by the Wampanoags in Gay Head. Most attempts at reclaiming their lost ancestral land largely failed, and the only meaningful success came from the efforts of a philanthropic group in London, the Society for Propagating the Gospel in 1711. The Society purchased Gay Head from the Lord of Limerick and became the newest landlord over the Gay Head Wampanoags (Banks 1911). The transfer of landlordship to the Society in 1711 offered some protection to the Gay Head Wampanoags and slowed the occupation of European settlement for another 100 years. After the revolutionary war the Society was replaced by the commonwealth and the Gay Head Wampanoags and their land became wards of the commonwealth (Banks 1911).

The codification of English property laws would fundamentally alter the landscape of Martha's Vineyard. The shift from Indigenous land stewardship to European agricultural systems led to soil depletion and changes in vegetation patterns, further altering the ecological balance in much of the island (Norton 1923). However, there is little ethnohistorical evidence to support European settlement impacts in Gay Head post-mid-twentieth century. During the eighteenth and nineteenth centuries European influence over the lands of Gay Head was limited to periodic leasing of pasturage for cattle and recreational endeavors (Herbster and Cherau 2002).

Figure 57: Cranberry harvest with Rachel Ryan and James Cooper https://bluedotliving.com/discovering-the-

The failure of the commonwealth-appointed guardians to oversee the Gay Head Wampanoags resulted in a de facto self-government (Banks 1911). According to account books, Wampanoags purchased very little food stuff, and if then only seasonally; they remained self-sufficient growing native crops and selling cranberries and clay (Bragdon 1986 and Herbster and Cherau 2002). However, towards the mid- 19th century the leasing of land for pasturage had increased and is evident in the description of Gay Head in letters written by S.A. Devans, a clergymen, in the 1830's. Devans describes Gay Head to the reader as follows "It is, as I have before observed, in possession of the Indians. Some of it is cultivated by them, but the larger part is used for pasturage. As you ride over its uneven surface, now to the summit of a rugged knoll, now down the precipitous sides of a deep hollow, again along the margin of an extended, irregular pond, it gives an aspect of life to the bald and desolate scenery to catch a view here and there of the herds of grazing cattle" (Devens 1838, p. 23). The land clearing was not a result of Wampanoag farming as the numbers of livestock owned by Wampanoag homesteaders was low (Herbster and Cherau 2002). The extent of land clearing is corroborated in the 1850 Whiting map of Martha's Vineyard and again in an early 20th century photograph of the headlands. The area of Gay Head Moraine Reservation has remained predominantly wooded as it is today.

Figure 58: Henry L. Whiting Map 1850

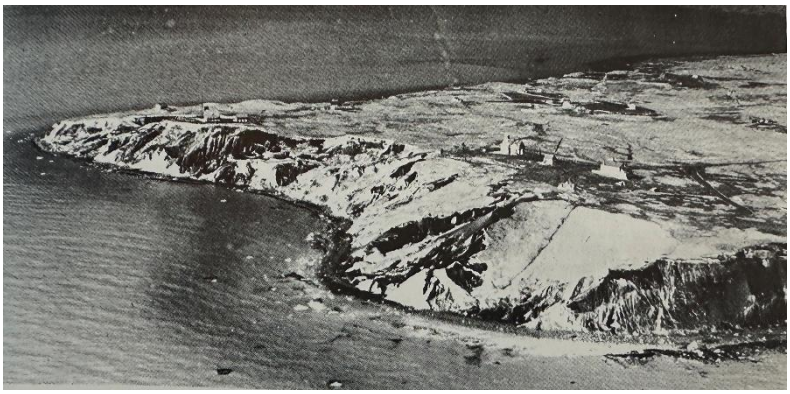


Figure 59: Aerial photograph of Northhead Gay Head, early 1900's

In 1870, the Massachusetts State Legislature passed Chapter 213 of the Acts of 1870, which incorporated the land comprising Gay Head as a town, later re-named "Aquinnah". The acts stipulated that the remaining common lands be parceled out and allotted to Wampanoag tribe members of Gay Head (Figure 61). The land was surveyed, and the lines were drawn; a starkly different Gay Head compared to four years prior in 1866 (Figure 60). The prospect of a return to collective ownership of Wampanoag ancestral common land would not be realizable in the face of

recorded boundaries. Stone fences had long delimited the land —a constant reminder of the rigidity of English property law and the lithic permanence of its bounds (Pierce and Segel 2016).

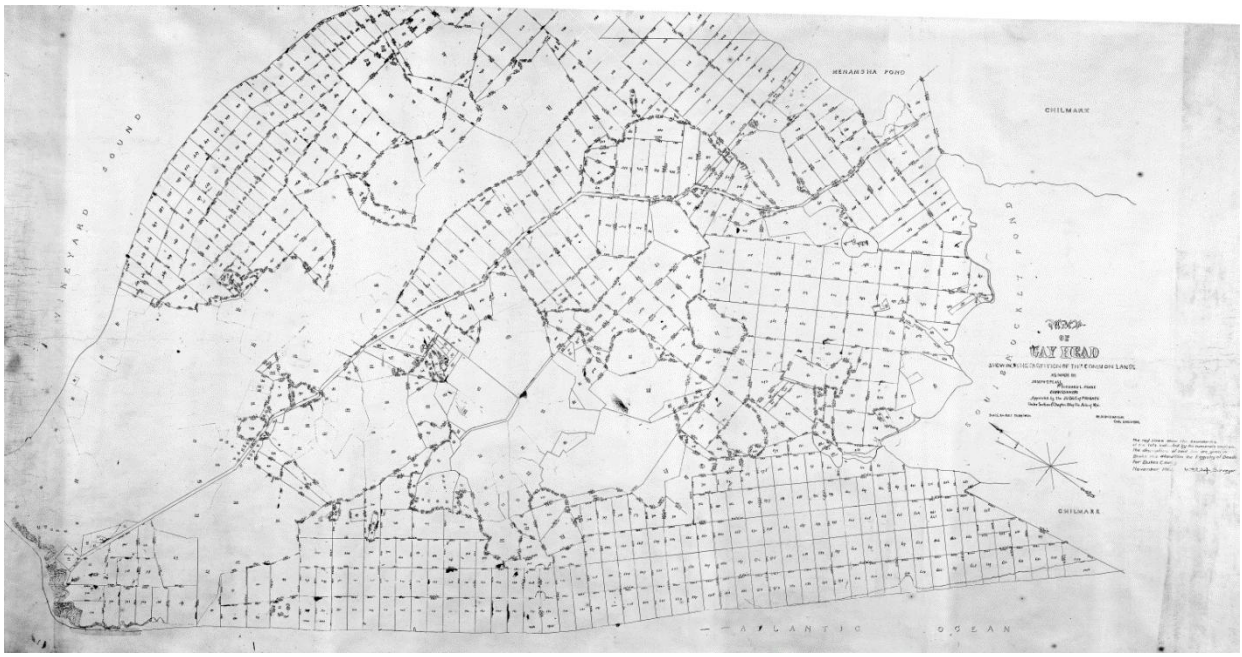


Figure 61: 1971 Set-off partition of common lands in Gay Head

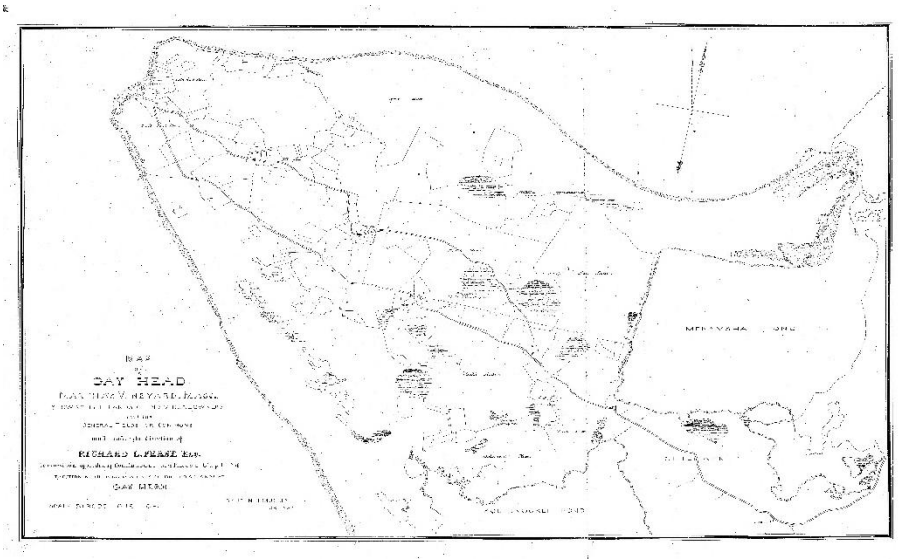


Figure 60: 1866 homesteads and common lands of Gay Head

Some Wampanoag families who remained in Gay Head were able to retain, and in some cases increase, their land holdings, by refusing to sell and by intermarrying within the Wampanoag community. Among those families are two with homesteads located within the bounds of Gay Head Moraine Reservation – the Manning and Jeffers. Other prominent families such as the Nevers and Vanderhoops also became significant land holders in the area of Gay Head Moraine Reservation.

The Alvin Manning homestead is situated at the intersection of what had been three common lands: North Pasture, East Pasture, and Middle Place. The Mannings were primarily whalemen and farmers (Pierce and Segel 2016). Marshall Manning was born in Easton, MA in 1791. He was a man of mixed race and married Hannah Taquenut of Aquinnah in 1810. Their children, born in Gay Head, were Mary, Thomas, Alvin, Abel, and Abiah. The

stone foundations of the Manning homestead complex were built by Alvin Manning, with surrounding properties owned by his siblings (Pierce and Segel 2016). Alvin Manning and his brother Thomas Manning, whose homestead abutted Alvin Manning's to the west, are listed as farmers on the 1859 Indian Census (Earle 1861). They had 3 cows and 4 pigs between them (Earle 1861). The Manning family has remained a prominent name devoted to the island, staying involved in the Wampanoag tribe and supporting local businesses and services throughout Martha's Vineyard still today (Eville 2021 and Manning 2008).

As members of the Manning family wed into other families and portions of the Manning homestead took on new family surnames such as Ryan, Diamond, Madison, Nevers, Vanderhoop, and Widdiss (Dukes County Registry of Deeds B:968 P:888; B:556 P:566; B:594 P:828; B:743 P:755; B:907 P:037; B:65 P:377-398).

A portion of Gay Head Moraine Reservation east of Lobsterville Road was part of the Ryan homestead and formerly part of the Manning homestead (DCDR B:112 P:228; B:117 P:334; B:119 P:442). The land transferred from the Manning family into the Ryan family when Charles H. Ryan, a fisherman from Long Island, married Rachael Diamond, daughter of James Diamond and Abiah Manning (Alvin Manning's sister) (Pierce and Segel 2016). Rachael was proud to be an Aquinnah Wampanoag and decedent of the Taquenut family of Gay Head and the Johnson family of Chappaquiddick. Rachael's grandmother, Hannah Taquenut, was one of the last to speak the native Wampanoag language in Gay Head. Rachael was a keeper of Wampanoag lore and tradition including knowledge of the great chief's secret burial places (Vineyard Gazette, December 10, 1937).

Figure 62: Charles Ryan house " Nestlenook" off Lobsterville Road

The Charles Ryan house is listed on the Massachusetts Register of Historic places (Gay.22). Known as "Nestlenook", the boarding house was built circa 1880 when the settlement of Lobsterville formed in response to the popularity of lobster fisheries in around 1878 (Baer 2017). The impression of a house is all that remains. Small boats were able to safely anchor off Lobsterville Beach before Menemsha Creek was dredged and opened for boats into Menemsha Pond. The small colony of fisherman lived in rows of cottages along the only streets, First and Second Streets or Front and Back Streets. The house was clearly visible from the water at this time. The only survivor of the shipwreck of the Clara Leavitt was able to rescue himself by floating on a hatch cover and stumbling along a cart path following a candle light from a window of the Ryan house where he was welcomed in and nursed back to health for a month by Rachael Ryan. The ship's cargo of granite carried the boat to the sea floor and the frozen crew that had washed up on shore was carried to the Gay Head church and buried (Scoville 1972 and MHC 1998).

The Charles Ryan house, before it disappeared into the wild, was the oldest historical building in the area of the Lobsterville settlement, followed by the "Binnacle" owned by Dorothy Scoville from 1916 and the Billy Ryan house from 1920 (MHC). Dorothy's house was said to have been built with a keel for a foundation by her seafaring father. During a hurricane the house floated to its current location and Dorothy, rather than move the house back, purchased the lot that it settled on (Ochs 2011). The backyard of the "Binnacle" is the northern tip of the property.

Figure 63: Dorothy Scoville house at Lobsterville

Figure 64: Billy Ryan house off Beechwood Way

Charles Ryan's son, Billy Ryan, built his house nearby off Beechwood Way in around 1920 from the lumber of the old ice house that once stood at Menemsha. Billy floated the lumber through the creek and along the beach to the building location (MHC 1998, Gay.1).

Many male inhabitants of Gay Head were mariners and spent a lifetime at sea without establishing a homestead in Aquinnah. A significant tract of "wood and brush land" on Gay Head Moraine Reservation was run out or surveyed for James Diamond during the setoff settlement of common land in 1870 (DCRD B:65 P:378, Pease 1971). James, a seaman from age 18, came to Gay Head and married Abiah Manning Cook, sister of Alvin Manning, in 1857. Trouble followed him and Diamond was remanded at the House of Corrections in 1858 for stealing from the Chilmark store while awaiting trial from a prior offence. He broke out of jail for the purpose of "supplying the calls of his appetite". He returned only to escape a second time and remained in hiding for four years. Diamond returned to jail in 1863 but was pardoned in 1864 under the condition that he enlist in the colored regiment, a newly formed entity within the northern militia. Diamond was 41 years old, making him 15 years older than the average soldier. In 1865, Diamond was discharged and returned to Aquinnah (Miller, 1994).

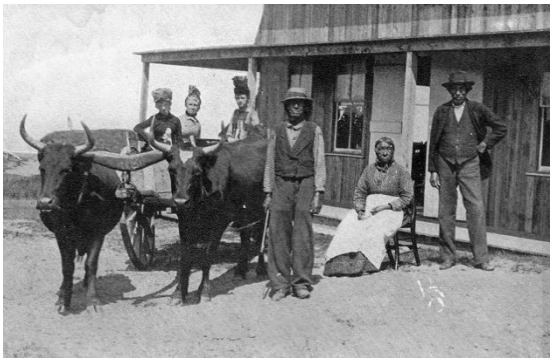


Figure 65: Deacon Thomas Jeffers, Aaron Cooper and Tamson Weeks with ox-cart and tourist circa 1900

The Jeffers, another Wampanoag family whose homestead included parts of Gay Head Moraine Reservation west of the Lobsterville Road, provided several Deacons to the Gay Head Community Baptist church, operating since 1693 (McCullough 2016). The Thomas Jeffers' homestead was likely established by Deacon Thomas Jeffers, son of Amos Jeffers and Bethiah Cooper. In the 1859 count of Gay Headers, Deacon Thomas Jeffers is listed as a mariner, selectman and owning one cow. His father, Amos Jeffers,

Figure 66: Deacon Thomas Jeffers and Aaron Cooper (left to right) Peabody Museum of Archaeology and Ethnology, Harvard University

was listed in 1859 as living with his son Thomas and having no land. Thomas' grandfather, the Elder Thomas Jeffers (spelled Jeffery), also a preacher, not native to Aquinnah, retired from preaching in his old age and cultivated "a little land 'about five acres, which he enclosed, where he raised crops and hay', and built 'a low one-story, little small house, but founded upon a rock'" southeast of Old South Road 1816 (Burgess 1970, reprint). Deacon Thomas Jeffers and his wife, Lucina James (m. 1852), had five children – Thomas Conant, Cordelia, Amos, Lucina and Henry. Thomas Conant Jeffers, the eldest, was a whaler in his younger days and lived in his family estate for the duration of his life. In 1884, when the *City of Columbus* ship was wrecked on Devil's Bridge, he led a lifeboat with his father and brother Henry that rescued 18 of the men aboard the ship. He was awarded with a silver medal from the Humane Society for his successful rescue and was known to rescue many other smaller wrecks off the coast of Aquinnah (Scoville 1972). In the 1880 census, Deacon Thomas is listed as a farmer and Thomas Conant Jeffers a fisherman. Thomas Conant's son Linus was well known as a fisherman and farmer.

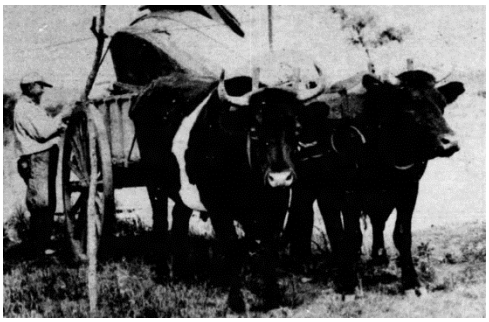


Figure 67: Linus Manning Jeffers, son of Thomas Conant and Isabel Jeffers, Boston Globe 1947, Charles McCormick

Land outside the Alvin Manning and Thomas Jeffers homesteads was assigned to various individuals of the Wampanoag Tribe of Gay Head that held homesteads elsewhere in Aquinnah or none at all. Daniel Nevers, who was listed as a mariner in the 1859 count did not establish himself with a homestead in Aquinnah. However, a sizable tract of land was run out for Daniel Nevers being defined by Thomas Manning and Thomas Jeffers homestead stone wall boundaries (Pease 1871, Pierce and Segel 2016). Land surrounding the boundaries of Gay Head Moraine Reservation in 1870 was homesteaded primarily by Abram Rodman and Johnson families (Map 9, page 34). Abram Rodman's land abutting Gay Head Moraine Reservation to the north was described in the index of ownership of Indian Lands in 1871 as an enclosed lot of clear and wood land, swamp, brush and beach known as the Johnson Place formerly owned by Isaac and Sarah Johnson. Rodman was a farmer and carpenter and owned 12 head of cattle, the most of any one owner listed on the 1859 Indian census of Gay Head (Earle 1861). His homestead was located off South Road and abutting Middle Place.

No major development occurs on Gay Head Moraine Reservation from the 19th century homesteads of Manning and Jeffers until 1991 when the Nityananda Institute bought five parcels, formerly part of the Manning homestead and Ryan homestead to be used as a meditation and yoga center (DCRD B:556 P:566; B:594 P:828). In 1996, the institute's building burnt to the ground and two years later the land was purchased by the Martha's Vineyard Land Bank for conservation (DCRD B:743 P:755). Remaining buildings and structures were removed and the land was returned to a natural state.

Figure 68: Foundation remains of the Manning homestead

Looking at Gay Head Moraine Reservation today, it is mostly woodland as it has been for centuries. The remains of houses and barns from early inhabitants are no longer intact, but

stone foundations are visible, along with stone walls that were once used to divide pastures and contain livestock.

Appendix G. Endangered Species

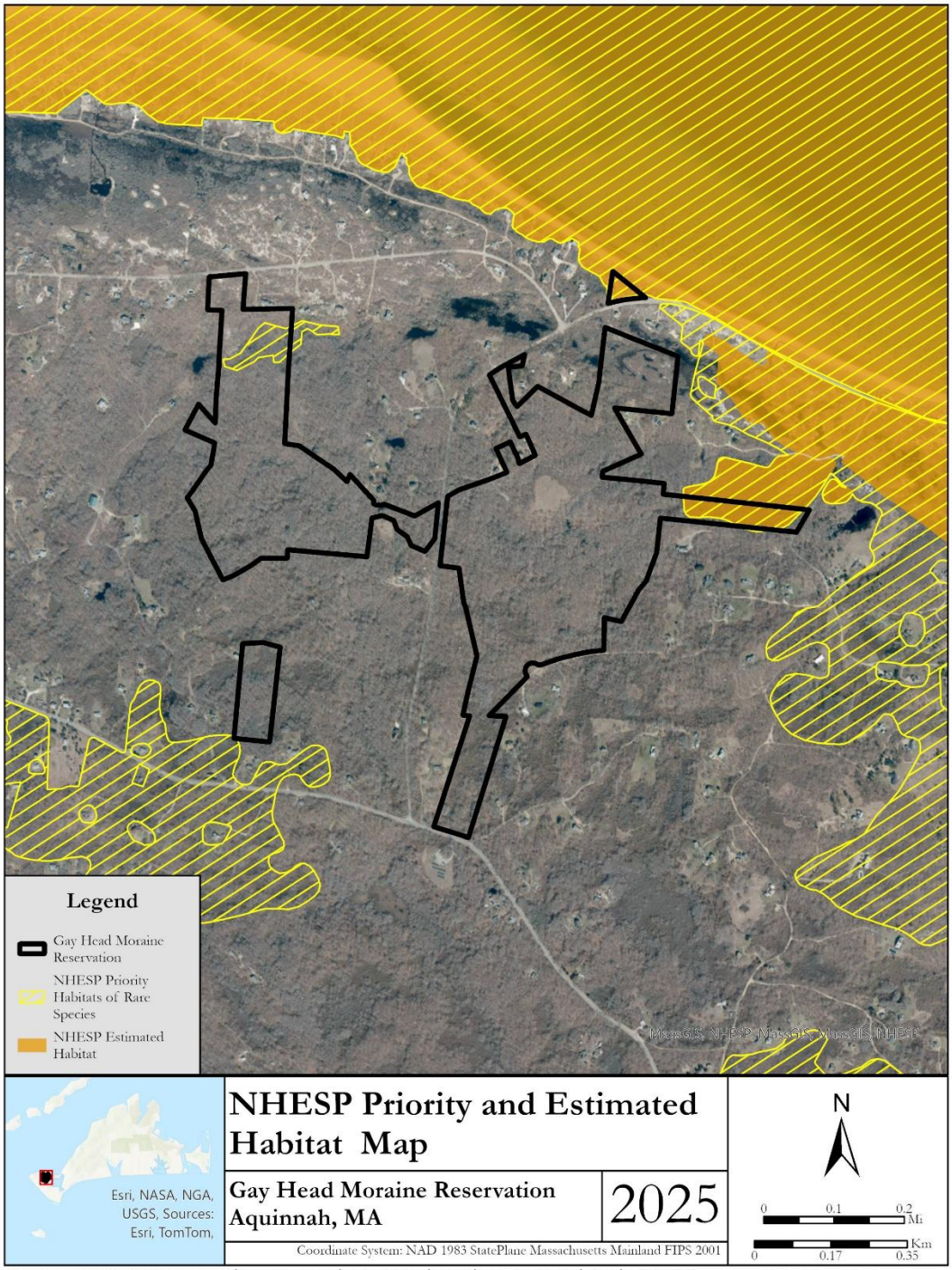
Portions of Gay Head Moraine Reservation fall within Priority Habitat of Rare species, as established by the Natural Heritage and Endangered Species Program (

Map 40, page 169). No portion of the proposed project is proposed within the boundaries of mapped priority habitat. However, in studying the property five mammal, three moth, four bird, and two plant species that are listed by the commonwealth as rare and are protected by the Endangered Species Act were observed on the property. Portions of proposed management for this property intersect with listed species' habitat requirements. This plan includes management goals that balance the needs of known and potential rare species on the property. If future management changes are required, repeat surveys will be conducted to understand effects on these species and a plan will be proposed to NHESP to mitigate any harm to the species and corresponding habitat.

State Status	Federal status	Type	Habitat requirement	Observation date	Survey dates	Proposed management impacts	Proposed mgt mitigation
Threatened	None	plant	rich deciduous woodland, openings with sparse shrub layer	8/2/2018, 7/11/2019	7/23/2020, 8/24/2021, 7/21/2022, 8/23/2023, 8/8/2024	none	survey population annually, survey for invasive competition, monitor woody shrub encroachment
Endangered	None	plant	woodland, field and edge	9/4/2024		none	hand prune abutting vegetation to alleviate encroachment
Special Concern	None	moth	dry open habitats with scrub oak	8/16/2018	28 trap nights in June-September over 5 years spanning 2004-2018	none	avoid cutting trees in trail creation, protect scrub oak from pruning; maintain vegetation on boundaries to limit light pollution from abutting development
Threatened	None	moth	scrub oak barrens, pine woodland and coastal woodland	7-11-2018, 7-18-2018, 7-31-2018, 8-16-2018, 7-20-2017, 8-3-2017	28 trap nights in June-September over 5 years spanning 2004-2018	none	avoid cutting trees in trail creation, protect scrub oak from pruning; maintain vegetation on boundaries to limit light pollution from abutting development
Special concern	None	moth	dune, grassland heathland	7-11-2018, 7-18-2018, 7-31-2018, 7-1-2017, 6-30-2009, 7-22-2009	28 trap nights in June-September over 5 years spanning 2004-2018	none	Limit trails through dune habitat, maintain vegetation on boundaries to limit light pollution from abutting development

Threatened	None	bird	nest in grassland, wet meadow, marshes on ground	9/12/2004	2000, 2004, 2017, 2020 dune, marsh and grassland (5-12 counts per year)	none	Create trails during winter before April 1, leash dogs year-round
Threatened	None	bird	nest in red maple swamp, builds nest with lichen	5/11/2000	2000 and 2020 1-5 counts in shrub swamp	none	limit siting trails through wetlands
Special concern	None	bird	spruce fir forest	Fall	habitat not present	none	habitat not present
Endangered	None	bat	roost in woodland, roost in trees during summer	August 2023 and 2020	August 2020 and 2023 (60 nights total)	none	Limit cutting of trees to November - April
Endangered	Endangered	bat	roost in woodland, hollow trees, under tree bark	August 2023	August 2020 and 2023 (60 nights total)	none	Limit cutting of trees to November - April
Special concern	None	bat	roost in deciduous trees, tree foliage	August 2023	August 2020 and 2023 (60 nights total)	none	Limit cutting of trees to November - April
Special concern	None	bat	roost in deciduous and coniferous woodlands in foliage	August 2023 and 2020	August 2020 and 2023 (60 nights total)	none	Limit cutting of trees to November - April
Special concern	None	bat	roost in conifer woodlands, under tree bark	August 2023	August 2020 and 2023 (60 nights total)	none	Limit cutting of trees to November - April

Map 40: NHESP priority habitat and estimated habitat on Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2023 Massachusetts Aerial; property boundary: MV Land Bank; NHESP layer: MassGIS. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

Date Exported: 9/16/2025 7:47 AM

D. Project Review Checklist

MASSWILDLIFE

MASSACHUSETTS
PROJECT REVIEW CHECKLIST

Massachusetts Endangered Species Act M.G.L. c.131A and Regulations (321 CMR 10.00)

Project Details

*Project or Site Name: _____

*Street Address/Location: _____

*Town(s): _____

*Total Site Acreage: _____ *Acreage of Disturbance[1]: _____

Parcel/lot number: _____ Assessors map/plat number: _____

Project Description (If necessary, a project/site description can also be provided as an attachment): _____

_____

_____

_____

Registry of deeds information[2]

Registry: _____ Certificate # (if registered land): _____

Book: _____ Page Number: _____

Do you have a previous NHESP Tracking number? (Yes / No) If yes, please provide: _____

Will this project require a filing with the Conservation Commission and/or DEP pursuant to the Wetlands Protection Act (WPA)? (Yes / No)

Map

*Required: Enclose a map with the site location clearly marked and centered on the page.

Landowner Info

*Are you the Record Owner[3] of the property? (Yes / No)
*If No, are you a representative of the Record Owner or do you have permission from the Record Owner to submit this request or filing?[4] (Yes / No)

*Landowner Name Organization (if applicable)

*Street Address/Location *City/Town *State *Zip Code

Email Telephone

Comments/Purpose of request[5]:

_____

_____

[1] Please disclose the full acreage of disturbance associated with the project, including areas outside of Priority Habitat.
[2] If your project contains more than one registered property, please attach a document listing the Registry information for each.
[3] Record Owner means any person or entity holding a legal or equitable interest, right or title to real property, as reflected in a written instrument or recorded deed, or any person authorized in writing by such person.
[4] If you are not the record owner, a statement or proof that you are authorized by the record owner must be attached.
[5] Provide the authorization you have to submit this request if you are not the record owner and not a representative of the record owner.

MASSWILDLIFE

v.5/2022

E. **Project Description**

1. Introduction
2. Project Map
3. Locus Map projected at 1:24,000 on the USGS Topography Basemap
4. Survey Map
5. Detailed Project Management Areas
6. Project Overview
7. Rare Species Data Collection Protocol and Dates
8. Project Objectives and Strategies
9. Project Photographs
10. Assessors Map and Deeds
11. See Appendix B and H.

Appendix H: Wetland Impacts

The implementation of Gay Head Moraine Reservation impacts 4.15 acres of wetland habitat. The following Notice of Intent will be filed with Aquinnah conservation commission and the Commonwealth Department of Environmental Protection prior to the implementation of this plan. The following document will be adjusted to incorporate any changes to the plan directed by the Secretary of Executive Office of Energy and Environmental Affairs in the Secretaries review letter.

A. **NOI Filing Documents**

1. WPA Form 3 NOI
2. List of Attachments for NOI
3. General Project Description
4. USGS Map and Narrative Description of Location
5. Project Planning and Wetland Resource Area Map
6. BVW and other Resource Area boundary Delineation methods
7. property Owners

Name	Organization	Address	Aquinnah, State Zip code

8. Proof of NHESP and DMF mailing
9. Notification to Abutters Letter

Notification to Abutters

By Hand Delivery, Certified Mail (return receipt requested), or Certificates of Mailing

This is a notification required by law. You are receiving this notification because you have been identified as the owner of land abutting another parcel of land for which certain activities are proposed. Those activities require a permit under the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40).

In accordance with the second paragraph of the Massachusetts Wetlands Protection Act, and 310 CMR 10.05(4)(a) of the Wetlands Regulations, you are hereby notified that:

A. A Notice of Intent was filed with the (Aquinnah) Conservation Commission on (insert date) seeking permission to remove, fill, dredge, or alter an area subject to protection under M.G.L. c. 131 §40. The following is a description of the proposed activity/activities:

(insert a brief description of the proposed project within this text box)

B. The name of the applicant is: (Martha's Vineyard Land Bank Commission).

C. The address of the land where the activity is proposed is: (insert physical address)

Project Site Assessors Map Locations:

Map	Parcel

D. Copies of the Notice of Intent may be examined or obtained at the office of the (Aquinnah) Conservation Commission, located at (insert physical address of office). The regular business hours of the Commission are (insert days of the week and hours the office is open), and the Commission may be reached at (insert telephone number).

E. Copies of the Notice of Intent may be obtained from the applicant by calling (Harrison Kisiel) at (508-627-7141). An administrative fee may be applied for providing copies of the NOI and plans.

F. Information regarding the date, time, and location of the public hearing regarding the Notice of Intent may be obtained from the (Aquinnah) Conservation Commission. Notice of the public hearing will be published at least five business days in advance, in the (insert newspaper's name).

Notification provided pursuant to the above requirement does not automatically confer standing to the recipient to request Departmental Action for the underlying matter. See 310 CMR 10.05(7)(a)4.

Abutters within 100 feet

Parcel/GIS /CAMA#	property Address	Owner Name	Co-Owner Name	Owner Address	Owner Address 2	Owner City	Owner State	Owner Zip
3-1.1	WEST BASIN ROAD	USA BIA TRUSTEE	WAMPANOAG TRIBE OF GAY HEAD (AQ)	20 BLACK BROOK RD		AQUINNAH	MA	02535
4-100.1	LOBSTER VILLE ROAD	MALONSON F RYAN	WASHINGTON BETTINA M	5A MAYSIES WAY		AQUINNAH	MA	02535
4-100.2	LOBSTER VILLE ROAD	MALONSON F RYAN	WASHINGTON BETTINA M	5A MAYSIES WAY		AQUINNAH	MA	02535
4-100.3	LOBSTER VILLE ROAD	MALONSON F RYAN	WASHINGTON BETTINA M	5A MAYSIES WAY		AQUINNAH	MA	02535
4-101	9 RIDGE ROAD	SLATE RONALD M	SLATE NANCY GILSON	PO BOX 179		CHILMARK	MA	02535
4-102	5 CLAY PIT ROAD	BURLAGE MATTHEW J	APARTMENT 3A BORRETT MANSIONS	41A STUBBS RD	APT 2, 17F, TOWER E	WAN CHAI HONG KONG	CH	00000
4-105	5 CLAY PIT ROAD	BURLAGE MATTHEW J	APARTMENT 3A BORRETT MANSIONS	41A STUBBS RD	APT 2, 17F, TOWER E	WAN CHAI HONG KONG	CH	00000
4-106	4 CLAY PIT ROAD	BORN JOHN R	BORN KATHLEEN L	3 WALNUT AVE		CAMBRIDGE	MA	02140
4-107	CLAY PIT ROAD	SCHWARTZ TERESA P TR	CLAYVIEW PROPERTY TRUST, C/O PICKMAN	118-21 QUEENS BLVD #316		FOREST HILLS	NY	11375
4-108	17 LOBSTER VILLE ROAD	OLSEN PETER C	HAMILTON-OLSEN APRIL A	4 SHERWOOD LANE		BEDFORD HILLS	NY	10507
4-12.1	LOBSTER VILLE ROAD	ISLAND HOUSING TRUST CORPORATION	C/O CROWELL OLIVER & MELYAWATI	PO BOX 432		CHILMARK	MA	02535
4-13	LOBSTER VILLE ROAD	M V LAND BANK COMMISSION		P.O. BOX 2057		EDGARTOWN	MA	02539
4-15.3	4 BEECHWOOD WAY	KANE FARMHOUSE LLC		130 MINUTEMAN RD		RIDGEFIELD	CT	06877

4-15.5	11 LOBSTER VILLE ROAD	HOPKINS CHARLES		1 MAC CLAREY WAY		WORCESTER	MA	01602
4-15.6	LOBSTER VILLE ROAD	M V LAND BANK COMMISSION		P.O. BOX 2057		EDGARTOWN	MA	02539
4-15.7	4 BEACH ROSE WAY	SWOLINZKY WENDY		PO BOX 634		CHILMARK	MA	02535
4-17	1 BEECHWOOD WAY	STARR MARGARET	STARR WILLIAM III	309 PARK PLACE		BROOKLYN	NY	11238
4-18	12 LOBSTER VILLE ROAD	NUOVO RICHE LLC	C/O TAWNYA MENESALE	889 WEST MAIN ST	UNIT #U-2	CENTERVILLE	MA	02632
4-3	4 LOBSTER VILLE ROAD	LYNCH PETER TR	LYNCH CATHERINE TR	1594 NORTH ORWELL RD		SHOREHAM	VT	05770
4-30	665 LIGHTHOUSE ROAD	AQUINNAH TOWN OF		955 STATE RD		AQUINNAH	MA	XXXXX
4-49	670 LIGHTHOUSE ROAD	MURPHY THOMAS D JR TR	TRAVIS B & LUCAS N BATZER TRUST TRS ETAL	755 WEST END AVE APT 15B		NEW YORK	NY	10025
4-50	15 LOBSTER VILLE ROAD	DIMASSA ANNETTE TR	GUARINO VINCENT J TR	636 CEDAR GROVE		ORANGE	CT	06477
4-52	15 LOBSTER VILLE ROAD	DIMASSA ANNETTE TR	GUARINO VINCENT J TR	636 CEDAR GROVE		ORANGE	CT	06477
4-53	21 LOBSTER VILLE ROAD	JARDIN RANDY S		PO BOX 4274		VINEYARD HAVEN	MA	02568
4-54	LOBSTER VILLE ROAD	AQUINNAH TOWN OF		955 STATE RD		AQUINNAH	MA	02535
4-55	2 BEECHWOOD WAY	BEECHWOOD PROPERTIES LLC		82 WENDELL AVE	SUITE 100	PITTSFIELD	MA	01201
4-59	LOBSTER VILLE ROAD	BADGER EDWINA	MARSHALL PATRICIA	PO BOX 2947		OAK BLUFFS	MA	02557

4-60	LOBSTER VILLE ROAD	PICKMAN JAMES	PICKMAN ELIZABETH R	118-21 QUEENS BLVD #316		FOREST HILLS	NY	11375
4-62.1	1 CLAY PIT PLACE	PICKMAN JAMES	PICKMAN ELIZABETH R	118-21 QUEENS BLVD #316		FOREST HILLS	NY	11375
4-63	LOBSTER VILLE ROAD	USA BIA TRUSTEE	WAMPANOAG TRIBE GAY HEAD (AQ)	20 BLACK BROOK RD		AQUINNAH	MA	02535
4-65	6 BEACH ROSE WAY	STANGE ERIC K & COSTA BARBARA M TRS	STANGE MARGIT K TR	26 WOODLAND ST		ARLINGTON	MA	02476
4-65.1	8 BEACH ROSE WAY	LETWIN BRUCE W TR	LETWIN MARY KING TR	52 LACONIA CIR		N ANDOVER	MA	01845
4-7	6 LOBSTER VILLE ROAD	SPITZ MARJORIE LOUISE		6 LOBSTERVILLE RD		AQUINNAH	MA	02535
4-8	9 LOBSTER VILLE ROAD	IWASKIEWICZ ROBERT	BESSETT MICHELE	165 BOOT HILL RD		EAST FAIRFIELD	CT	05448
4-95	18 RIDGE ROAD	SEIBEL MACHELLE M TR	SEIBEL SHARON G TR	170 OLD FARM ROAD		NEWTON	MA	02459
4-96	17 RIDGE ROAD	SEIBEL MACHELLE M TR	SEIBEL SHARON G TR	170 OLD FARM RD		NEWTON	MA	02459
4-98	22 RIDGE ROAD	WALLEN BARBARA ANN TR	PARABOCSHI GARY TR	22 RIDGE ROAD		AQUINNAH	MA	02535
4-98.1	24 RIDGE ROAD	HIGGINS MEGAN M & HIGGINS ADRIAN R TRS	THE MEGAN M HIGGINS 2023 TRUST	24 RIDGE ROAD		AQUINNAH	MA	02535
5-104	484 LIGHTHOUSE ROAD	DALY NANCY	CAVANAUGH KEVIN P	161 RAWSON RD		BROOKLINE	MA	02445
5-105	471 LIGHTHOUSE ROAD	COLTER RICHARD	COLTER DEBORAH	471 LIGHTHOUSE RD		AQUINNAH	MA	02535
5-107	494 LIGHTHOUSE ROAD	KOLM LUKAS R TR		PO BOX 688		NEW CASTLE	NH	03854

5-115	523 LIGHTHOUSE ROAD	MIREL ELIZABETH POST TR ETAL	POST ROBERT M TR ETAL	151 KENDAL DRIVE		OBERLIN	OH	44074
5-116	531 LIGHTHOUSE ROAD	KIRCHICK WILLIAM D TRUSTEE	C/O ARNOLD ZACK	170 WEST CANTON ST		BOSTON	MA	02118
5-122	LIGHTHOUSE ROAD	HALL BENJAMIN L TR	HALL BRIAN M TR	PO BOX 5039		EDGARTOWN	MA	02539
5-123	JEFFERS WAY	MOEL DONALD I TRUSTEE	DONALD I MOEL M.D. TRUST	540 WEST WEBSTER AVE	APT 613	CHICAGO	IL	60614
5-125	9 SKYE LANE	ZACK ARNOLD		170 WEST CANTON ST		BOSTON	MA	02118
5-127	7 SKYE LANE	BASSETT LEAH		7 SKYE LANE		AQUINNAH	MA	02535
5-128	4 SKYE LANE	BASSETT GORDON W JR		PO BOX 342		CHILMARK	NA	02535
5-129	LOBSTER VILLE ROAD	NOVAK SUSAN, PETER A & LISE	C/O MESPELLI	75 WINTER PARK RD		FRAMINGHAM	MA	01701
5-131	LOBSTER VILLE ROAD	LYNCH DAVID TR	LYNCH LAURA TR	1594 NORTH ORWELL RD		SHOREHAM	VT	05770
5-134	JEFFERS WAY	MARTHA'S VINEYARD LAND BANK		PO BOX 2057		EDGARTOWN	MA	02539
5-136	17 JEFFERS WAY	MOEL HARDYE S TRS	HARDYE S MOEL TRUST	540 W WEBSTER AVE	APT 613	CHICAGO	IL	60614
5-140	JEFFERS WAY	HARDING MARK TRS	MUNAH KUTAH REALTY TRUST	25 DEVON ST		MASHPEE	MA	02649
5-141.1	11 HARPOON HOLLOW	LITT ERIC ETRUSTEE	NORTH HOUSE REALTY TRUST	72 BEVERLY RD		CHESTNUT HILL	MA	02467
5-142	JEFFERS WAY	KELLY WILLIAM H JR ETAL	BROSCHEIT HANS T ETAL	PO BOX 1447		WEST TISBURY	MA	02575
5-214.1	1 HOWWASSWE WAY	SANFILLIPPO JAMES E	SANFILLIPPO JEDIDIAH R	8 RAYMOND'S HILL		AQUINNAH	MA	02535
5-214.2	10 HOWWASSWE WAY	MALONSON F RYAN	WASHINGTON BETTINA M	5A MAYSIES WAY		AQUINNAH	MA	02535

8-31	694 STATE ROAD	AQUINNAH TOWN OF		955 STATE RD		AQUINNAH	MA	02535
8-35	737 STATE ROAD	SOLBERG FREDERICK M JR TR	SOLBERG ELIZABETH T TR	850 W 52ND ST		KANSAS CITY	MO	64112
8-37	2R TAR BARREL ROAD	FELDBERG PENELOPE C TRUSTEE	THE PENELOPE C FELDBERG REV TR	62 DARWYN DR		WINDSOR	CT	06095-1601
8-38	2 TAR BARREL ROAD	FELDBERG PENELOPE C	FELDBERG ARIANA S	2 TAR BARRELL RD		AQUINNAH	MA	02568
8-41	1 TAR BARREL ROAD	MEDVEDOW JILL S TR	KAZIS RICHARD F TR	131 GARDNER RD		BROOKLIN E	MA	02445
9-152	720 STATE ROAD	VANDERHO OP PAULINE ETALS	C/O PAUL GALBRAITH	280 BOYLSTON ST #905		CHESTNUT HILL	MA	02467

10. Letter of Municipal Status

Appendix A

Martha's Vineyard Land Bank Commission

July 12, 1993

Commonwealth of Massachusetts
Department of Environmental Protection
Wetlands Division
21 Riverside Drive
Lakeville, Massachusetts 02347

attention: Ms. Patricia Kellogg

Dear Ms. Kellogg:

John Potter, our land superintendent, has asked me to forward to you information regarding the land bank's municipal status. I understand from him that the department of environmental protection needs this information for its files to confirm that land bank Notices of Intent (NOIs) qualify for exemption from application fees.

As a foreword, it is interesting to note that the land bank, as orginally presented to the voters in 1984, called for the organization to be independent of the island's towns, similar to the Metropolitan District Commission. This was soundly defeated and the proposed legislation was gutted and revised so as to make the land bank local rather than island-wide.

Each Vineyard town has a land bank board. These boards make all of the decisions --- which land to purchase, how much to spend to acquire it, how to manage it, whether to issue debt, how to budget expenses. The land bank commission lacks independent decision-making authority and was created to serve as a "communication umbrella," viz., to provide a forum for the various town land bank boards to resolve differences.

The management plans from which NOIs derive are the towns'. Each town land bank board develops its own management plans for the land bank properties in its town and composes these plans after a public hearing to receive comments from its citizens; the land bank commission's role is to implement these plans according to the dictates of the town. As a result, our applications for NOIs are made in the names of the towns.

In order to clarify the status of the land bank commission, we turned to the commonwealth for a ruling; the pertinent pages of this ruling (from the commonwealth ethics commission) are enclosed but I have excerpted the essentials Here:

P.O. Box 2057 • Edgartown, Massachusetts 02539 • 508 627-7141

Ms. Patricia Kellogg
July 12, 1993
Page 2

> "... [W]e reaffirm our conclusion that the land bank commission is a municipal agency ... . The land bank commission is an instrumentality of each of the member municipalities ... . [a]s an instrumentality of each member municipality, the land bank commission is analogous to any local board in the municipality ... ."

Land bank applications have a long history of being exempt from NOI fees. Your records will show several examples; I draw your attention to nos. SE 20-320 (Katama Point preserve) and SE 12-187 (Waskosim's Rock reservation) where no fee was due the commonwealth.

If any other information relative to application fee exemptions would be useful, please do not hesitate to contact me.

Yours very truly,

James Lengyel
Executive Director

DISCUSSION:

The Land Bank Commission As A "Municipal Agency"

In November, 1990 the Commission issued *EC-COI-90-2*, which concluded that the Land Bank Commission is an independent municipal entity for purposes of G.L. c. 268A. Since that time, the Massachusetts Appeals Court affirmed a Commission decision that members of a regional school committee are municipal employees under G.L. c. 268A. In doing so the Court concluded that a regional school district is an instrumentality of each municipal member under G.L. c. 268A, §1(f). *McMann v. State Ethics Commission*, 32 Mass. App. Ct. 421, 428 (1992). In reaching this conclusion the Court considered the ordinary and approved use of the word "instrumentality" in the statute; the formation, operation and purpose of a regional school district; and the purpose of G.L. c. 268A. *Id.* at 425-428. The Court found that the municipalities use the school district as a means to fulfill their statutory obligation to provide education and that the municipalities played a substantial role in the creation of the district and the district's financial matters. *Id.* at 427.

This Commission has expressly followed the Appeals Court's reasoning in considering whether a regional entity is a municipal agency within the meaning of G.L. c. 268A, §1(f). *EC-COI-92-26; 92-27.* The Commission no longer considers regional municipal entities to be "independent" municipal entities.[2/] *See EC-COI-92-26; 92-27; 92-15.* Rather, the Commission will consider whether such entities are instrumentalities of each municipal member based on the ordinary and approved usage of the statutory language, the purpose of G.L. c. 268A and the form, operation and purpose of the regional entity.

Based on this precedent, we reaffirm our conclusion that the Land Bank Commission is a municipal agency within the meaning of G.L. c. 268A, §1(f) but we no longer will consider the Land Bank Commission to be an "independent municipality entity." The Land Bank Commission is an instrumentality of each of the member municipalities. We conclude that the member municipalities play a significant role in the substantive work of the Land Bank Commission and control (through approval) the Land Bank's budget. The Land Bank Commission serves the traditional role of the municipality in preserving and conserving land, particularly for purposes of future water

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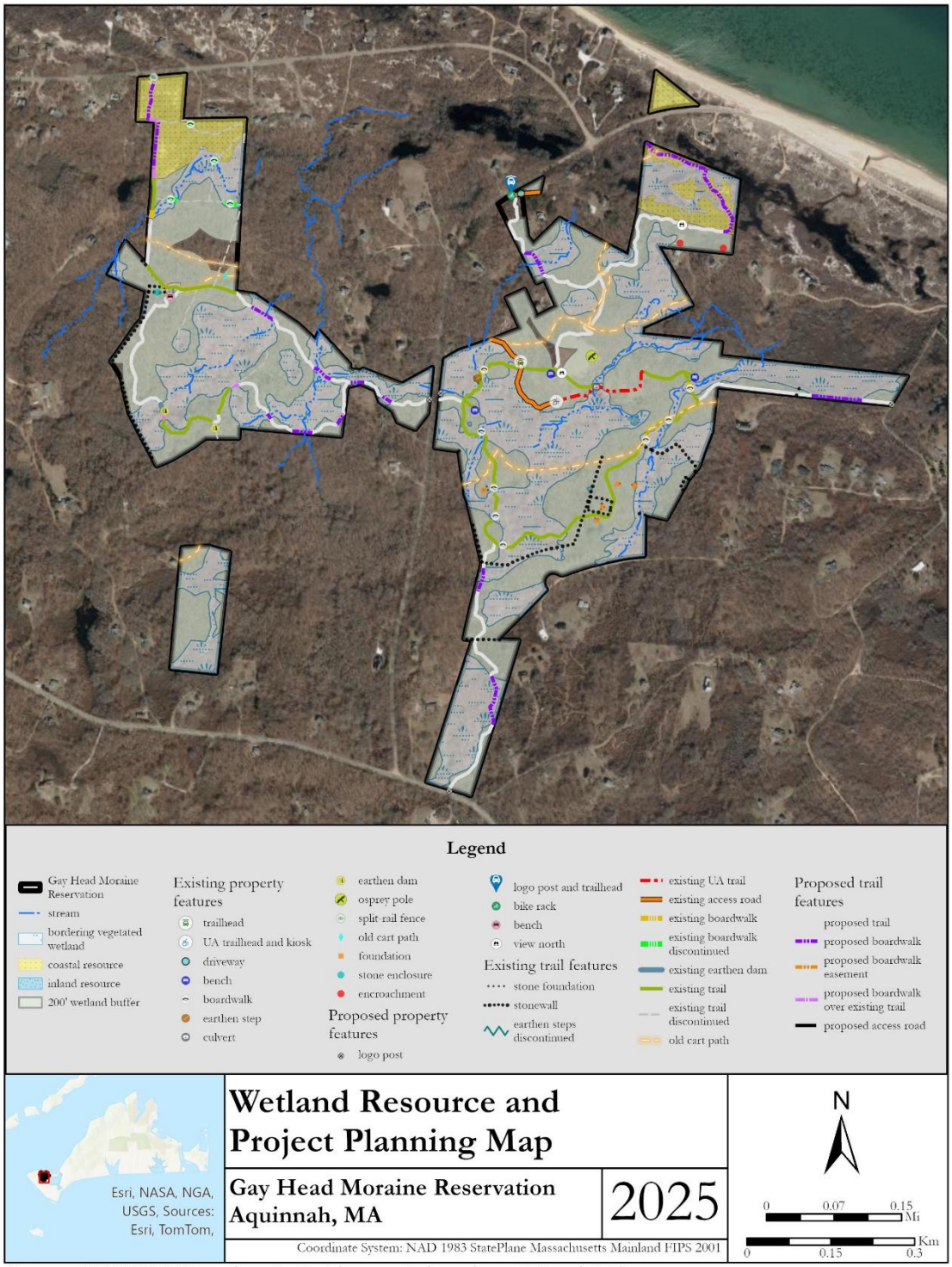
[2/] *See McMann, supra.*, at 428, n. 5 (questioning the statutory basis for municipal entities as "independent" municipal entities). Also, note that the definition of "state agency" includes "any independent state authority, district, commission, instrumentality or agency..." (emphasis added), whereas the definition of municipal agency does not include the word "independent". G.L. c. 268A, §1(f) and (p).

supply protection and recreational use. By joining together as members of the Land Bank, the municipalities recognize the mutual land interests they share in protecting the coastline and preserving open space. Thus, as an instrumentality of each member municipality, the Land Bank Commission is analogous to any local board in the municipality. Further, for the reasons stated in *EC-COI-90-2* we reaffirm our conclusion that the Land Bank Commission shares more attributes with the municipal level of government than with other levels of government.

Table 25: Wetland resource area and riverfront impacts from proposed management activities at Gay Head Moraine Reservation, Aquinnah MA

Activity	Length (ft)	Area Impact (ft^2)
Proposed trails in riverfront	3,901	11,703
Proposed boardwalk footers	3,070	564
Proposed management for listed species in riverfront		141,054
Proposed management for listed species in resource area		27,653
Boardwalk replacement	63	188
Existing trails discontinued in both resource area and riverfront	-1,009	-3,027
Existing trails discontinued in resource area	-348	-1,035
Existing trails discontinued in riverfront	-1,375	-4,125
Existing boardwalk discontinued in resource area and riverfront	-163	-644
Existing boardwalk discontinued in resource area	-17	-51

Map 41: Wetland resource areas and 200' buffer area with proposed project features at Gay Head Moraine Reservation, Aquinnah, MA



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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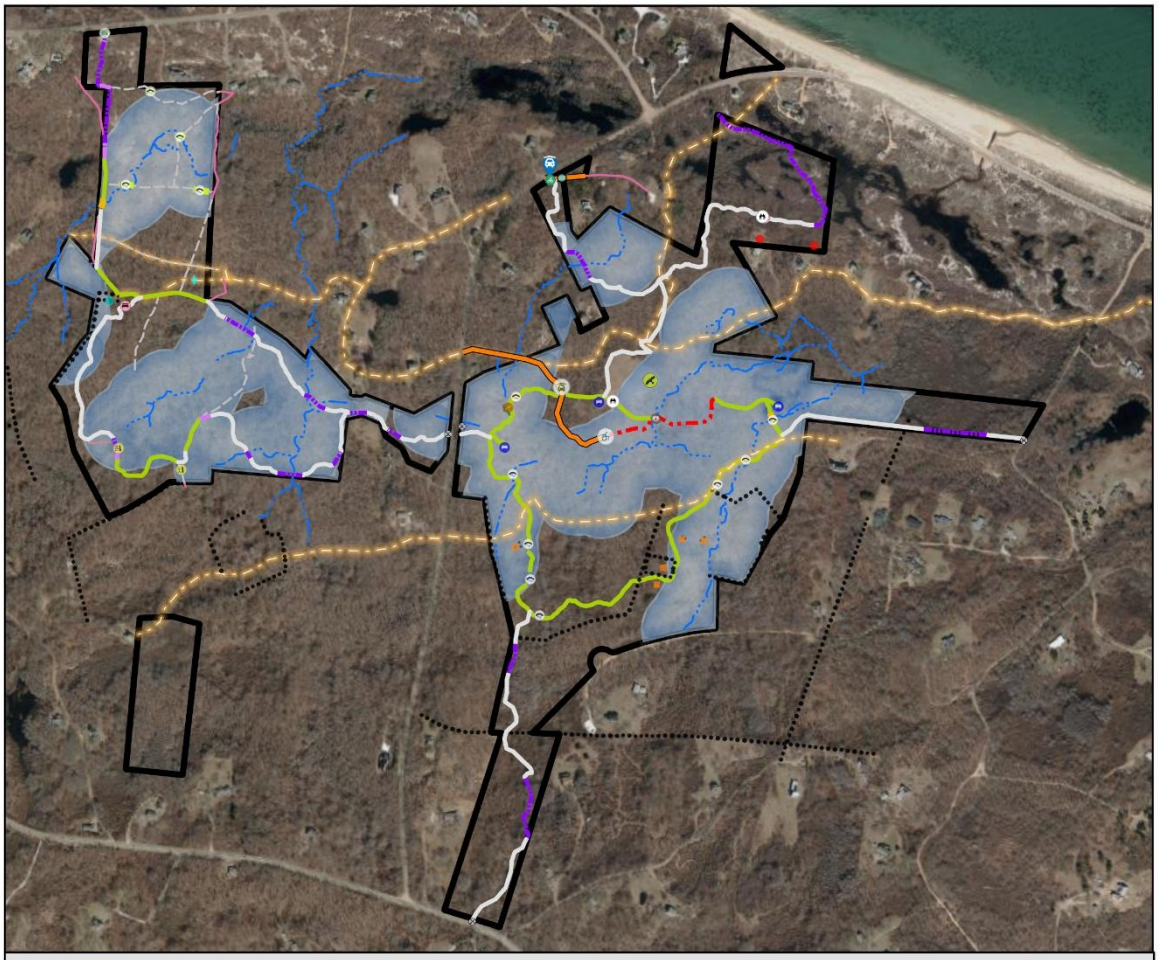
Map 42: 200' riverfront area and proposed project features for Gay Head Moraine Reservation, Aquinnah, MA



Legend

- Gay Head Moraine Reservation
- stream
- 200' riverfront

Existing property features

- trailhead
- UA trailhead and kiosk
- driveway
- bench
- boardwalk
- earthen step
- culvert
- earthen dam
- osprey pole
- split-rail fence
- old cart path
- foundation
- stone enclosure
- encroachment

Proposed property features

- logo post
- logo post and trailhead
- bike rack
- bench
- view north

Existing trail features GHM only

- stone foundation
- stonewall
- existing earthen dam
- existing access road
- existing UA trail
- existing boardwalk
- existing boardwalk discontinued
- existing trail
- off-premises trail
- earthen steps discontinued
- existing trail discontinued
- old cart path
- Gay Head Moraine,1,boardwalk over existing trail

Riverfront and Project Planning Map

Gay Head Moraine Reservation Aquinnah, MA 2025

Coordinate System: NAD 1983 StatePlane Massachusetts Mainland FIPS 2001

N

0 0.07 0.15 Mi

0 0.13 0.25 Km

Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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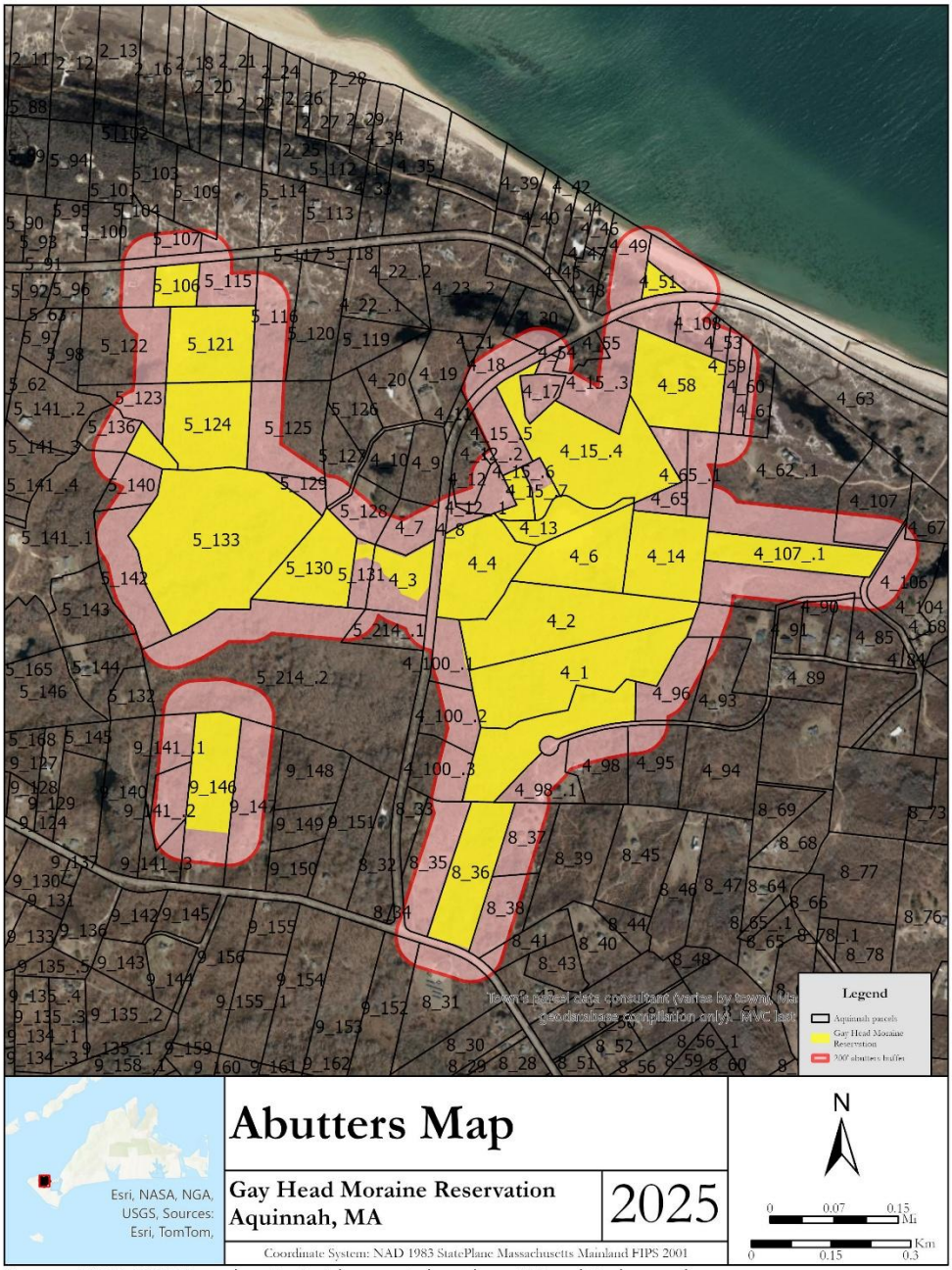
Appendix I. Abutters

Map 43: Abutters within a 200’ boundary of Gay Head Moraine Reservation and any easement.



Sources: USGS 2019 Massachusetts Aerial; property boundary: MV Land Bank; parcels: MVC. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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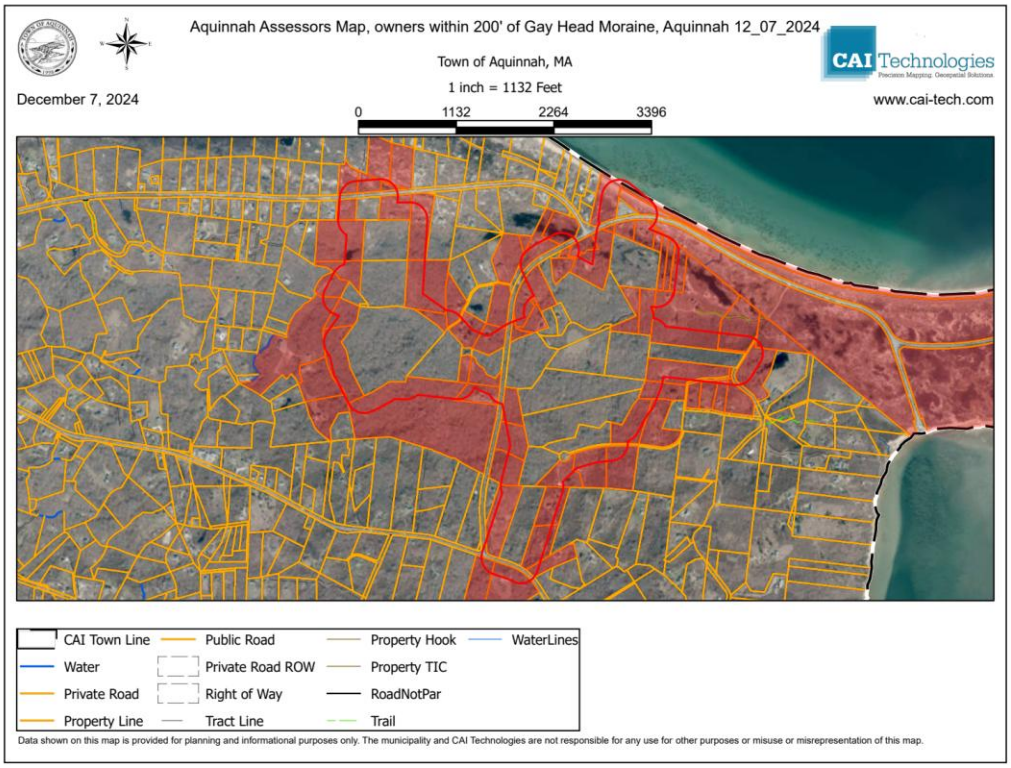

Figure 69: AxisGIS Aquinnah assessors map (2024)

Table 26: List of Abutters that are within 200 ft of the Gay Head Moraine Reservation boundary.

Parcel/ GIS/ Cama Number	property Address	Owner Name	Co-owner Name	Owner Address	Owner City	Owner State	Owner Zip
3-1.1	West Basin Road	USA BIA Trustee	Wampanoag Tribe Gay Head (AQ)	20 Black Brook Rd	Aquinnah	MA	02535
4-100.1	Lobsterville Road	Malonson F Ryan	Washington Bettina M	5A Maysies Way	Aquinnah	MA	02535
4-100.2	Lobsterville Road	Malonson F Ryan	Washington Bettina M	5A Maysies Way	Aquinnah	MA	02535
4-100.3	Lobsterville Road	Malonson F Ryan	Washington Bettina M	5A Maysies Way	Aquinnah	MA	02535
4-101	9 Ridge Road	Slate Ronald M	Slate Nancy Gilson	PO Box 179	Chilmark	MA	02535
4-102	5 Clay Pit Road	Burlage Matthew J	N/A	Apartment 3A Borrett Mansions 41A Stubbs Rd Apt 2, 17F, Tower E	Wan Chai Hong Kong	CH	00000

4-106	4 Clay Pit Road	Born John R	Born Kathleen L	3 Walnut Ave	Cambridge	MA	02140
4-107	Clay Pit Road	Schwartz Teresa P Tr	Clayview property Trust, C/O Pickman	118-21 Queens Blvd #316	Forest Hills	NY	11375
4-108	17 Lobsterville Road	Olsen Peter C	Hamilton-Olsen April A	4 Sherwood Lane	Bedford Hills	NY	10507
4-12	13 Lobsterville Road	Gadd Laurence	Elkin Cecelia	118 North Egremont Rd	GT Garrington	MA	01230
4-12.1	Lobsterville Road	Island Housing Trust Corporation	Crowell Oliver & Meliawati	PO Box 432	Chilmark	MA	02535
4-15.3	4 Beechwood Way	Kane Farmhouse LLC	N/A	130 Minuteman Rd	Ridgefield	CT	06877
4-15.5	11 Lobsterville Road	Hopkins Charles	N/A	1 Mac Clarey Way	Worcester	MA	01602
4-15.7	4 Beach Rose Way	Swolinzky Wendy	N/A	PO Box 634	Chilmark	MA	02535
4-17	1 Beechwood Way	Starr Margaret	Starr William III	309 Park Place	Brooklyn	NY	11238
4-18	12 Lobsterville Road	Nuovo Riche LLC	Tawnya Menesale	889 West Main St Unit #U-2	Centerville	MA	02632
4-19	1 Skye Lane	Friedman Mark J	Friedman Joyce	72 Overlook Rd	Upper Montclair	NJ	07043
4-21	Lobsterville Road	Town of Aquinnah	N/A	955 State Road	Aquinnah	MA	02535
4-30	665 Lighthouse Road	Town of Aquinnah	N/A	955 State Road	Aquinnah	MA	02535
4-49	670 Lighthouse Road	Murphy Thomas D Jr Tr	Travis B & Lucas N Batzer Trs Etal	755 West End Ave Apt 15B	New York	NY	10025
4-50	15 Lobsterville Road	Dimassa Annette Tr	Guarino Vincent J Tr	636 Cedar Grove	Orange	CT	06477
4-52	15 Lobsterville Road	Dimassa Annette Tr	Guarino Vincent J Tr	636 Cedar Grove	Orange	CT	06477
4-53	21 Lobsterville Road	Jardin Randy S	N/A	PO Box 4274	Vineyard Haven	MA	02568

4-55	2 Beechwood Way	Beechwood Properties LLC	N/A	82 Wendell Ave Suite 100	Pittsfield	MA	01201
4-59	Lobsterville Road	Badger Edwina	Marshall Patricia	PO Box 2947	Oak Bluffs	MA	02557
4-60	Lobsterville Road	Pickman James	Pickman Elizabeth R	118-21 Queens Blvd #316	Forest Hills	NY	11375
4-61	23 Lobsterville Road	Fowler Judith Middleton C Trs	Middleton C Tr Clements P O	1A Veterans Memorial Dr	Peabody	MA	01960
4-62.1	1 Clay Pit Road	Pickman James	Pickman Elizabeth R	118-21 Queens Blvd #316	Forest Hills	NY	11375
4-63	Lobsterville Road	USA BIA Trustee	Wampanoag Tribe Gay Head (AQ)	20 Black Brook Rd	Aquinnah	MA	02535
4-65	6 Beach Rose Way	Stange Eric K & Costa Barbara M Trs	Stange Margit K Tr	26 Woodland St	Arlington	MA	02476
4-65.1	8 Beach Road Way	Letwin Bruce W Tr	Letwin Mary King Tr	52 Laconia Cir	N Andover	MA	01845
4-67	2 Clay Pit Road	Goldberg Victor M Est of Tr Etal	Goldberg Harriet J Tr Etal	PO Box 578	Gate Mills	OH	44040
4-7	6 Lobsterville Road	Spitz Marjorie Louise	N/A	6 Lobsterville Rd	Aquinnah	MA	02535
4-8	9 Lobsterville Road	Iwaskiewicz Robert	Bessett Michele	165 Boot Hill Rd	East Fairfield	CT	05448
4-85	1 Ridge Road	Lefeber Anthony & Patricia Ann Trs	The Anthony Lefeber 2022 Trs & Patricia	PO Box 127	Chilmark	MA	02535
4-87	3 Ridge Road	Aquinnah Bluffs LLC	Marc Meyer	16 Chilton St #2	Cambridge	MA	02138
4-90	5 Ridge Road	Posner Jon E Trs	Jon E Posner 2023 Living Trust	69 Fancher Rd	Pound Ridge	NY	10576
4-91	7 Ridge Road	Hecht Thomas	Korrick Susan	40 Westminster Rd	Newton Centre	MA	02549

4-93	15 Ridge Road	Seibel Machelle M Tr	Seibel Sharon Elaine	170 Old Farm Road	Newton	MA	02459
4-95	18 Ridge Road	Seibel Machelle M Tr	Seibel Sharon G Tr	170 Old Farm Road	Newton	MA	02459
4-96	17 Ridge Road	Seibel Machelle M Tr	Seibel Sharon G Tr	170 Old Farm Road	Newton	MA	02459
4-98	22 Ridge Road	Wallen Barbara Ann Tr	Parabocshi Gary Tr	22 Ridge Road	Aquinnah	MA	02535
4-98.1	24 Ridge Road	Higgins Megan M & Higgins Adrian R Trs	The Megan M Higgins 2023 Trust	24 Ridge Road	Aquinnah	MA	02535
5-104	484 Lighthouse Road	Daly Nancy	Cavanaugh Kevin P	161 Rawson Rd	Brookline	MA	02445
5-105	471 Lighthouse Road	Colter Richard	Colter Deborah	471 Lighthouse Rd	Aquinnah	MA	02535
5-107	494 Lighthouse Road	Kolm Lukas R Tr	N/A	PO Box 688	New Castle	NH	03854
5-108	518 Lighthouse Road	Leibovich Joan B Trustee	The Lighthouse Rd Nominee Trust	221 Mt Auburn St Unit 101	Cambridge	MA	02138
5-109	496 Lighthouse Road	Wampanoag Tribe of Gay Head (Aquinnah)	Leibovich Joan B Tr	20 Black Brook Road	Aquinnah	MA	02535
5-110	518 Lighthouse Road	Leibovich Joan B Trustee	The Lighthouse Rd Nominee Trust	221 Mt Auburn St Unit 101	Cambridge	MA	02138
5-115	523 Lighthouse Road	Mirel Elizabeth Post Tr Etal	Post Robert M Tr Etal	151 Kendal Drive	Oberlin	OH	44074
5-116	531 Lighthouse Road	Kirchick William D Trustee	Arnold Zack	170 West Canton St	Boston	MA	02118

5-122	Lighthouse Road	Hall Benjamin L Tr	Hall Brian M Tr	PO Box 5039	Edgartown	MA	02539
5-123	Jeffers Way	Moel Donald I Trustee	Donald I Moel M.D. Trust	540 West Webster Ave Apt 613	Chicago	IL	60614
5-125	9 Skye Lane	Zack Arnold	N/A	170 West Canton	Boston	MA	02118
5-127	7 Skye Lane	Bassett Leah	N/A	7 Skye Lane	Aquinnah	MA	02535
5-128	4 Skye Lane	Bassett Gordon W Jr	N/A	PO Box 342	Chilmark	MA	02535
5-129	Lobsterville Road	Novak Susan, Peter, & Lise	Mespelli	75 Winter Park Rd	Framingham	MA	01701
5-136	17 Jeffers Way	Moel Hardye S Trs	Hardye S Moel Trust	540 W Webster Ave Apt 613	Chicago	IL	60614
5-140	Jeffers Way	Harding Mark Trs	Munah Kutah Realty Trust	25 Devon St	Mashpee	MA	02649
5-141.1	11 Harpoon Hollow	Litt Eric E Trustee	North House Realty Trust	72 Beverly Rd	Chestnut Hill	MA	02467
5-142	Jeffers Way	Kelly William H Jr Etal	Broscheit Hans T Etal	PO Box 1447	West Tisbury	MA	02575
5-143	10 Harpoon Hollow	Litt Marc O Trustee	Barn Realty Trust	310 West 94 St Apt 6A	New York	NY	10025
5-144	7 Harpoon Hollow	Litt Mortimer Tr	Litt Charlotte Tr	420 Newton St	Brookline	MA	02467
5-214.1	1 Howwasswe Way	Sanfillippo James E	Sanfillippo Jedidiah R	8 Raymond's Hill	Aquinnah	MA	02535
5-214.2	10 Howwasswe Way	Malonson F Ryan	Washington Bettina M	5A Maysies Way	Aquinnah	MA	02535
8-31	694 State Road	Town of Aquinnah	N/A	955 State Road	Aquinnah	MA	02535
8-35	737 State Road	Solberg Frederick M Jr Tr	Solberg Elizabeth T Tr	850 W 52nd Street	Kansas City	MO	64112
8-37	2R Tar Barrel Road	Feldberg Penelope C Trustee	The Penelope C Feldberg Rev Tr	62 Darwyn Dr	Windsor	CT	06095-1601
8-38	2 Tar Barrel Road	Feldberg Penelope C	Feldberg Ariana S	2 Tar Barrel Rd	Aquinnah	MA	02568

8-41	1 Tar Barrel Road	Medvedow Jill S Tr	Kazis Richard F Tr	131 Gardner Rd	Brookline	MA	02445
9-141.1	3 Harpoon Hollow	Weiss Martin T	Weiss Susan A	168 West Quasset Rd	Woodstock	CT	02681
9-141.2	1 Harpoon Hollow	Freedman Jonathan P	Freedman L Doris	16 David Dr	N Salem	NY	10560
9-141.3	22 Harpoon Hollow	Corjulo Kathryn	N/A	22 Harpoon Hollow	Aquinnah	MA	02535
9-147	771 State Road	Hart Edward & Kathleen	Hart Siobahn & Shaw Theodore	39 Oak Street	Saratoga Springs	NY	12866
9-152	720 State Road	Vanderhoop Pauline Etals	Paul Galbraith	280 Boylston Street #905	Chestnut Hill	MA	02467

Appendix J. Universal Access

The Recreational Opportunities Spectrum (ROS) classification for Gay Head Moraine Reservation is "Semi-Primitive Non-motorized". The ROS is a model designed and used by the U.S.D.A. Forest Service to categorize conservation areas or universal access planning. The land bank framework for describing the accessibility of its properties is applied to the property as follows.

Table 27: Universal access opportunities at Gay Head Moraine Reservation, Aquinnah, MA

property Name	Gay Head Moraine Reservation
Size (acres)	
Primary activities	Hiking, bird watching, bicycling, boating
Primary elements	Information kiosk, trailhead, views of Vineyard Sound
Primary spaces	cultural features, pond
Obstacles that limit accessibility	Archaeological sensitive areas, topography, soil, distance
Existing and potential alternatives	Lobsterville Beach
Proposed ROS classification	Semi-primitive, non-motorized
Proposed expectation of accessibility	638' to trail from UA vehicle space to bench in moderately open canopy woodland

For all less-developed land bank trails, the Universal Access Plan states the following (Potter 1997):

> *Use outdoor recreation access routes to link primary elements and primary spaces within one-quarter mile of a trailhead or drop-off and use accessible recreation trails to connect other primary elements and primary spaces on all less-developed land bank conservation areas, but only if modifications are minimal, will provide continuous barrier-free access, do not require a fundamental alteration of the setting, and are not in conflict with natural and scenic resource protection goals.*

Universal access exists for Gay Head Moraine Reservation from the trailhead at Gay Head Moraine Reservation to a bench in the moderately open canopy woodland. Additional universal access is not feasible due to distance from trailhead; topography; and wetlands.