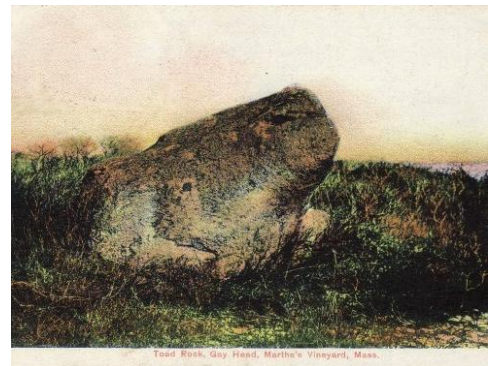


Toad Rock Reservation

Aquinnah, Massachusetts
Draft Management Plan



2026



1909

6/16/2026



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

Executive Summary

Toad Rock Reservation is a 101-acre conservation area consisting of coastal woodland, red maple/black gum (beetlbung) swamp, shrub swamp, interdunal marsh/swale, maritime dune, maritime shrubland, and sandplain healthland. The property is located between State Road and Moshup Trail and is bisected by Old South Road and the stonewall differentiating the Wampanoag Middle place from South Pasture. Much of the property is located south of Old South Road, the once vibrant heart of the Gay Head (Aquinnah) town. The great stone entrance steps, cellar foundations, and stonewalls of once prominent homesteads belonging to the Wamsley and Howwaswee families of Gay Head are partially hidden from view by the untamed undulating woodland. Roads leading from Old South Road to the ‘Lower Town’ and the sea are mere depressions on the property, disconnected from the other by dense thickets and swamps. (Burgess 1970).

The property is named for the large batrachian glacial erratic situated on the southeast portion of the property. The rock is said to have been a pet toad of Moshup’s that turned to stone when he departed from Aquinnah. Historically, the rock was a tribal meeting place as well as a makeshift post office for members to pass notes back and forth.

Vegetation and wildlife inventories on the property revealed one commonwealth-listed plant species, one listed avian species, six listed moth species, and five listed mammal species. The woodlands, dune and heathland meet primary habitat needs of these rare species.

This management plan proposes to create approximately 15,129 linear feet of new trail, including 3,118 feet of raised boardwalk and 80 feet of stairs, that connects State Road and Gay Head Moraine Reservation to the north with the existing trail system on Toad Rock Reservation and trailhead off Moshup Trail and Squibnocket Pond Reservation to the south. The plan proposes to install a 3-vehicle trailhead off Old South Road. The land bank will work closely with the Wampanoag Tribe to protect and highlight the cultural features of the property through vegetation clearing, use of split rail fences, educational signs and trail siting that deters vandalism and looting while enriching the historical and cultural significant experience of the property. In addition, the plan proposes to allow general hunting of deer, pheasant, and turkey for the entirety of the property, address invasive species; prohibit motorized vehicles, bicycles and horses; prohibit dogs between April and September (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-

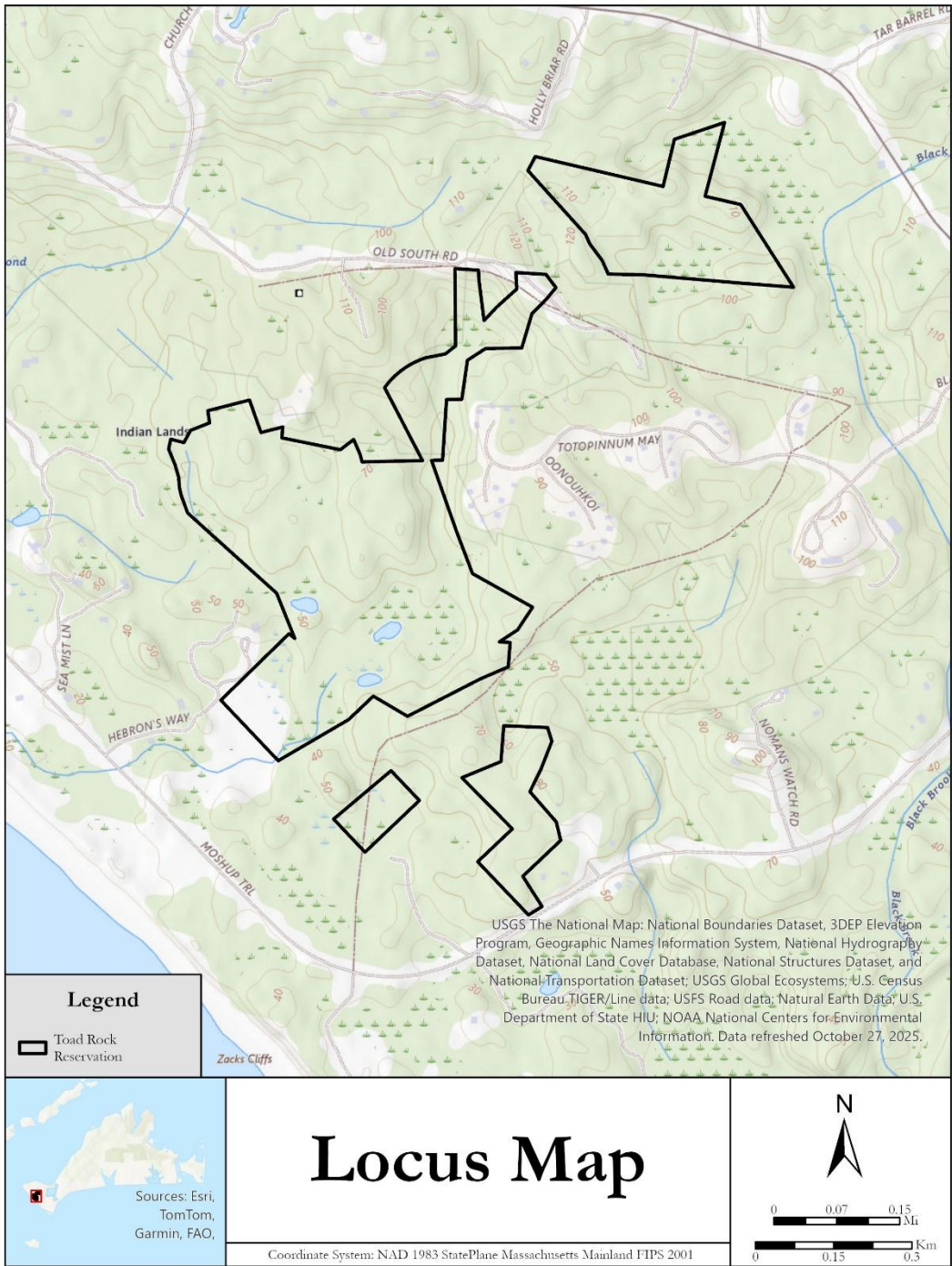
NHESP) for activity proposed in estimated and priority habitat for rare species and activities proposed in and around wetland resource areas.

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.

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

Map 1: Locus map for Toad Rock Reservation, Aquinnah, MA



Sources: USGS National Map; 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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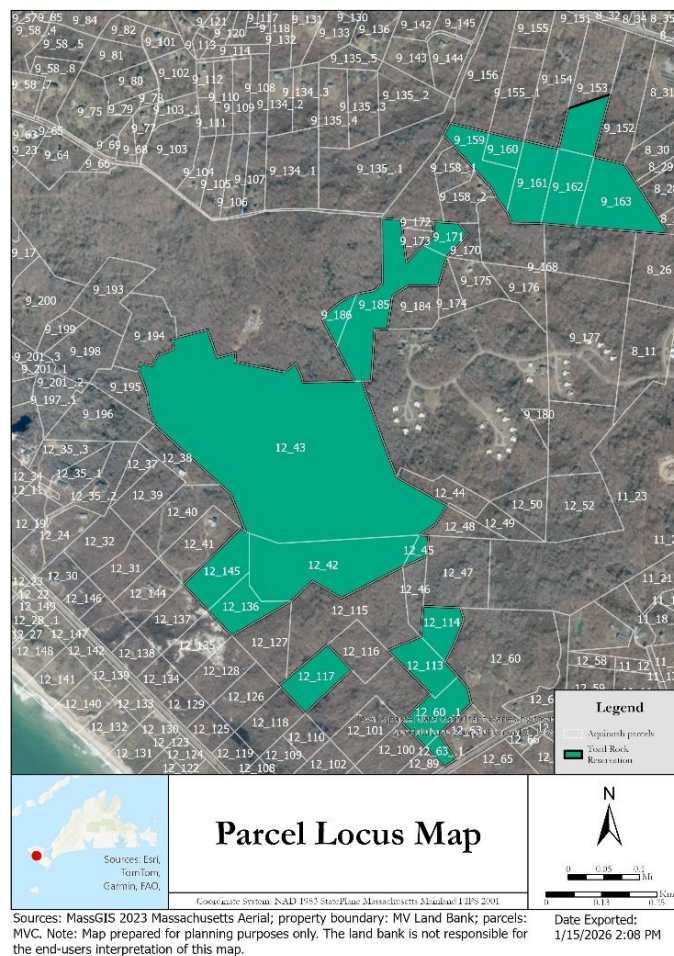
I. Natural Resource Inventory

A. Physical Characteristics

1. Locus

The Toad Rock Reservation is located at roughly 41° 19' 58" N, 70° 48' 36" W in Aquinnah, Massachusetts as depicted in the locus map, page 12 . The property comprises four separate parcels amounting to 101 acres of woodland, shrubland, dune, and heathland that are connected through trail easements or are isolated at this time (Map 3, page 13). The property is accessible via trail easements from State Road and Old South Road and Moshup Trail through an existing trailhead. The extent of Toad Rock Reservation is shown on Aquinnah tax maps 9 and 12 as parcels 153, 159, 160, 161, 162, 162.1, 163, 171, 185, 186 on map 9 and parcels 42, 43, 45, 60.1, 63.1, 113, 114, 117, 136, 145 on map 12 (Appendix A. Map 24, page 70).

Map 2: Parcel locus map of Toad Rock Reservation in Aquinnah, MA



Map 3: Aerial photograph of Toad Rock Reservation in Aquinnah



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 Appendices A and B (pages 74 and 76, respectively).

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 (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).

Toad Rock Reservation constitutes a thick deposit of boulders and stone in a sand, silt, clay matrix from the last significant glacial period, Wisconsin Glaciation, that occurred approximately 25,000 years ago. These deposits formed a rolling, hilly landform called a terminal moraine (Fletcher and Roffinoli 1986; Figure 1, page 14).

Figure 1: Generalized Geologic Map of Martha's Vineyard (SCS 1986)

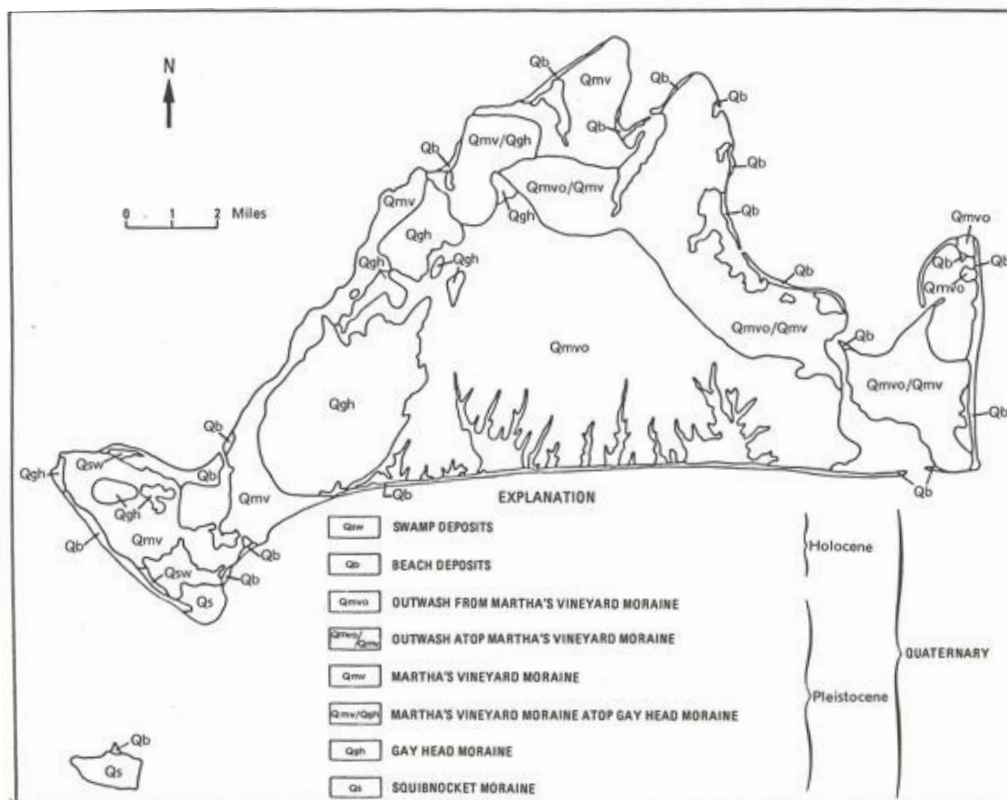


Figure 2.—Generalized geologic map of Martha's Vineyard.

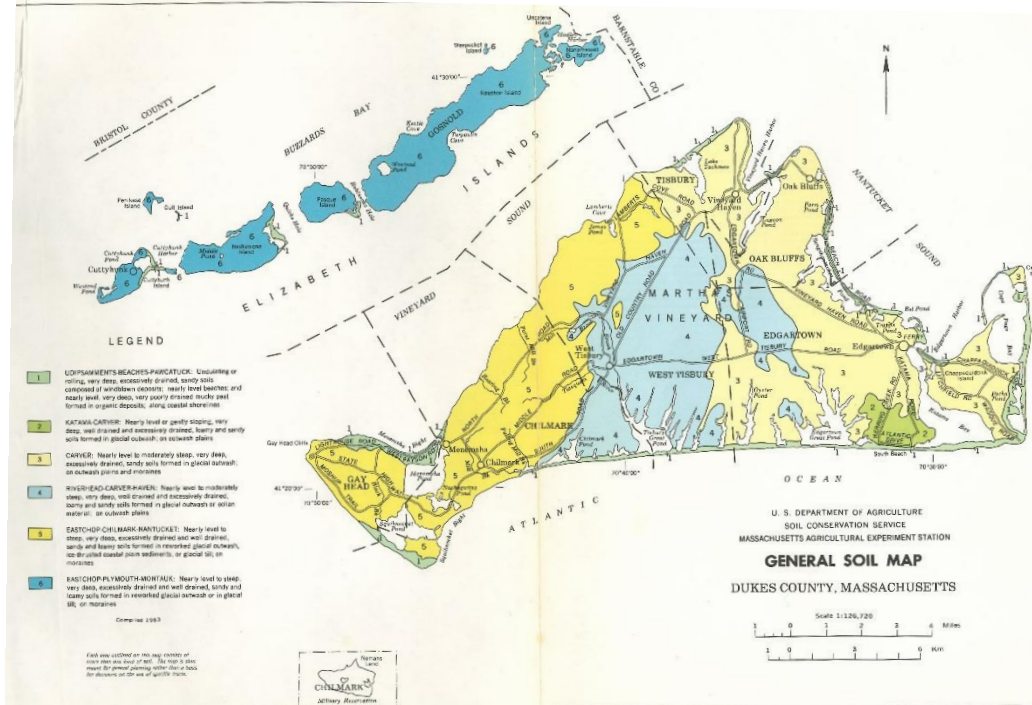
4. Soils

The General Soils Map (Appendix C, **Error! Reference source not found.**, page **Error! Bookmark not defined.**) depicts general classes of soils across Martha's Vineyard. The property sits within the Eastchop-Chilmark-Nantucket complex that is characterized by steep, deep and drained "sandy and loamy soils formed in reworked glacial outwash, ice-thrusted coastal plain sediments, or glacial till: on moraines" (Fletcher and Roffinoli 1986).

The Eastchop soils typically dominate the complex at 57%. However, Nantucket soils are most pronounced on Toad Rock Reservation and dominate woodland areas. A combination of Freetown

and Swansea muck occurring in wetland depressions and Berryland loamy sand occurring in maritime dune environs promotes diverse ecological communities on the Reservation. 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 31, page 82).

Figure 2: General Soil Map of Martha's Vineyard



5. Topography

Toad Rock Reservation is situated in the rolling hills of the Martha's Vineyard moraine. The Property is gently declining from a maximum elevation of 126 feet in the northern portion of Toad Rock Reservation to 26 feet near the shore. Small hills are interspersed throughout the property resulting in large wetland depressions that drain through the maritime dune creating interdunal swale marshes.

A detailed map of the topography of the property with 2-foot contours is located in Appendix A (Map 25, page 70).

Map 4: USGS topographic map of Toad Rock Reservation, Aquinnah, MA



6. Hydrology

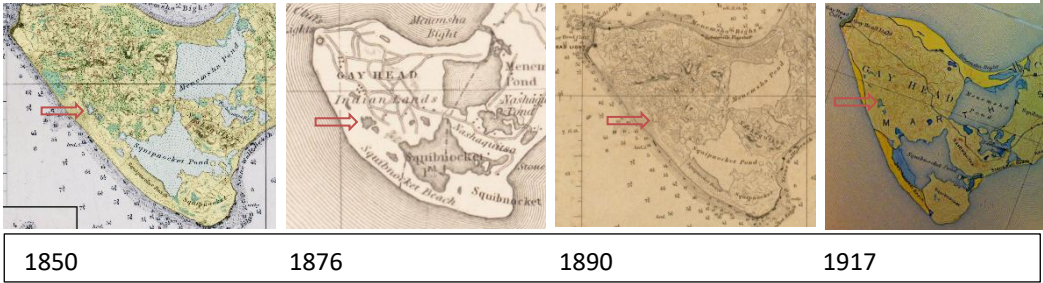
Toad Rock Reservation straddles the Aquinnah Coastal Watershed (2,187 acres) and the Squibnocket Pond Watershed (1,719 acres) with the northern parcel sitting in the Black Brook Sub Watershed (175 acres) (Map 26. Page 71). Watersheds define the area of land that contributes water to a waterbody. A watershed also defines the area from which pollutants enter the body of water in question (MVC 2023). The Aquinnah Coastal Watershed comprises the area of land that contributes water into the Vineyard and Rhode Island Sounds while the other watersheds and sub watersheds of the Reservation contribute water into ponds and streams. A watershed’s ecological community composition and development impact are directly related the health of the associated waterbody. Approximately 30% of the Squibnocket Pond Watershed comprises conserved land while only 18% of the Black Brook Sub Watershed is protected conservation land (MVC 2023).

The property does not border directly on a waterbody. However, two small ponds surrounded by dense vegetation occurs on the property along with several meandering, low-volume, sandy-bottom streams with moderate sized stones. During the 19th and early 20th century the interdunal swale area was depicted as a pond on historic Whiting (1850), Walling (1876), US Coast Guard (1890) and Wigglesworth (1917) maps (Norman B. Leventhal Map Center at Boston Public Library and Harvardforest.fas.harvard.edu).

Figure 3. Hebron 's Pond



Figure 4: 19th and early 20th century maps showing the interdunal swale as a pond



There are 41 acres of wetland resource area and 52 acres of protected buffer on the property, including 42 acres of riverfront, all protected through the Aquinnah wetlands protection bylaw and commonwealth wetlands protection act (Map 11, page 36 and Appendix A: Map 18, page 46).

Although wetlands are prominent on the property, sea-level rise is not an impacting factor to consider due to the property’s elevation and distance from shore. Toad Rock Reservation is located well outside the 10-foot LiDAR sea-level rise projection (Map 19, page 47, Appendix A: Map 28, page 72) and is in an area of minimal flood hazard (FEMA Flood Zones) (Map 20, page 47 and Appendix A: Map 27, page 71).

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 flow) 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).

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. The increased water yield in streams would have led to pond formation in the interdunal swale area. 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). The revegetation of cleared areas on the property around wetland habitats and evolution of a diverse structural ecosystem has helped restore and protect the hydrological patterns of the property's wetland ecosystem.

There are 7,552 linear feet of perennial and intermittent streams that flow through the property. The undulating topography of the property carved by glacial meltwater provides paths for precipitation received in higher elevations to run into lower elevation valleys, nourishing streams or vegetated wetlands. However, runoff from precipitation is secondary to groundwater as a source of water for stream flow. Perennial streams are typically located below ground water-level and rely on groundwater discharge year-round regardless of precipitation inputs. Comparatively, intermittent streams rely on groundwater and precipitation inputs and occur in areas where the water table drops below the stream bed at times throughout the year. During times of low precipitation and decreased groundwater input, stream leakage occurs resulting in a dry channel in portions or all of the stream. Toad Rock Reservation has nearly 5,000 feet of perennial streams and nearly 3,000 feet of intermittent streams.

Stream crossings created for access that are undersized can 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). There are no hydrologic impediments such as earthen dams and bridges on the property. Proposed stream crossings must be designed to account for increased flow and have adequate height and length so as not to be an impediment.

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 maritime 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). Maritime 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 maritime dune to the shrub-and tree-rich maritime dune community (Hesp 1991).

In comparison, interdunal swales are nutrient limited in response to excess water that results in anoxic conditions and subsequent decrease in decay rate (Conn and Day 1997). Swales are formed in dunes where blowouts create a depression below groundwater levels or in cases of seaward expansion of the dune. Soils are typically sandy or sandy with a peat component. As groundwater fluctuates, swales are either inundated or dry resulting in low species diversity (New York Natural Heritage Program 2026). During periods of inundation some nutrients, such as nitrogen, that are crucial to decomposition are lost through leaching and dilution (Jones and Etherington 1971). However, swales such as the one on the property that has fluctuating water levels alternating from dry to inundated may demonstrate a greater decomposition rate compared to dry or submerged areas according to Poi de Neiff et al. (2006).

Threats to primary productivity in wetland systems such as the swamp and swale on the property involve alterations of the natural hydrology and introduction of invasive species. Changes in

groundwater levels due to excessive withdrawals impacts species composition and nutrient availability for above and below ground decay (New York Natural Heritage Program 2026). 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).

iii. Climatic Process

Terrestrial and hydrologic climatic processes are impacting the resilience of habitats at Toad Rock 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 that is impacting portions of the property. 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 plants ranges as is the case with *Miscanthus sinensis*, Japanese silver grass. This is a clump grass that prefers sun but can tolerate the partial shade of a woodland understory. Seed dispersal is wind driven and dependent on the large quantities of seed present in the inflorescence.

Climate change and sea-level rise impact all coastal communities (Kulp and Strauss 2019). However, impending sea-level rise impacts on Toad Rock Reservation are minimal due to the property's elevation and distance from shore. The entire property is located outside the 3-10-foot LiDAR sea-level rise projection and 1% annual chance of flooding (500-year flood zone) (Map 20Map 19, page 47, Appendix A.; Map 28, page 72) in an area of minimal flood hazard (FEMA Flood Zones).

Acceleration of sea-level rise due to anthropogenic climate change puts low-lying coastal areas like the dunes and interdunal swale of Toad Rock Reservation at risk for ecologically harmful impacts in the future. Coastal wetlands provide important ecosystem functions, including refugia, breeding and foraging habitat for wildlife; run-off filtration; and excess sediment and nutrient storage (NOAA 2023).

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).

Toad Rock Reservation represents a gradient of habitats from woodland to maritime 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 Toad Rock 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, red maple, beetlebung, 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 occupied isolated areas of the property in small upland pockets near stream corridors. The combination of beech leaf disease, beech bark disease, and extreme weather resulting from climate change have severely devastated 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 through 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 stonewalls, cellar holes, and stone foundations on Toad Rock Reservation attest, much of this land was cleared land at one time and likely used for pasture. LiDAR imaging reveals evidence of historic cultivated crops in limited areas. Over the last century, the process of woodland succession on abandoned agricultural land yielded a forest of oak and beech trees with maples

and beetlebungs in low-lying areas. Many of these trees 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 trees to grow outward as well as upward.

An area of sandplain heathland with dense Ericaceae shrubs and unvegetated exposed sand openings is located between the two ponds on the property. Two of Esther Howwaswee house sites were located in this area. Both homes were taken apart and moved in the early 1900's after being partially buried in wind-driven sand (Burgess 1970). This suggests the coastal dune reached inland as far as the sandplain heathland. The present vegetation cover indicates the area no longer receives coastal influences of wind and salt spray. Left unmanaged, shrubs will ultimately yield to trees, 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. The non-native, feathertop reed grass (*Calamagrostis epigejos*), located in the maritime dune/swale area of the property is an example of these effects; this relatively unknown invasive species was introduced from Eurasia. This densely colonial grass impacts native wetland and dune species by outcompeting them. Feathertop reed grass tolerates a wide range of habitat conditions and reproduces through rhizomes and numerous seeds that are viable for five years (Rawlins et al. 2018). Expansion of this cultivated species can quickly alter the compositions and health of a coastal community displacing American beech grass in the dunes and further reducing diversity in the dune swales.

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 Sadinski 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

Toad Rock Reservation comprises five general habitat communities – woodland, maritime dune, sandplain heathland, shrubland, and marsh. They are described in detail and displayed on the Ecological Communities Map (Appendix D: page 93).

A total of 248 plant species is known to occur on the Toad Rock Reservation (Appendix D: Table 9, page 86). Woodlands dominate the landscape of Toad Rock Reservation and host the greatest number of species compared to other habitats on the property. However, the greatest species per acre ratio was observed in the sandplain heathland, the smallest habitat on the reservation (Table 1, page 22).

One commonwealth-listed plant species is known to occur on the property in the red maple/beetlebung swamp. Two non-native invasive plants – *Miscanthus sinensis* and *Calamagrostis epigejos* – occur in the maritime dune located in the southern portion of the property.

Table 1: Vegetation survey years, habitats, and plant species totals at Toad Rock Reservation, Aquinnah, MA

Habitat	Acres	# Points	2004	2006	2009	2017	Plot size m2	Plant species	Plants/acre
Upland Woodland	52.2	20	3	3	4	10	3	87	2
Mixed-oak woodland	29.9	13	3	2		8	3		
Coastal woodland	17.4	4			3	1	3		
Maritime woodland	4.9	3		1	1	1	3		
Red maple/ black gum swamp	30.9	13	3	2	2	6	3	120	4
Maritime shrubland	2.6	10		10			2	51	20
Sandplain heathland	0.9	9			9		2	31	34
Shrub swamp	7.7	6	6				2	22	3
Interdunal marsh/swale	3.1	17			9	8	1	72	23
Maritime dune	2.2	27			14	13	1	65	30

Emergent marsh	1.91	0						44	23
Pond	0.2								

2. Wildlife

Wildlife on the Property was recorded using a variety of quantitative survey techniques and through general observations by land bank staff and via staff-verified observations by individuals using wildlife recording apps such as iNaturalist and the local bird alert network. Direct and indirect (tracks and scat) sightings aided in creating a running inventory of species. The lists of these groups in Table 20-Table 27 (Appendix E: page 109-132) are not exhaustive but provide an assessment of common occupants of Toad Rock Reservation.

i. Birds

Formal avian point-count surveys were conducted at Toad Rock Reservation during spring migration (2004, 2006, 2007, 2008, 2025), summer breeding season (2004, 2006, 2007, 2010, 2017, 2020, 2025), fall migration (2003, 2004, 2007, 2009, 2017, 2020, 2025), and winter (2004, 2007, 2009, 2020). No new avian observations on the property were observed from local birders reported in the “Bird News” column in the *Vineyard Gazette* specific to the property location and through iNaturalist. A total of fifty-eight bird species was detected on the property during diurnal avian point-count surveys between 2003-2025. Additionally, American woodcock (*Scolopax minor*) were detected during an acoustic survey in May 2025. No owl species were detected during nocturnal owl surveys in August 2010 and during night-time acoustic monitoring during March and April of 2025. Thirteen survey points were established in nine habitats on the reservation between 2003-2025 as property was accrued (Table 2, page 23). A total of 203 five-minute point counts was conducted over the 22-year period. All survey points are outlined on the Avian Survey Map with their corresponding survey years and habitats (Map 34, page 105, and Table 2, page 23).

Table 2: Avian 5-minute point count survey years and habitats at Toad Rock Reservation, Aquinnah, MA

Point Number	Habitat	Years surveyed
1	Maritime dune/ interdunal marsh swale	2007, 2008, 2009, 2010, 2017, 2025
2	Coastal woodland	2007, 2009, 2010, 2017
3	Red Maple-Black Gum swamp	2004, 2007, 2009, 2010, 2017, 2025
4	Mixed-oak woodland	2017, 2017, 2020, 2025
5	Red Maple-Black Gum swamp	2003, 2004, 2020, 2025
6	Maritime shrubland	2006, 2007, 2025
7	Emergent Marsh	2010
8	Shrub swamp	2003, 2004
9	Pond/shrub swamp	2025
10	Coastal woodland	2010

11	Mixed-oak woodland	2025
12	Red Maple-Black Gum swamp	2025
13	Coastal woodland	2025

ii. Invertebrates

Night-flying moth community composition and abundance was assessed using black-light traps during the summers of 2008, 2009, 2010 and 2017. A total of 335 (including six listed-species) lepidoptera species, belonging to 11 families, was cataloged for the property (Appendix E: Table 24, page 115). A detailed list of Macrolepidoptera species observed on the property is included in Table 25 (Appendix E, page 125). All incidental catches in light traps, such as the fiery searcher, were identified, recorded, and listed in Table 25, page 125.

Figure 5: Fiery searcher (*Calosoma scrutator*)



A survey of Odonate species was conducted in Summer 2008 by Allen Keith on the two small ponds on the property and is attached in Appendix C. A total of 20 species was observed over the course of six visits between June 11th and September 7th. Additionally, passive observations of butterflies, other flying insects, spiders and beetles were recorded during the various ecological surveys on the property. A detailed list of all insect and arachnid species is included in Table 25, page 125.

Figure 6: White-tailed deer, mother and



iii. Mammals

Sixteen mammal species (including five listed bat species) were detected on the property through direct (sightings, acoustic monitors, and camera trap photos) and indirect (tracks, scat) observations. Acoustic monitors were used to record nocturnal presence of bat species on the property from April-August during 2025. Camera traps were set at the two ponds during 2025 from July 24 to August 11 to observe and record wildlife. A full list of mammal species observed on the property is included in Table 27 (Appendix E: page 132).

iv. Reptiles and amphibians

Opportunistic observations of reptiles occurred during regular property checks and other ecological surveys. Additionally, spring frog call surveys were conducted in April 2026 using acoustic monitors set to record 24 hours for 29 days (4/24/2025-5/22/2025). Four amphibian species and two reptile species were observed on the property and are included in Table 26 (Appendix E: page 131).

v. Fish

No fish were surveyed in compiling this management plan.

3. Rare and Endangered Species

Sixty-two percent of Toad Rock Reservation is designated as priority habitat for rare species by the Natural Heritage and Endangered Species Program (NHESP 2025) (Map 17, page 45). Much of the designated area comprises swamps and coastal woodland habitats (Table 3, page 25).

Table 3: Designated priority habitat by habitat type at Toad Rock Reservation, Aquinnah

Habitat	Total Acres	Acres designated as priority habitat
Red maple/black gum swamp	30.9	18.6
Interdunal marsh/swale	3.1	3.1
Shrub swamp	7.7	3.3
Maritime woodland	4.9	4.8
Maritime shrubland	2.6	2.6
Maritime dune	2.2	2.2
Shallow emergent marsh	1.9	1.5
Coastal woodland	17.4	15.7
Sandplain heathland	0.9	0.9
Mixed-oak woodland	29.9	9.7
Pond	0.2	0.2

The property provides breeding and feeding habitat in the woodlands and grassy coastal areas for various moth species including the five rare species observed on the property. The areas of open woodland, streams, and ponds, as well as the woodland/dune edge provides feeding habitat to rare bat species observed on the property. Additionally, three of the rare bat species documented on the property are tree bats that meet breeding habitat requirements in the woodland of the property from early spring to late fall. The rare bird observed on the property is a fall and winter visitor that finds suitable hunting grounds in the open coastal habitats. Finally, the open marshy areas within the red maple/black gum swamp provides opportunities for the rare plant species observed on the property to propagate (Table 4, page 26). The property is also designated as habitat for additional rare species surveyed for in the dune, heath and shrubland habitats but not observed.

Map 5: NHESP map on Toad Rock Reservation, Aquinnah

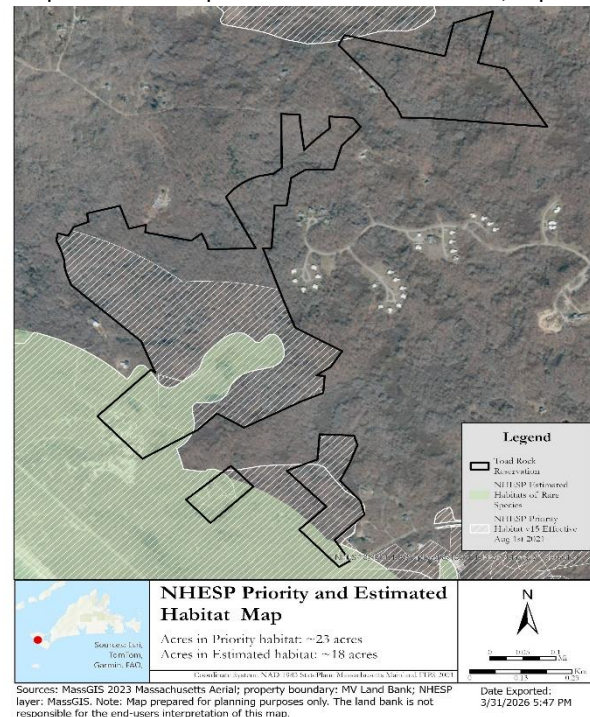


Table 4: Listed-species type and corresponding habitat requirements at Toad Rock Reservation, Aquinnah

Species Type	Habitat Requirements
Plant	wooded wetland
Moth	Woodland, maritime dune and shrubland, swale
Mammal	Woodland, stream, pond,
Bird	Maritime dune, sandplain heathland

C. Cultural Characteristics

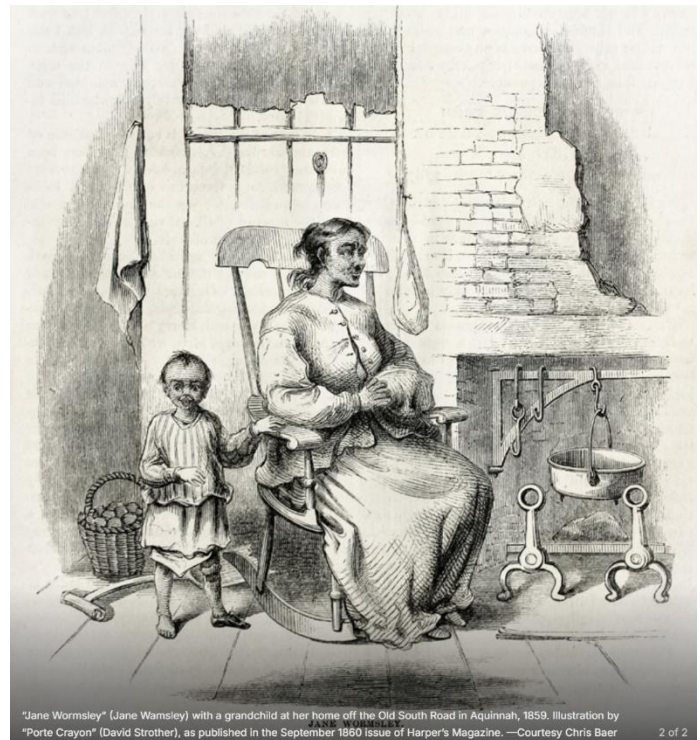
1. Land History

Toad Rock Reservation is located in the area of Aquinnah once referred to as the “Lower Town” by Gay Headers. The bulk of the property is located south of Old South Road, the original path that meandered through Quitsa, Squibnocket, and the “Old Gay Head village”, branched south to Long Beach, and terminated at the cliffs. The road is bounded by an established stonewall that is the dividing line between Middle Place and South Pasture, two large areas of common land used by Wampanoags prior to the partition of land in 1870. Early maps of Gay Head indicate some settlement north near the town center but provide minimal evidence of permanent settlements further south and on the property.



Settlement patterns and documentation thereof changed in the 19th century. A few dozen homesites, stonewalls, cultivated fields and acres of pasture land are depicted in the 1850 Whiting Map. The property remained sparsely settled at this time. However, archaeological evidence indicates the few settlements that existed on the property were well developed. Archaeological work on the property and surrounding area during the early 1990s by Suzanne Glover and Kevin McBride resulted in the discovery of 26 homesteads dating to the early 1700s into the late 1800s further supporting the

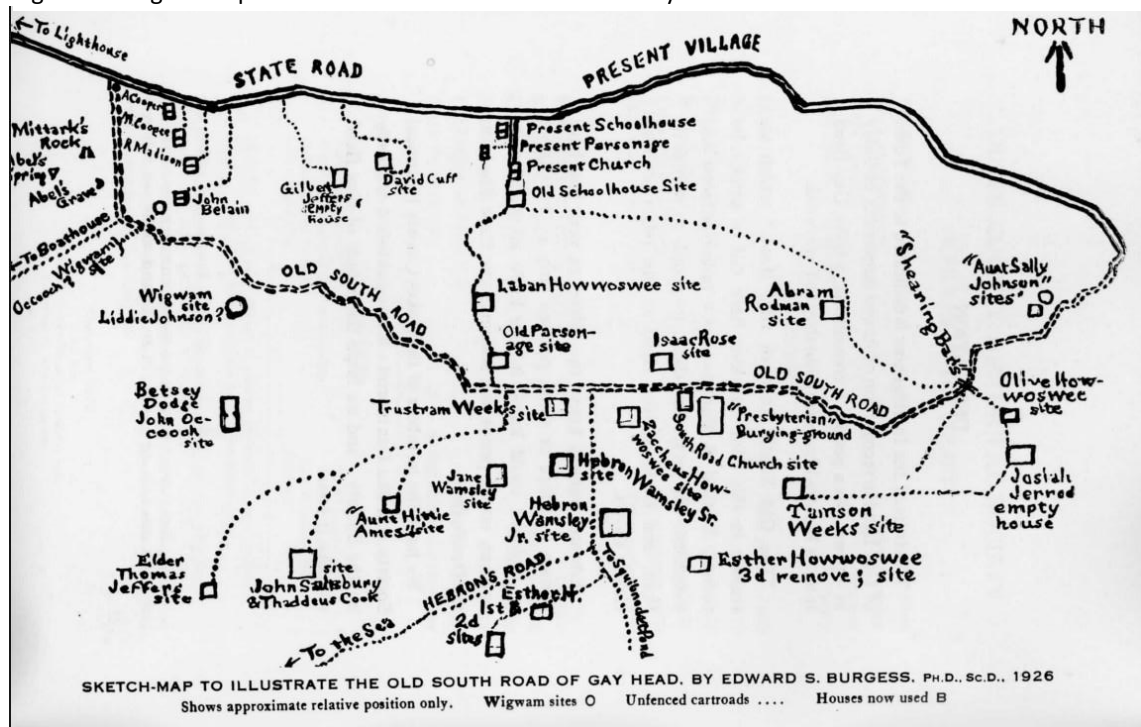
Figure 7: Jane Wormsley (Jane Wamsley) with a grandchild at her home off the Old South Road in Aquinnah, 1859.



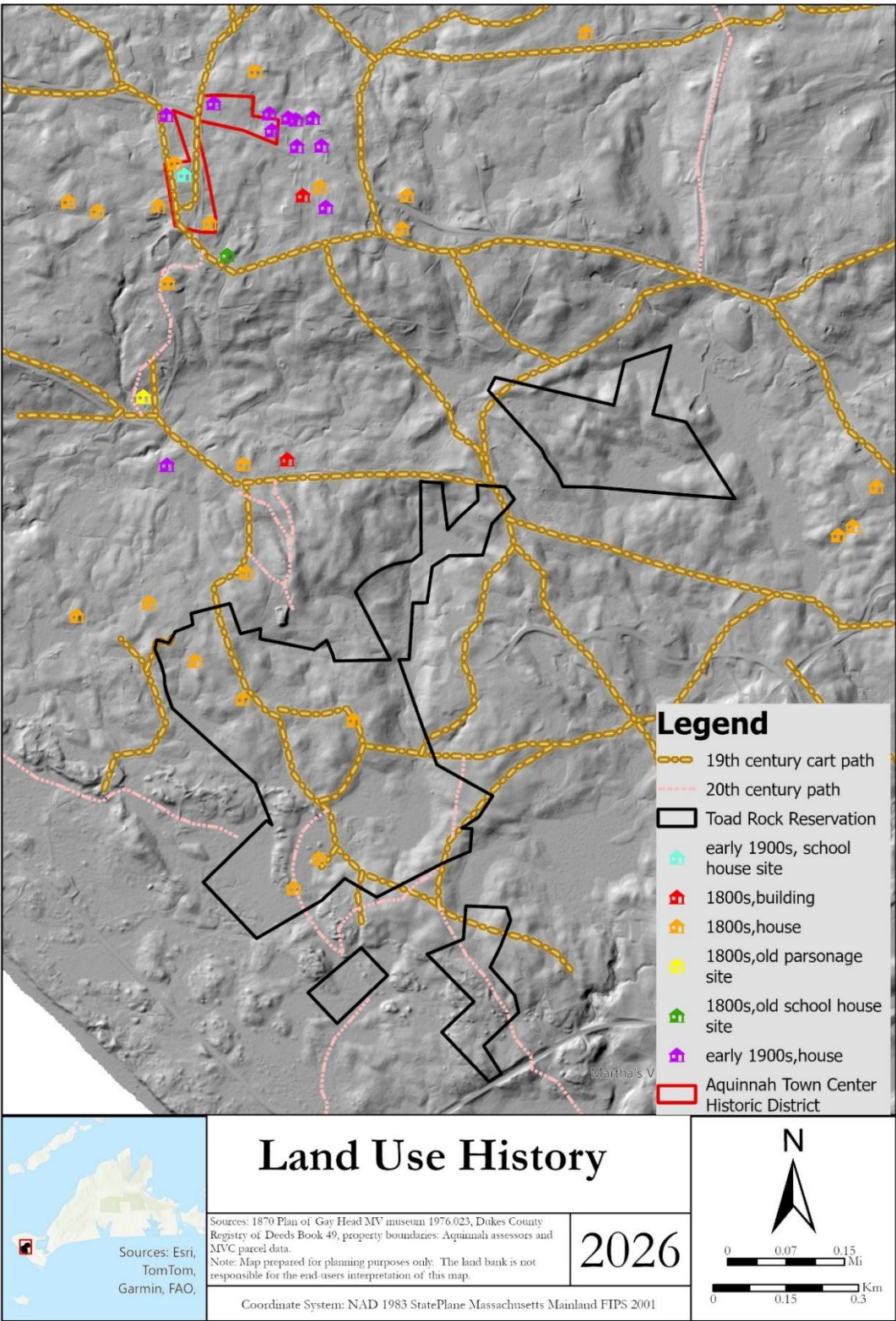
Whiting Map depiction of Gay Head at that time. The structures and archaeological evidence indicate the areas was used for farming and included animal pens, barns and outbuildings. The homesteads were connected to Old South Road by long-forgotten cart paths that ended at fields and homes (Glover and McBride 1993, Whiting Map 1850). The homesteads on the property belonged to Jane and Hebron Wamsley, Esther Howwaswee, and Josiah Jerret during the 19th century and abut Zaccheus Howwaswee's homestead off Old South Road (Burgess 1970). A portrait by Porte Crayon of Jane Wamsley, circa 1859, was published in the September 1860 issue of Harper's Magazine (documented by Chris Baer). The imprint of civilization on the property is minimal. A few cellar holes and a lattice of stonewalls remain as evidence of past land use. The property remains much as it was prior to the influences of European land use practices with nearly a third of the woodland on the property designated as ancient untouched woodlands. This is likely due to the extensive red maple/ black gum swamp on the property and lack of access. A more detailed account of the land use history of the Toad Rock Reservation and surrounding area is located in Appendix F: page 133

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Figure 9: Burgess Map 1926 from "The Old South Road of Gay Head"

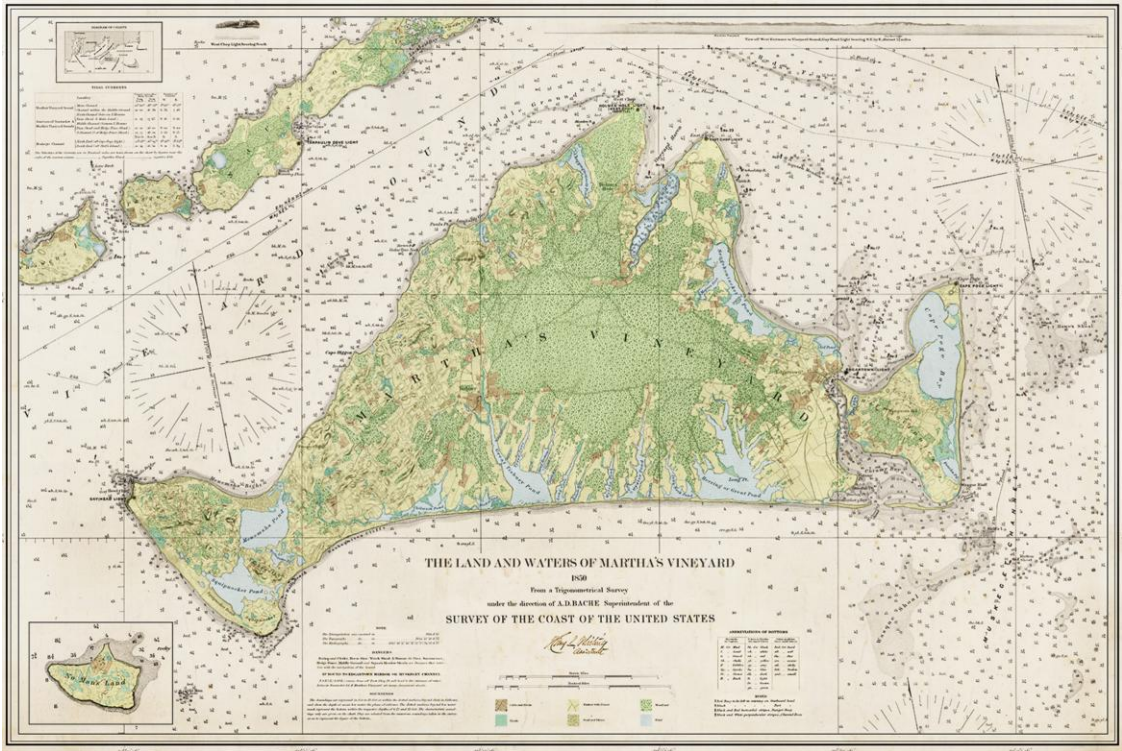


Map 6: Land use history recreated using Lidar, Whiting 1850 Map, 1866 Indian Land Map, and E. Burgess Map 1926

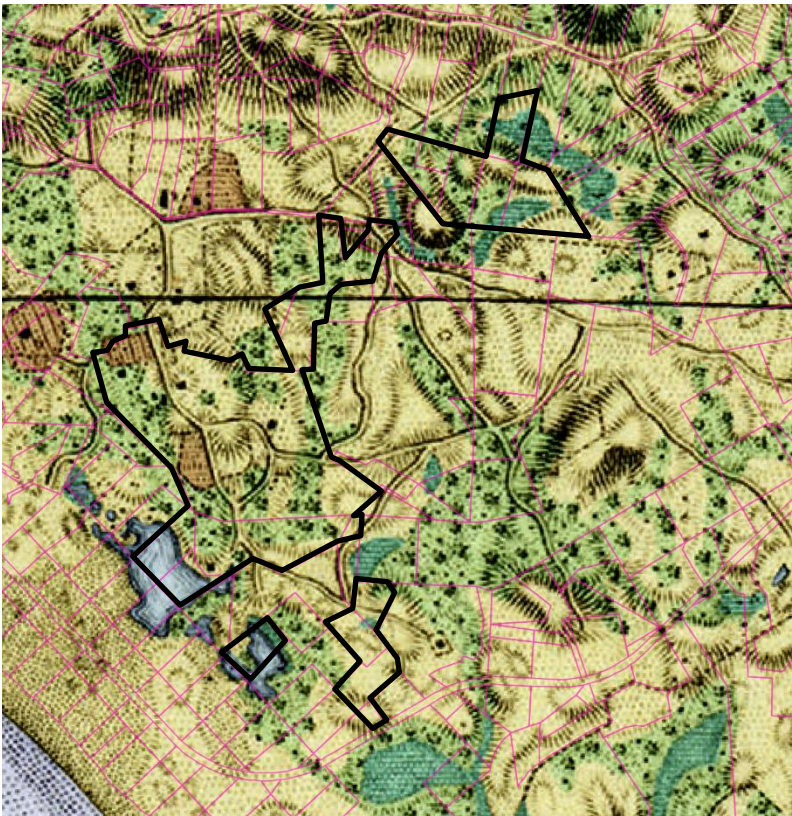


A detailed map of the Gay Head area on the coast of Connecticut. The map shows the coastline with several labeled locations: Gay Head, Head Light, Indian Lands, Menemsha Pond, Prospect Hill, Pequot Hill, Menemsha Pond, Nashuaquon, Nashuaquon, Squibnocket Beach, and Squibnocket. The map is oriented with North at the top and shows the coastline of Connecticut.

Map 7: 1850 Henry Laurens Whiting Map (harvardforest.fas.harvard.edu/maps)



Close up of property area.



D. Property and Development Characteristics

1. Legal and Regulatory Context

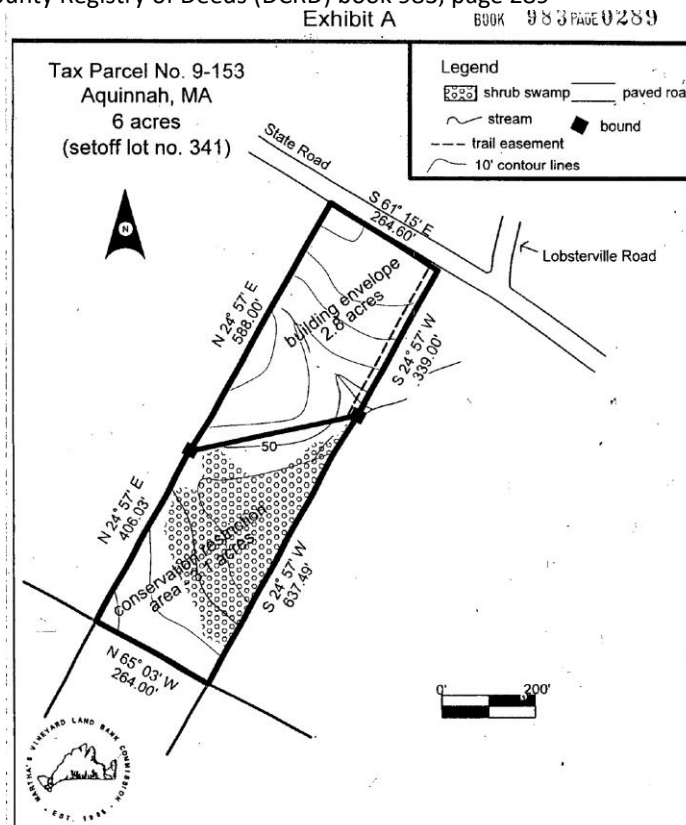
i. Easements, Rights and Restrictions

a) Conservation Restrictions

Several portions of Toad Rock Reservation are under a conservation restriction that prohibit typical activities such as building construction, soil removal, dumping, subdivision and alteration of drainage.

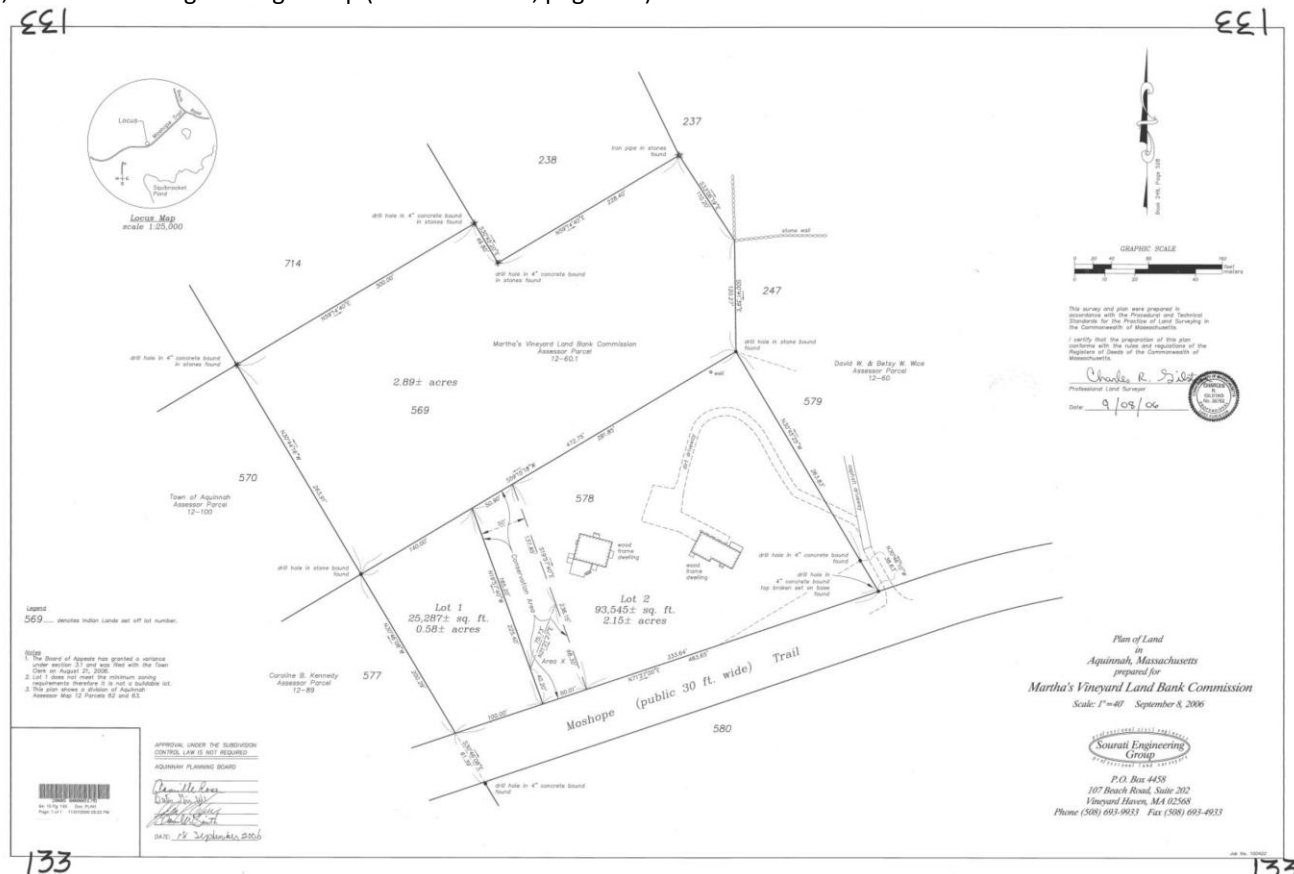
A conservation restriction was established and agreed upon in 2003 by the land bank with the Town of Aquinnah for a 3.1-acre portion of parcel 153 (Figure 12, page 31). The following exceptions to the prohibited typical acts include sign installation; unpaved road construction on set-off lot 331 used solely to connect Aquinnah tax parcels 8-27 and 8-28 with 8-26; conversion of woodland to grassland; trail creation; and boardwalk, platform, fence and erosion control device installation.

Figure 12: Exhibit A Dukes County Registry of Deeds (DCRD) book 983, page 289



Additionally, a conservation restriction was established and agreed upon in 2006 by the land bank with Russell Smith over a portion of set-off lot 578, Map 12, parcel 63. The grantor reserved the right to cut trees in an area along Moshup Trail designated as area "X" on plan filed at DCRG, book 15, page 133.

Figure 13: Plan of land in Aquinnah, Mass, Prepared for Martha's Vineyard Land Bank Commission Scale 1"=40' September 8, 2006 Sourati Engineering Group (DCRC: book 15, page 133)



b) Exclusive Use Easement

The Town of Aquinnah granted the land bank an exclusive use easement for passive recreation over a 5.2-acre parcel (Map 9, lot 163).

c) View Easement

A view easement over parcel 60.1 (Map 12) owned by the land bank is held by the grantor, David and Betsy Wice (BK1057, PG1033 and 1031). The view easement includes the right to trim and remove vegetation from the stonewall located at the juncture of set off lots 237, 247 and 569 as well as rights to trim vegetation to preserve the existing view of the Atlantic Ocean over parcel 60.1 from parcel 60 (Map 12). The right to access Toad Rock Reservation from lot 60.1 expired upon completion and implementation of the Toad Rock Preserve management plan in 2012.

d) Easements and agreements

Several trail easements, one trailhead easement and one maintenance vehicle parking easement were granted to the land bank by various grantees for the purpose of connecting parcels and creating the cross-Aquinnah trail. A passive recreation trail is permitted within the 10-foot-wide easement areas defined in the following recorded documents:

Table 5: Recorded easement and agreement documents pertaining to Toad Rock Reservation, Aquinnah, MA

Grantee	Grantor	Date	Document Citation	Type
Richard Skidmore and Joan LeLacheus	MVLBC	02/10/2003	BK928 PG535	Trail
Town of Aquinnah	MVLBC	12/12/2003	BK983 PG274	Trail
David and Betsy Wice	MVLBC	12/29/2005	BK1067 PG1036	Trail and trailhead
Moshup Trust and Pegasus Trust	MVLBC	02/20/2020	BK1521 PG640	Access
Fruchtman Family Trust	MVLBC	02/07/2020	BK1521 PG642	Trail connecting "O" to "S" and short-term maintenance vehicle parking
M. Miller ad Moshup Trust	Tacknash Trust	02/21/202	BK1521 PG549	Relinquish access easement, permit land bank maintenance vehicles to travel between and install a trail for public passive recreation between "S" and "T"
Mark Miller	MVLBC	01/31/2020	BK1521 PG656	Trail between "s" and "T"
Town of Aquinnah	MVLBC	09/12/2022		Trail and trailhead easements

Map 8: Conservation restriction and easement map for Toad Rock Reservation, Aquinnah

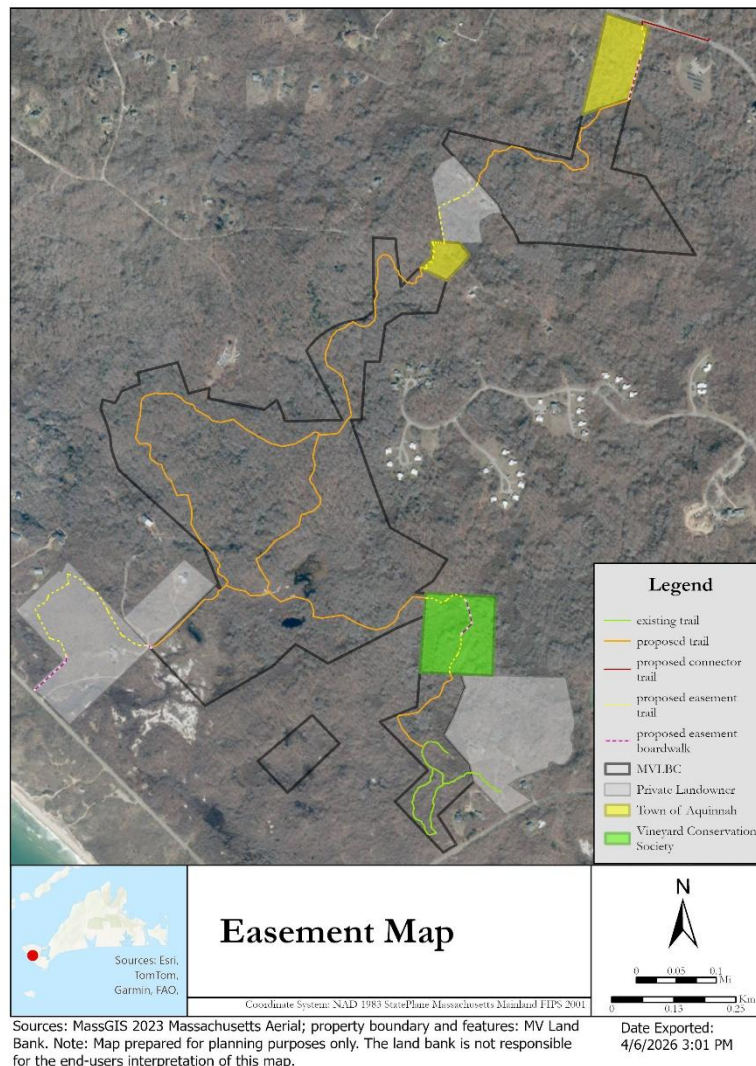
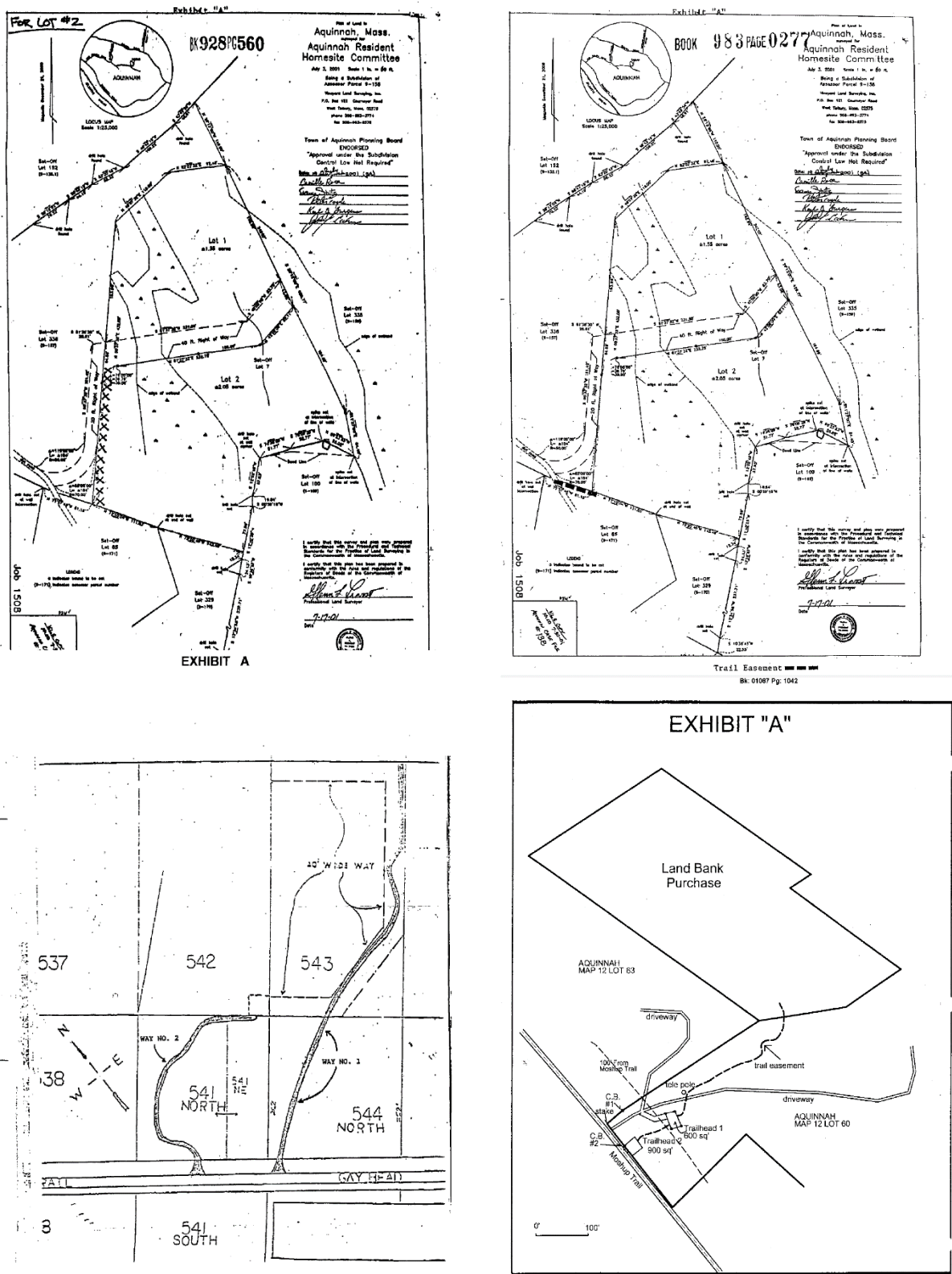
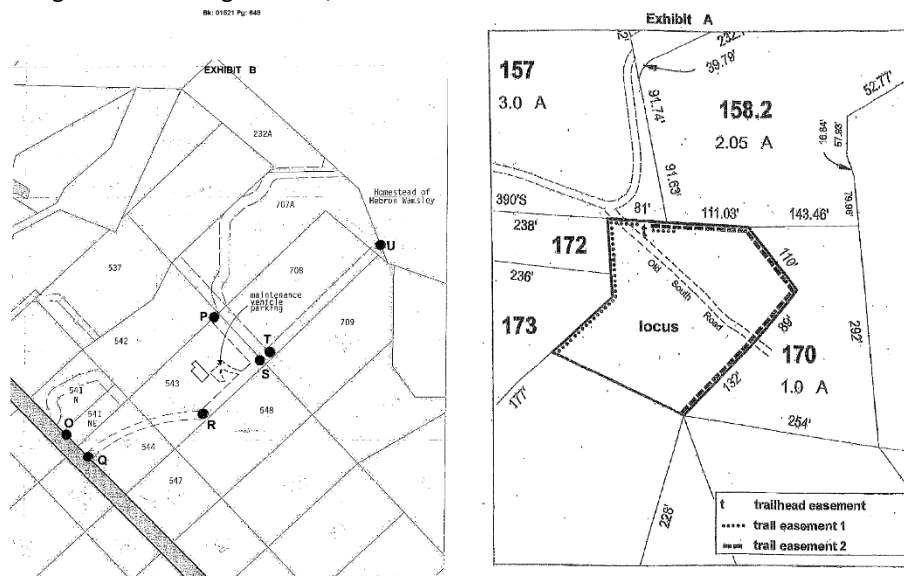


Figure 14: Dukes County Reg. of Deeds BK928 PG560, BK983 PG277, BK1067 PG1042, and BK1521 PG647



Map 9: Dukes County Reg of Deeds BK 1521 PG648 and PG655, Exhibit B;
Intergovernmental agreement, Exhibit A

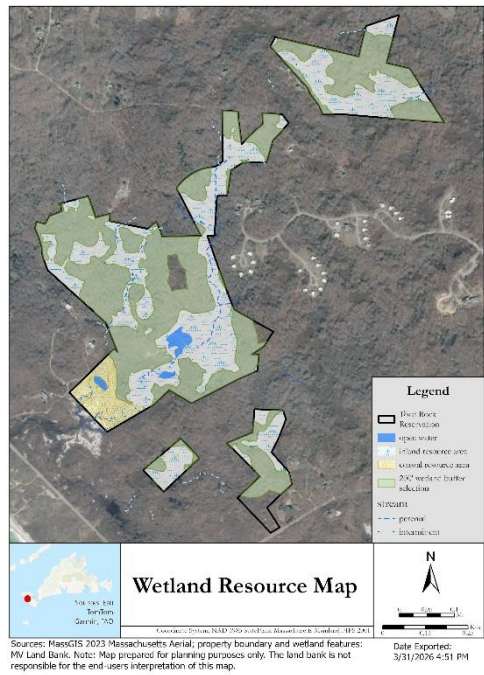


ii. Commonwealth MESA and WPA Filings

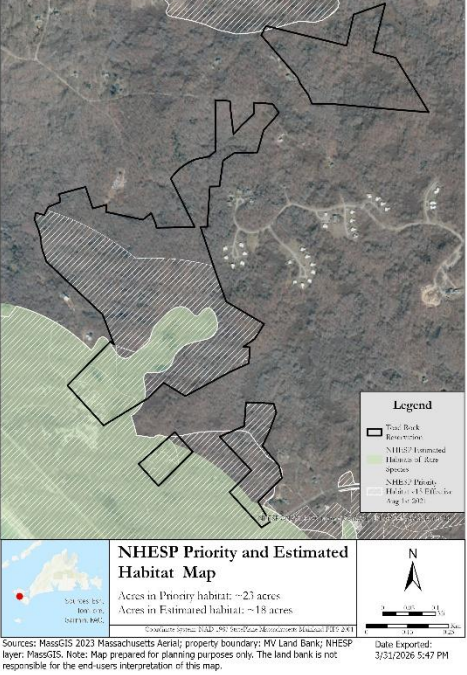
Priority habitat is the geographic extent of commonwealth-listed plant/wildlife species that fall under Massachusetts Endangered Species Act (MESA) rulings. Estimated habitat is the extent of listed wetland wildlife species alone and is protected by wetland protection act (WPA) and MESA rulings. Projects 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 proposed in 63 acres of rare species priority and wetland habitat and in 97 acres of wetland resource and buffer designated on the property (Map 12, page 36). 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 (Appendix G: page 143, Appendix H: page 151).

Map 11: Wetland resource and buffer zone map for Toad Rock Reservation, Aquinnah



Map 12: NHESP priority and estimated habitat map at Toad Rock Reservation, Aquinnah



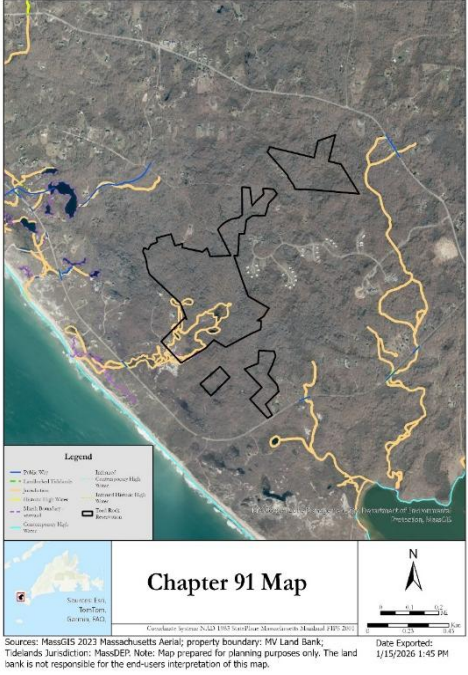
iii. Chapter 91

Toad Rock Reservation is mapped in the presumed tidelands jurisdiction of MassDEP under M.G.L. c. 91 and the Waterways Regulations in 310 CMR 9.00 (Map 10, page 36). However, the streams and interdunal swales are intermittent, rocky and narrow and are not navigable ways during any season by vessel including small kayaks. The proposed boardwalks and stream crossings for the property do not preclude pedestrian passage in the streams.

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). Toad Rock Reservation falls within 5 districts within the town of Aquinnah: Coastal District (inland), Island Roads District (Major Road and Special Ways Zones); Moshup Trail District; Special Places District; and Town of Aquinnah District (Building Permit Limitation area) (Map 13, page 39). The DCPCs and Overlay Districts are governed by

Map 10: Jurisdiction pursuant to Chapter 91 regulations at 310 CMR 9.04 Map, Toad Rock



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

a) Coastal District

A special permit is required from the Aquinnah Planning Board Plan Review Committee (APBPRC) for construction of buildings or structures within 200 feet of wetlands, waterbodies, coastal habitats and bluffs over 15 feet (Section 2.4.1 of Aquinnah Zoning Bylaws 2012). The proposed project includes 77 feet of a boardwalk pedestrian trail within the coastal district.

b) Island Roads District

The Islands Road District is intended to protect the rural character of the town by controlling development along major roads and special ways. Within the Island Roads District, a special permit is required to alter any stonewalls. All curb-cuts 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. Historic vistas are protected by preventing obstructing development and maintaining tree-canopy along routes. Additional protection is extended to Special Ways including Old South Road that runs through the property. Development within 40 feet of a special way requires a planning board special permit and fences, walls and structures are prohibited within 20 feet of the centerline of Old South Road.

The plan proposes to create 169 feet of boardwalk off Moshup Trail and 203 feet of trail off State Road that are within the Island Roads District – Major Roads. Both trails are proposed

Figure 17: Moshup Trail



Figure 16: State Road



to be marked with low-profile trail marker signs and are located in easement areas. Additionally, half of a 0.29-acre trailhead, sized to accommodate three vehicles, is proposed within the Old South Road Special Way in an easement area underlain by land owned by the Town of Aquinnah. To connect the

trailhead to the proposed trail system south of Old South Road, 46 feet of trail is proposed within the Old South Road Special Way. A low-profile trail marker sign is proposed in the Special Way to identify the trail entrance. Use of Old South Road as primary for vehicles access is permitted in instances where no alternative access exists as is the case with the Town of Aquinnah parcel of Old South Road.

Figure 15: Old South Road



c) Moshup Trail District

The Moshup Trail district is designed to protect the open views and environmental significance in the area by controlling the visual impact potential development and associated alterations have on the landscape. Within the Moshup Trail District of Critical Planning Concern (Article XI) a special permit is needed from the APBPRC for any signage; the siting of any structure, curb-cuts, alteration of existing stonewalls; parking areas; and the

removal of any vegetation. Any structures must meet specific aesthetic guidelines as well as be sited 150 ft from the road and have a foundation no more than 18" above grade.

The proposed project includes 36 feet of stairs, 1,548 feet of new trail, 866 feet of boardwalk trail and two land bank trail markers within the Moshup Trail District. It is recommended that all pedestrian trails within the district be installed as raised boardwalk to protect the dune (Borer 1982). However, 1,548 feet of new trail is sited through coastal woodland and will not require a boardwalk.

Figure 18: Moshup Trail



d) 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 and develop or construct within 100 feet of many special places, including Toad Rock located on the property. Permitted uses within the 100 feet include outdoor recreation and actions related to conservation and agriculture. The area outlined in yellow is a hilltop zone that is designated as a special place to protect the cultural and historic resources of the area north of Toad Rock.

Figure 19: Special Place - Toad Rock



e) Town of Aquinnah District

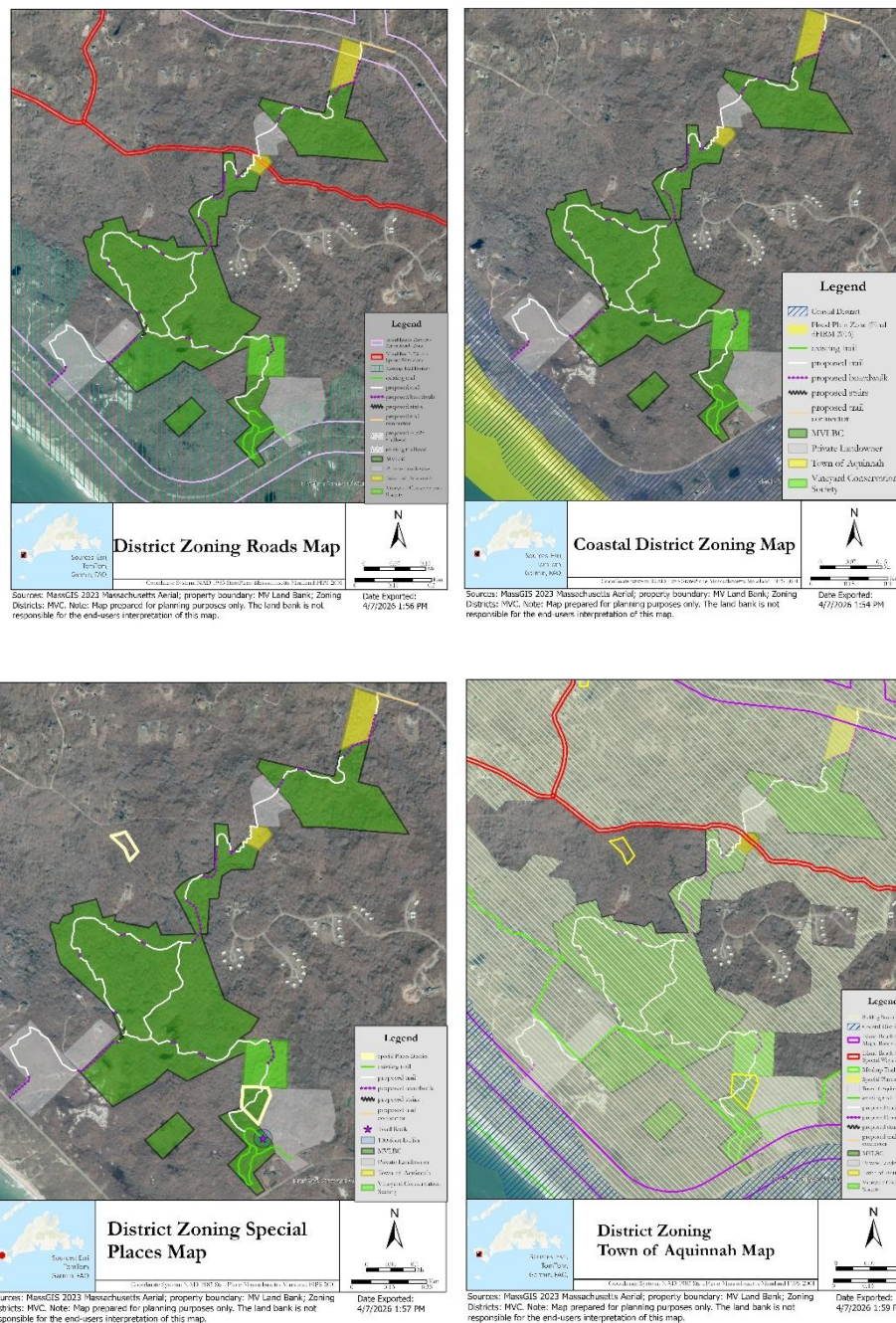
With the Aquinnah Town District of Critical Planning Concern (ADCPC) (Article XIII) a special permit is required from the APBPRC for any structures, curb-cuts; driveways; pedestrian paths over 3ft in width; roads wider than 12 ft; use of any impervious materials, signs, the removal of all living trees over 3 ft diameter at base from an area greater than 200 ft²; 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). The plan does not propose the cutting of vegetation for view clearing or habitat restoration. However, the plan does propose the creation of 8,708 linear feet of trail on the property and 6,421 linear feet of trail in easement areas that are within the ADCPC and will require approval from the APBPRC.

Within coastal areas (500 ft from high watermark), except on municipal lots, no new boardwalks or parking lots are permitted. The plan does not propose any trails and trailheads within coastal areas as defined previously.

All signs within the ADCPC must be approved by the APBPRC. The plan proposes to install eight trail marker signs indicating the public is entering a trail easement area/leaving land bank property. Additionally, the plan proposes to install 8 cultural land use signs along the trail for the purpose of describing the significant historic and cultural uses of the property. Prior to any development a project notification form must be submitted to the

Massachusetts Historical Commission and the APBPRC to determine if a survey is required to protect historical and archeological resources of the property.

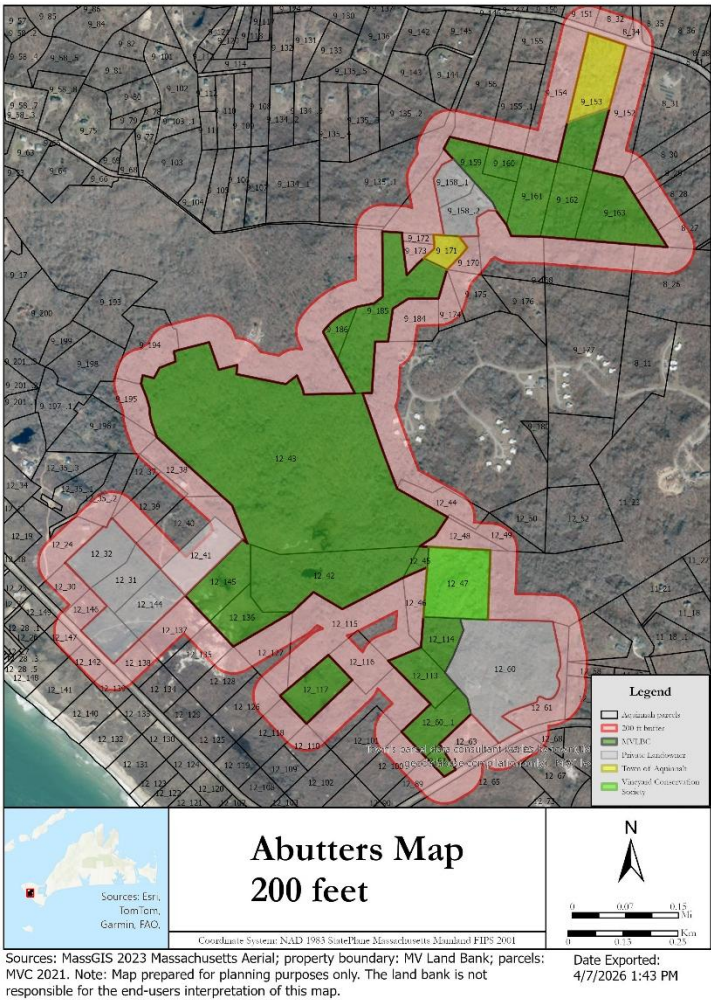
Map 13: Districts of Critical Planning Concerns map, Toad Rock Reservation, Aquinnah



2. Abutters

A list of those owning land abutting or within 200 ft of Toad Rock Reservation was generated based on the Aquinnah 2025 Assessors Map as it appears in the AxisGIS program (Map 14, page 40, Appendix I: Map 39, page 160). Abutters are included in Appendix I: Table 31, page 162.

Map 14: Abutters within 200 feet of the property boundary for Toad Rock Reservation



3. Existing Use and Infrastructure

Toad Rock Reservation is bounded by acres of primarily undeveloped dense woodlands comprising private conservation land, Wampanoag tribal land and private residential land (Map 16, page 43). This property is an aggregation of coastal lands and overgrown historic homesteads once used for farming and woodlots. The following uses and infrastructure occurring on the property are listed below and depicted on Map 15, page 42.

i. Structures:

There are cable remains of a radar tower grown over and into the surrounding woodland on the property.

ii. Roads:

There are no roads on Toad Rock Reservation. However, there are remnants of old cart paths that connected 19th century homesteads to the Old South Road.

iii. Trails:

Figure 20:
Cable through
tree



A loop trail totaling 1,958 linear feet was installed on the property in 2013 following approval of the 2012 Toad Rock Preserve management plan and MA-NHESP.

Figure 21:
Boardwalk



iv. Boardwalks:

There is 45 feet of ground-level board walk installed on the existing trail loop of Toad Rock Preserve in the maritime shrubland. It is made from pressure-treated lumber.

Figure 22: Fence and
rock



v. Gates and Fencing:

One section of split-rail fence crosses the trail 50 feet from Toad Rock limiting public access to the rock.

vi. Stonewalls and Foundations

Approximately 7,214 linear feet of stonewalls outline homesteads, grazing land and property boundaries. There are nine foundations of former houses, large barns, out buildings, and root cellars. Three large rock piles exist near the northwestern homesteads of Jane Wamsley and Hebron Wamsley, Jr.

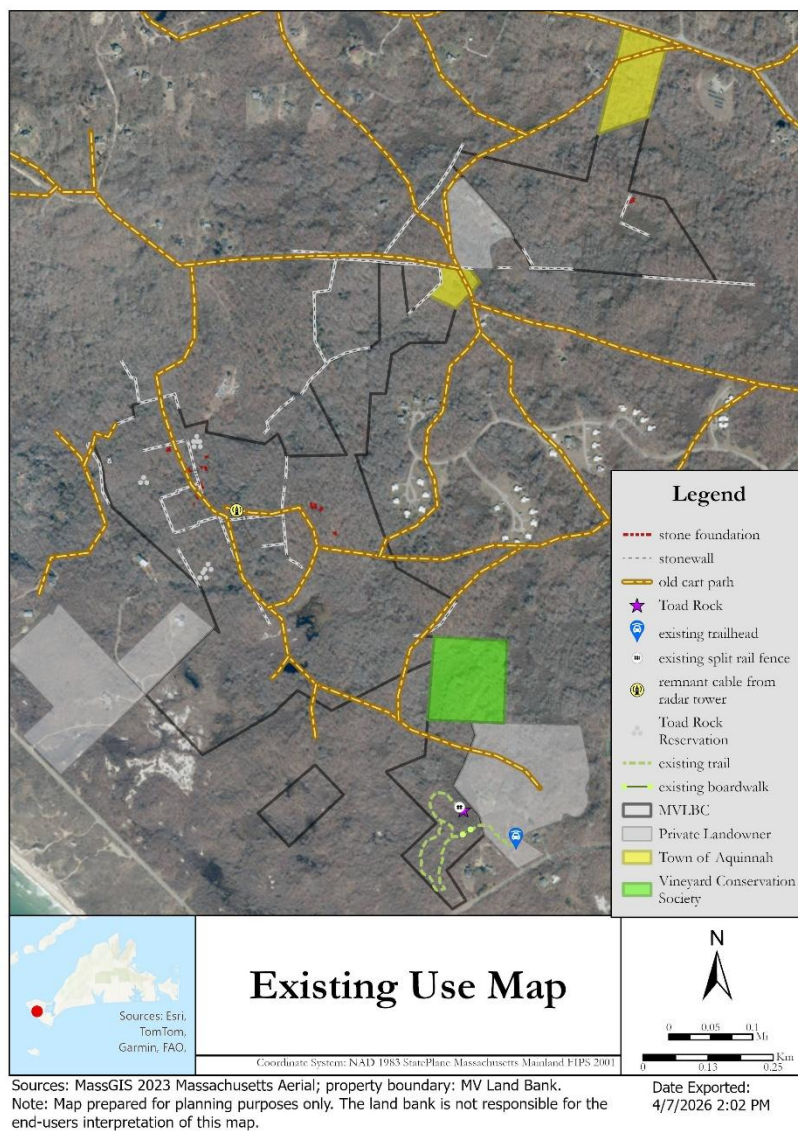
Figure 23: Cultural features: stonewall, stone pile, foundation steps



vii. Trailhead, logo post, and kiosk

A 2-vehicle trailhead is located in an easement area off Towhee Lane. A logo post for the property is located at the entrance to Towhee Lane off Moshup Trail and a kiosk with informational signs regarding the rules of the property as well as ecological and land use history knowledge is located in the northwest corner of the trailhead.

Map 15: Existing use map of Toad Rock Reservation, Aquinnah



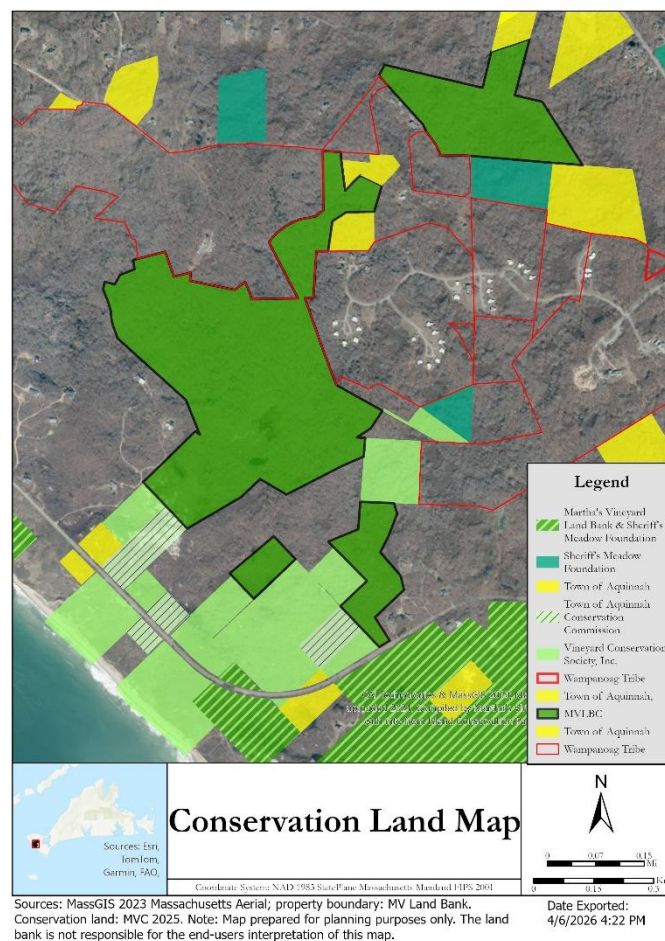
II. Inventory Analysis

A. Constraints & Issues

1. Ecological Context

Toad Rock Reservation abuts 31 acres of conservation property comprising 13 parcels owned by Sherriff's Meadow Foundation, Vineyard Conservation Society or the Town of Aquinnah Conservation Commission (Map 16, page 43). Additionally, the town of Aquinnah owns an additional 13 abutting acres; and several large Wampanoag Tribal holdings, amounting to 96 acres, abuts the property. The property protects many acres of contiguous wetland habitat and sensitive coastal habitats. The property offers habitat for 13 listed species, as well as a variety of avian and wildlife species.

Map 16: Conservation, municipal and tribal land surrounding Toad Rock Reservation, Aquinnah, MA



2. Natural and Cultural Resource Concerns

There are five main areas of concern at Toad Rock 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:

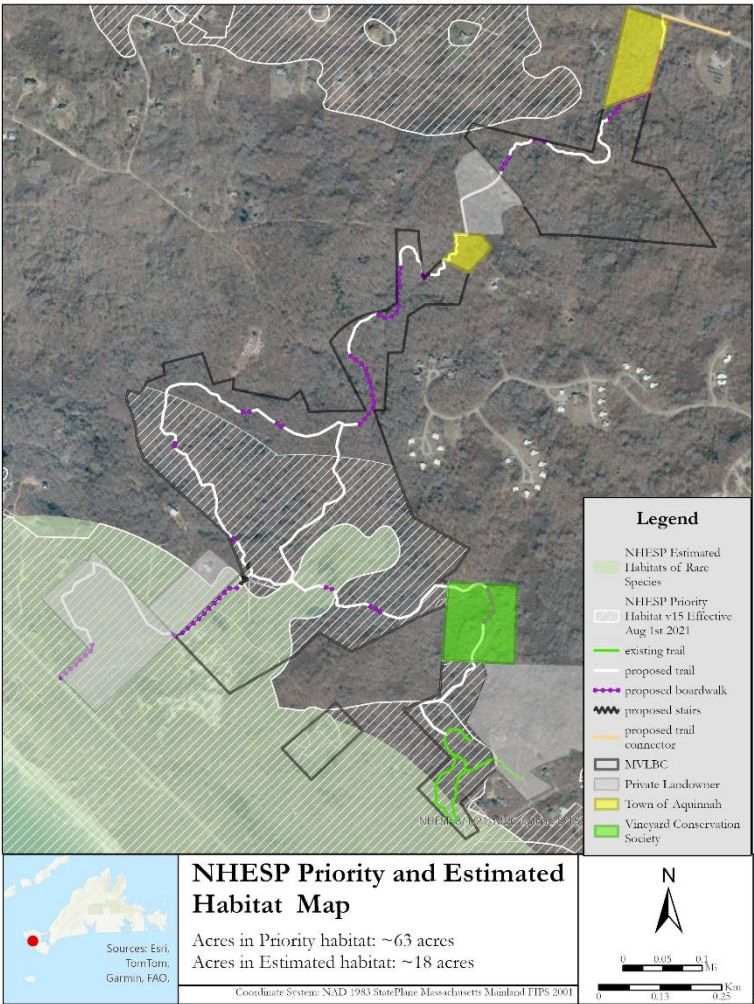
i. Commonwealth-listed rare species

A total of 13 commonwealth-listed species – one plant, six moth, five bat, and one bird species – was detected on Toad Rock Reservation during property surveys and inventories between 2004 and 2025. The commonwealth lists 11 Lepidoptera species for the property of which four were observed during surveys from May-October in 2008, 2009, 2010 and 2017. The dune/swale and sandplain heath are the most commonly associated habitats for the listed species designated by NHESP for the property. Additionally, the commonwealth lists one bird and one plant species for the property that were not the species observed on the property. Surveys for the listed plant species were conducted in the dune, and sandplain heathland during July 2007, 2011, 2017 and 2025 and surveys for the listed bird species were conducted in the maritime shrubland, dune,

and sandplain grassland in March 2004, May 2008, and June 2017. Protection measures for the listed species designated for the property by NHESP and the additional listed species observed on the property are outlined in the management portion of this plan. A total of 62% of the property is mapped for priority habitat of rare species by NHESP (Natural Heritage and Endangered Species Program) (**Error! Reference source not found.**, page **Error! Bookmark not defined.**). The implementation of this plan intersects with 1.17 acres of priority habitat (Appendix G: page 143). The plan proposes to mitigate impacts to rare species on the property by minimizing disturbance when siting new trails through, abutting stonewalls, utilizing uplands where possible, conducting work outside of breeding seasons for rare birds and avoiding cutting trees.

Maintaining structural diversity is a management goal that would benefit listed species associated with the property, as well as create opportunities for additional listed species to propagate. Protecting the hydrology on the property and monitoring for and removing invasive species in the open habitats will help maintain robust habitats for rare species to thrive.

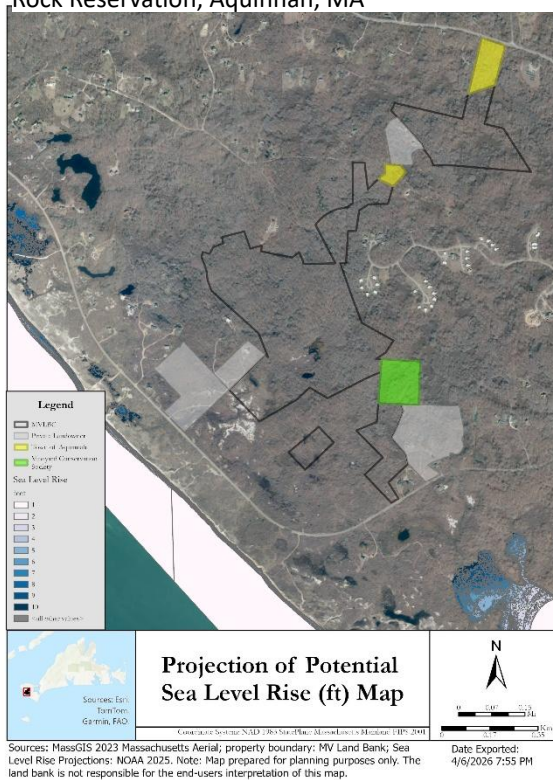
Map 17: NHESP Priority and estimated habitat mapped on Toad Rock Reservation, Aquinnah, MA



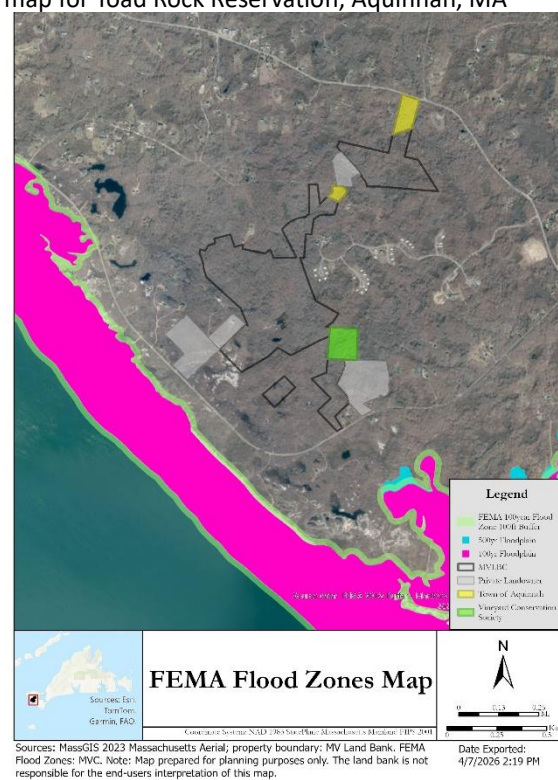
Sources: MassGIS 2023 Massachusetts Aerial; property boundary: MV Land Bank; NHESP layer: MassGIS. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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Map 19: Potential sea-level rise map for Toad Rock Reservation, Aquinnah, MA



Map 20: FEMA 100-year and 500-year flood zone map for Toad Rock Reservation, Aquinnah, MA



iv. Invasive species

Invasive species are a concern on any property regardless of its remoteness or proximity to development. 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 are *Miscanthus sinensis* and *Calamagrostis epigejos*. Both colonize the bare exposed soil of the maritime dune/marsh swale community that is the most proximal habitat to development and roads.

Figure 24: *Miscanthus sinensis*

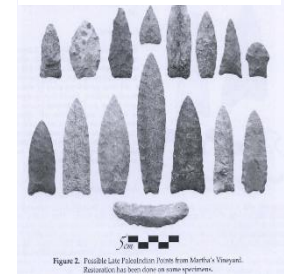


v. Indigenous People's artifacts and historical cultural resources.

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 and later in early

permanent settlements such as the one along Old South Road. Evidence of indigenous people's use of the land is often left behind in the form of tools and shell middens or trash piles (Figure 25, page 48). A clear picture of the past can be difficult to rebuild after common era disturbance. Due to the extensive time period of Wampanoags 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 26, page 48). The artifacts in Aquinnah represent more than 9,000 years of use by indigenous people (Hufstader 2018 and Moody 2008).

Figure 25: Possible late paleoIndian points from Martha's Vineyard, (Moody 2008)

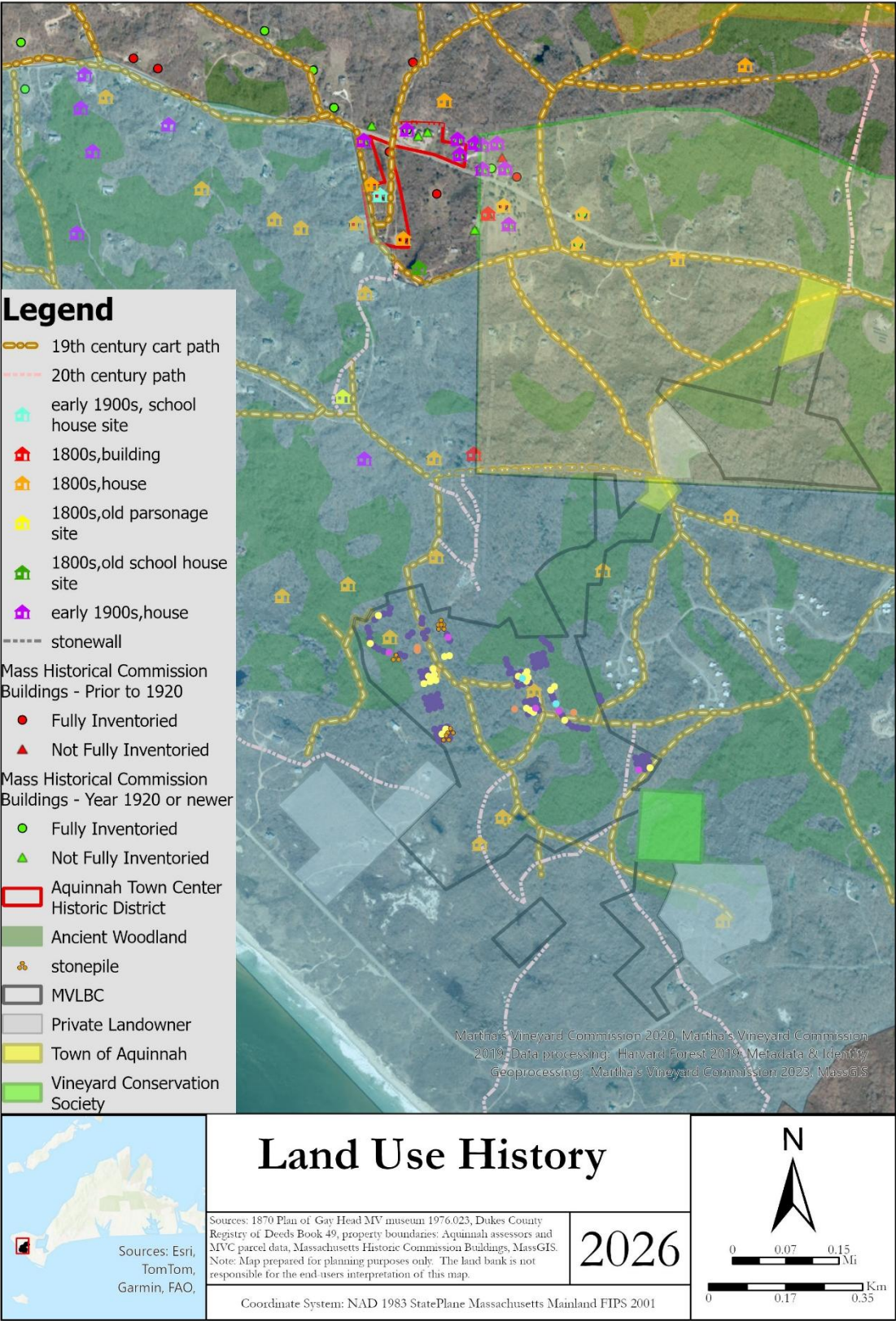


Toad Rock Reservation is located in an area named "Middle Place" and "South Pasture". The settlement of Old South Road was booming during the 18th century. Several Massachusetts Historical Commission-inventoried buildings, pre-1920, are marked in the area where Old South Road intersects with State Road (Map 21, page 49). The area to the south of the congested town center was called the "Lower Town" and it comprises several homesteads that are represented on the property by timeworn foundations overgrown in brambles and thickets. The bogs of the interdunal marsh swales that occur on and around the property were flooded during the 19th and early 20th centuries and surrounded by a dynamic dune system. One of the houses belonging to Esther Howwaswee was located overlooking Hebron's Pond. It was the second house belonging to Esther. Both were unbuilt and moved to new locations after the shifting sand overwhelmed each little house; which is a testament to the power wind once had on the maritime dune system. Neighboring homesteads to the north on the property belonged to the Wamsley family and included several houses, large barns, outbuildings, stone piles and long stretches of stonewall suggesting the area was cleared in upland areas and used for farming. The stone piles suggest some of the land was cleared for cultivation. Management strategies such as pounding posts instead of digging and adding material to exposed soil on trails are proposed to mitigate the exposure and disturbance of archaeological findings that are presumed to exist on the property. If digging is required, the presence of a certified cultural agent of the tribe would ensure all discovered artifacts are properly protected and that the project can continue. Consulting with a tribal historic preservation office for the Wampanoag tribe during trail siting helps identify sensitive areas to avoid and create management strategies to minimize impacts to cultural resources.

Figure 26: Maps of Wampanoag settlement in Aquinnah from 1620-1871



Map 21: Land use history map for Toad Rock Reservation, Aquinnah, MA



vi. Planning Process

- a) Initial field surveys.
 - 1) *Habitat delineation.*
 - 2) *Wildlife and vegetation inventories.*
 - 3) *Wetland delineation.*
 - 4) *Create soil and topography maps.*
- b) Pre-consultation with NHESP in regards to Priority Habitat mapping.
- c) Incorporate preliminary management plan goals into field survey results.
- d) Determine points of interest.
- e) Assess habitat management needs.
- f) Assemble public input.
- g) Identify areas that need to be avoided.
- h) Site trailhead and trails.
 - 1) *Flag initial trail and trailhead.*
 - 2) *Assess trail for grade and management issues.*
 - 3) *Walk the trail in both directions.*
- i) 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.

vii. Sociological Context

Toad Rock Reservation is positioned in the town of Aquinnah off Old South Road. The property is within 0.68 miles of Aquinnah center and is surrounded by a few private residences, conserved land, town of Aquinnah Land and Wampanoag tribal land. The area is admired for its cultural significance and scenic, recreational, and rural value provided its remoteness and pre-1870 undivided homesteads.

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 as fitting. Some general concerns already incorporated into this management plan include:

- a) Trespassing on private property.

- b) Hunting near private residences.
- c) Disturbance of cultural artifacts.

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 balancing the public use of natural resources with protection of the same.

2. Goals at Purchase

The purchase of Toad Rock Reservation meets all of the land bank's seven criteria for property acquisition: forest land conservation; wetland conservation; ocean and pond frontage and wetland environs; 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 advisory board in 2005 and 2016 (Appendix B: page74).

3. Opportunities

The 101 acres of Toad Rock Reservation provides several opportunities for the public to interact within these scenic landscapes. They are as follows:

i. Access:

A proposed 3-vehicle trailhead located off-premises on parcel 171 (map 9) will serve as the secondary trailhead for access to the property. An existing 2-vehicle off-premises trailhead is located off Towhee Lane on parcel 60 (map 12). The proposed trail system will connect the two trailheads.

ii. Trails and boardwalks:

A through trail and loop trail comprising of 2.8 miles of trail and boardwalk is proposed that will connect State Road and Gay Head Moraine to the north with Moshup Trail and Squibnocket Reservation to the South. Approximately, 0.25 miles of trail exist on the property that is accessed by the 2-vehicle trailhead for the former Toad Rock Preserve located on Towhee Lane in Aquinnah. The existing trail will be incorporated into the proposed trail system. In some cases, the trail crosses through parcels on the property in which private parties have outstanding partial interests. The proposed trail system will allow those with outstanding partial interest to access their interests in otherwise inaccessible properties.

iii. Views:

The property offers intimate views of isolated ponds, open dune and both dense and open understory woodlands all the while ocean waves produce a soft symphony to the otherwise still

environs. Several interior benches and cultural educational signs are proposed along the trail. The existing trail offers extensive views from Surveyor's Hill of Squibnocket Pond and beyond to Noman's.

iv. Gatherings of natural products:

The property provides some opportunities for gathering for household use. There are berries pickable from the trail environs as it meanders through coastal woodlands and small quantities of cranberries are available in the interdunal swales. 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. Hunting:

The remote nature of the property provides ample space for hunting of deer by shotgun, muzzleloader and archery as well as the hunting of turkey and pheasant. There are 61 acres of the property available for hunting (Map 29, page 72). The plan proposes to limit deer shotgun hunting to the number of hunters recommended by the hunting subcommittee.

vi. Fishing:

There is no access to the small ponds on the property for fishing. Water level in the ponds is less than one foot in most areas.

vii. Passive recreation:

The property is well-suited for passive recreational.

a) Birdwatching

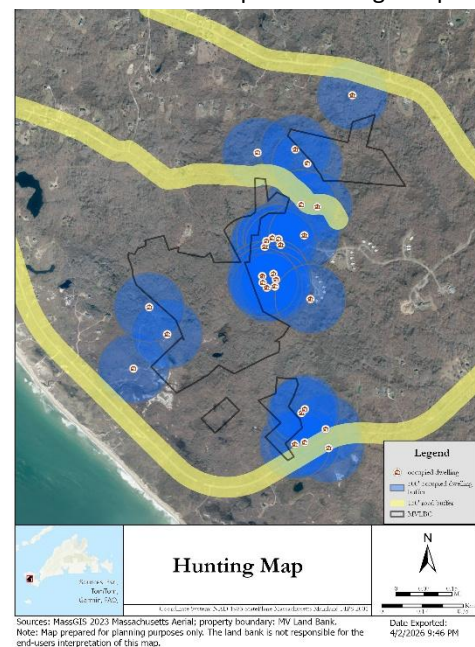
The variety of habitats provides excellent birdwatching especially during the migratory seasons in April and early September.

b) Hiking

The proposed trails provide an opportunity for 2.8 miles of hiking. Due to the various boardwalks and sensitive habitats bicycling and horseback-riding are not proposed for the property. However, bicycle racks will be provided at trailheads to ensure those traveling to the property by bicycle can store it while hiking the trails on foot.

viii. Universal Access (UA)

Map 22: Huntability area with a firearm at Toad Rock Reservation and zone of no discharge of a firearm 500' from occupied dwellings Map. See



Steep slopes at the proposed trailhead and sandy soils at the existing trailhead are factors that preclude universal access on the property. The property's ROS (Recreation Opportunities Spectrum) classification is "Semi-Primitive Non-motorized". Further details are included in Appendix J, page 165.

III. Land Management Planning

This final section of the management plan states goals for Toad Rock Reservation and outlines land bank 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 preliminary management plans for the property are shown on Map 32, page 85 in Appendix A.

Nature Conservation Goals

Provide long-term protection for plants, wildlife, and natural processes occurring at Toad Rock 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 listed breeding birds observed through breeding bird surveys on the property.
 1. Site trails around expansive woodland thickets where possible.
 2. Prohibit pets during the breeding season (April – September); leash otherwise.
 3. Site trails outside of contiguous shrublands that support breeding harrier activity.
 - a. Conduct management activities in harrier habitat prior to March 1 and after June 30.
 4. Retain snags that do not create a hazard to the public on the property.
- E. Promote habitats and protect specific host plants that support rare moth species on the property.
 1. Protect dune and swale habitat by ensuring management practices do not alter the hydrology of the property.
 2. Retain old- or late-successional trees in the open woodland area.
 3. Screen abutting light pollution where possible.
 4. Protect larval host plants from cutting and overgrowth of competing species, invasive species and succession. Encourage host plant population growth through cultivation from native stock and utilization in screening and restoration areas.
- F. Protect and promote robust habitats of rare plants by removing invasive species, promoting biodiversity and managing succession where necessary rare plants on the property.
 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. Conduct botanical surveys by a qualified botanist for known rare plants of proposed areas and within 20 feet of management areas in appropriate habitats within 12 months of the 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.
 5. Create a mowing regime for the open spaces of the property to protect and promote rare plant propagation, dispersal and expansion, if ever deemed necessary.
- G. Protect rare bats and their habitat observed on the property through acoustic and mist-netting surveys.
1. Prohibit cutting of known roost trees and trees within a 150-foot radius between June 1 and July 31.
 2. Protect woodland habitat continuity around any known northern long-eared bat hibernacula by establishing a 0.25-mile radius no-cutting area.

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

Strategies:

- A. Protect habitat corridors that create large contiguous ecological communities and promote movement of species for breeding, foraging and range shifts in response to climate change and genetic exchange.
- B. Site trails and trailhead to avoid the disruption of species movement between breeding, foraging and shelter spaces.
- C. Avoid siting trails within riparian corridors, where possible, to allow for the natural expansion of streams during periods of heavy precipitation; where unavoidable, install boardwalks with minimal vegetation disturbance and at appropriate heights to accommodate free flowing water in floodplains.
- D. Identify areas of significant sensitive biodiversity value and site trails to avoid these areas unless a compelling reason exists to visit 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 clean fill, as necessary.
 2. Install steps (stone, earthen, wood or 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 sideslopes 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 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 waterbars, troughs, banking and other methods fitting to the soil substrate and topography.
 10. Use stone and ramps at boardwalk ends, as necessary.
- 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

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 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. Site trails that provide views of water.
 3. Use boardwalks with light-penetrating decking and no-dig footers within wetland resource areas.
- F. Limit direct access of the pond and emergent marsh shoreline.
- G. Prohibit temporary boating in the pond.
- H. Site trails outside of prime breeding habitat where feasible.
- I. Provide distant views of bird habitat from trails and install benches.
- J. Install educational signs regarding wildlife, such as river otter, and their habitat on the property.
- K. Enforce and post pet rules on the property as defined in Section B. Objective 8.
- L. Monitor changes in vegetation cover during regular property checks and by updating ecological inventory in 2036.

Objective 6: Manage open habitats and views.

Strategies:

- A. Protect the sandplain heathland and dune community through selective cutting of trees as they migrate into the habitat.

1. Retain open-growth trees, larger shrub pockets.
 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. Maintain capacious views of Squibnocket Pond and Noman's from Surveyor's Hill.
1. Cut shrubs no less than three feet in an undulating fashion to maintain views from the trail.
 2. Limb trees up to ten feet from the ground to improve views south from the trail.
 3. Stump-grind any trees that died and are impeding the view.

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. File with the Aquinnah Conservation Commission for planned treatments of exotic and invasive species that occur within wetland resource and buffer zones.
- H. File with NHESP for planned treatments and modifications thereof that occur in priority habitats.
- I. 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 downed trees when they occur simultaneously in one area and pose a fire risk; otherwise retain individual downed trees as habitat.
- F. Explore the use of controlled burns to manage understory woodland fuels.
- G. Thin woodlands in targeted areas following an approved forestry plan to reduce fire fuel where woodlands meet development and within large tracks.

Objective 9: Protect natural processes on the property.

Strategies:

- A. Encourage native plants that support native pollinators.
 1. Plant native wildlife host plants to increase diversity in areas that require screening.

2. Use island-grown native plants and/or seed for any restoration or screening projects.
 3. 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. Convert a buffer of woodlands abutting coastal wetlands to open habitats as needed.
 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 habitat management 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, filling, dredging, building 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 thereunder
 - (c) Land subject to flooding or inundation by groundwater, surface flow, tidal action or coastal storm flowage
 - (2) Zoning by-law IV. Conservation regulations
 - i. Special permit uses
 - (a) Removal of all vegetation over 3" diameter at base from areas greater than 200 ft²
 - (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.
 - (d) Removal of ground cover, shrub or tree from Moshup Trail district.
 - (e) Cutting of vegetation within 150' from bluff or cliff crest.
 - (f) Topping or pruning that increases the visibility of a structure.
 2. Site waterview trails on the highest elevation possible away from wetland resource boundaries 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. Limit peat harvest of wetlands.
4. Protect wetlands from water-level loss and promote native species.

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 recreation uses between dawn and dusk with the exception of star-gazing and fishing that occur after dusk (see project map).
- B. Provide access for land recreation (hiking, birdwatching, non-motorized bicycling etc.).
 1. Encourage pet walkers, through signage, to bag or remove excrement from the property.
 2. Install a bike rack at trailheads to accommodate visitors arriving via bicycle.
 3. Use signage to enforce the pet policy on the property as defined in B. Obj. 8.
 4. Prohibit the launch 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 banks 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 required contact a designated member of the tribe to be present during the activity.
 5. Consult with Massachusetts Historical Commission and Cultural Officer for the Wampanoag Tribe prior to implementation of the plan and any adaptive changes made to the plan in the future.
- 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, if necessary.
 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 any 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.

Objective 2: Manage existing trails on the property.

Strategies:

- A. Maintain approximately 1,958 linear feet (11,748 ft²) of the existing trail on the property.
 - 1. Replace decking on ground-level boardwalk as needed.
 - 2. Mow and use hand tools to manage vegetation along trails to maintain a trail corridor of 8 feet.
- B. Incorporate appropriate existing trails into the trail system for the property and manage per the methods outlines in B. Obj. 5.
- C. Close existing trails not targeted for use in the trail system using fencing and/or brush.

Objective 3: Designate 2-vehicle trailhead of Towhee Lane as the main trailhead for the property.

Strategies:

- A. Instruct visitors in the land bank map and website to use the Towhee Lane trailhead as the primary access to the Property.
- B. Maintain land bank logo marker on Moshup Trail to indicate the trailhead location.
- C. Use stone or split-rail fencing to demark the boundary of the trailhead, as necessary.

Objective 4: Create 3-vehicle trailhead off Old South Road on Town of Aquinnah property following the interagency agreement that the land bank has with the town regarding this property.

Strategies:

- A. Create a 28' by 40' (1120 ft²) trailhead off Old South Road at Toad Rock Reservation.
 - 1. Add hardener to stabilize soil, as needed.
 - 2. Level trailhead area through the addition of material to low areas.
- B. Use split-rail fencing and/or stones to limit vehicle access to the trailhead environs only as needed and where appropriate.
- C. Trim vegetation at trailhead access point, as needed, to maximize a good line of site.
- D. Install information kiosk at trail entrance and land bank logo marker.
- E. Install bicycle rack.

Objective 5: Create new trails as shown on the Project Maps.

Strategies:

- A. Create approximately 11,931 linear feet (65,140 ft²) of new trail at the property including trail easements that connect various parcels together.
 - 1. Make trail corridors eight feet wide with a maintained tread of six feet for trails on land bank property
 - 2. Make trail corridors as stated in any easements.
 - 3. Use ride-on or walk-behind mower (as determined by dbh of understory vegetation) and hand tools to create trail; avoid cutting trees.
 - 4. 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.
 - 5. 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. Employ the half rule and limit the trails grade to half the grade of the side-slope.
 - c. Limit grade to no more than 15% with an average grade of less than 10% (6°).
 - d. Install stairs where a slope of greater than 15% exists and cannot be avoided.

-
- e. 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).
 - f. Use existing trails where possible and appropriate.
 - B. Avoid siting trails through wetland resources areas and associated buffer zones where possible.
 - 1. Install raised boardwalk as use dictates when siting trails through a wetland resource area is unavoidable.
 - 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 maritime dunes 2' above the grade of surrounding dune system to allow for free movement of sand.
 - 2. Prohibit bicycles and horses on trails due to extensive boardwalks.
 - C. 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.
 - 3. Follow the contours of the shoreline and banks when siting trails along water.
 - D. 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 erosion from precipitation by siting trails 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 outlopes).
 - E. Minimize the cutting of trees in the creation of trails.
 - F. Allow staff discretion to close or relocate trails or add new trails, such as spur trails for off-property trail connections.
 - G. 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.
 - H. 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.

- I. Mark trails with directional signs.
- J. Check and maintain trails monthly.
- K. Maintain existing trail system in good condition to discourage visitor divergence from trail.

Objective 6: 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 intimate interior views and long-distance views south from Surveyors Hill through tree removal and annual trimming, mowing and limbing of branches.
 - 1. Trim vegetation to undulating heights with a minimum height of 36".
 - 2. Flush-cut trees and limb branches for long distance views.
 - 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. Install rustic benches and view platforms where appropriate.
- D. Maintain existing open spaces through selective cutting.
- E. Manage vegetation along stonewalls, foundations, and fences using hand equipment.
- F. Rebuild stonewalls and foundations, as needed.
- G. Plant native vegetation to screen houses that diminish views.

Objective 7: Entertain possibilities for other trail links.

Strategies:

- A. Create new trails, as necessary, to connect the property to future conservation land and trail easements.
- 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 8: Manage pets on the property.

Strategies:

- A. Prohibit dogs April – September and otherwise permit leashed pets; dogs must be under the immediate control of the owner at all times.
- B. Escalate permitted dog rule to a prohibition of 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.
- E. Post rules and educational signage regarding dogs and wildlife in appropriate locations.
- F. Post pet rules on land bank website.

Objective 9: 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 equipment from the property promptly.
 2. Re-survey any known squatting locations 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 10: 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.

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 hunting at Toad Rock Reservation by permission following the land bank hunting policy.

Strategies:

- A. Allow archery hunting (5 hunters per week) at Toad Rock Reservation during the Massachusetts deer archery season; review annually and adjust in response to recommendations from hunting subcommittee.
- B. Allow general hunting deer shotgun [MA approved season (2) weeks], blackpowder, archery; turkey (spring and fall); and pheasant.
 1. Permit hunters to use dogs for pheasant hunting
 2. Hunting dogs must be in the immediate control of the owner
 3. Ban hunters and dogs on an individual hunter basis as needed in response to negative interactions reported to or observed by staff.
 4. Close properties to the public during the two-week deer shotgun season and any future season that warrants a closure; post closure signs one week prior to the start of deer shotgun and remove day after deer shotgun season ends.
 5. Close property during deer-shotgun hunting season, or other firearm hunting season, at the discretion of the land superintendent after consulting with the land bank hunting subcommittee.
 6. Post trail easements.
- C. 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.
- D. Require hunters to remove all deer by foot using the trail system.

- E. Allow the dressing of deer on premises providing the viscera are buried on the property no closer than 100 feet from any trail or trailhead.
- F. Advise permitted hunters of their rights and regulations by directing them to the [mass.gov/hunting-regulations](https://www.mass.gov/hunting-regulations) website (<https://www.mass.gov/hunting-regulations>).
- G. Direct hunters to the land bank hunting policy located on the landbank website (<https://www.mvlandbank.com/properties/hunting>) for maps and land bank rules and regulations.
- H. Notify the public of the hunting policy and hunting season dates for the property through the land bank website.
- I. 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 wetland and dune habitats to protect known rare plant population from unintentional damage.
- C. Allow the collection of plant parts and 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 any individual plant.
- E. Encourage the gathering of permitted 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 to 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, state 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>).

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 updated accordingly.
- D. Install "End of Public Property" signs where appropriate and boundary signs every 50-100 feet.
- 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.

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. Provide pedestrian access via the trail system to land owners with outstanding partial interests in some parcels of the property that are otherwise inaccessible to those partial interest owners.
- C. 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 with current aerial photographs regarding boundary encroachments
 - 1. Walk boundaries to confirm a potential encroachment violation.
 - 2. Correct encroachment 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 noncompliant.

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 6: Monitor and oversee recreational use of Toad Rock Reservation.

Strategies:

- A. Install wildlife cameras to monitor wildlife and unauthorized uses.
- B. Utilize a summer ranger on the property, as needed.

Objective 7: 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 commission regarding the proposed activities in the plan with regards to historic landmarks and artifacts.
- E. Follow deed restrictions attached to the parcels at Toad Rock Reservation.
- F. Contribute the land bank's share to property's road association to cover matters managed by such associations, e.g., surface maintenance, speed-limit postings and other postings as to use rules, insurance etc.

IV. Literature Cited

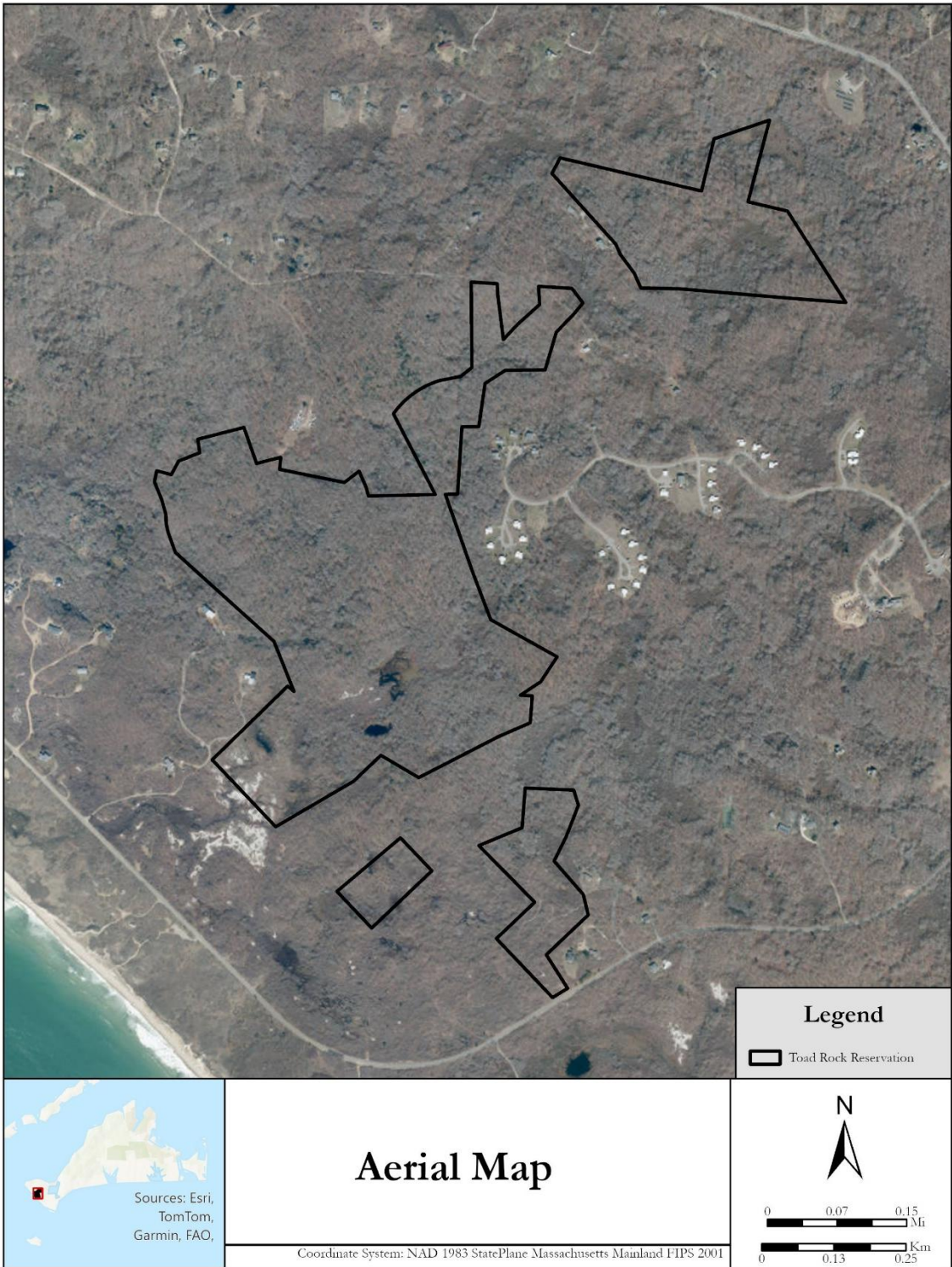
- Avery, T. and H. Burkhart. 2002. Forest Measurements. McGraw-Hill, Boston, MA. 456 pp.
- Banks, C. E. 1911 (1966). The History of Martha's Vineyard Dukes County Massachusetts. Volume II. The Dukes County Historical Society, Aquinnah, MA.
- Belušič, G., Pirih, P. and Stavenga, D.G. 2013. A cute and highly contrast-sensitive superposition eye—the diurnal owlfly *Libelloides macaronius*. *Journal of experimental biology*, 216(11), pp.2081-2088.
- Bennett, A.F., Haslem, A., Cheal, D.C., Clarke, M.F., Jones, R.N., Koehn, J.D., Lake, P.S., Lumsden, L.F., Lunt, I.D., Mackey, B.G. and Nally, R.M. 2009. Ecological processes: a key element in strategies for nature conservation. *Ecological Management & Restoration*, 10(3), pp.192-199.
- Borer, Carol. 1982. Moshup Trail: Site Design Guidelines. Town of Aquinnah, Planning Board, pp 42.
- Burgess, E. 1970. The Old South Road of Gay Head. The Dukes County Intelligencer Vol. 12, No. 1. Dukes County historical Society, Inc. Edgartown, MA. 40pp.
- Conn, C.E. and Day F.P. 1997. Root decomposition across a barrier island chronosequence: litter quality and environmental controls. *Plant and Soil*, 195, 351-364.
- Dresser, T. 2011. The Wampanoag Tribe of Martha's Vineyard: Colonization to recognition. The History Press, Charleston, SC. pp 191.
- Dukes County Registry of Deeds (DCRD), Books 49 and 65 Aquinnah, MA; Dukes County Registry of Deeds.
- Dukes County Registry of Deeds (DCRD), Land Titles and Boundary Lines of the Indian Lands of Gay Head Martha's Vineyard 1871.
- Dunwiddie, P.W. 1986. Terrestrial Vegetation Field Manual 2nd edition. Massachusetts Audubon Society.
- EPA. 2020. Ecological Processes: What are the trends in the ecological processes that sustain the nation's ecological systems. <https://www.epa.gov/report-environment/ecological-processes>
- Fletcher, P.C., Roffinoli, R.J. Soil Conservation Service (SCS). 1986. Soil Survey of Dukes County, Massachusetts. United States Department of Agriculture.

- Glover, S. and K. McBride. 1993. Current survey research on Martha's Vineyard: Gay Head- tribal Trust Lands and abutting lands. Conference on New England Archaeology. Newsletter Vol12, No.1. January 1993.
- Griffin, J.B. 1967. Eastern North American Archaeology: A Summary: Prehistoric cultures changed from small hunting bands to well-organized agricultural towns and tribes. *Science*, 156(3772), pp.175- 191.
- Hufstader, L. 2018. Aquinnah sites reveal 10,000 years of Wampanoag history. *Vineyard Gazette*. August, 19, 2018.
- Humphrey, T. (2023, January 6). Coyote is spotted in Aquinnah. *The Vineyard Gazette - Community*. Retrieved February 21, 2023, from <https://vineyardgazette.com/news/2023/01/06/coyote-spotted-Aquinnah>.
- Jones, R. and Etherington, J.R. 1971. Comparative studies of plant growth and distribution in relation to waterlogging: IV. The growth of dune and dune slack plants. *Journal of Ecology*, 59, 793-801.
- Kulp, S.A. & B.H. Strauss. 2019. New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding. *Nature Communications* 4844: <https://doi.org/10.1038/s41467-019-12808-z>
- Lee, L. 1998. *Vineyard voices: words, faces and voices of Island people. And There He Was – Right There.* Martha's Vineyard Historical Society. Edgartown, MA. P178.
- MCIA. 1982. Massachusetts Commission on Indian Affairs: Annual Report 1982.
- Mass.gov. 2023. <https://www.mass.gov/service-details/learn-about-river-otters>.
- MassWildlife. 2017. *Living With Wildlife - Eastern Coyotes in Massachusetts.* MassWildlife.
- Moody, W. 2008. Living on the edge: PaleoIndians on Martha's Vineyard. *Bulletin of the Massachusetts Archaeological Society*, Vol. 69, No.1.
- MVC. 2023. Squibnocket Pond Individual System Assessment. Martha's Vineyard Commission. Retrieved February 24, 2023, from <https://www.mvcommission.org/watersheds-marthas-vineyard>.
- New York Natural Heritage Program. 2026. Online Conservation Guide for *Maritime freshwater interdunal swales*. Available from: <https://guides.nynhp.org/maritime-freshwater-interdunal-swales/>. Accessed February 26, 2026.
- NOAA. 2023. What is a salt marsh? National Ocean Service. Retrieved February 17, 2023, from <https://oceanservice.noaa.gov/facts/saltmarsh.html>
- Oldale, R. N. 1992. *Cape Cod and the Islands: The Geologic Story.* Parnassus Imprints.
- Oliver TH, Heard MS, Isaac NJB, Roy DB, Procter D, Eigenbrod F, Freckleton R, Hector A, Orme CDL, Petchey OL, Proença V, Raffaelli D, Suttle KB, Mace GM, Martín-López B, Woodcock BA, Bullock JM. Biodiversity and Resilience of Ecosystem Functions. *Trends Ecol Evol*. 2015. Nov 30 (11):673-684. doi: 10.1016/j.tree.2015.08.009. Epub 2015 Oct 1. PMID: 26437633.

-
- Plane, A. M., & Button, G. 1993. The Massachusetts Indian Enfranchisement Act: Ethnic Contest in Historical Context, 1849-1869. *Ethnohistory*, 40(4), 587–618. <https://doi.org/10.2307/482589>
- Poi de Neiff, A.; Neiff, J.J., and Casco, S.L. 2006. Leaf litter decomposition in three wetland types of the Parana River floodplain. *Wetlands*, 26(2), 558-566.
- Pierce, R. A., & Segel, J. D. 2016. Wampanoag families of Martha's Vineyard: the Wampanoag genealogical history of Martha's Vineyard, Massachusetts : volume I (Vol. I). Genealogical Publishing Company.
- Proulx, D. (2023, February). Coyote Talk with Dan Proulx. West Tisbury; Massachusetts.
- Raesy, E.J. 2001. Progress and status of river otter reintroduction projects in the United States. *Wildlife Society Bulletin*, pp.856-862.
- Rawlins, K.A., R.L. Winston, C.T. Barger, D.J. Moorhead, and R. Carroll. 2018. New Invaders of the Northeast and Northcentral United States. USDA Forest Service, Forest Health Assessment and Applied Sciences Team, Morgantown, West Virginia. FHTET-2017-04.
- Silverman, D. J. 2005. Faith and boundaries: Colonists, Christianity, and community among the Wampanoag Indians of Martha's Vineyard, 1600-1871. Cambridge University Press.
- Smith, R. S., Johnston, E. L., & Clark, G. F. 2014. The role of habitat complexity in community development is mediated by resource availability. *PLoS ONE*, 9(7). <https://doi.org/10.1371/journal.pone.0102920>
- Swain, P. C. 2020. Classification of the Natural Communities of Massachusetts. Massachusetts Division of Fisheries and Wildlife, Westborough, MA.
- Walling, H. F. 1858. Map of the Counties of Barnstable, Dukes, & Nantucket, Massachusetts. Martha's Vineyard Museum. map.

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

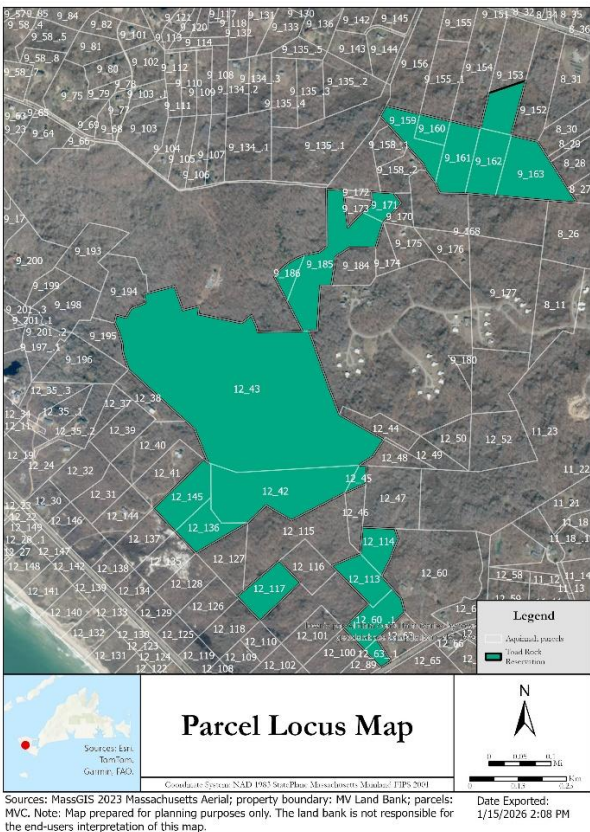
Map 23: Aerial image of Toad Rock Reservation, Aquinnah, MA.



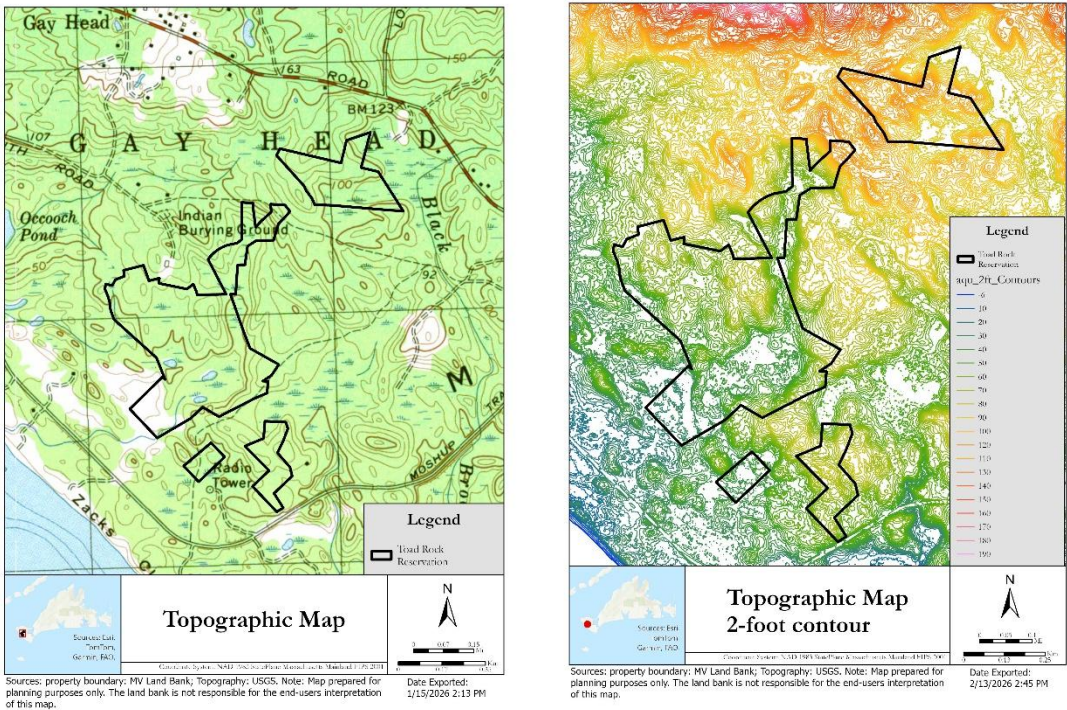
Sources: MassGIS 2023 Massachusetts Aerial; property boundary: MV Land Bank.
Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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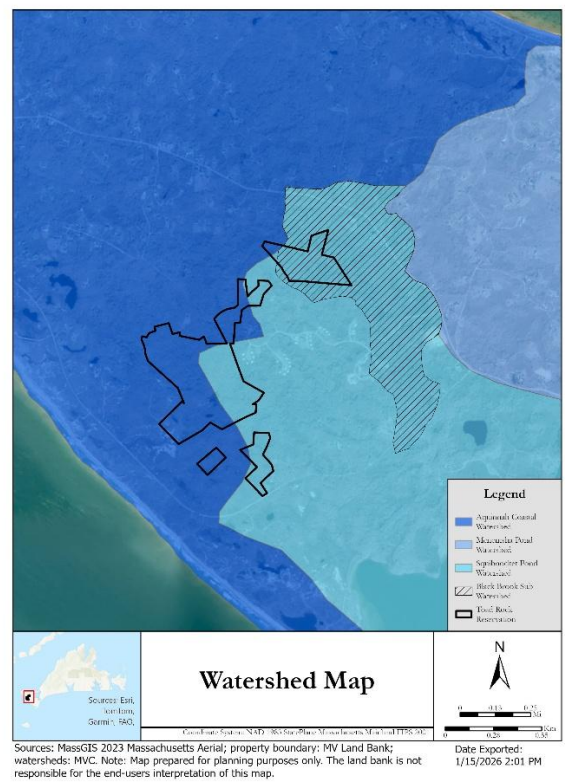
Map 24: Town parcel map of Toad Rock Reservation, Aquinnah, MA.



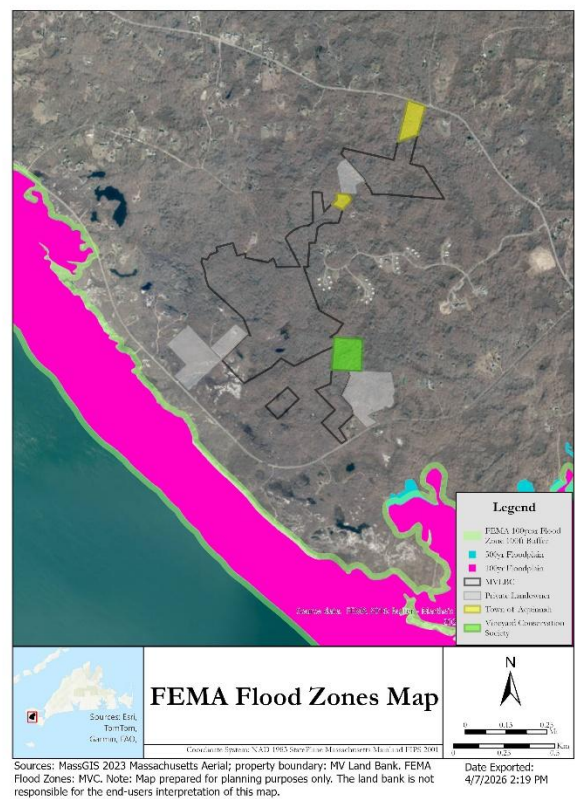
Map 25: Topographic maps of Toad Rock Reservation, Aquinnah, MA.



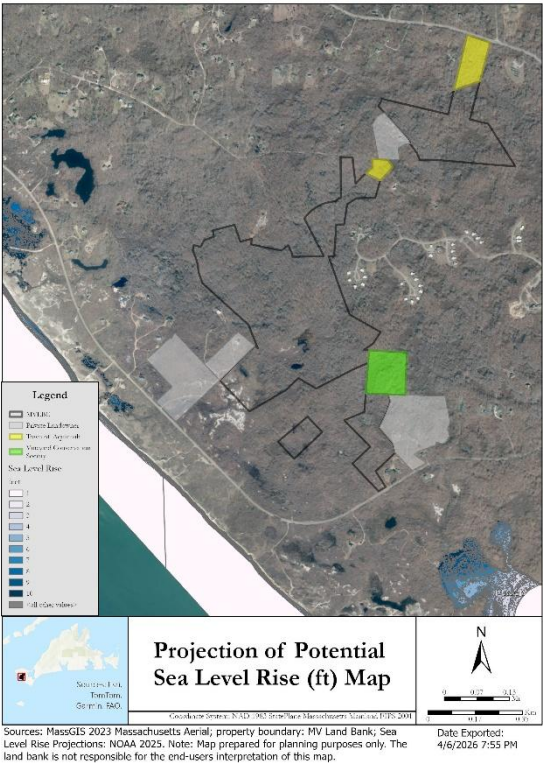
Map 26: Watershed boundaries map of Toad Rock Reservation, Aquinnah, MA.



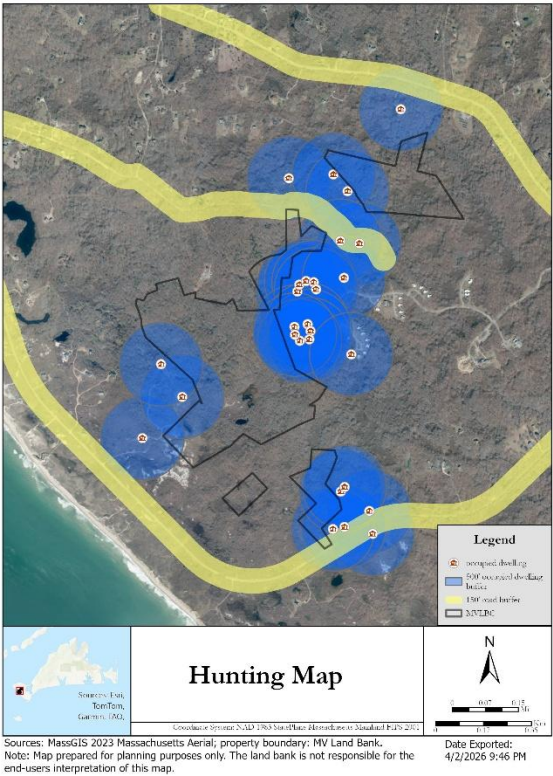
Map 27: Flood zones (FEMA) of Toad Rock Reservation, Aquinnah, MA.



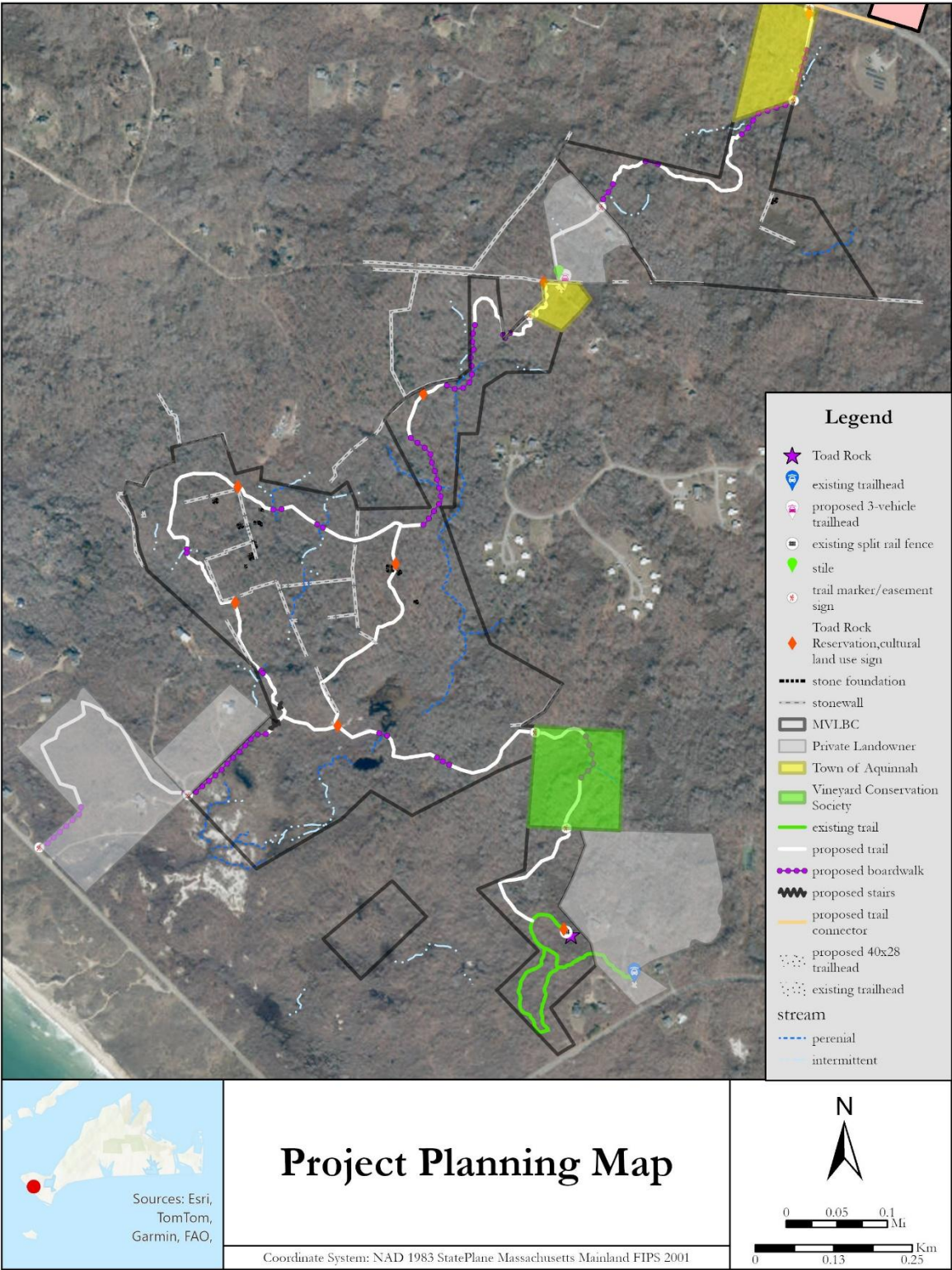
Map 28: Sea-level rise scenarios and the resulting impact zones of Toad Rock Reservation, Aquinnah, MA.



Map 29: Hunttable areas of Toad Rock Reservation, Aquinnah, MA.



Map 30: Proposed project planning map of Toad Rock Reservation, Aquinnah, MA.



Sources: MassGIS 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 Toad Rock Reservation follow.



August 29, 2005

Martha's Vineyard Land Bank Commission

Toad Rock Preserve preliminary management plan

acreage	± 2.8 acres
tax parcel nos.	12-60 (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) prohibit hunting, given adjacent road and occupied dwelling.
aesthetic goals	(1) maintain (and expand, as appropriate) view of the Atlantic Ocean.
recreational goals	(1) site trailhead off the Moshup Trail, with space to accommodate two vehicles. (2) open property for hiking, non-motorized biking and horseback-riding and other passive uses; install trail(s) where appropriate (3) arrange trail connections to other conservation areas and neighborhoods; arrange for proper signage to inform hikers of any restrictions on these off-premises trails

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September 12, 2016

Martha's Vineyard Land Bank Commission

Toad Rock Preserve [expansion] preliminary management plan

<i>acreage</i>	46.5 acres [partial interest]
<i>tax parcel nos.</i>	12-43
<i>nature conservation goals</i>	(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
<i>natural products goals</i>	(1) study suitability of property for hunting — with a predisposition to allowing it — by seeking a recommendation from the land bank hunting subcommittee
<i>recreational goals</i>	(1) integrate property into existing adjacent preserve (2) install additional trails as fitting, especially in connection with the planned cross-Aquinnah trail
<i>administrative goals</i>	(1) oversee and police land on regular basis in order to maintain property as an attractive conservation area

approved by vote of the Aquinnah town advisory board: August 29, 2016

approved by vote of the land bank commission: September 12, 2016

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B. Deeds for Toad Rock Reservation

The complete deeds to Toad Rock Reservation are reference below and can be located in the Dukes County office of Recorded and Registered Lands (<https://www.masslandrecords.com/Dukes/>).

Table 6: Documentation of deeds for Toad Rock Reservation, Aquinnah, MA

Guarantor	Day	Year	Book/Page
Michael F. Fontes III	6-Jun	2003	950-817
Ernestine M. Peckham, trustee et al.	30-Oct	2003	976-169
David H. Wice et al.	29-Dec	2005	1067-1033
Island Affordable Housing Fund, Inc.	30-Dec	2005	1068-174
Clair M. Waterbury, Jr.	18-Jan	2006	1070-211
Paul W. Waterbury	18-Jan	2006	1070-214
Victoria Brown	21-Jun	2006	1087-116
Russell H. Smith	7-Nov	2006	1100-978
Carmela E. Stephens, trustee	23-Jan	2007	1108-493
Esther Chandler	7-Mar	2008	1144-995
John Occococh Vanderhoop	7-May	2009	1178-327
Donald Taylor	11-May	2009	1178-780
Nathaniel A. Wice et al.	16-Jun	2015	1378-954
George B. Brush, trustee et al.	29-Jun	2016	1409-294
Jan W. Whiting, court comm	13-Apr	2017	1436-261
Donald D. Worley, personal representative	15-Jun	2017	1441-494
Sharon J. Nowell	13-Jul	2017	1443-741
Richard K. Fabio	13-Jul	2017	1443-743
Hope Horgan	31-Jul	2018	1473-135
Jeffrey L. Madison et al.	21-Feb	2020	1521-636
Marie Monteiro	25-Feb	2025	1702-945
Andrea Winfrey	25-Feb	2025	1702-949
Roque Monteiro	25-Feb	2025	1702-953
Otis Peter Jeffers III	5-Mar	2025	1703-458
Sylvia Browne	25-Mar	2025	1704-990
Karen van Brakle	31-Mar	2025	1705-331
Renée Metell	1-Apr	2025	1705-407
Edward Harris III	16-Apr	2025	1706-606
Grace Reeves	17-Apr	2025	1706-698
Helen Wanzer Mays	22-Apr	2025	1706-981
Cynthia V. Akins et al.	3-Jun	2025	1710-208
Beverly Wright MacDiamid	11-Jun	2025	1710-861
David Harris	15-Jul	2025	1713-331
Kenneth Silvia	30-Sep	2025	1719-145
Michele Lee	5-Dec	2025	1724-483
Brenda Martin	30-Dec	2025	1726-762

C. Surveys of Toad Rock 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 7: Documentation of surveys for Toad Rock Reservation, Aquinnah, MA

Guarantor	Date	Book	Page
MVLBC	11/7/2006	15	133
Aquinnah Resident Homesite Committee	2/21/2003	928	560
Madeline and Jean Missud, Jr	7/21/1959		

06/01/2000 05:44 2100040070 WILEY

PAGE 02

PLAN OF LAND IN GAY HEAD, MASS.

W. J. NORTON,

Surveyed

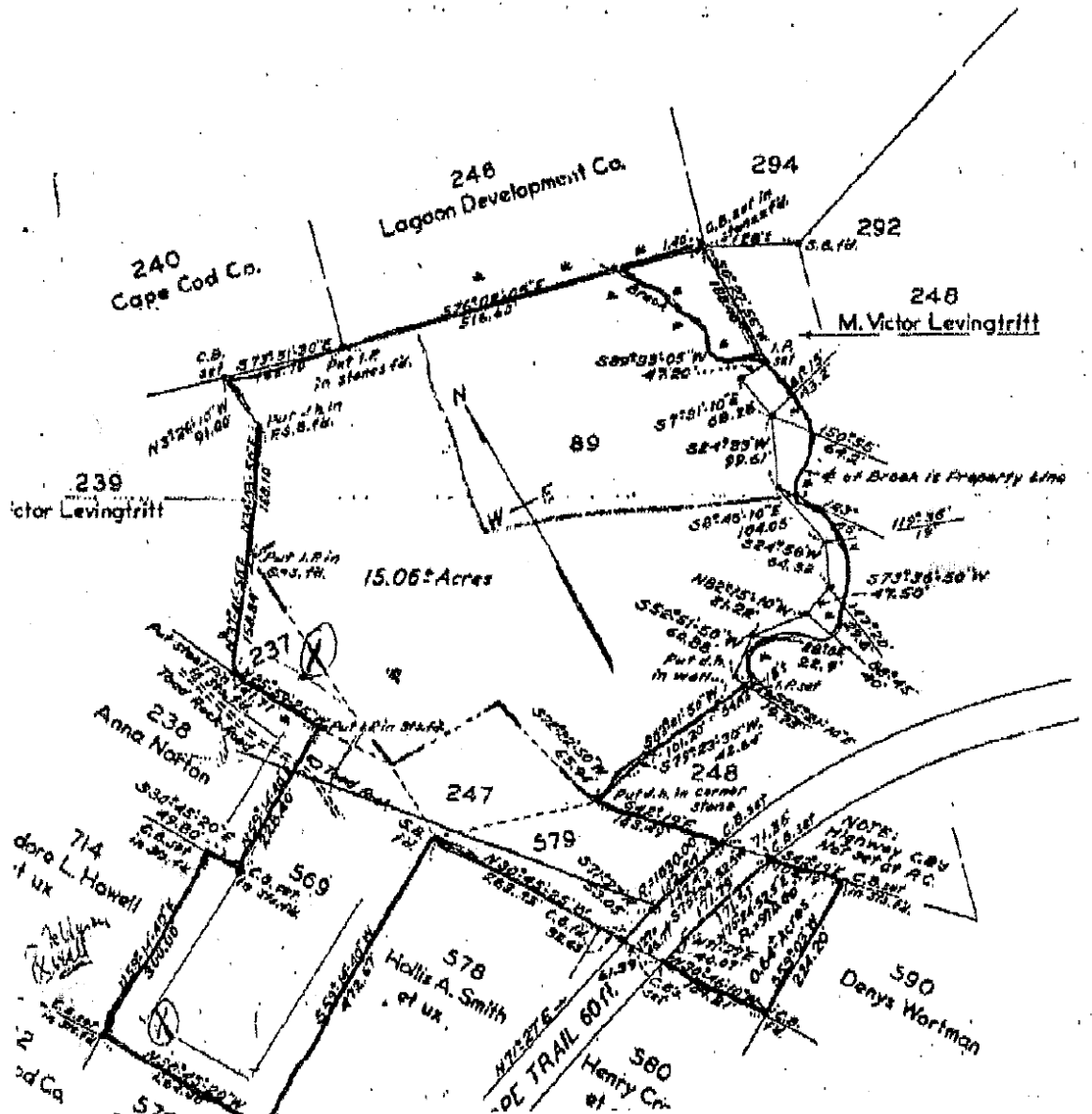
for

MADLINE J. & JEAN W. MISSUD, JR.

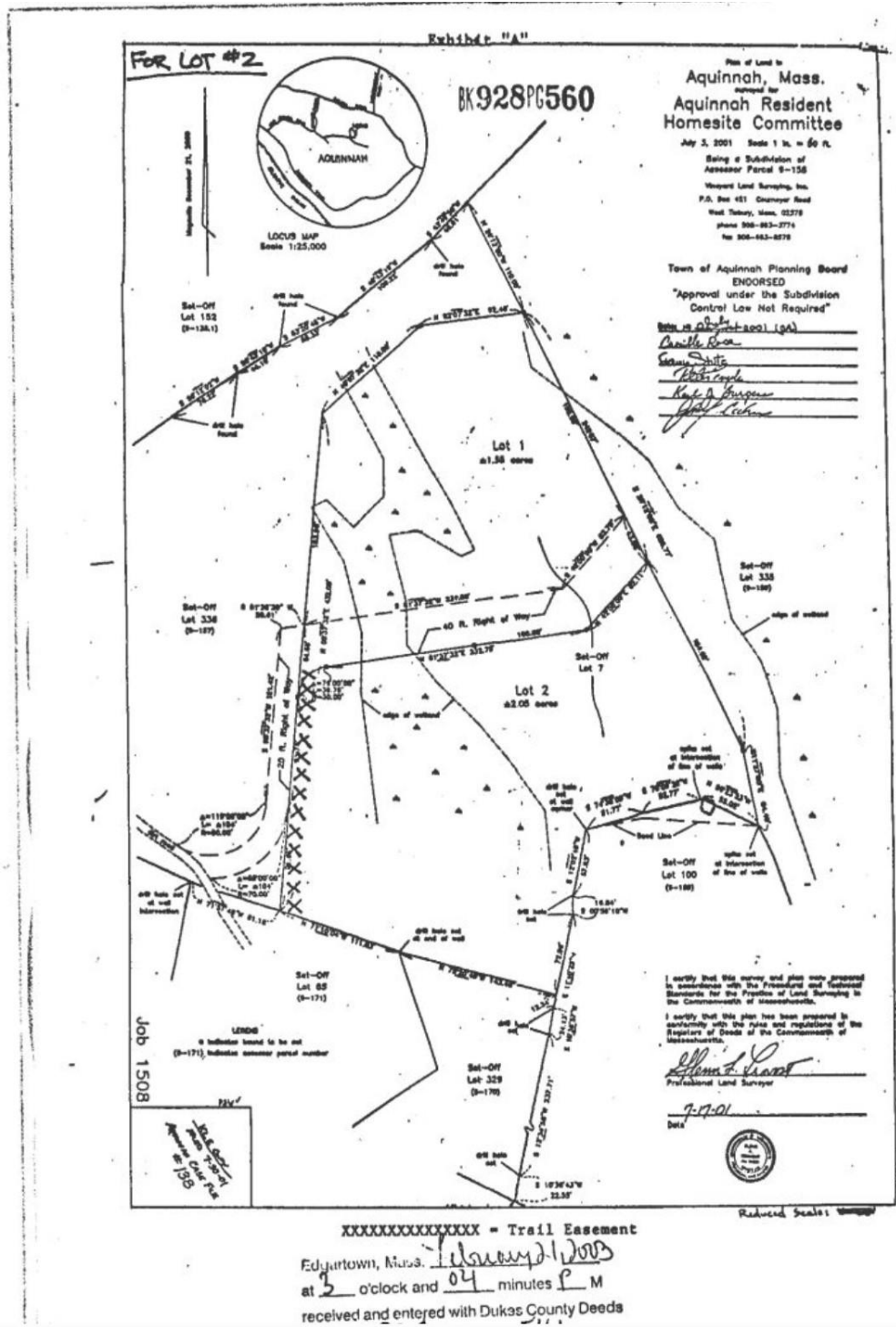
July 21, 1959.

Scale 1" = 200'

Hollis A. Smith, M. S. Reg'd. Land Surveyor
Vineyard Haven, Mass.







D. Covenants and Restrictions

Covenants and Restrictions pertaining to Toad Rock 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 8: Documentation of covenants and restrictions for Toad Rock Reservation, Aquinnah, MA

Date	Grantee	Grantor	Document Citation	Type
02/10/2003	Richard Skidmore and Joan LeLacheus	MVLBC	BK928 PG535	Trail easement
12/12/2003	Town of Aquinnah	MVLBC	BK983 PG274	Trail easement
12/29/2005	David and Betsy Wice	MVLBC	BK1067 PG1036	Trail and trailhead easement
02/20/2020	Moshup Trust and Pegasus Trust	MVLBC	BK1521 PG640	Access easement
02/07/2020	Fruchtman Family Trust	MVLBC	BK1521 PG642	Trail easement connecting "O" to "S" and short-term maintenance vehicle parking
02/21/202	M. Miller and Moshup Trust	Tacknash Trust	BK1521 PG549	Relinquish access easement, permit land bank maintenance vehicles to travel between and install a trail for public passive recreation between "S" and "T"
01/31/2020	Mark Miller	MVLBC	BK1521 PG656	Trail easement between "s" and "T"
09/12/2022	Town of Aquinnah	MVLBC		Trail and trailhead easements
12/15/2005	David and Betsy Wice	MVLBC	BK1067 PG1031 & 1033	View easement
12/16/2003	Town of Aquinnah	MVLBC	BK983 PG278	Conservation restriction and trail easement
09/15/2006	Russell Smith	MVLBC	BK1101 PG50	Conservation restriction

Appendix C. Soils Maps and Descriptions

A. Soil Maps

The Toad Rock Reservation is located in till and frontal moraine on Martha's Vineyard according to the N.S. Shaler map of 1888.

Figure 27: Surface geology map by N.S. Shaler (1888) with Toad Rock Reservation's location marked with a red star.

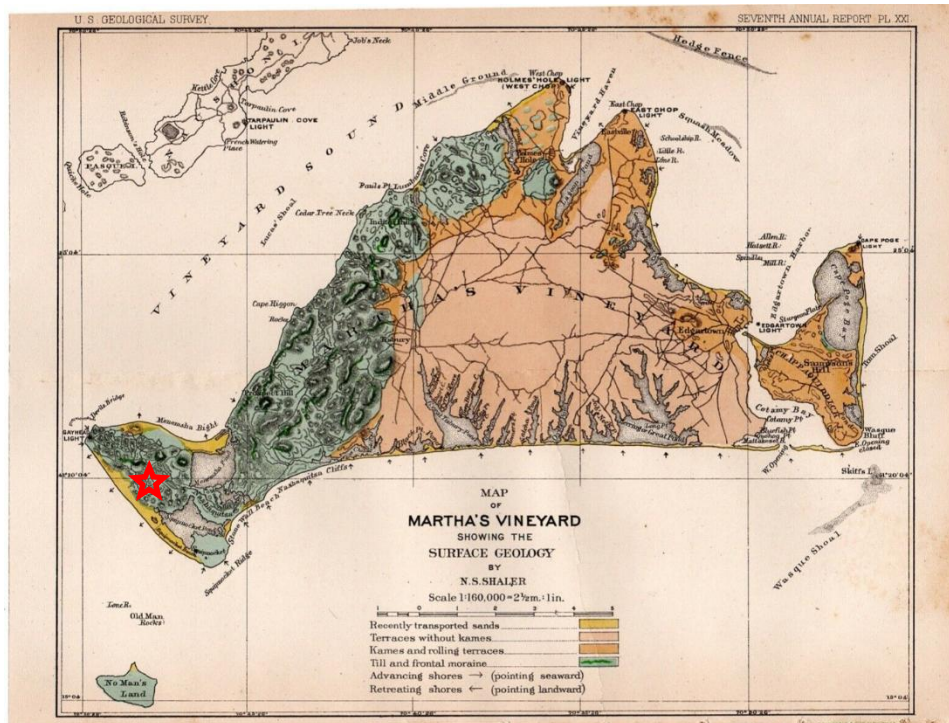


Figure 28: General soil as mapped by Soil Conservation Service (1986)

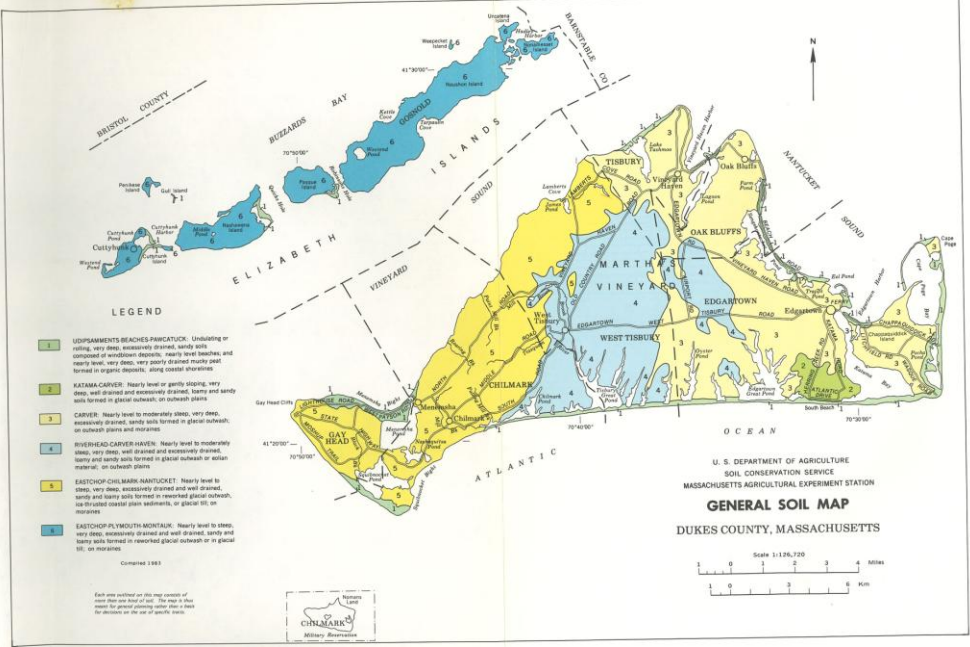
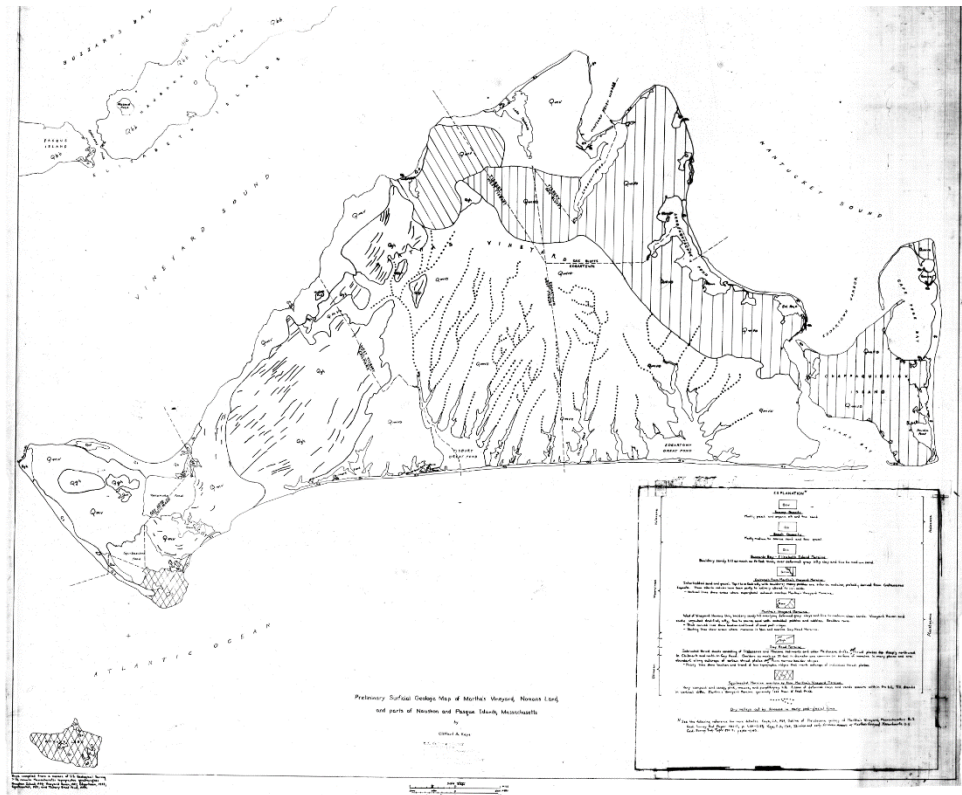
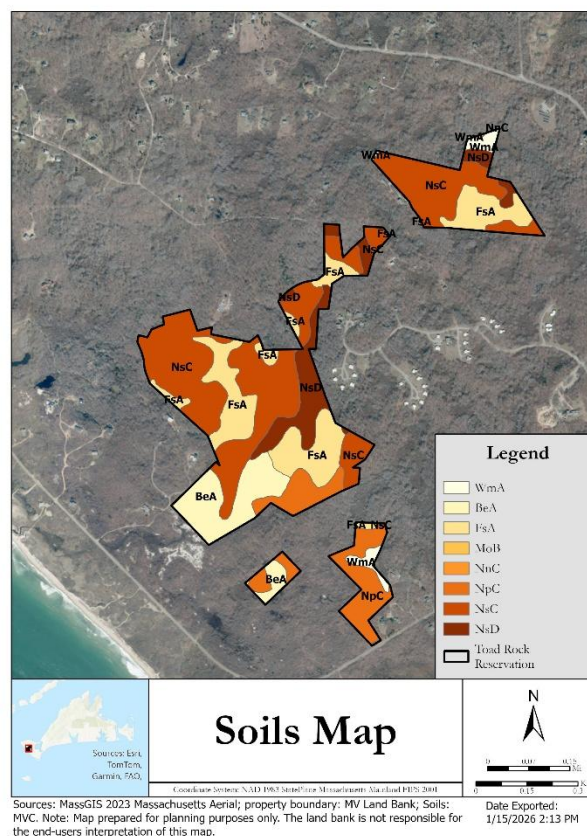


Figure 29: Preliminary surficial geologic map of Martha's Vineyard, Nomans Land, and parts of Naushon and Pasque Islands, Massachusetts, 1972 by C.A. Kaye 72-205



Map 31: Soil units on Toad Rock Reservation, Aquinnah, MA



B. Soil Type Descriptions

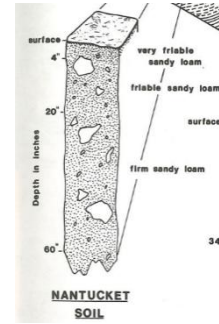
The soils found in Toad Rock Reservation are either poorly-drained wetland soils or stony soils of hills and rolling topography. They comprise Freetown and Swansea muck, Berryland loamy sand, Whitman, and Nantucket-Plymouth complex. The dominant soil on the property are those from the Nantucket-Plymouth series and are the only soils on the property suitable for farming providing the soil is not an issue. The following summaries of each soil type are derived from Fletcher & Roffinoli (1986) Dukes County Soil Surveys.

1. Freetown and Swansea mucks

- i. Freetown and Swansea muck (21.5 acres)
 - 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.

2. Nantucket Soil

- i. Nantucket-Plymouth complex, rolling, very stony (44.3 acres)
 - a) NsC 3-8%
- ii. Nantucket-Plymouth complex, hill, very stony (10.1 acres)
 - a) NsD unclassified slope
- iii. Nantucket-Plymouth complex rolling (12.3 acres)
 - a) NpC unclassified slope
- iv. Nantucket sandy loam, very stony (0.04 acres)
 - a) NnC 8-15% slope
- v. 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.



3. Berryland loamy sand

- i. Berryland loamy sand (11.5 acres)
 - a) BeA, 0-2%
 - b) Berryland soils are found in base of swales and low areas adjacent to ponds and swamps. These are poorly drained, nearly level soils with a seasonally high water-table. They are poorly suited to woodland production, farming and development.

4. Whitman Variant

- i. Whitman Variant silt loam, very stony (2.1 acres)
 - a) WmA 0-3% slopes
- ii. 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

A. Survey methods

During the late summer and early fall, quantitative vegetation surveys were conducted in the woodland (7/29/04, 10/11/06, 9/1/09, 8/15/17), shrub swamp (9/9/04), dune and swale (9/24/09, 8/17/17) and heathland (9/1/09) of Toad Rock Reservation (Map 32, page 85). Qualitative meandering surveys of the entire property were conducted in spring, summer and early fall of 2004 (09/09), 2007 (05/23, 08/01, 08/23, 10/02), 2008 (05/08, 06/01, 09/05, 06/16), 2009 (09/22), 2011 (07/27), 2019 (09/02), and 2025 (07/11).

1. Woodland

The woodland was surveyed following the point sampling method using a basal area factor of 10 as described by Avery and Burkhart (1994). 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 one plot per two acres for the first 10 acres and one plot per five acres thereafter using the formula $\text{feet between points} = \sqrt{\text{acres/point} \times 43,560}$. A total of 32 points was randomly located in the woodland using ArcPro 3.4 and plotted on the ground using a handheld GPS in 2004 (#6), 2006 (#5), 2009 (#5) and 2017 (#16). At each point a 10BAF wedge prism was used to locate 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 determined using a GRS densitometer and recorded for all plots. Additionally, visible down trees and snags were recorded for each point. Post data collection, plots were characterized into four habitats – coastal woodland, maritime woodland, mixed-oak woodland and red maple/black gum swamp – using the natural communities key based on the Massachusetts “Classification of Natural Communities” (Swain 2020). Mesic versus upland woodland points were categorized using the 20/50 rule for wetland vegetation delineation where dominant species are determined in each vegetation stratum as those with relative cover that adds to 50% beginning with the greatest percent in addition to those covering greater than 20%.

2. Maritime dune/interdunal marsh swale

The dune and swale on the Toad Rock Reservation was surveyed, following modified methods described by Dunwiddie (1986). Individual 1-m² circular plots were samples. Number of plots sampled was calculated based on total acreage of grassland, plot size of 1-m², and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 17 plots was randomly generated in the grassland using ArcPro 3.4 and located in the field using a handheld GPS in 2009 (#9) and 2017 (#8). 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. Maritime shrubland

The maritime shrubland was inventoried following modified methods described by Dunwiddie (1986). Individual 2-m² circular plots were samples. Number of plots sampled was calculated based on total acreage of shrubland, plot size of 2-m², and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 10 plots was randomly generated in the shrubland using ArcPro 3.4 and located in the field using a handheld GPS in 2006. 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.

4. Sandplain heathland

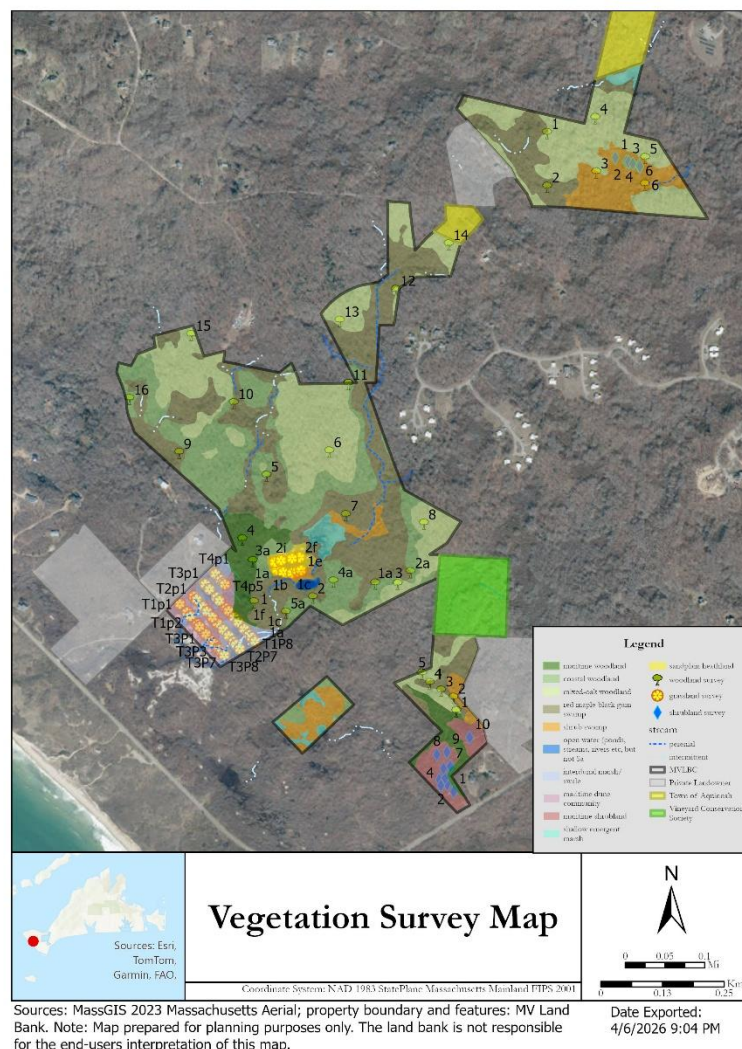
The sandplain heathland was inventoried following modified methods described by Dunwiddie (1986). Individual 2-m² circular plots were samples. Number of plots sampled was calculated based

on total acreage of shrubland, plot size of 2-m², and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of nine plots was randomly generated in the heathland using ArcPro 3.4 and located in the field using a handheld GPS in 2009. 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.

5. Shrub swamp

The shrub swamp was inventoried following modified methods described by Dunwiddie (1986). Individual 2-m² circular plots were samples. Number of plots sampled was calculated based on total acreage of shrubland, plot size of 2-m², and a minimum sampling goal of 0.0044 acres or 80% of total species sampled. A total of 6 plots was randomly generated in the shrubland using ArcPro 3.4 and located in the field using a handheld GPS in 2004. 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 32: Vegetation survey points and transects on Toad Rock Reservation, Aquinnah



B. Species Diversity

A total of 248 plant species were observed within Toad Rock Reservation. Results from qualitative and quantitative vegetation surveys were used to create the species list for Toad Rock Reservation (Table 9, page 86).

Table 9: Plant species of Toad Rock Reservation, Aquinnah, MA

	Scientific name	Common name	Morphology	maritime shrubland	shrub swamp	mesic woodland	upland woodland	maritime dune	interdunal marsh/swale	sandplain heathland	emergent marsh
Non-vascular plants											
	FUNGI										
1	<i>Astraeus sp.</i>	earthstar	fungi								
	LICHEN										
1	<i>Usnea strigosus</i>	old mans beard	lichen				X	X	X		
2	<i>Cladonia sp.</i>	raindeer lichen	lichen					X			
	LYCOPHYTE										
1	<i>Lycopodiella apressa</i>	appressed bog-clubmoss	moss-like			X					
	BRYOPHYTE										
1	<i>Polytrichum sp.</i>	haircap moss	moss	X			X				
2	<i>Polytrichum ohioense</i>	Ohio polytrichum moss	moss	X				X			
3	<i>Sphagnum cuspidata</i>	sphagnum moss	moss		X	X			X		
4	<i>Atrichum crispum</i>	crispate smoothcap	moss			X					
5	<i>Dicranum scoparium</i>	broomfork moss	moss			X					
6	<i>Jungermannia pumila</i>	dwarf flapwort	moss			X					
7	<i>Pellia epiphylla</i>	overleaf pellia	moss			X					
8	<i>Thuidium sp.</i>	fern moss	moss			X					
9	<i>Leucobryum sp.</i>	pincushon moss	moss				X				
10	<i>Fissidens sp.</i>	pocket-moss	moss			X					
Vascular plants											
	GRAMINOID										
1	<i>Agrostis gigantea</i>	redtop bentgrass	graminoid					X	X		
2	<i>Agrostis hyemalis</i>	winter bentgrass	graminoid						X		
3	<i>Agrostis prenanthes</i>	autumn bentgrass	graminoid								X
4	<i>Agrostis sp.</i>	<i>Agrostis sp</i>	graminoid			X	X		X		
5	<i>Ammophila breviligulata</i>	American beach grass	graminoid					X	X		
6	<i>Andropogon gerardii</i>	big bluestem	graminoid							X	

7	<i>Andropogon virginicus</i> var. <i>virginicus</i>	broomsedge bluestem	graminoid						X		X
8	<i>Anthoxanthum odoratum</i>	sweet vernalgrass	graminoid					X			
9	<i>Calamagrostis epigejos</i>	feathertop reed grass	graminoid					X			
10	<i>Carex crinata</i>	fringe sedge	graminoid			X					
11	<i>Carex lurida</i>	sallow sedge	graminoid			X					
12	XXXX XXXXXXXXXXXX	XXXXXX XXXXXXXXXXXX	graminoid			X					
13	<i>Carex pensylvanica</i>	pennsylvania sedge	graminoid	X		X	X	X			
14	<i>Carex scoparia</i>	pointed broom sedge	graminoid					X			
15	<i>Carex seorsa</i>	weak stellate sedge	graminoid			X					
16	<i>Carex</i> sp.	<i>Carex</i> sp.	graminoid			X	X		X		
17	<i>Cladium mariscoides</i>	smooth saw-sedge	graminoid			X					X
18	<i>Cyperus strigosus</i>	straw-colored flatsedge	graminoid						X		
19	<i>Danthonia spicata</i>	poverty grass	graminoid					X			
20	<i>Deschampsia flexuosa</i>	crinkled hairgrass	graminoid	X			X	X			
21	<i>Dichanthelium sphaerocarpon</i>	round-fruited rosette panicgrass	graminoid				X				
22	<i>Dulichium arundinaceum</i>	three-way sedge	graminoid			X					
23	<i>Eriophorum vaginatum</i>	tussock cottonsedge	graminoid						X		
24	<i>Eriophorum virginicum</i>	tawny cottonsedge	graminoid						X		X
25	<i>Festuca filiformis</i>	hair fescue	graminoid	X		X					
26	<i>Festuca rubra</i>	red fescue	graminoid					X			
27	<i>Glyceria canadensis</i>	rattlesnake manna grass	graminoid			X					
28	<i>Glyceria obtusa</i>	Atlantic manna grass	graminoid			X		X	X		
29	<i>Holcus lanatus</i>	velvet grass	graminoid	X		X					
30	<i>Juncus acuminatus</i>	sharp-fruited rush	graminoid								X
31	<i>Juncus canadensis</i>	Canada rush	graminoid			X		X	X		X
32	<i>Juncus effusus</i>	soft rush	graminoid			X			X		
33	<i>Juncus greenei</i>	Greene's rush	graminoid					X	X		
34	<i>Juncus marginatus</i>	grass-leaved rush	graminoid								X
35	<i>Juncus pylaei</i>	Pylaei's soft rush	graminoid								X
36	<i>Juncus tenuis</i>	path rush	graminoid			X	X	X	X		
37	<i>Leersia oryzoides</i>	rice cut grass	graminoid			X					
38	<i>Miscanthus sinensis</i>	Chinese silvergrass	graminoid					X			
39	<i>Panicum acuminatum</i>	hairy rosette-panicgrass	graminoid			X		X	X		
40	<i>Panicum amarum</i>	bitter panicgrass	graminoid					X			
41	<i>Panicum virgatum</i>	switch grass	graminoid					X	X	X	X
42	<i>Paspalum</i> sp	beadgrass	graminoid			X					
43	<i>Rhynchospora alba</i>	white beaksedge	graminoid								X
44	<i>Rhynchospora capitellata</i>	brownish beaksedge	graminoid						X		
45	<i>Rhynchospora fusca</i>	brown beaksedge	graminoid			X					
46	<i>Schizachyrium scoparium</i>	little bluestem	graminoid	X		X		X	X	X	

47	<i>Schoenoplectus americanus</i>	chair-maker's club-bulrush	graminoid								X
48	<i>Schoenoplectus pungens</i>	three-square club-bulrush	graminoid						X		X
49	<i>Schoenoplectus tabernamontani</i>	soft-stemmed club-bulrush	graminoid								X
50	<i>Scirpus cyperinus</i>	woolgrass	graminoid						X		X
	FERN										
1	<i>Athyrium angustum</i>	northern lady fern	fern		X	X					
2	<i>Athyrium asplenoides</i>	southern lady fern	fern			X					
3	<i>Dennstaedtia punctilobula</i>	hay-scented fern	fern			X	X				
4	<i>Dryopteris carthusiana</i>	spinulose wood fern	fern			X					
5	<i>Dryopteris intermedia</i>	intermediate wood fern	fern		X	X					
6	<i>Onoclea sensibilis</i>	sensitive fern	fern		X	X			X		
7	<i>Osmunda regalis</i>	royal fern	fern			X					
8	<i>Osmundastrum cinnamomeum</i>	cinnamon fern	fern			X	X			X	
9	<i>Parathelypteris noveboracensis</i>	New York fern	fern		X	X	X				
10	<i>Parathelypteris simulata</i>	Massachusetts fern	fern		X	X	X				
11	<i>Phegopteris connectilis</i>	long beech fern	fern			X					
12	<i>Pteridium aquilinum</i>	bracken fern	fern			X	X				
13	<i>Thelypteris palustris</i>	marsh fern	fern			X					X
14	<i>Woodwardia areolata</i>	netted chainfern	fern			X					
	HERB										
1	<i>Achillea millefolium</i>	yarrow	herb			X		X			
2	<i>Agalinis purpurea</i>	purple agalinis	herb								X
3	<i>Anaphalis margaritacea</i>	pearly everlasting	herb				X	X			
4	<i>Anemone quinquefolia</i>	wood anemone	herb			X	X				
5	<i>Aralia nudicaulis</i>	wild sarsaparilla	herb				X			X	
6	<i>Arctostaphylos uva-ursi</i>	bearberry	herb			X					
7	<i>Arisaema triphyllum</i>	jack-in-the-pulpit	herb			X					
8	<i>Asclepias incarnata</i>	swamp milkweed	herb						X		
9	<i>Bidens frondosa</i>	devil's beggar-ticks	herb			X					
10	<i>Cakile edentula</i>	sea rocket	herb					X			
11	<i>Callitriche heterophylla</i>	greater water-starwort	herb			X					
12	<i>Calopogon tuberosus</i>	tuberous grass-pink	herb								X
13	<i>Chrysosplenium americanum</i>	golden-saxifrage	herb			X					
14	<i>Circaea canadensis</i>	broad-leaved enchanter's-nightshade	herb				X				
15	<i>Cirsium horridulum</i>	yellow thistle	herb	X							
16	<i>Decodon verticillatus</i>	water willow	herb			X			X		
17	<i>Drosera intermedia</i>	spatulate-leaved sundew	herb			X					X
18	<i>Drosera rotundifolia</i>	round-leaved sundew	herb								X
19	<i>Epifagus virginiana</i>	beech drops	herb				X				

20	<i>Epigaea repens</i>	trailing-arbutus	herb				X				
21	<i>Erigeron canadensis</i>	Canada fleabane	herb			X		X			
22	<i>Eupatorium hyssopifolium</i>	hyssop-leaved boneset	herb				X	X			
23	<i>Eupatorium pilosum</i>	ragged thoroughwort	herb			X					
24	<i>Eupatorium pubescens</i>	rough boneset	herb							X	
25	<i>Eurybia divaricata</i>	white wood aster	herb				X				
26	<i>Eurybia spectabilis</i>	purple wood aster	herb			X					
27	<i>Euthamia caroliniana</i>	slender-leaved goldenrod	herb	X			X	X			X
28	<i>Euthamia graminifolia</i>	lance-leaf goldenrod	herb				X	X	X		
29	<i>Fragaria virginiana</i>	common strawberry	herb							X	
30	<i>Galium aparine</i>	scratch bedstraw	herb						X		
31	<i>Galium palustre</i>	marsh bedstraw	herb					X	X		
32	<i>Gaultheria procumbens</i>	wintergreen	herb	X		X	X			X	
33	<i>Geum canadense</i>	white avens	herb				X				
34	<i>Hibiscus moscheutos</i>	swamp rose-mallow	herb						X		
35	<i>Hieracium caespitosum</i>	yellow hawkweed	herb				X				
36	<i>Hieracium pilosella</i>	mouse-ear hawkweed	herb				X				
37	<i>Hudsonia tomentosa</i>	beach heather	herb			X		X	X	X	
38	<i>Hypericum canadense</i>	lesser St. John's-wort	herb							X	X
39	<i>Hypericum mutilum</i>	dwarf St. John's-wort	herb						X		X
40	<i>Hypochaeris radicata</i>	hairy cat's ear	herb						X		
41	<i>Impatiens capensis</i>	spotted touch-me-not	herb			X			X		
42	<i>Ionactis linariifolia</i>	flax-leaved stiff-aster	herb	X		X		X			
43	<i>Iris versicolor</i>	blue iris	herb			X			X		
44	<i>Kalmia latifolia</i>	sheep laurel	herb							X	
45	<i>Lactuca serriola</i>	prickly lettuce	herb	X							
46	<i>Lathyrus japonicus</i>	beach vetchling	herb					X			
47	<i>Lechea mucronata</i>	hairy pinweed	herb			X		X			
48	<i>Leucanthemum vulgare</i>	ox-eye daisy	herb					X			
49	<i>Linum medium</i>	common yellow flax	herb					X			
50	<i>Ludwigia palustris</i>	common water-primrose	herb						X		
51	<i>Lycopus americanus</i>	American water-horehound	herb								X
52	<i>Lycopus uniflorus</i>	northern water-horehound (Bugleweed)	herb			X			X		X
53	<i>Lysimachia borealis</i>	star-flower	herb	X		X	X				
54	<i>Lysimachia quadrifolia</i>	whorled yellow-loosestrife	herb			X					
55	<i>Lysimachis terrestris</i>	swamp yellow-loosestrife	herb						X		X
56	<i>Maianthemum canadense</i>	Canada mayflower	herb			X	X				
57	<i>Medeola virginiana</i>	Indian cucumber root	herb			X	X				
58	<i>Melampyrum lineare</i>	cow-wheat	herb				X				
59	<i>Mitchella repens</i>	partridge-berry	herb			X					

60	<i>Moehringia lateriflora</i>	blunt-leaved grove-sandwort	herb					X			
61	<i>Monotropa uniflora</i>	Indian pipe	herb	X			X				
62	<i>Nabalus altissimus</i>	tall rattlesnake-root	herb				X				
63	<i>Nuphar variegata</i>	bullhead pond-lily	herb								X
64	<i>Nuttallanthus canadensis</i>	old field toadflax	herb					X			
65	<i>Persicaria arifolia</i>	halbred-leaved smartweed	herb						X		
66	<i>Persicaria hydropiper</i>	water-pepper smartweed	herb			X					
67	<i>Persicaria hydropiperoides</i>	false water-pepper smartweed	herb						X		
68	<i>Persicaria sagittata</i>	arrow-leaved tearthumb	herb						X		X
69	<i>Pityopsis falcata</i>	sickle-leaved golden-aster	herb	X		X		X			
70	<i>Platanthera lacera</i>	green fringed bog-orchid	herb			X					
71	<i>Pogonia ophioglossoides</i>	rose pogonia	herb			X					X
72	<i>Polygala cruciata</i>	drum-heads milkwort	herb						X		X
73	<i>Polygonatum pubescens</i>	hairy Solomon's-seal	herb				X				
74	<i>Polygonum arifolia</i>	halbred-leaved smartweed	herb			X					
75	<i>Polygonum articulatum</i>	coastal jointed knotweed	herb				X	X			
76	<i>Pontederia cordata</i>	pickerelweed	herb								X
77	<i>Potentilla canadensis</i>	dwarf cinquefoil	herb	X			X			X	
78	<i>Potentilla simplex</i>	common cinquefoil	herb				X				
79	<i>Pseudognaphalium obtusifolium</i>	sweet everlasting (blunt-leaved rabbit-tobacco)	herb			X					
80	<i>Pyrola americana</i>	pyrolia	herb				X				
81	<i>Rumex acetosella</i>	field sorrel	herb	X		X	X	X	X		
82	<i>Rumex britannica</i>	greater water dock	herb								X
83	<i>Rumex crispus</i>	curly dock	herb					X	X		
84	<i>Scutellaria lateriflora</i>	mad dog skullcap	herb			X			X		X
85	<i>Sericocarpus asteroides</i>	toothed white-topped-aster	herb				X				
86	<i>Sericocarpus linifolius</i>	narrow-leaved white-topped-aster	herb	X							
87	<i>Solidago latissimifolia</i>	Elliot's goldenrod	herb	X		X	X	X	X		X
88	<i>Solidago odora</i>	sweet goldenrod	herb				X				
89	<i>Solidago rugosa</i>	rough-stemmed goldenrod	herb				X				
90	<i>Solidago sempervirens</i>	seaside goldenrod	herb					X			
91	<i>Sparganium americanum</i>	common bur-reed	herb			X					
92	<i>Sparganium eurycarpum</i>	great bur-reed	herb			X					
93	<i>Spiraea tomentosa</i>	steeplebush	herb						X		X
94	<i>Spiranthes cernua</i>	nodding laddies'-tresses	herb								X
95	<i>Symphyotrichum ericoides</i>	heath American-aster	herb					X			
96	<i>Symphyotrichum undulatum</i>	wavy-leaved American-aster	herb			X	X				
97	<i>Symphyotrichum novi-belgii</i>	New York american-aster	herb	X		X			X		
98	<i>Symplocarpus foetidus</i>	skunk-cabbage	herb		X	X					
99	<i>Triadenum virginicum</i>	marsh St. John's-wort	herb						X		X

100	<i>Typha angustifolia</i>	narrow-leaved cat-tail	herb									X
101	<i>Typha latifolia</i>	broad-leaved cat-tail	herb	X								
102	<i>Uvularia sessilifolia</i>	sessile-leaved bellwort	herb			X	X					
103	<i>Viola cucullata</i>	blue marsh violet	herb			X						X
104	<i>Viola lanceolata</i>	lance-leaved violet	herb							X		
105	<i>Viola pallens</i>	northern white violet	herb			X						
106	<i>Xyris torta</i>	slender yellow-eyed grass	herb									X
	SHRUB											
1	<i>Alnus incana</i>	speckled alder	shrub							X		
2	<i>Amalanchier canadensis</i>	Canada serviceberry	shrub				X					
3	<i>Amelanchier laevis</i>	smooth shadbush	shrub	X		X	X			X	X	
4	<i>Amelanchier nantucketensis</i>	Nantucket shadbush	shrub	X								
5	<i>Aronia arbutifolia</i>	red chokeberry	shrub	X						X		
6	<i>Aronia melanocarpa</i>	black chokeberry	shrub	X				X				
7	<i>Baptisia tinctoria</i>	Yellow wild indigo	shrub	X								
8	<i>Clethra alnifolia</i>	sweet pepperbush	shrub	X	X	X	X			X	X	
9	<i>Corylus americana</i>	American Hazelnut	shrub	X	X	X	X	X	X			
10	<i>Gaylussacia baccata</i>	black huckleberry	shrub	X		X	X	X	X	X	X	
11	<i>Gaylussacia frondosa</i>	dangleberry	shrub			X	X				X	
12	<i>Hamamelis virginiana</i>	witch-hazel	shrub			X	X					
13	<i>Ilex glabra</i>	inkberry	shrub		X							
14	<i>Ilex verticillata</i>	winterberry	shrub	X	X	X	X				X	
15	<i>Lindera benzoin</i>	spicebush	shrub		X	X	X					
16	<i>Lyonia ligustrina</i>	maleberry	shrub	X	X	X	X				X	
17	<i>Morella caroliniensis</i>	bayberry	shrub	X		X	X	X	X	X	X	
18	<i>Prunus maritima</i>	beach plum	shrub	X								
19	<i>Prunus serotina</i>	black cherry	shrub	X			X	X				
20	<i>Quercus ilicifolia</i>	scrub oak	shrub	X							X	
21	<i>Rhododendron viscosum</i>	swamp azalea	shrub	X	X	X	X				X	
22	<i>Rhus copallinum</i>	shinning sumac	shrub	X	X	X	X					
23	<i>Ribes hirtellum</i>	hairy-stemmed gooseberry	shrub				X					
24	<i>Ribes lacustre</i>	bristly swamp currant	shrub							X		
25	<i>Rosa carolina</i>	pasture rose	shrub	X				X	X			
26	<i>Rosa palustris</i>	swamp rose	shrub			X		X	X			
27	<i>Rosa rugosa</i>	beach rose	shrub					X				
28	<i>Rosa virginiana</i>	Virginia rose	shrub	X	X	X	X	X	X			
29	<i>Salix bebbiana</i>	long-beaked willow	shrub							X		
30	<i>Toxicodendron vernix</i>	poison sumac	shrub		X	X				X		X
31	<i>Vaccinium corymbosum</i>	highbush blueberry	shrub	X	X	X	X	X	X	X	X	
32	<i>Vaccinium pallidum</i>	late lowbush blueberry	shrub	X			X					

33	<i>Viburnum denatum</i> var. <i>lucidum</i>	southern arrowwood	shrub	X		X	X	X		X	
34	<i>Viburnum dentatum</i> var. <i>venosum</i>	northern arrowwood	shrub	X		X	X				
	TREE										
1	<i>Acer rubrum</i>	red maple	tree		X	X	X	X		X	
2	<i>Benthamidia florida</i>	flowering big-bracted-dogwood	tree			X					
3	<i>Fagus grandifolia</i>	American beech	tree			X	X				
4	<i>Ilex opaca</i>	American Holly	tree			X	X	X		X	
5	<i>Nyssa sylvatica</i>	beetlebung	tree			X	X			X	
6	<i>Ostrya virginiana</i>	hop-hornbeam	tree			X	X				
7	<i>Pinus rugosa</i>	pitch pine	tree	X				X			
8	<i>Quercus alba</i>	white oak	tree	X		X	X			X	
9	<i>Quercus coccinea</i>	scarlet oak	tree	X		X	X	X			
10	<i>Quercus stellata</i>	post oak	tree				X				
11	<i>Quercus velutina</i>	black oak	tree	X		X	X	X	X	X	
12	<i>Salix cinerea</i>	gray willow	tree						X		
13	<i>Sassafras albidum</i>	sassafras	tree			X	X				
	VINE										
1	<i>Arctostaphylos uva-ursi</i>	bearberry	vine							X	
2	<i>Cuscuta gronovii</i>	common dodder	vine						X		X
3	<i>Mikania scandens</i>	climbing hempvine	vine								X
4	<i>Parthenocissus quinquefolia</i>	virginia creeper	vine	X	X	X	X	X	X		
5	<i>Rubus allegheniensis</i>	common blackberry	vine	X		X	X	X	X		
6	<i>Rubus flagellaris</i>	prickly dewberry	vine			X	X	X	X	X	
7	<i>Rubus hispidus</i>	bristly dewberry	vine			X	X				
8	<i>Rubus idaeus</i>	red raspberry	vine				X				
9	<i>Rubus occidentalis</i>	black raspberry	vine				X				
10	<i>Smilax glauca</i>	glaucus greenbrier	vine				X				
11	<i>Smilax rotundifolia</i>	common greenbrier	vine	X	X	X	X	X	X		
12	<i>Toxicodendron radicans</i>	poison ivy	vine	X		X	X	X	X	X	X
13	<i>Vaccinium macrocarpon</i>	large cranberry	vine						X		X
14	<i>Vitis aestivalis</i>	summer grape	vine		X	X	X				
15	<i>Vitis labrusca</i>	fox grape	vine			X	X				
				51	22	120	87	65	72	31	44
			Acre	2.6	7.7	30.9	52.2	2.2	3.1	0.9	1.9
			Sp/Acre	19.6	2.86	3.88	1.67	29.5	23.2	34.4	23.2

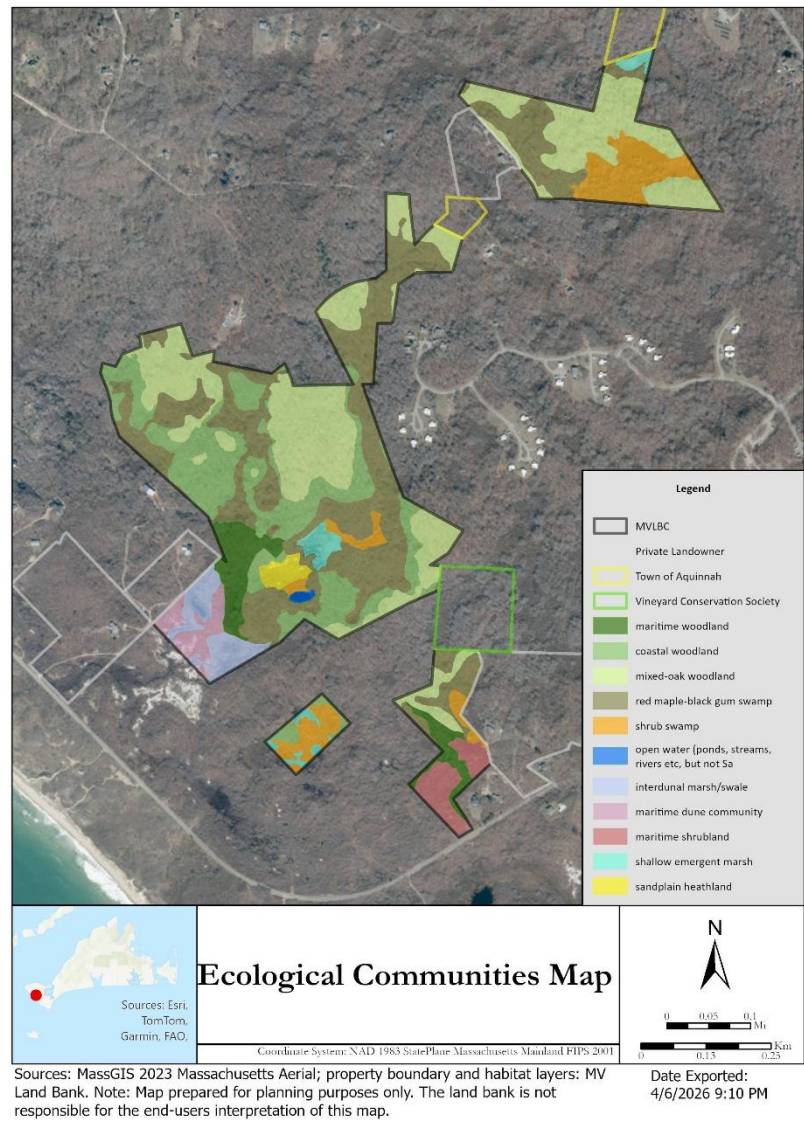
* Proper nomenclature cited according to GoBotany.NativePlantTrust.org (2026).

**Rare species XXX out and highlighted in yellow.

C. Ecological Communities

There are eleven different natural communities within Toad Rock Reservation (Map 33, page 93). 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 33: Ecological communities of Toad Rock Reservation, Aquinnah, MA



1. Mixed oak woodland (n=13):

The mixed-oak woodland is the co-dominant ecological community at Toad Rock Reservation, totaling 28.9 acres. The trees form a dense crown with 84% canopy cover. In sample areas, the woodland overstory is dominated by black oak (84%), followed closely by white oak (53%) and sassafras (46%). Trees in the woodland can reach a height of up to 70 feet, though the average is

closer to 50 feet. The average diameter at breast height (dbh) in the stand is 12 inches, with a few tree diameters measuring at over 25 inches. The basal area is 135 square feet per acre.

The understory of the mixed-oak woodland is densely populated, with a percent ground cover of 26 %, with nearly all understory vegetation measuring between three feet and fifteen feet tall. Some areas near homesteads have an open, savanna-like appearance. Poison ivy is pervasive throughout the mixed-oak woodland with dominant shrubs comprising sweet pepperbush, highbush blueberry, and dangleberry. Crawling and climbing vines such as prickly dewberry and greenbrier are present with patches of New York fern and star flower, often occurring around the base of trees.

Figure 30: Mixed-oak woodland at Toad Rock Reservation



Table 10: Dominant understory plant species of mixed-oak woodland of Toad Rock Reservation, Aquinnah, MA.

Scientific name	Common name	Importance value
<i>Toxicodendron radicans</i>	poison ivy	43.5
<i>Clethra alnifolia</i>	sweet pepperbush	28.0
<i>Rubus flagellaris</i>	prickly dewberry	23.0
<i>Vaccinium corymbosum</i>	highbush blueberry	16.7
<i>Smilax rotundifolia</i>	greenbrier	14.6
<i>Parathelypteris simulata</i>	Massachusetts fern	12.8
<i>Symplocarpus foetidus</i>	skunk cabbage	12.2
<i>Lysimachia borealis</i>	star-flower	11.9
<i>Gaylusacca frondosa</i>	dangleberry	11.3

2. Red maple/black gum swamp (n=13):

The maple/black gum swamp is nearly equal in coverage to the mixed-oak woodland on the property. This wooded wetland habitat totals 31 acres and occurs in the low-lying areas of the property. Trees in the swamp can reach a height of up to 70 feet, though the average is closer to 48 feet. The average dbh in the stand is nine inches, with a few tree diameters measuring at over 26 inches. The basal area is 128 square feet per acre. The canopy of the swamp is closed with a 85% canopy cover.

The understory of the maple/black gum swamp receives minimal filtered light due to the closed canopy of trees. The understory is moderately dense, with a percent ground cover of 30% and a diverse vegetation stratum. The canopy woodland comprises old growth trees dominated by red

maple, black gum and black oak (54%). The understory is a dense wall of highbush blueberry and sweet pepperbush woven together with greenbrier. Underneath the taller shrubs, poison ivy lurks. Various shades of green sphagnum create a soft, spongy base for common species such as dewberry, skunk cabbage, star flower and Massachusetts fern to colonize.

Figure 31: Red maple/ black gum swamp at Toad Rock Reservation



Table 11: Dominant understory plant species of red maple/tupelo swamp of Toad Rock Reservation.

Scientific name	Common name	Importance value
<i>Clethra alnifolia</i>	sweet pepperbush	89.0
<i>Vaccinium corymbosum</i>	highbush blueberry	23.0
<i>Toxicodendron radicans</i>	poison ivy	22.0
<i>Parathelypteris simulata</i>	Massachusetts fern	21.1
<i>Rubus flagellaris</i>	prickly dewberry	15.5
<i>Smilax rotundifolia</i>	greenbrier	14.3
<i>Sphagnum</i>	sphagnum	12.5
<i>Lysimachia borealis</i>	star-flower	11.0
<i>Symplocarpus foetidus</i>	skunk cabbage	10.6

3. Coastal Woodland (n=4)

The coastal woodland occurs in areas below 60 feet in elevation that support deciduous trees and are impacted by salt spray on an occasional basis. It totals 17 acres and has a dense crown of 87% cover dominated by black gum and black oak. American holly, sassafras and witch-hazel create a sub canopy of berry producing trees that provide a food source to wildlife. Trees in the coastal woodland can reach a height of up to 70 feet, though the average is closer to 48 feet. The average dbh in the stand is nine inches, with a few tree diameters measuring at over 20 inches. The basal area is 160 square feet per acre.

The understory of the coastal woodland is a mix of sweet pepperbush, arrowwood, dangleberry and high bush blueberry with some areas carpeted by hay-scented fern and other areas sparsely covered with star flower and Canada mayflower in the spring and otherwise bare.

Figure 32: Coastal Woodland at Toad Rock Reservation



Table 12: Dominant understory plant species of coastal woodland of Toad Rock Reservation, Aquinnah, MA.

Scientific name	Common name	Importance value
<i>Dennstaedtia punctilobula</i>	hay-scented fern	76.1
<i>Clethra alnifolia</i>	sweet pepperbush	71.4
<i>Rubus flagellaris</i>	prickly dewberry	20.1
<i>Maianthemum canadense</i>	Canada-mayflower	18.9
<i>Viburnum dentatum</i>	arrowwood	15.7
<i>Lysimachia borealis</i>	star-flower	11.2
<i>Ilex opaca</i>	American holly	11.2
<i>Gaylussacia frondosa</i>	dangleberry	11.1
<i>Quercus alba</i>	white oak	10.9
<i>Vaccinium corymbosum</i>	highbush blueberry	7.4

4. Maritime Woodland (n=3)

The maritime woodland is a mixed woodland of deciduous and evergreen trees that is close enough to the coast to be impacted by salt spray on a daily basis. A small area of the property (5 acres) meets these criteria. The area has a dense canopy cover of 88% comprised mostly of black oak with some black gum scattered about. American holly and sassafras create a sub canopy of berry producing trees that provide a food source to wildlife. Trees in the maritime woodland are stunted and reach heights of up to 45 feet, though the average is closer to 31 feet. The average dbh in the stand is eight inches, with a few tree diameters measuring up to 19 inches. The basal area is 70 square feet per acre.

The understory of the maritime woodland is a mix of mostly black huckleberry, sweet pepperbush, arrowwood, and shinning sumac. Black and white oak sprouts create a sub-canopy above the shrubs. Vines such as poison ivy, Virginia creeper, and greenbrier snake through the shrubs creating impenetrable walls in some areas. Star flower lights up the ground in the spring and sweet goldenrod emerges in the fall and provides a touch of color to the otherwise green and brown understory.

Figure 33: Maritime woodland at Toad Rock Reservation



Table 13: Dominant understory plant species of maritime woodland of Toad Rock Reservation, Aquinnah, MA.

Scientific name	Common name	Importance value
<i>Gaylussacia baccata</i>	black huckleberry	78.3
<i>Clethra alnifolia</i>	sweet pepperbush	49.8
<i>Toxicodendron radicans</i>	poison ivy	28.7
<i>Parthenocissus quinquefolia</i>	Virginia creeper	18.1
<i>Quercus velutina</i>	black oak	17.0
<i>Smilax rotundifolia</i>	greenbrier	14.9
<i>Viburnum dentatum</i>	arrowwood	14.9
<i>Quercus alba</i>	white oak	14.4
<i>Lysimachia borealis</i>	star-flower	14.3
<i>Rhus copallinum</i>	shinning sumac	10.1
<i>Solidago odora</i>	sweet goldenrod	8.5

5. Sandplain heathland (n=9):

The sandplain heathland occurs in a 0.9-acre area that was once part of the dynamic dune community. Over time the movement of sand did not extend as far north from the coast and a variety of plants were able to colonize the sandy soils. The sandplain heathland is an open canopy community dominated by shrubs from the blueberry family with little to no ground cover over the exposed sandy soils. The evergreen wintergreen is the most common ground cover observed in this community.

Figure 34: Sandplain heathland at Toad Rock Reservation



Table 14: Dominant vegetation in sandplain heathland of Toad Rock Reservation.

Scientific name	Common name	Importance value
<i>Gaultheria procumbens</i>	wintergreen	61.6
<i>Gaylussacia baccata</i>	black huckleberry	52.1
<i>Clethra alnifolia</i>	sweet pepperbush	45.2
<i>Kalmia latifolia</i>	sheep laurel	35.4
<i>Gaylussacia frondosa</i>	dangleberry	25.8
<i>Rhododendron viscosum</i>	swamp azalea	15.1
<i>Osmunda cinnamomeum</i>	cinnamon fern	12.0
<i>Lyonia ligustrina</i>	maleberry	12.2
<i>Morella caroliniensis</i>	bayberry	12.2

6. Shrub swamp (n=6):

There are approximately 7.7 acres of shrub swamp that comprise pond perimeters, stream corridors and areas that are seasonally inundated with water on Toad Rock Reservation. The shrub swamp areas are dominated by sweet pepperbush with the occasional high bush blueberry, winterberry, and red maple. Greenbrier and grape vines weave throughout the shrubs making it nearly impossible to pass through. Massachusetts fern and sphagnum are common ground cover in this ecological community.

Figure 35: Shrub swamp at Toad Rock Reservation



Table 15: Dominant vegetation in shrub swamp of Toad Rock Reservation.

Scientific name	Common name	Importance value
<i>Smilax rotundifolia</i>	greenbrier	86.09
<i>Clethra alnifolia</i>	sweet pepperbush	71.76
<i>Parathelypteris simulata</i>	Massachusetts fern	24.33
<i>Acer rubrum</i>	red maple	20.89
<i>sphagnum</i>	sphagnum	16.59
<i>Ilex verticillata</i>	winterberry	14.77
<i>Vaccinium corymbosum</i>	highbush blueberry	12.77
<i>Vitis aestivalis</i>	summer grape	10.11

7. Maritime Shrubland (n=10):

There are approximately 2.6 acres of maritime shrubland on the property. The maritime shrubland is a community impacted by salt spray and dominated by over 40% deciduous shrub cover of varying heights. Some black oak and white oak trees extend above the dense shrub layer. Poison ivy is pervasive throughout the habitat and ground cover such as Elliot's goldenrod occurs but in limited numbers.

Figure 36: Maritime shrubland at Toad Rock Reservation



Table 16: Dominant vegetation in maritime shrubland of Toad Rock Reservation.

Scientific name	Common name	Importance value
<i>Gaylussacia baccata</i>	black huckleberry	120.7
<i>Toxicodendron radicans</i>	poison ivy	33.5
<i>Corylus americana</i>	American hazelnut	32.7
<i>Quercus velutina</i>	black oak	24.9
<i>Smilax rotundifolia</i>	common greenbrier	16.4
<i>Quercus alba</i>	white oak	13.0
<i>Rosa virginiana</i>	Virginia rose	12.3
<i>Rhus copallinum</i>	shinning sumac	10.0
<i>Solidago latissimifolia</i>	Elliot's goldenrod	10.0

8. Maritime Dune and interdunal marsh swale (n=17):

There are over five acres of dune/swale community that are dynamic, sparsely vegetated areas with sandy soils dominating the 2.2 acres of maritime dune. The interdunal swales occurs in shallow depressions between the higher dune mounds of sand and are switch grass dominated with sphagnum and large cranberries coving the ground. During the various times of the year the area glows with a golden hue from the sand false heather and grass-leaved and slender goldenrod. The dune/swale community is diverse with opportunistic species due to the constant turnover of bare ground. The swales were once ponds and are drawn as such on maps from the 19th and early 20th centuries.

Figure 37: Maritime dune and interdunal swale of Toad Rock Reservation



Table 17: Dominant vegetation in maritime dune community of Toad Rock Reservation.

Scientific name	Common name	Importance value
<i>moss</i>	moss	73.48
<i>Panicum virgatum</i>	switch grass	37.25
<i>Euthamis graminifolia</i>	grass-leaved goldenrod	29.79
<i>Toxicodendron radicans</i>	poison ivy	21.19
<i>bare ground</i>	bare ground	17.37
<i>Schizachyrium scoparium</i>	little bluestem	13.29
<i>Ammophila breviligulata</i>	American beach grass	9.34
<i>Festuca rubra</i>	red fescue	8.93
<i>Danthonia spicata</i>	poverty grass	8.60
<i>Panicum acuminatum</i>	hairy rosette-panicgrass	7.97

Table 18: Dominant vegetation in interdunal swale of Toad Rock Reservation.

Scientific name	Common name	Importance value
<i>Vaccinium macrocarpon</i>	large cranberry	37.16
<i>Toxicodendron radicans</i>	poison ivy	32.85
<i>Euthamis graminifolia</i>	grass-leaved goldenrod	32.48
<i>Panicum virgatum</i>	switch grass	26.55
<i>moss</i>	moss	23.49
<i>Rosa carolina</i>	pasture rose	13.00
<i>lichen</i>	lichen	12.53
<i>Juncus tenuis</i>	path rush	12.27
<i>Euthamia caroliniana</i>	slender goldenrod	11.70
<i>bare ground</i>	bare ground	11.42

9. Shallow emergent marsh:

There are three shallow emergent marshes that formed along stream corridors. They comprise approximately two acres of the property and are dominated by grasses, sedges and rushes with large areas of water willow on the perimeter. The water level is less than one foot and the ground can either be firm and sandy or deep and peaty. There is a diverse herbaceous community along the borders including many orchids, asters and ferns and some uncommon species such as hempvine.

Figure 38: Shallow emergent marsh and hempvine at Toad Rock Reservation



10. Pond and stream environs (0.2 acre):

There are approximately 9,000 linear feet of perennial and intermittent streams that traverse through the property towards the Atlantic shoreline. Water trickles and burbles over a rocky stream bed that varies in width from two to six feet. Some areas have well defined banks while others are more intermittent and can only be identified by the exposed soil resulting from overland flow. A plethora of fern species, 14 in total, and uncommon plants such as the green fringed bog orchid lines the edges of the streams. A small 0.2-acre pond that is two to three feet deep exists along one of the major stream corridors on the property. Water lilies float on the surface and water willow grows in bunches along the edge. Flashes of color are observed in the grasspink orchids that grow on hummocks of overarching sedges and rushes and in the densely-packed stalks of blue tubular flowers of the pickerelweed.

Figure 39: Pond and stream habitat at Toad Rock Reservation



Appendix E. Wildlife

Toad Rock 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; 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, maleberry) are a suitable food sources for deer (Martin et al., 1961). During the summer, several bat species utilize the woodland for its unrelenting supply of insects and possibly for roosting.

2. Shrublands

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., grape) that feed a variety of wildlife. Deer and deer fawn may use shrubs and dense vegetation for shelter and deer fawns have been seen feeding discreetly in shrubby vegetation. Similarly, deer beds have been observed frequently and across habitat types.

3. Heathlands and Dune

Open habitats 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. The combination of shrub pockets, open bare ground and dense grass cover make the dune excellent habitat for nesting American woodcock which can be heard drumming on the property during the early spring months.

4. Wetlands

Wetland habitats, especially those with standing water, are ideal for waterfowl, as well as for breeding reptiles and amphibians and bats. Certain wetland plants are rare with restricted populations and/or are hosts for developing pupa of rare or threatened invertebrates. Frogs may be seen basking on lily pads in the ponds and emergent marshes and turtles may poke their heads above water for a quick breath of air before diving back under to search for food. The various frogs on the property are more likely heard than seen. Choruses of green, pickerel and spring peepers compete with the Atlantic Ocean surf for sound waves space during the spring. These

frogs utilize wetland habitat for breeding and feeding and are great wetland indicators. Turtles feed on vegetation such as berries and leaf matter, as well as small fish and invertebrates. Frogs feed on flying insects and other invertebrates. The wetland habitat on the property is suitable for spotted turtle populations and there is a known population in the bog complex across from the pond. River otters utilize the pond and its shore for foraging and denning, and coyotes in the area may be using the woodland and shoreline for hunting.

B. Wildlife Surveys

Formal avian point count surveys, lepidoptera black-light trap surveys, and acoustic bat surveys were conducted on the property (Map 34, page 105; Map 35, page 106; Map 36, page 107). 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 Toad Rock Reservation during spring migration (2004, 2006, 2007, 2008, 2025), the summer breeding season (2004, 2006, 2007, 2010, 2017, 2020, 2025), fall migration (2003, 2004, 2007, 2009, 2017, 2020, 2025) and the winter (2004, 2007, 2009, 2020). Toad Rock Reservation was created through a series of property purchases spanning over two decades, resulting in variation between the years and seasons each point was surveyed (Table 2, page 23). In total, thirteen survey points were established throughout nine different habitats on the property, including interdunal marsh/swale, coastal woodland, mixed-oak woodland, red maple/black gum swamp, maritime shrubland, maritime dune, sandplain heathland, pond/shrub swamp and maritime woodland (Map 34, page 105). The red maple/black gum swamp habitat was the most surveyed, represented by three survey point locations. The coastal woodland habitat and sandplain heathland habitat were both represented by two survey point locations and all other habitats were represented by one survey point location. All birds identified by sight or sound during the five-minute survey periods, including birds flying overhead, were recorded, as well as breeding behavior if observed. Birds identified outside of the survey period by either land bank staff or local birders were noted as present (P) on the property, but were excluded from analysis.

Acoustic monitoring efforts were conducted to detect American woodcock presence in May 2025.

An owl survey was performed during March 2020. 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. No owl species were heard during the survey.

2. Invertebrate

Nocturnal moth species were surveyed using a stainless-steel rigid vein 18-24 in "leptrap" with a 32–40-Watt quantum black light. Traps were set using a photoelectric switch from dusk to dawn in the summers of 2008, 2009, 2010, and 2017 in red maple/black gum swamp, sandplain heath, shrub swamp, interdunal swale and maritime woodland, shrubland and dune (Map 36, page 107). Species

were collected, processed, and sent to Mark Mello, an entomologist with the Lloyd Center for the Environment, in Dartmouth, MA for positive identification.

3. Amphibian

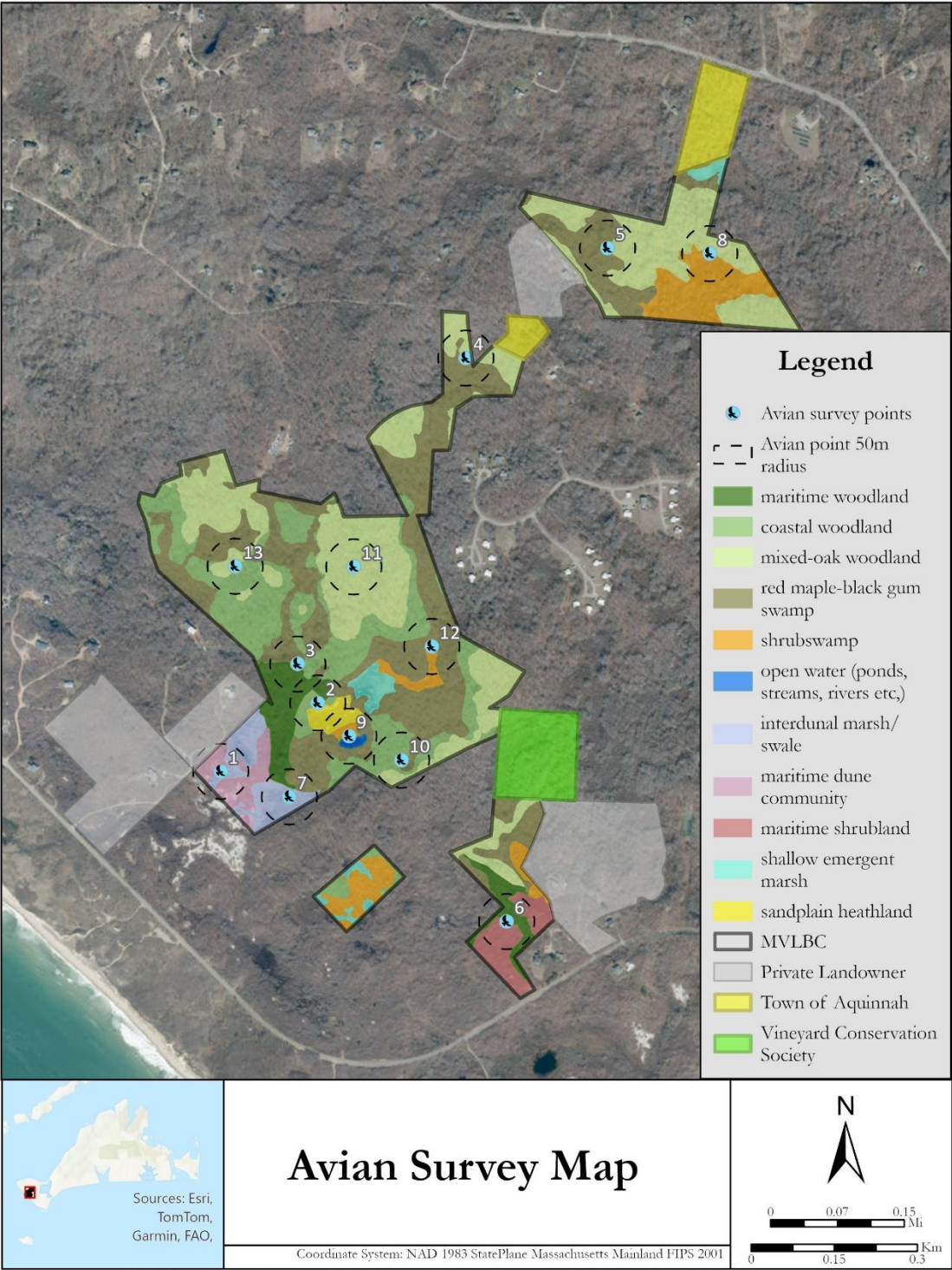
An acoustic monitor was used to survey frogs during the spring or 2025. A wildlife acoustics song meter mini was fastened to a tree in the red maple/black gum swamp and interdunal swale (Map 35, page 106). The monitor was set to record for 30 minutes of every hour for each 24-hour period with a sample rate of 38,400Hz. Monitors were installed in April and May of 2025. The recording was manually analyzed for frog calls from which species were identified and recorded.

4. Mammal

Wildlife cameras were used in the red maple/ black gum swamp and pond habitat to record terrestrial mammal species (Map 35, page 106). Two wildlife cameras set on motion sensors were installed at a height of less than three feet in July and August 2025. 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 near the pond and emergent marsh from July 23-August 12, 2025. 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 16kHz and a three second trigger window. Data were analyzed using the Kaleidoscope Pro 5.9 software (Wildlife Acoustics) with Massachusetts region auto ID. All identifications were manually vetted.

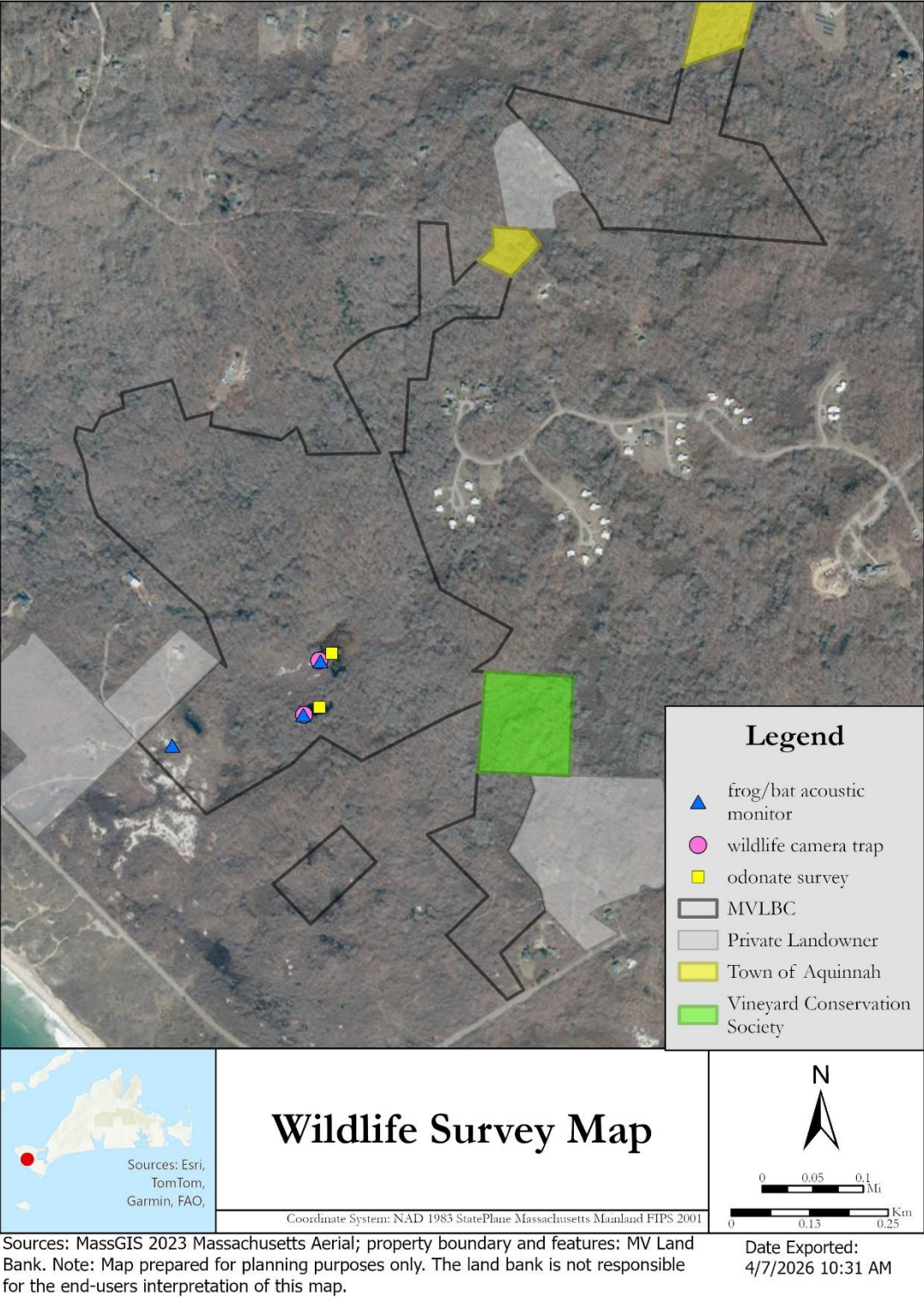
Map 34: Avian survey point locations at Toad Rock Reservation 2004-2025



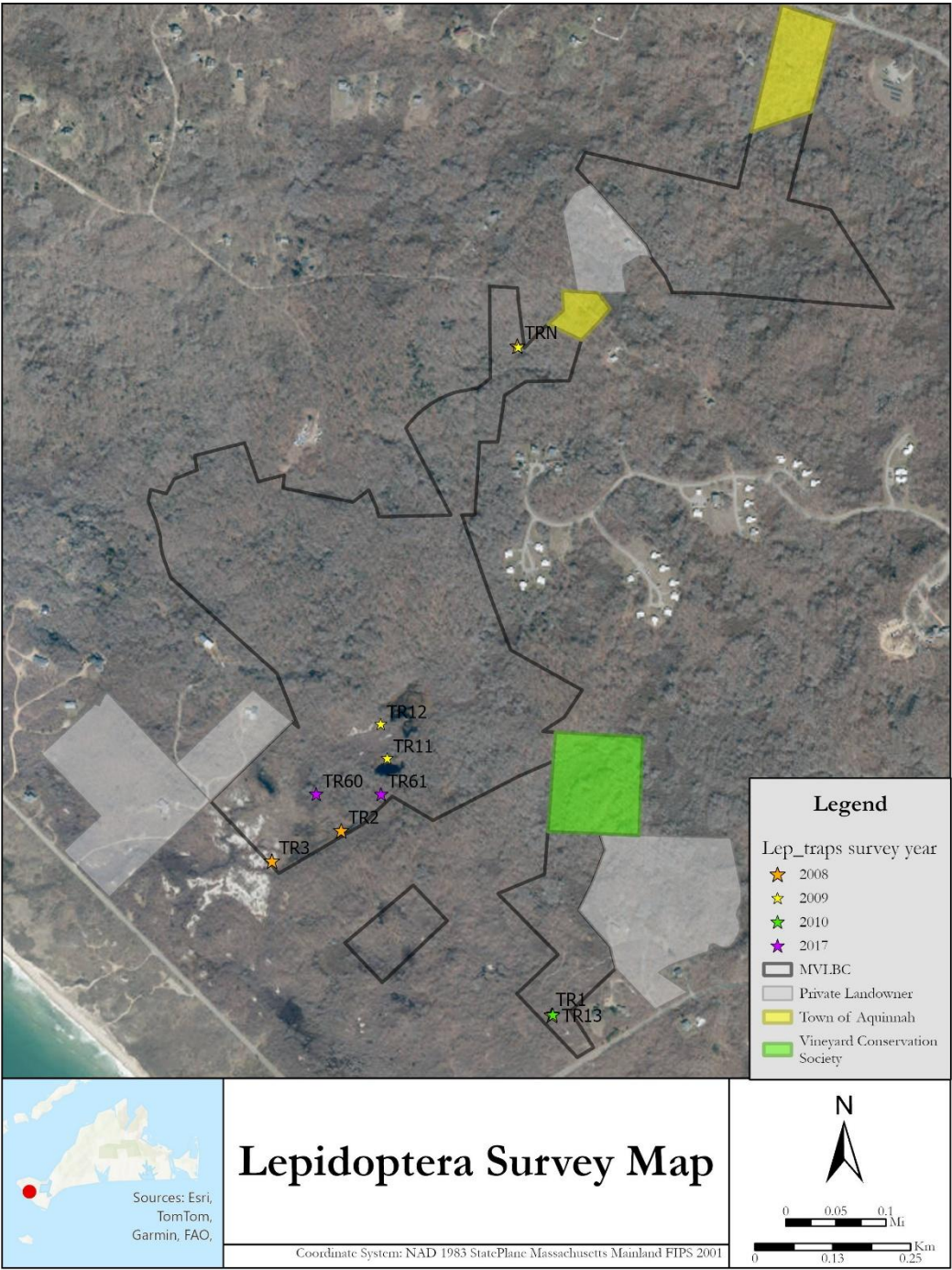
Sources: MassGIS 2023 Massachusetts Aerial; property boundary and features: MV Land Bank. Note: Map prepared for planning purposes only. The land bank is not responsible for the end-users interpretation of this map.

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Map 35: Acoustic and camera trap survey location for Toad Rock Reservation



Map 36: Lepidoptera survey locations for Toad Rock Reservation 2008-2017



Sources: MassGIS 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.

C. Wildlife diversity

1. Avian

A total of 57 bird species was observed at Toad Rock Reservation between 2004 and 2025 through quantitative point count surveys and passive observations recorded while on the property by land

bank staff and others. Many bird species observed on the property are seasonally-dependent. Ten species were observed on the property across all seasons, and the highest species richness was observed during the summer breeding season (46). The potential and observed breeding bird species of Toad Rock Reservation are associated with various habitats, each of which provides different nesting and foraging requirements. Of the nine natural community types surveyed, maritime dune had the highest species richness (40), followed by red maple-black gum swamp (34), maritime woodland (30), maritime shrubland (28), mixed-oak woodland (25), pond/shrub swamp (23), coastal woodland (21) and interdunal marsh/swale (4). One species was observed across all natural community types, the Eastern towhee (*Pipilo erythrophthalmus*).

The probable and possible breeding birds on Toad Rock 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 expansive shrublands. Common yellowthroat nest in ground supported by greenbrier, sedges and grasses, cattails, and other low plants. Northern cardinals wedge their nests into forks of small sapling and shrub branches, or vine tangles; blackberry, rose shrubs and grape are commonly used shrubs and vines which are plentiful on the property. American goldfinches build their nests high in shrubs where vertical branches join and are generally shaded by leaves from above but open and visible from below. Those species who nest in open ground, like American Woodcock, may nest near or in open habitats such as heathland and dune communities.

Woodland trees provide suitable nesting options for birds such as the familiar American robin, blue jay, mourning dove, and great blue heron. The woodlands support other less commonly observed species, such as northern waterthrush, eastern wood-pewee, red-eyed vireo, and wood thrush. Red-eyed vireos and wood thrushes use forks in branches. Eastern wood-pewees may use oak and maple saplings. Additionally, mature trees and snags in 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.

Table 19: Avian survey intensity by habitat and season at Toad Rock Reservation, Aquinnah, MA

Maritime Dune/Interdunal Marsh Swale - Point ID 1				
Season	Spring	Summer	Fall	Winter
Visits	3	16	8	1
Years	2	4	4	1

Coastal Woodland - Point ID 2, 10, 13				
Season	Spring	Summer	Fall	Winter
Visits	1	17	7	1
Years	1	4	4	1

Red Maple/Black Gum Swamp - Point ID 3, 5, 12				
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Season	Spring	Summer	Fall	Winter
Visits	8	33	15	7
Years	4	6	7	3

Mixed-Oak Woodland - Point ID 4, 11

Season	Spring	Summer	Fall	Winter
Visits	5	20	10	2
Years	3	3	3	1

Maritime Shrubland - Point ID 6

Season	Spring	Summer	Fall	Winter
Visits	5	11	6	2
Years	2	2	3	1

Emergent Marsh - Point ID 7

Season	Spring	Summer	Fall	Winter
Visits	0	2	0	0
Years	0	1	0	0

Shrub Swamp - Point ID 8, 9

Season	Spring	Summer	Fall	Winter
Visits	4	10	6	4
Years	2	2	3	1

Table 20: Bird species observed on Toad Rock Reservation during fall with frequency values.

Fall Avian Bird Surveys (2003, 2004, 2006, 2007, 2009, 2017, 2020, 2025)	Maritime dune/interdunal swale	Coastal woodland	Red maple/black gum swamp	Mixed-oak woodland	Maritime shrubland	Emergent marsh	Shrub swamp
point counts/years	8/4	7/4	15/7	10/3	6/3	0	6/3
Year Round	Average Weighted (point counts/year) % Frequency						
American crow	50	0	13	0	8	ND	0
American goldfinch	44	0	19	0	42	ND	17
American robin	25	0	4	19	8	ND	25
Blackbird sp.	0	0	0	25	0	ND	0
Black-capped chickadee	38	54	54	40	0	ND	0
Blue jay	44	63	63	100	50	ND	92

Carolina wren	0	8	4	6	0	ND	0
Downy woodpecker	6	8	8	13	8	ND	0
Eastern phoebe	0	0	6	0	0	ND	0
Eastern towhee	50	42	60	35	67	ND	67
Gray catbird	38	42	58	6	100	ND	50
Hairy woodpecker	0	0	13	0	33	ND	0
Merlin	P	0	0	0	0	ND	0
Mourning dove	25	0	0	0	0	ND	25
Northern cardinal	0	0	23	0	0	ND	0
Northern flicker	13	0	8	40	42	ND	25
Osprey	0	0	6	0	0	ND	0
Peregrine falcon	25	0	0	0	0	ND	0
Red-bellied woodpecker	0	0	4	23	33	ND	0
Red-breasted nuthatch	0	0	0	P	0	ND	0
Red-tailed hawk	0	0	13	0	0	ND	0
Song sparrow	38	0	0	0	0	ND	0
Tree swallow	6	0	6	0	0	ND	0
Tufted titmouse	0	0	0	19	0	ND	0
Warbler sp.	0	0	0	13	0	ND	0
White-breasted nuthatch	0	13	10	31	0	ND	42
Wood duck	0	0	6	0	0	ND	0
Woodpecker sp.	0	8	6	13	0	ND	0
Breeding							
Common yellowthroat	0	0	31	0	0	ND	17
Eastern wood-pewee	0	0	0	P	0	ND	0
Great crested flycatcher	6	0	4	8	0	ND	0
Green heron	0	0	4	0	0	ND	0
Ovenbird	0	0	0	13	0	ND	0
Red-eyed vireo	0	8	0	0	0	ND	0

Table 21: Bird species observed on Toad Rock Reservation during winter with frequency values.

	Maritime dune/interdunal swale	Coastal woodland	Red maple/black gum swamp	Mixed-oak woodland	Maritime shrubland	Shrub swamp	Emergent marsh
Winter (2004, 2009, 2007, 2020)							
point counts/years	1/1	1/1	7/3	2/1	2/1	4/1	0
Year round	Average Weighted (point counts/year) % Frequency						

American crow	0	0	8	0	50	0	ND
American goldfinch	100	0	0	0	0	0	ND
American robin	0	0	17	0	0	0	ND
Black-capped chickadee	0	0	58	0	100	75	ND
Blue jay	100	100	50	50	0	75	ND
Carolina wren	0	0	33	50	0	0	ND
Eastern towhee	0	0	17	50	0	0	ND
Northern cardinal	0	0	8	0	0	0	ND
Red-bellied woodpecker	0	0	8	0	0	0	ND
Song sparrow	100	0	0	0	0	0	ND
Tufted titmouse	0	0	0	50	0	0	ND
White-breasted nuthatch	0	0	67	0	0	50	ND
Yellow-breasted chat	0	0	33	0	0	0	ND
Winter residents							
American tree sparrow	0	0	33	0	0	0	ND
Breeding							
White-throated sparrow	0	0	0	0	0	25	ND
Yellow-rumped warbler	0	0	0	0	0	25	ND

Table 22: Bird species on Toad Rock Reservation during spring with frequency values

	Maritime dune/interdunal swale	Coastal woodland	Red maple/black gum swamp	Mixed-oak woodland	Maritime shrubland	Shrub swamp	Emergent marsh
Spring (2004, 2006, 2008, 2020, 2025)							
point counts/years	3/2	1/1	10/4	5/3	5/2	6/2	0
Year Round	Average Weighted (point counts/year) % Frequency						
American crow	0	0	7	0	0	0	ND
American goldfinch	50	0	20	0	75	17	ND
American robin	0	0	0	22	13	0	ND
Black-capped chickadee	50	100	60	67	50	83	ND
Blue jay	0	0	7	0	50	17	ND
Brown thrasher	50	0	0	0	0	0	ND
Brown-headed cowbird	50	0	40	0	50	0	ND
Carolina wren	50	0	33	0	63	50	ND
Chipping sparrow	0	0	0	0	13	0	ND
Downy woodpecker	0	0	0	33	0	17	ND
Eastern towhee	100	0	60	78	100	100	ND

Gray catbird	50	0	73	67	88	83	ND
Hairy woodpecker	0	0	20	0	0	0	ND
Herring gull	0	0	20	0	0	0	ND
House wren	0	0	0	33	0	0	ND
Mourning dove	0	0	27	0	0	0	ND
Northern cardinal	50	0	67	67	50	33	ND
Northern flicker	0	0	0	0	13	0	ND
Red-bellied woodpecker	0	0	0	0	0	17	ND
Red-tailed hawk	0	0	27	11	0	17	ND
Red-winged blackbird	75	0	40	0	0	0	ND
Song sparrow	50	0	20	0	0	0	ND
Tufted titmouse	0	100	40	67	13	0	ND
Turkey vulture	0	100	0	0	0	0	ND
White-breasted nuthatch	0	0	40	33	0	17	ND
Spring/Fall migrants							
White-throated sparrow	0	0	0	33	50	33	ND
Wood thrush	0	0	27	33	0	0	ND
Yellow-rumped warbler	0	0	0	0	50	0	ND
Breeding							
Baltimore oriole	0	0	0	0	13	0	ND
Black-and-white warbler	0	100	60	33	50	17	ND
Blue-winged warbler	0	0	0	0	50	0	ND
Common yellowthroat	50	100	67	33	75	33	ND
Eastern wood-pewee	25	0	0	0	0	0	ND
Great crested flycatcher	0	0	53	33	0	33	ND
Ovenbird	50	0	53	33	50	50	ND
Red-eyed vireo	0	0	20	0	0	0	ND

Table 23: Bird species on Toad Rock Reservation during summer breeding season with frequency values and nesting probabilities.

	Maritime dune/interdunal swale	Coastal woodland	Red maple/black gum swamp	Mixed-oak woodland	Maritime shrubland	Shrub swamp	Emergent marsh	Nest Placement	Breeding Potential
Summer (2004, 2006, 2007, 2010, 2017, 2020, 2025)									
Avian Species	16/4	15/4	33/6	20/3	11/2	10/2	2/1		
Year round	Average Weighted (point counts/year) % Frequency								
American crow	4	5	5	0	21	0	0	tree	PO
American goldfinch	59	0	10	7	38	38	0	shrub	PR

American robin	27	10	20	13	14	0	0	tree	PR
Bank swallow	4	0	0	0	0	0	0	burrow	NB
Black-capped chickadee	10	63	53	63	27	31	0	cavity	PR
Blue jay	42	29	26	63	0	57	0	tree	PR
Brown thrasher	8	0	0	0	0	0	0	shrub	PO
Carolina wren	4	14	8	17	14	7	0	cavity	PR
Cedar waxwing	10	19	2	4	0	14	0	tree	PO
Chipping sparrow	4	0	0	0	0	0	0	shrub	PO
Double-crested cormorant	8	0	0	0	0	0	0	ground	PO
Downy woodpecker	0	16	7	4	0	0	0	cavity	PO
Eastern phoebe	0	0	0	0	0	17	0	building	PO
Eastern towhee	100	89	80	47	100	76	100	ground	PR
Gray catbird	76	87	56	43	75	67	0	shrub	PR
Great black-backed gull	17	0	0	0	0	0	0	ground	NB
Hairy woodpecker	0	0	2	4	0	0	0	cavity	PR
Mourning dove	32	0	5	6	14	0	50	tree	PR
Northern cardinal	13	16	14	30	0	7	0	shrub	PO
Northern flicker	0	5	4	4	0	0	0	cavity	PO
Osprey	4	0	6	0	20	0	0	tree	NB
Red-bellied woodpecker	0	0	0	4	0	0	0	cavity	PO
Red-headed woodpecker	0	17	0	0	0	0	0	cavity	NB
Red-tailed hawk	7	0	7	0	0	0	0	tree	PO
Red-winged blackbird	7	5	8	4	0	7	0	shrub	PO
Song sparrow	20	0	6	0	0	0	0	shrub	PR
Sparrow species	6	0	0	0	0	0	0		
Tree swallow	8	0	0	0	0	0	0	ground	PO
Tufted titmouse	0	19	24	47	7	0	0	cavity	PR
Turkey vulture	4	10	0	0	7	7	50	tree/ground	PO
White-breasted nuthatch	4	21	6	11	0	7	0	cavity	PO
Wood duck	0	0	0	0	0	7	0	cavity	PO
Woodpecker sp.	0	0	0	6	0	0	0		
Spring/fall migrants									
Northern waterthrush	0	5	0	0	0	0	0	ground	NB
Wood thrush	0	0	6	29	0	0	0	tree	PO
Breeding									
Baltimore oriole	0	0	0	0	13	0	0	tree	PO
Black-and-white warbler	0	10	10	14	7	17	0	ground	PR
Black-billed cuckoo	8	0	0	0	0	0	0	tree	PO
Common yellowthroat	53	30	41	25	73	76	0	shrub	PR
Eastern wood-pewee	0	0	2	11	0	0	0	tree	PR
Great crested flycatcher	4	21	24	17	0	33	0	cavity	PR
Green heron	0	0	0	0	0	7	0	tree	PO
House wren	0	0	3	0	0	0	0	cavity	PO
Ovenbird	6	29	32	66	0	36	0	ground	PR

Red-eyed vireo	7	19	10	21	21	21	50	tree	PR
Rose-breasted grosbeak	0	0	0	0	0	17	0	tree	PO
Ruby-throated hummingbird	0	0	2	0	0	0	0	tree	PO
Scarlet tanager	8	0	4	0	0	0	0	tree	PO
Yellow-billed cuckoo	0	0	2	0	0	0	0	tree	PO
Yellow warbler	4	5	4	0	21	0	0	shrub	PR

2. Invertebrate

Toad Rock 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 335 species was observed across all trap sites (Table 24, page 115); six 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 151). Some moth species are generalists, utilizing a large variety of hosts; other species are specialists and require specific host plants. These specialist species can be easily threatened with changes to host plant populations.

The varied ecological communities on Toad Rock Reservation support a multitude of moth species for some portion of their life cycles. Species observed range from nuisance gypsy moths to showy species from the Saturniidae family such as *Hyalophora cecropia*, *Automeris io*, and *Antheraea polyphemus*. Species such as maple, oak, black berry, hazelnut, grape and beach plum provide food for the newly hatched caterpillars.

Figure 40: *Hyalophora cecropia* from Saturniidae family



Figure 41: Giant eastern cranefly

Passive observations of the property from 2008-2025 indicate a variety of other invertebrates utilize the property and include butterflies, damselflies, dragonflies, and the less obvious jumping spiders. Cicadas may be heard in wooded habitats during the summer months. Skunk cabbage and other flowering wetland plants attract a variety of pollinators that bring a spring-time hum to the woodland after the quiet winter thaw. The large and fragile giant eastern crane fly, an elusive woodland creature, can be spotted during spring and fall along streams at dusk (Table 25, page 125). A ferocious aerial hunter of other flying insect, the four-spotted owlfly is a crepuscular predator that prowls the open woodlands of Toad Rock Reservation. It is identified by its clubbed, long antennae and large, divided and bulging eyes that optimize prey location on the fly (Belušič et al 1013). The four-spotted owlfly belongs to the subfamily Ascalaphinae, named for the Greek underworld spirit Ascalaphus, who was turned into a screech-owl as punishment.



Figure 42: Four-spotted owlfly

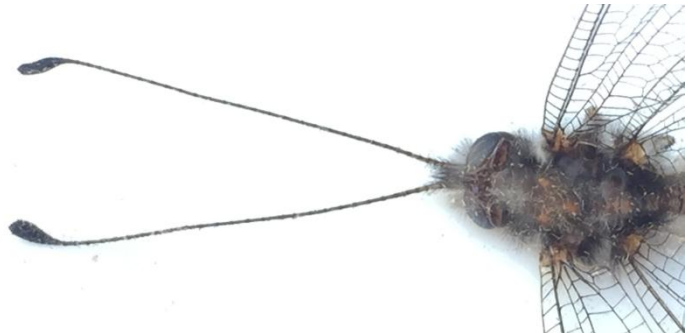


Table 24: Summary of macrolepidoptera species recorded from Toad Rock Reservation, Aquinnah, MA

MONA #	ZOOK #	Habitat – Year – Trap ID	RMS – 2008 - TRN	RMS – 2009 – TR8	RMS – 2017 – TR61	MS – 2008 – TR1	MS – 2009 – TR5	MS – 2010 – TR13	SS – 2009 – TR11	Heath – 2009 TR12	Swale – 2008 – TR2	Swale – 2017 – TR60	Dune – 2008 – TR3
		Sampling nights	1	2	5	1	1	1	1	4	4	5	5
		THYATIRIDAE											
		Thyatirinae											
6237		<i>Pseudothyatira cymatophoroides</i>			1							0	
		DREPANIDAE											
		Oretinae											
6255		<i>Oreta rosea</i>	0	1		0	0		0	0	0		0
		GEOMETRIDAE											
		Ennominae			0							0	

6261		<i>Heliomata cycladata</i>	0			0					0		0
6272		<i>Eumacaria madopata</i> (= ' <i>latiferrugata</i> ')	0		0	0					1	1	0
6273		<i>Speranza</i> (= ' <i>ltame</i> ') <i>pustularia</i>		2	3		0		0	1		1	
6326		<i>Macaria aemulitaria</i>			0							2	
6341		<i>Macaria bicolorata</i>		0			1		0	0			
6342		<i>Macaria bisignata</i>	0			0					0		1
6449		<i>Glena cribrataria</i>	0		1	0					0	0	1
6597		<i>Ectropis crepuscularia</i>	1	1	1	0	0		0	1	0	0	0
6598		<i>Protoarmia porcelaria</i>	0	0	0	0	0		0	1	1	2	2
6599		<i>Epimecis hortaria</i>	0	0	0	0	0		0	1	1	1	0
6620		<i>Melanolophia canadaria</i>		0	1		0	1	0	1		0	
6621		<i>Melanolophia signataria</i>	0			0		1			0		1
6640		<i>Biston betularia</i>	0			0					1		0
6654		<i>Hypagyrtis unipunctata</i>	0	2	2	0	1		0	1	0	0	0
6655		<i>Hypagyrtis esther</i>		0			1		0	0			
6658		<i>Phigalia titea</i>	0			1					0		0
6667		<i>Lomographa vestaliata</i>			1			1				1	
6720		<i>Lytrosia unitaria</i>		1	1		0		0	1		1	
6724		<i>Euchlaena serrata</i>			1							0	
6725		<i>Euchlaena muzaria</i>	0	2	2	0	0		0	3	0	0	1
6729		<i>Euchlaena johnsonaria</i>		0			0		0	1			
6739		<i>Euchlaena irraria</i>	0	0	1	0	0		1	1	0	1	2
6743		<i>Xanthotype urticaria</i>	0			0					0		1
6753		<i>Pero honestaria</i>			0			1				1	
6754		<i>Pero ancetaria</i> (= ' <i>hubneraria</i> ')	1		1	0					0	0	2
6755		<i>Pero morrisonaria</i>	0	0	0	0	0		1	1	0	2	2
6763		<i>Phaeoura quernaria</i>			0							1	
6796		<i>Campaea perlata</i>	0	0	1	0	0		0	1	0	2	1
6798		<i>Ennomos subsignaria</i>			1							0	
6812		<i>Homochlodes fritillaria</i>		0			0		0	1			
6815		<i>Gueneria similaria</i>		1			0		0	1			
6822		<i>Metarranthis duaria</i>	0			0		1			0		2
6822.1		<i>M. near "duaria"</i>		0			0		0	1			
6823		<i>Metarranthis angularia</i>	0			0		1			0		1
6826		<i>Metarranthis hypochraria</i>		1			0	1	0	1			
6827		<i>Metarranthis refractaria</i>		0	0		0		0	1		1	
6829.1		<i>Metarranthis sp.nr. lateritaria</i>			1							0	
6836		<i>Plagodis pulveraria</i>			0							1	
6837		<i>Probole alienaria</i>	0	0	3	0	0	1	0	1	0	1	2
6840		<i>Plagodis serinaria</i>			0							2	
6843		<i>Plagodis fervidaria</i>	0	0	2	0	0	1	0	1	0	1	1
6844		<i>Plagodis alcoolaria</i>		0	0		0		0	1		1	

6884		<i>Besma endropiaria</i>			0							1	
6885		<i>Besma quercivoraria</i>	0	0	3	0	0	1	0	1	0	1	2
6888		<i>Lambdina fiscellaria</i>	0			0					0		1
6941		<i>Eusarca confusaria</i>	0	1	0	0	0		0	1	0	2	1
6963		<i>Tetracis crocallata</i>	0	0	0	0	0		0	1	0	2	1
6964		<i>Tetracis cachexiata</i>	0	0	1	0	0		0	1	0	2	2
6966		<i>Eutrapela clemataria</i>		0	1		0	1	0	1		1	
6982		<i>Prochoerodes lineola</i>	0	1	2	0	0	1	0	0	1	1	1
6987		<i>Antepione thiosaria</i>	0			0					0		1
7009		<i>Nematocampa resistaria</i>	0	2	1	0	1		0	1	0	1	0
		Geometrinae											
7046		<i>Nemoria bistriaria</i>		1	2		0		0	0		0	
7048		<i>Nemoria mimosaria</i>			0			1				1	
7053		<i>Dichorda iridaria</i>	0		1	0		1			0	1	1
7071		<i>Chlorochlamys chloroleucaria</i>			0							1	
7084		<i>Hethemia pistasciaria</i>			0							1	
		Sterrhinae											
7094		<i>Lobocleta ossularia</i>	0		0	0					0	1	1
7132		<i>Pleuroprucha insulsaria</i>	0		0	0					0	1	1
7139		<i>Cyclophora pendulinaria</i>	0		2	0		1			0	0	1
7157		<i>Scopula caecuminaria</i>	0			0					0		1
7159		<i>Scopula limboundata</i>	0	2	2	0	1		0	2	1	0	1
		Larentiinae											
7196		<i>Eulithis diversilineata</i>	0	1	2	0	0		0	0	0	2	1
7206		<i>Eulithis explanata</i>		1	2		0		0	2		1	
7239		<i>Hydriomena pluviata/transfigurata</i>	1			1					0		1
7292		<i>Rheumaptera prunivorata</i>						1					
7414		<i>Orthonama obstipata</i>	0			0					1		1
7416		<i>Costaconvexa centrostrigaria</i>		1	1		0		0	2		3	
7440		<i>Eubaphe mendica</i>			0							1	
7625		<i>Psaphida rectangulata</i>			1							1	
7917		<i>Cladara anguliniata</i>	1			0					0		0
		<i>Eupithecia spp.</i>	1	2	2	0	0		0	1	0	1	0
		LASIOCAMPIDAE											
		Macromphalinae											
		Lasiocampinae											
7698		<i>Malacosoma disstria</i>	0	1	2	0	0		0	1	0	1	1
7701		<i>Malacosoma americanum</i>	0		3	0					0	2	1
		SATURNIIDAE											
		Ceratocampinae											
		Listed species		5	2		0		0	0		6	
7715		<i>Dryocampa rubicunda</i>		1	1		0		0	1		2	

7716		<i>Anisota stigma</i>		0	0		0		0	1		9	
7719		<i>Anisota senatoria</i>		0			1		0	0			
		Hemileucinae									0		0
7746		<i>Automeris io</i>	0	0	2	0	0		0	1	1	2	1
		Saturniinae									0		0
7757		<i>Antheraea polyphemus</i>	0	1	1	0	0		0	0	0	2	1
7758		<i>Actias luna</i>		1	0		0		0	1		2	
7767		<i>Hyalophora cecropia</i>	0		0	0		1			0	2	2
		SPHINGIDAE											
		Sphinginae											
7810		<i>Sphinx gordius</i>	0	1	1	0	1	1	0	1	0	0	3
7824		<i>Paonias excaecatus</i>	0	1	1	0	0		0	4	1	3	2
7825		<i>Paonias myops</i>	0	0	1	0	0		0	3	0	2	1
7826		<i>Paonias astylus</i>	0		1	0					0	1	1
7827		<i>Laothoe juglandis</i>		0	1		0		0	1		0	
		Smerinthinae											
		Macroglossinae		0			0		0	0			
7859		<i>Eumorpha pandorus</i>	0	0		0	0		0	1	0		1
7870		<i>Sphecodina abbottii</i>	0			0		1			0		1
7871		<i>Diedamia inscripta</i>	0			0					0		1
7884		<i>Darapsa versicolor</i>	0	0		0	0		0	1	3		0
7885		<i>Darapsa myron</i>	0			0					0		0
7886		<i>Darapsa choerilus</i> (= "pholus")	0	2	1	0	0	1	0	2	1	2	1
		NOTODONTIDAE											
		Notodontinae											
7917	930010	<i>Paraeschra georgica</i>			3			1				2	
		Phalerinae											
7902	930033	<i>Datana ministra</i>		1	0		0		0	0		1	
7904	930035	<i>Datana drexelii</i>	0	2	2	0	1	1	0	3	0	3	1
7906	930037	<i>Datana contracta</i>		0	0		1		0	0		1	
7915	930046	<i>Nadata gibbosa</i>	0	1	4	0	1	1	1	4	2	3	1
7920	930049	<i>Peridea angulosa</i>		1	1		0		0	3		1	
7951	930127	<i>Symmerista albifrons</i>		1			1		0	2			
7958	930134	<i>Dasylophia thyatiroides</i>		0			0		0	1			
		<i>Hyperaeschra georgica</i>	0			0					0		1
		Heterocampinae											
7975	930067	<i>Macruocampa marthesia</i>		2	3		1		0	3		1	
7983	930075	<i>Heterocampa obliqua</i>		1	1		1		0	2		2	
7990	930082	<i>Heterocampa umbrata</i>	0	0	1	0	1	1	0	2	0	2	1
7994	930086	<i>Heterocampa guttivitta</i>		0	0		0		0	1		1	
7995	930087	<i>Heterocampa biundata</i>		1	1		0	1	0	0		0	
7998	930090	<i>Lochmaeus manteo</i>		0			0		0	1			

8005	930098	<i>Schizura ipomoeae</i>		1	2		0		0	0		1	
8006	930099	<i>Schizura badia</i>	0	0	0	0	0		0	1	0	2	2
8007	930100	<i>Schizura unicornis</i>		0	1		0		0	1		0	
8017	930110	<i>Oligocentria lignicolor</i>			0							2	
		Nystaleinae											
7951	930127	<i>Symmerista albifrons</i>			1							0	
		EREBIDAE											
		Lymantriinae											
8318	930141	<i>Lymantria dispar</i>			1							0	
8316	930168	<i>Orgyia leucostigma</i>											1
		Pangraptinae											
8490	930559	<i>Pangrapta decoralis</i>		1			1		0	0			
		Boletobinae											
9039	930731	<i>Hyperstrotia flaviguttata</i>	0			0					0		1
		Arctiinae											
8089	930204	<i>Hypoprepia minuta</i>	0			0					0		1
8045.1	930219	<i>Crambidia pallida</i>	0			0					0		1
8196	930246	<i>Grammia parthenice</i>	0			0					1		0
8188	930253	<i>Grammia figurata</i>	0		1	0		1			0	1	1
8169	930278	<i>Apantes phalerata</i>	0		0	0					1	1	3
8171	930280	<i>Apantes nais</i>	0		1	0		1			0	1	1
8118	930297	<i>Virbia</i> (= " <i>Holomelina</i> ") <i>opella</i>	0	2	3	0	1		0	2	0	2	3
8134	930309	<i>Spilosoma congrua</i>	0	0	2	0	0	1	1	1	0	1	2
8133	930311	<i>Spilosoma latipennis</i>		0	0		0		1	1		1	
8137	930316	<i>Spilosoma virginica</i>	0		3	0					0	1	2
8140	930319	<i>Hyphantria cunea</i>	0		1	0					0	1	2
8156	930332	<i>Phragmatobia fuliginosa</i>		0	0		0		0	1		1	
8129	930335	<i>Pyrrharctia isabella</i>	0		1	0					1	0	0
8121	930336.6	<i>Virbia aurantiaca</i>	0			0					1		1
8203	930360	<i>Halysidota tessellaris</i>	0	2	2	0	1		0	3	1	1	0
8211	930370	<i>Lophocampa caryae</i>	0	0	2	0	0		1	1	1	2	2
		Hermiiniinae											
8322	930469	<i>Idia americalis</i>	0	1	2	0	1		0	1	0	3	1
8323	930471	<i>Idia aemula</i>		1	2		1		0	1		1	
8326	930474	<i>Idia rotundalis</i>		0	2		1		0	2		1	
8328	930476	<i>Idia julia</i>			2							1	
8329	930477	<i>Idia diminuendis</i>		0	0		1		0	1		2	
8340	930489	<i>Zanclognatha literalis</i>		0			0		0	2			
8341	930490	<i>Zanclognatha theralis</i>		2	1		1		0	2		1	
8345	930492	<i>Zanclognatha laevigata</i>	0	1		0	0		0	1	1		0
8347	930494	<i>Zanclognatha obscuripennis</i>			1							0	
8351	930498	<i>Zanclognatha cruralis</i>		1			0		0	0			
8352	930499	<i>Zanclognatha marcidilinea</i>			1							1	

8353	930500	<i>Zanclognatha jacchusalis</i> ("orchreipennis")	0	1	2	0	1		0	3	0	1	1
8355	930502	<i>Chytolita morbidalis</i>	0	0	1	0	0		0	1	0	2	2
8360	930511	<i>Macrochilo orciferalis</i>	0		1	0					1	3	1
8364	930514	<i>Phalaenostola larentioides</i>			0							1	
8370	930520	<i>Bleptina caradrinalis</i>	0	2	3	0	1		0	2	2	2	1
8378	930529	<i>Renia salusalis</i>	0	1	3	0	0		0	1	0	1	1
8379	930530	<i>Renia factiosalis</i>	0		1	0					0	0	1
8381	930532	<i>Renia discoloralis</i>	0		1	0					0	0	1
8386	930538	<i>Renia "adspergillus" (small, plain)</i>		0	0		1		0	0		1	
8387	930539	<i>Renia sobrialis</i>		0	1		0		0	2		1	
8397	930551	<i>Renia sobrialis</i>	0			0					0		1
8384.1	932352	<i>Renia flavipunctalis</i>	0	0		0	1		0	1	0		1
8385.1	932363	<i>Renia "larvalis" (larger. like salusalis)</i>		1			0		0	1			
		Pangraptinae											
8490	930559	<i>Pangrapta decoralis</i>	0		3	0		1			0	2	1
8491	930560	<i>Ledaea perditalis</i>	0		1	0					0	0	1
		Hypeninae											
8441	930561	<i>Hypena manalis</i>	0			0					0		1
8442	930562	<i>Hypena baltimoralis</i>		1	3		0	1	0	0		2	
8444	930565	<i>Hypena palparia</i>						1					
8465	930588	<i>Hypena scabra</i>	0		0	0					0	2	1
		Scolecocampinae											
8514	930637	<i>Scolecocampa liburna</i>		1	1		0		0	1		1	
8522	930643	<i>Gabara subnivosella</i>	0	0	1	0	0		0	1	1	2	1
9821	931063	<i>Amolita roseola</i>		0			0		0	1			
		Hypenodinae											
8427	930670	<i>Dyspyralis puncticosta</i>			1							0	
		Phytometrinae											
9038	930730	<i>Hyperstrotia villificans</i>			1							0	
		Erebinae											
8774	930765	<i>Catocala muliercula</i>	0			0					0		1
8777	930767	<i>Catocala badia</i>		1	0		0		0	1		4	
8801	930792	<i>Catocala ilia</i>		1	0		0		0	1		1	
8846	930832	<i>Catocala sordida</i>		0			1		0	0			
8847	930833	<i>Catocala gracilis</i>	0	1	0	0	0		0	1	0	1	1
8849	930835	<i>Catocala andromedae</i>		1	1		0		0	0		0	
8618	930891	<i>Drasteria graphica</i>	0	0	1	0	0	1	0	1	1	4	5 9
8619	930892	<i>Drasteria occulta</i>	0	0		0	0		0	1	0		2
8689	931023	<i>Zale lunata</i>	0			0					1		0
8697	931032	<i>Zale minerea</i>	0		0	0					0	2	1
8717	931053	<i>Zale horrida</i>	0	0	1	0	0	1	0	1	0	2	1
		Listed species		0	0		0		0	1		2	

8851	930837	<i>Catocala coccinata</i>			0							1	
8857	930841	<i>Catocala ultronia</i>	0			0					0		1
8865	930847	<i>Catocala praeclara</i>	0		1	0					0	0	1
8876	930857	<i>Catocala micronympha</i>		1	1		0		0	0		0	
8878.1	930860	<i>Catocala lineella</i>			1							0	
8739	930924	<i>Caenurgina erechtea</i>	0		0	0					0	1	1
8745	930944	<i>Mocis texana</i>						1					
8764	930956	<i>Argyrostromis anilis</i>	0		1	0		1			1	1	2
8721	930962	<i>Allotria elonympha</i>	0	2	3	0	0		0	3	1	2	0
8719	931055	<i>Euparthenos nubilis</i>		0			0		0	0			
9821	931063	<i>Amolita roseola</i>			0							2	
9727	931726	<i>Parallelia bistriaris</i>		2			0		0	0			
		Eulepidotinae											
8587	931089	<i>Panopoda rufimargo</i>	0	2	2	0	1		0	3	1	2	1
8588	931090	<i>Panopoda carneicosta</i>		0			0		0	0			
8525	931101	<i>Phyprosopus callitrichoides</i>			0							1	
		EUTELIIDAE											
		Euteliinae											
8955	931103	<i>Marathyssa inficita</i>			1							0	
8957	931106	<i>Paectes oculatrix</i>	0		0	0					0	1	1
8959	931107	<i>Paectes pygmaea</i>		0			0		0	1			
8962	931111	<i>Paectes abrostoloides</i>			0							1	
8968	931118	<i>Eutelia pulcherrima</i>	0	1	1	0	0		0	0	0	1	1
		NOLIDAE											
		Nolinae											
8983	931121	<i>Meganola minuscula</i>			1							1	
8983.1	931122	<i>Meganola phylla</i>	0		1	0					0	1	1
8983.2	931123	<i>Meganola spodia</i>		1	1		0		0	1		0	
8989	931129	<i>Nola pustulata</i>			1							1	
8996	931136	<i>Nola clethrae</i>	0		1	0		1			0	2	1
8970	931149	<i>Baileya ophthalmica</i>	0	0		0	0		0	1	0		1
		Risobinae											
8970	931149	<i>Baileya ophthalmica</i>			0							1	
		NOCTUIDAE											
		Plusiinae											
8904	931186	<i>Chrysanympa formosa</i>								1			
8908	931191	<i>Autographa precationis</i>	1	1									1
		Amphipyrrinae											
10019	931548	<i>Psaphida resumens</i>	1										
		Heliothinae											
11068	932045	<i>Helicoverpa zea</i>											1
11104	932129	<i>Schinia spinosae</i>									2		
		Bagisarinae											

9169	931241	<i>Bagisara rectifascia</i>		1						2			
9189	931406	<i>Charadra deridens</i>		1									
		Eustrotiinae											
9038	930730	<i>Hyperstrotia villificans</i>		1									
9046	931289	<i>Deltote bellicula</i>			1							0	
9047	931290	<i>Lithacodia muscosa</i>			1							0	
		Pantheinae											
9189	931406	<i>Charadra deridens</i>			0							1	
		Raphiinae											
9193	931412	<i>Raphia frater</i>			0							1	
		Balsinae											
9663	931418	<i>Balsa tristrigella</i>			0							1	
9664	931419	<i>Balsa labecula</i>								1			
		Acronictinae											
9200	931421	<i>Acronicta americana</i>		0	1		0		0	1		1	
9209	931430	<i>Acronicta radcliffei</i>		0	1		0		0	1		0	
9228	931445	<i>Acronicta hasta</i>			0							1	
9237	931454	<i>Acronicta interrupta</i>			0			1				0	
9238	931455	<i>Acronicta lobeliae</i>		0	1		0	1	0	1		0	
9243	931463	<i>Acronicta ovata</i>		2	2		1		0	1		2	
9244	931465	<i>Acronicta modica</i>		0	1		0		0	0		1	
9245	931466	<i>Acronicta haesitata</i>		2	2		0		0	1		1	
9249	931467	<i>Acronicta increta</i> (+ "inclara")	0	1	2	0	0		0	2	0	3	1
9247	931469	<i>Acronicta tristis</i>	0		0	0					0	2	1
9254	931471	<i>Acronicta afflicta</i>	0		1	0		1			0	2	2
9257	931474	<i>Acronicta impleta</i>		1	1		0		0	0		1	
9259	931476	<i>Acronicta noctivaga</i>	0	0	1	0	0		0	2	0	1	1
9264	931478	<i>Acronicta longa</i>	0		0	0					0	1	1
9266	931480	<i>Acronicta lithospila</i>	0		1	0					0	2	2
9272	931485	<i>Acronicta obliterata</i>	0	0	1	0	0		0	1	0	0	3
9281	931494	<i>Agriopodes fallax</i>	0	1	0	0	0	1	0	2	0	1	1
9285	931497	<i>Polygrammate hebraeicum</i>	0	2	4	0	0		0	3	1	3	0
9286	931498	<i>Harrisimemna trisignata</i>		0	1		0		0	1		1	
8104	931499	<i>Comachara cadburyi</i>		0	1		0		0	1		2	
9062	931501	<i>Cerma cerintha</i>	0	1	1	0	0		0	0	0	0	1
		Oncocnemidinae			0							0	
		<i>Listed species</i>	0	0	0	0	0		0	4	9 2	1	3
		Agaristinae											
9638	931544	<i>Amphipyra pyramidoides</i>	0			0					0		1
9299	931964	<i>Eudryas unio</i>			2							0	
9301	931966	<i>Eudryas grata</i>		1	1		0		0	0		1	
		Condicinae											

9690	931989	<i>Condica videns</i>	0		0	0					0	1	2
9057	932025	<i>Homophoberia apicosa</i>		0	1		0		0	1		0	
9065	932026	<i>Leuconycta diphtheroides</i>		1			0		0	0			
		Eriopinae											
9631	932192	<i>Calloplistria mollissima</i>	0		0	0					1	1	1
9633	932194	<i>Calloplistria cordata</i>		1			0		0	0			
		Noctuinae											
		Listed species		0			0		0	1			
9618	932208	<i>Phosphila turbulenta</i>		1	3		0		0	1		1	
9619	932209	<i>Phosphila miseloides</i>	0	1	5	0	0		0	3	0	2	1
9666	932216	<i>Spodoptera frugiperda</i>		0			0		0	1			
9678	932228	<i>Elaphria versicolor</i>			0							1	
9681	932233	<i>Elaphria festivoidea</i>	0	0		0	0	1	0	1	0		2
9681.1	932233	<i>Elaphria alapallida</i>			0							2	
9647	932266	<i>Proxenus miranda</i>	0			0					0		1
9650	932269	<i>Athetis tarda</i>	0	0	0	0	0	1	0	1	0	1	1
9522	932287	<i>Iodopepla u-album</i>	0	0		0	0		0	1	0		1
9545	932290	<i>Euplexia benesimilis</i>						1					
9364	932314	<i>Apamea sordens (=finitima)</i>	0			0					0		1
9333	932319	<i>Apamea lignicolora</i>		0			0		0	0			
9378	932339	<i>Apamea burgessi</i>	0			0					1		0
9454	932358	<i>Amphipoea velata</i>		0			0		0	1			
9416	932384	" <i>Oligia</i> " <i>minuscule</i>		0			0		0	1			
9457	932447	<i>Amphipoea americana</i>	0			0					0		1
9482	932475	<i>Papaipema speciosissima</i>	0			0					1		0
9525	932517	<i>Bellura obliqua</i>	0		0	0					0	2	1
9942	932596	<i>Xystocheilus rufago</i>	0			1					0		0
9947	932603	<i>Epiglaea apiata</i>	0			0					1		0
9952	932609	<i>Eucirroedia pampina</i>	0			0					1		0
9957	932616	<i>Agrochola bicolorago</i>	0			0					1		0
9963	932625	<i>Parastichtis suspecta*</i>			2							0	
9578	932664	<i>Hyppa xylinoides</i>						1					
9815	932672	<i>Cosmia calami</i>		0	0		1		0	0		1	
9420	932695	<i>Fishia illocata</i>	0			0					1		0
9556	932713	<i>Chytonix palliatricula</i>	0	2	1	0	0	1	0	3	0	3	1
9629	932749	<i>Fagitana littera</i>	0		2	0					0	0	1
10291	932805	<i>Morrisonia latex</i>			0							1	
10291	932805	<i>Morrisonia latex</i>	0			0		1			0		2
10300	932882	<i>Spiramater grandis</i>			1							2	
10300	932882	<i>Spiramater grandis</i>	0	0		0	0		1	1	0		2
10301	932883	<i>Spiramater lutra</i>			2							1	
10265	932906	<i>Siderdis rosea</i>	0		0	0		1			0	1	1
10266	932907	<i>Sideridis congermana</i>						1					

10431	932928	<i>Dargida (= "Faronta") diffusa</i>	0		0	0					0	1	1
10393	933039	<i>Lacinipolia teligera</i>	0			0					1		1
10397	933044	<i>Lacinipolia renigera</i>	0		0	0					2	1	1
10288	933146	<i>Orthodes detracta</i>	0	0	1	0	0		0	1	0	2	1
		Listed species		0	0		0		0	1		1	0
10490	932773	<i>Orthosia revicta</i>	0			1					0		0
10501	932784	<i>Crocigrapha normani</i>						1					
10517	932799	<i>Egira alternans</i>	0			1		1			0		1
10520	932802	<i>Morrisonia evicta</i>	0			0		1			0		1
10521	932803	<i>Morrisonia confusa</i>						1					
10524	932810	<i>Nephelodes minians</i>	0			0					1		1
10436	932933	<i>Mythimna oxygala</i>						1					
10438	932935	<i>Mythimna unipuncta</i>		1	0		0		0	1		1	
10439	932937	<i>Leucania extincta</i>	0			0					0		1
10444	932943	<i>Leucania phragmatidicola</i>			1							0	
10449	932948	<i>Leucania insueta</i>	0			0					0		1
10459	932963	<i>Leucania inermis</i>		0	1		0	1	1	0		1	
10462	932966	<i>Leucania pseudargyria</i>			0							1	
10532. 1	933089	<i>Homorthodes lindseyi</i>	0		1	0		1			0	2	2
10563	933113	<i>Protorthodes oviduca</i>	0			0					0		1
10569	933120	<i>Ulolonche modesta</i>	0			0					0		2
10585	933136	<i>Orthodes majuscula ("crenulata")</i>		0			0	1	0	1			
10587	933138	<i>Orthodes cynica</i>	0	0	1	0	0	1	1	1	0	1	2
10627	933193	<i>Tricholita signata</i>	0			0					1		1
10915	933211	<i>Peridroma saucia</i>		0			0		0	1			
10903	933216	<i>Anicla illapsa</i>	0			0					1		0
10878	933228	<i>Striacosta albicosta</i>			0							1	
10870	933232	<i>Dichagyris acclivis</i>	0		0	0					0	2	1
10715	933329	<i>Euxoa scandens</i>	0			0					0		3
10805	933395	<i>Euxoa tessellata</i>		1			0		0	0			
10810	933422	<i>Euxoa violaris</i>	0			0					2		1
10838	933461	<i>Euxoa detersa</i>	0			0					2		0
10666	933494	<i>Feltia manifesta</i>	0			0		1			0		1
10680	933495	<i>Feltia geniculata</i>	0			0					2		1
10670	933498	<i>Feltia jaculifera</i>	0			0					1		1
10676	933503	<i>Feltia herilis</i>	0			0					0		1
10641	933506	<i>Agrotis vetusta</i>	0			0					2		1
10658	933519	<i>Agrotis stigmata</i>	0			0					0		1
10659	933521	<i>Agrotis volubilis</i>	0			0		1			0		2
10663	933528	<i>Agrotis ipsilon</i>	0	0	0	1	0		0	0	1	1	0
10891	933529	<i>Ochropleura implecta</i>		0	0		0	1	1	1		1	
10994	933536	<i>Cerastis tenebrifera</i>	1			0					0		0

10993	933546	<i>Hemipachnobia monochromatea</i>		0			0	1	4	0			
11010	933547	<i>Lycophotia phyllophora</i>	0	0		0	1		0	1	0		1
11012. 2	933551	<i>Noctua pronuba</i>	0	1	1	0	0		0	2	1	1	2
10969	933586	<i>Xestia dilucida</i>	0			0					1		1
10955	933626	<i>Agnorisma badinodis</i>	0			0					1		0
11006	933649	<i>Protolampra brunneicollis</i>	0	2	0	0	1		0	0	2	2	1
11029	933680	<i>Abagrotis alternata</i>		1			0		0	2			
		Listed species	0			0					7		3
11045	933688	<i>Abagrotis anchocelioides</i>		3			0		0	0			

Table 25: Insect species observed during from 2008-2025 on Toad Rock Reservation, Aquinnah, MA

Order Araneae	
Family Ixodidae	
<i>Amblyomma americanum</i>	Lone star tick
<i>Dermacentor variabilis</i>	Dog tick
<i>Ixodes scapularis</i>	Deer tick
Family araneidae	
<i>Araneus marmoreus</i>	marbled ord-weaver
Class Insecta	
Order Coleoptera	
Family Carabidae	
<i>Calosoma scrutator</i>	Fiery searcher beetle
Order Diptera	
Family Pediciidae	
<i>Pedicia albivitta</i>	Giant eastern crane fly
Family Culicidae	
<i>Unknown sp.</i>	Mosquito
Family Tabanidae	
<i>Chrysops sp.</i>	Deer fly
Order Hemiptera	
Family Cicadidae	
<i>Neotibicen canicularis</i>	dog-day cicada
Family Gerridae	
<i>Unknown sp.</i>	Water strider spp.
Order Hymenoptera	
Family Apidae	
<i>Anis millifera</i>	Eastern honeybee
<i>Bombus sp.</i>	Bumblebee spp.
Family Formicidae	
<i>Formica exsectoides</i>	Allegheny mound ant

<i>Unknown sp.</i>	Red ant sp.
Order Neuroptera	
Family Myrmeleontiformia	
<i>Ululodes quadripunctatus</i>	Four-spotted owlfly
Order Lepidoptera	
Family Hesperidae	
<i>Erynnis juvenalis</i>	Juvenal's duskywing
Family Nymphalidae	
<i>Danaus plexippus</i>	Monarch
<i>Phyciodes tharos</i>	Pearl crescent
<i>Nymphalis antiopa</i>	Mourning cloak
<i>Vanessa cardui</i>	Painted lady
Family Lycaenidae	
<i>Lycaena phlaeas</i>	American Copper
<i>Strymon melinus</i>	Grey hairstreak
Order Odonata	
Family Aeshnidae	
<i>Anax junius</i>	Common Green Darner
Family Coenagrionidae	
<i>Enallagma sp.</i>	Bluet spp.
<i>Enallagma civile</i>	Familiar Bluet
<i>Enallagma aspersum</i>	Azure Bluet
<i>Ischnura verticalis</i>	Eastern Forktail
<i>Ischnura posita</i>	Fragile Forktail
<i>Nehalennia gracilis</i>	Sphagnum Sprite
Family Lestidae	
<i>Lestes disjunctus</i>	Common Spreadwing
<i>Lestes vigilax</i>	Swamp Spreadwing
<i>Lestes eurinus</i>	Amber-winged Spreadwing
<i>Lestes rectangularis</i>	Slender Spreadwing
Family Libellulidae	
<i>Pachydiplax longipennis</i>	Blue Dasher
<i>Erythemis simplicollis</i>	Eastern Pondhawk
<i>Libellula cyanea</i>	Spangled Skimmer
<i>Libellula incesta</i>	Slaty Skimmer
<i>Libellula lydia</i>	Common Whitetail
<i>Libellula pulchella</i>	Twelve-spotted Skimmer
<i>Libellula semifasciata</i>	Pinted Skimmer
<i>Sympetrum internum</i>	Cherry-faced Meadowhawk
<i>Sympetrum rubicundulum</i>	Ruby Meadowhawk
<i>Sympetrum obtrusum</i>	White-faced Meadowhawk

<i>Sympetrum vicinum</i>	Yellow-legged Meadowhawk
<i>Sympetrum semicinctum</i>	Band-winged Meadowhawk
<i>Pantala hymenaea</i>	Spot-winged Glider
<i>Tramea carolina</i>	Carolina Saddlebags
<i>Tramea lacerata</i>	Black Saddlebags
Order Orthoptera	
Family Acrididae	
<i>Melanoplus femurrubrum</i>	Red-legged grasshopper

**Report to the Martha's Vineyard Land Bank on the
2008 Odonate Survey of Land Bank Ponds and
Adjacent properties off Moshup's Trail, Aquinnah**

This is the first year I have done an odonate survey of these very interesting small ponds. It was great fun to find a new site that is totally undisturbed as far as I can tell. Six visits were made from June 11 to September 7 inclusive. A total of 20 species were observed. Most were common species that only required visual identification; 3 spreadwings were captured and identified in the hand and one meadowhawk was captured and collected because it appears to be the first documented record for Martha's Vineyard. One delightful feature of the ponds is the presence of large numbers of two native orchid species and a species of Cottongrass (*Eriophorum* sp.) which is uncommon to rare on the island.

Observations. These are spring-fed ponds so the water level did not appear to vary all season. The lower pond surface is fairly open with only emergent vegetation around the edges and much deeper water than the slightly larger upper pond. The upper pond is very heavily vegetated with lily pads and with floating mats of vegetation, largely sphagnum moss of several species, sundews and water willow, which will barely support an adult's weight. There are some shallow spots with a firm white sand bottom and other spots with a mucky bottom of undetermined depth but at least 4 feet in places. One curious feature is the presence of small minnows of some species in both ponds, in the stream that flows between them, and in part of the stream that flows out of the lower pond. Since the stream is not connected to any other body of water the question of how these fish reached these ponds suggests itself; these fish may have arrived a very long time ago when there was such a water connection.

There appear to be healthy populations of most species despite the fact that some species disappeared earlier than the same species persisted at other ponds on the island (cf. Black Saddlebags, Common Whitetail, Slaty Skimmer, Painted Skimmer). Sphagnum Sprite was seen fairly regularly which was a nice surprise since it is known from only two other sites on the island and only on one occasion at one of those two sites. The habitat type common at the upper pond should have also been good for Eastern Red Damsel *Amphiagrion saucium* which is known on the island only from the same two sites where Sphagnum Sprite had been found previously. However, I did not find it despite three visits in the Damsel's known flight period (early May to mid June). Better luck next year. Two other species I did not find were Eastern Amberwing *Perithemis tenera* which I expected and Ebony Jewelwing *Calopteryx maculata* which could conceivably live along the stream flowing between the two ponds, though the amount of habitat for the latter species is limited.

Six species were only found once. Something I have found to be true in the last several years is that odonates wander much more than one might expect, so some of these six species may not be "residents" at these ponds. Though the presence of bullfrogs and the small fish suggest some possible predation pressure, there is clearly enough vegetation in the upper pond and around the edge of the lower pond to provide adequate shelter for nymphs, thereby permitting healthy populations of most species.

As you know, in September all previously collected odonate specimens taken on the island were moved from Polly Hill Arboretum to the Land Bank office in Edgartown.

Species RecordedLestidae – Spreadwings

Common Spreadwing *Lestes disjunctus* – 1 on 30 July; 2 on 25 August

Swamp Spreadwing *Lestes vigilax* – 1 barely adult on 28 June (in-hand ID); 4 on 12 July; 10 on 30 July; 5+ on 25 August; 3 on 7 September

Amber-winged Spreadwing *Lestes eurinus* – one barely adult on 28 June (in-hand ID)

Slender Spreadwing *Lestes rectangularis* – 1 male on 7 September (in-hand ID)

Coenagrionidae – Pond Damsels

Bluet sp. *Enallagma* sp. – one probable *civile* on 28 June

Familiar Bluet *Enallagma civile* – 10+ on 12 July; 5 on 30 July (all females); 6+ on 25 August

Azure Bluet *Enallagma aspersum* – 1 male on 30 July

Eastern Forktail *Ischnura verticalis* – 10+ on 11 June; 20+ on 28 June; 5+ on 12 July; 6+ on 30 July; 1 male 25 August; 2 males & 4 females on 7 September

Fragile Forktail *Ischnura posita* – 6+ on 11 June; 10+ on 28 June; 4+ on 12 July; 3 on 25 August; 3+ on 7 September

Sphagnum Sprite *Nehalennia gracilis* – 4+ on 11 June; 6+ on 28 June; 1 teneral on 12 July; 1 probably of this species seen briefly 25 August; 2 females seen well 7 September – the latter are the two latest known seasonal reports for this species for the island.

Aeshnidae – Darners

Common Green Darner *Anax junius* – 4+ on 11 June; one on 28 June; 1 female on 12 July; 2 in outflow area 25 August; 2 in outflow area 7 September

Libellulidae – Skimmers

Blue Dasher *Pachydiplax longipennis* – 5+ on 11 June; 35+ on 28 June; 20+ on 12 July; 30+ on 30 July; 2 on 25 August

Eastern Pondhawk *Erythemis simplicicollis* – 5 on 28 June; 15+ on 12 July; 20+ on 30 July; 2 males & 3 females 25 August; 1 female and 2 males 7 September

Spangled Skimmer *Libellula cyanea* – 5+ on 28 June; 1 on 12 July

Slaty Skimmer *Libellula incesta* – 6+ on 28 June; 10+ on 12 July; 9 on 30 July

Common Whitetail *Libellula lydia* – 8+ on 11 June; 8+ on 28 June; 10+ on 12 July; 1 on 30 July

Twelve-spotted Skimmer *Libellula pulchella* – 1 on 30 July

Painted Skimmer *Libellula semifasciata* – 1 away from ponds on 11 June; one at ponds 28 June; 2 on 12 July

Ruby Meadowhawk *Sympetrum rubicundulum* – 1 male and 1 teneral 28 June; 5+ on 12 July; 10+ on 30 July; 4+ on 25 August; 1+ on 7 September

White-faced Meadowhawk *Sympetrum obtrusum* – 1 male collected 7 September; 1 other probable male seen (apparently the first documented records for Martha's Vineyard).

Yellow-legged Meadowhawk *Sympetrum vicinum* – 5+ on 12 July; 5 on 30 July; 1 male & 3 females 25 August; 20+ on 7 September

Band-winged Meadowhawk *Sympetrum semicinctum* – 1 along stream outflow 12 July; 1 same place 30 July

Spot-winged Glider *Pantala hymenaea* – 1 in outflow area 28 June

Carolina Saddlebags *Trapea carolina* – 2 on 28 June; 1 on 30 July

Black Saddlebags *Trapea lacerata* – 1 on 30 July

Notes on visits:

11 June: 4:30 to 5:30 PM; clear and bright sun; no wind; Indigo Bunting singing

28 June: 3:00 to 4:00 PM; no wind; clear bright sun; one Green Heron; 1,500+ Rose Pagonias *Pagonia ophioglossoides*, 10+ Grass-Pinks *Calopogon pulchellus*; small fish in upper Pond - how did they get there?

12 July: 1:30 to 3:00 PM; no wind; bright sun; 30+ Rose Pagonias and 10+ Grass Pinks – all old; 1 female Wood Duck; 1 hen Mallard with 7 ducklings 10-14 days old; 3 Bullfrogs.

30 July: 1:25-2:45 PM; no wind; bright sun; 1 Grass Pink; many tadpoles & 1 bullfrog; Needham's Skimmer *Libellula needhami* and Common Green Darner near entry road.

25 August: 9:45 to 11:05 AM; high thin overcast; light wind; 3 Grass Pinks still blooming; no birds; surprisingly, no Saddlebags, White-tails, Slaty or Painted Skimmers which are still common elsewhere.

7 September: 1:30 – 2:45 PM; slight wind; clear and sunny; big drop in variety of species; many small minnows in stream (20+) both at outflow of upper pond but also in outflow of lower pond and stream below lower pond – none more than 3 inches, most 1-2 inches; Purple Gerardia *Gerardia purpurea* and a species of Cottongrass are common in swamp edges of lower pond; several tadpoles, presumably of Bullfrogs since no other frog species was seen all season.

Submitted October 20, 2008 by Allen Keith, Chilmark, MA

3. Amphibians and reptiles

Acoustic monitors recorded one amphibian species on the property, spring peepers. 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 events create ideal opportunities for frogs to lay eggs. Frogs spend their early growth in water as tadpoles before transforming into land animals. Three additional amphibian species were observed in the pond and surrounding wetlands (Table 26, page 131). Likewise, one turtle species was observed sunning on rocks or logs in the pond. One snake species, a black racer, was encountered in the coastal dune rattling its tail in alarm. The black racer tail vibration is a form of Batesian mimicry used to deceive predators. No fish surveys were conducted in the pond.

Table 26: Amphibian and reptile species observed during 2008-2025 on Toad Rock Reservation, Aquinnah, MA

Scientific Name	Common Name
Class Amphibia	
Order Anura	
Family Ranidae	
<i>Lithobates catesbeianus</i>	American bullfrog
<i>Lithobates palustris</i>	Pickerel frog
<i>Lithobates clamitans</i>	Green frog
<i>Pseudacris crucifer</i>	Spring peeper
Class Reptilia	
Order Squamata	
Family Colubridae	
<i>Coluber constrictor</i>	Black racer
Order Testudines	
Family Emydidae	
<i>Chrysemys picta</i>	Painted turtle

4. Mammal

Fifteen species of mammals were observed on the property (Table 27, page 132). Of note are the otter and bat species.

The North American river otter is endemic to North America. Habitat loss, hunting and pollution are responsible for a significant loss in occupied range. Otters mate in the spring and deliver pups the following January-May after a delayed implantation period of up to 273 days (Mass.gov 2023, Raesly 2001). Otters are active year-round at various locations throughout Martha's Vineyard.

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 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)

Six bat species were documented traveling through the preserve. The bats that occur on the preserve are all insectivores. However, where they hunt for their prey is somewhat species-specific.

Table 27: Mammal species observed during 2008-2025 on Toad Rock Reservation, Aquinnah, MA

Scientific Name	Common Name
Class Mammalia	
Order Artiodactyla	
Family Cervidae	
<i>Odocoileus virginianus</i>	White-tailed deer
Order Carnivora	
Family Felidae	
<i>Felis catus</i>	Domestic cat
Family Mephitidae	
<i>Mephitis mephitis</i>	Striped skunk
Family Mustelidae	
<i>Lutra canadensis</i>	North American River Otter
Family Procyonidae	
<i>Procyon lotor</i>	Raccoon
Order Eulipotyphla	
Family Soricidae	
<i>Blarina brevicauda</i>	Northern short-tailed shrew
Order Lagomorpha	
Family Leporidae	
<i>Sylvilagus spp.</i>	Cottontail rabbit
Order Rodentia	
Family Sciuridae	
<i>Sciurus carolinensis</i>	Gray squirrel
<i>Tamias striatus</i>	Eastern chipmunk
Family Chiroptera	
<i>Eptesicus fuscus</i>	Big brown bat

Appendix F. Land Use History in Detail

Pre-European Settlement

Archaeological evidence suggests that during the Late Archaic time, roughly 5,000 years ago, hunters and gatherers utilized land near water all over the island for food collection. During the Woodland Period that followed the Archaic Period, archaeological evidence indicates native inhabitants grew crops, cooked and stored food often near salt-water ponds where the soil was fertile. Woodland Period sites especially along the shores of Squibnocket and Menemsha Ponds contain the most prevalent prehistoric resources for the island's archaeological record (Glover 1994). The preserve is in relatively close proximity to the shores of Squibnocket Pond and thus may have been used in one way or another by the native inhabitants, pre-European settlers' arrival.

The preserve is named for the large batrachian glacial erratic situated on the southeast portion of the property. The rock was thought to be a pet toad of Moshup's that turned to stone upon his departure; a tribal meeting place; and a makeshift post office for members to pass notes back and forth. An 1860 drawing and 1909 photo depicts the rock sitting atop a grassy knoll; now the rock sits nestled deep in the woodland of the property.

Figure 43: Toad Rock sketch (1860) and photograph (1909)



Seventeenth and Eighteenth Centuries

The sachemship of Aquinnah was purchased by Thomas Mayhew Sr. in 1641 and a Christian conversion program was initiated. Nearly half the Wampanoags on Martha's Vineyard died during two epidemics in, 1643 and 1645, that swept through the immunologically vulnerable native population (Silverman 2005). The loss of prominent people on the tribe during these epidemics created an opportunity for Christianity to spread among the native population that were looking for answers and order (Silverman 2005). Thomas Mayhew reported in 1674 that all but one of 300

native families considered themselves Christian (Silverman 2005). The peninsula of Gay Head was sold in 1687 to Thomas Dongan, the governor of New York and Earl of Limerick. Only a handful (58 houses) of residences existed in Aquinnah at this time (Glover 1994). The homesteads centered around Old South Road, the location of the original path that led to the Aquinnah settlement on the Cliffs (www.wampanoagtribe.net/pages/wampanoag_way/aquinnah).

Figure 44: Capt. Paul Pinkham "Chart of Nantucket Shoals" 1798



According to 18th century maps of Martha's Vineyard the Howwaswee and Wamsley homesites off Old South Road are the primary inhabitants of the property. They were the only families to inhabit the property with house and stone foundations beginning in the 18th century with no other families following.

Figure 45: Des Barres, Joseph Wallet, "Coast of New England from Chatham Harbor to Narragansett Bay" Map 1781



In 1711, the Society for the Propagation of the Gospel in New England gained title to Gay Head and created a reservation for the native people. A mixture of fishing and farming (sheep and cattle) was relied upon heavily by the inhabitants of Gay Head during this time (Glover 1994). Many Wampanoag men joined whaling ships resulting in an imbalance of women to men in Gay Head in the 18th century resulting in native women marrying men from outside of the Wampanoag Tribe (Silverman 2005).

The Gay Head Wamsley family, originated from South Kingstown, Rhode Island with Thomas Wamsley (b. 1680) and his wife Patience, both mixed-race and indentured slaves to Henry Gardner until 1706. Their second eldest son, James Wamsley (b.

1713), married Elizabeth Powers of Chappaquiddick. They were living on Chappaquiddick in 1773. Their two sons, Joseph and Powers, born 1750 and 1755 respectively, worked on the ship, American Revenue until 1779. One of them married Leah Tallman of Gay Head in 1775. They had three children, Patience (b. 1777), Salsbury (b. 1783) and Hebron (b. 1784). Joseph and Powers served on the ship, American Revenue, under Capt. Samuel Champlin Jr. and later on the ship, Dean, during the Revolutionary War. Their ship was captured by the British ship Pegasus in 1781 and Joseph and Powers were held on the prisoner ship, Jersey, likely until their deaths. Salsbury and Hebron (1) were likely born of another father seeing as Joseph and Powers were at sea (Pierce and Segel 2016).

Salsbury married Jane B. Robbins of Middleborough. Salsbury and Jane lived in Middleborough until their return to Gay Head sometime around 1823. They had six children, Elizabeth (b1809) wife of Zacheus Howwaswee, Priscilla (b. 1812) wife of Isaac Rose, Charlotte (b. 1815) wife of Abram Rodman, Jane (b. 1817), Hebron Jr (b. 1818) and Harriet Amanda (b. 1821) second wife of Isaac Rose. Jane was the Gay Head school teacher in 1827. Salsbury died in 1825. The heirs of Salsbury Wamsley inherited his homestead land as noted in the 1871 division of land (Pierce and Segel 2016).

Hebron (1) married Amy Pechaket in 1809 and later Jane Francis in 1846. Hebron died in 1849 and left to his wife, Jane Francis, his homestead “bounded E. by Zachariah Howwaswee, Isaac Rose and Hebron Wamsley Jr., S by Hebron Wamsley Jr. and Esther Howwaswee, W by Willow Pond and Patience Gershom, and a peat swamp near the Peaked Pond, SE from Abram Rodman’s and the SE half of a peat swamp S of James Boyer’s house” (Pierce and Segel 2016). While alive Hebron (1) and his nephew, Hebron Jr. worked as carpenters and undertakers, creating the red coffins known from Gay Head (Burgess 1970).

Hebron Jr., son of Salsbury, was for a brief time a seaman and sailed on the ship the Seine in 1837. He married Eleanor Peters in 1840 and had 9 children between 1840 and 1863 (Pierce and Segel 2016).

Hebron Jr.’s aunt, Jane Francis, was also the half-sister to Jonathan Francis of Squibnocket Pond. She was the first female preacher at the old Baptist Indian Church and, while strict, she was revered as a caring person of the people of Gay Head (Pierce and Segel 2016, Silverman 2005 and Burgess 1970).

The Howwaswee homestead on the property once belonged to Esther, daughter of Moses (Laban) Howwaswee and Jane Tallman, granddaughter of Zachariah Hosuit, a minister of the Gay Head church during the 18th century. The Howwaswee or Hosuit are an old and prominent Gay Head family with records mentioning the surname as far back as 1630. Abel Hosuit (b. 1630) had four children, Sam, Abel, Jonah and

Zachariah. In 1702, according to Sewall's "Cape Cod and Martha's Vineyard Memoranda" the Hosuit's were respected preachers, living in wigwams complete with spinning wheels and looms for weaving suggesting sheep were part of the animal husbandry practice in Gay Head at this time (Pierce and Segel 2016). According to Rachael Ryan, Esther Howwaswee's great niece, Esther built and lived in many wigwams (Pierce and Segel 2016). Esther was an important figure in the Wampanoag tribe, serving as medicine women and midwife to the community at large (Dresser 2011).

According to the "Old South Road of Gay Head" by Burgess (1970)², the Wamsley homesteads could be reached from Howwaswee Lane, a charming path meandering south towards the Lower Town through thickets and tangles. First reached is the well-preserved cellar hole of Hebron Wamsley Sr. (uncle to Hebron Wamsley Jr) with the three big stone steps intact. The home had a front room, two bedrooms, and a stone chimney. Next are the homesteads of Wamsley Jr. and his aunt Jane Francis Wamsley. The Hebron's Lane leads from the Wamsley Jr. homestead south to Hebron's Pond where one of Esther Howwaswee's homes once stood.

The "Indian Lands" of Gay Head included common lands and individual homesteads of various sizes depending on need and ability to work the land. In 1862, the reservation became the "District of Gay Head" and the General Court ordered the final distribution of all common lands with the exception of the Cranberry Bogs, Cliffs and Herring Creek (Glover 1994). It took five years and two surveyors, Hon. Charles Marston and Richard L. Pease, to complete the task of researching family histories of the inhabitants of Gay Head and divide the land properly amongst the residents (Banks 1966). The Wampanoag people were granted Commonwealth of Massachusetts citizenship in 1869 and were no longer wards of the state. This removed land sale restraints formerly placed on native lands and allowed sales of native land to non-native buyers (Plane and Button 1993).

Toad Rock Reservation is part of Middle Place and South Pasture, two areas of common land identified in the 1865-1870 census and survey of land holdings in Gay Head conducted by the commonwealth (Glover 1994). Within these larger common lands were homesteads described by Marston in book 49 in 1863 and recorded at DCRD, text that accompanied the "Section Plans of Indian Lands on Gay Head" as described by Richard Pease in 1866, and further descriptions by Richard and Joseph Pease in 1870 in book 64 at DCRD. These homestead land divisions are outlined by stonewalls and include foundations and stone piles where permanent structures were lived in. Other lots may have had non-permanent structures such as wigwams on them that have left no physical trace on the land. A home lot for Hebron Wamsley containing 30 acres was described in book 49 page 36 with widow Jane Wamsley being allotted a portion of the lot in the north westerly area and the female heirs of

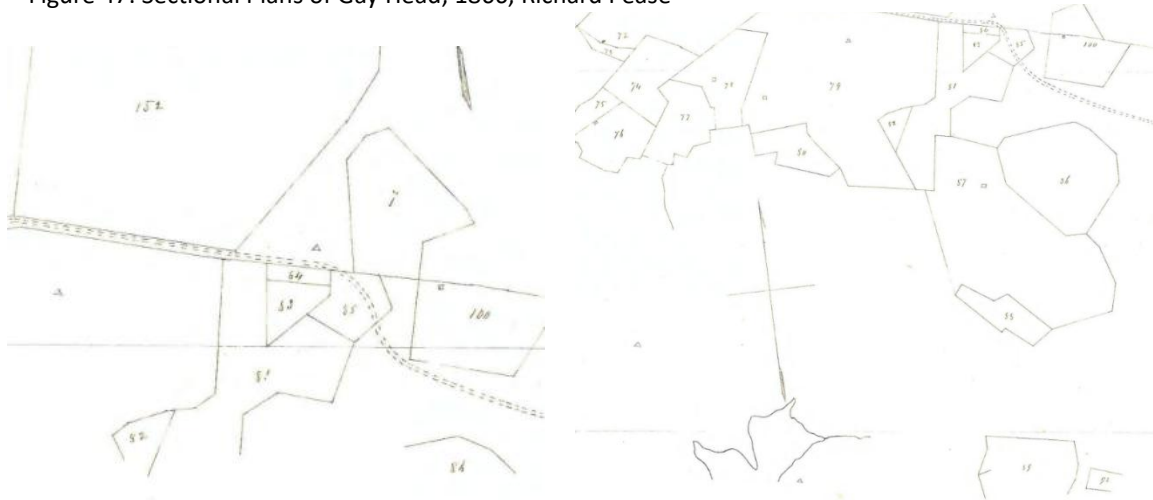
Salsbury Wamsley being granted the "lower meadow". Another homestead lot located in Middle place, described as lot 7 in the sectional plans, was surveyed for Josiah Jerrett. The lot adjoined the homestead of his mother Olive Jarrett and is part of the property north of Old South Road. The lot opposite Josiah Jerrett's to the south is part of South Pasture and described as lot 81 in the sectional plans. This lot was surveyed

Figure 46: Sectional Plan 1870 text describing Abram Rodman's lot in South Pasture and "Abigail's Place"

No 81. Row out for Abram Rodman; a tract of land, chiefly	No 82. Inside of the last-described tract lies a piece of
Swamp; beginning at a bound near a cherry tree with a stone in its branches, partly grown over with wood, standing near the South road, being a bound between said Rodman and the homestead of Jacobus Howassawer, and thence, by said homestead, / about S 10 1/2 W 21.00 to a bound in the swamp; then by said S 64 1/2 W 5.15 Jacobus, by several courses S 88 1/2 W 7.05 S 88 1/2 W 2.31 S 79 1/2 W 2.11 S 75 1/2 W 6.10 S 58 1/2 W 7.09 S 54 1/2 W 2.20 to a large rock in wall, of fence, thence about S 16 1/2 E 32.00 to a tree in swamp, thence at S 80 E 5.00 at N 15 E 23.00 at S 79 E 6.00 at N 10 1/2 E 12.00 at S 70 E 8.12 at S 76 1/2 E 15.00 at S 24 1/2 E 14.00 to a rock by land of Tallman heirs; and by same, S 53 1/2 W 12.00 to land of Olive Jerrett; and by her land, S 34 1/2 W 11.15 to end of stone wall; then by said Olive and L. Cooper, N 3 1/2 E 20.00 to a bound near the South road; and then by road, N 74 W 10.00 to the place of commencement.	cleared, or meadow land, commonly known as Abigail's Place, and belonging to the heirs of Charlotte Rodman. Beginning at the large rock at the western corner of the last described tract; thence S 15 1/2 E 15.00 N 30 1/2 E 20.00 to stone wall; then by stone wall, S 88 1/2 W 2.31 to a cross wall, S 79 1/2 W 2.11 S 75 1/2 W 6.10 S 58 1/2 W 7.09 S 54 1/2 W 2.20 to the place of commencement.

for Abram Rodman and was described as primarily swamp with the exception of a small area of cleared land described as lot 82 and known as "Abigail's Place" and belonging to the heirs of Charlotte Rodman.

Figure 47: Sectional Plans of Gay Head, 1866, Richard Pease



Esther Howwaswee land was described in book 65 page 154 as lot 177. Other land was described for Esther Howwaswee in previous surveys as she lived in more than one location in Gay Head (Burgess 1970). The remainder of the property that was in common land was used for agriculture such as grazing livestock or as woodlots and was assigned to various Gay Head families (Smalley, Randolph, Rodman, Wamsley, Belain, Frances Nevers, Jerrett, Devine, Cook, Weeks, Francis, and Howwaswee). According to Alfred Vanderhoop (born 1912, Aquinnah), after town people moved from Old South Road north to State Road the South Pasture was used to pasture everyone's cattle. The town-elected fence viewer would assess the fences in town annually. Come spring on Field Day town people would pitch in and repair the fence that kept cattle on the south side (South Pasture) (Lee 1998). However, due to the hydrology of the area much of the red maple and black gum swamp was not cleared and is considered old-growth woodland.

The Wampanoag tribe of Gay Head regained their federal recognition from the Bureau of Indian Affairs in 1987 and a settlement act enabled the Wampanoag tribe of Gay Head to acquire 485 acres that abuts the Toad Rock Reservation on several sides.

Figure 48: Richard Pease Map of Gay Head Showing the Lands of Individual owners and General Fields of Common, 1866

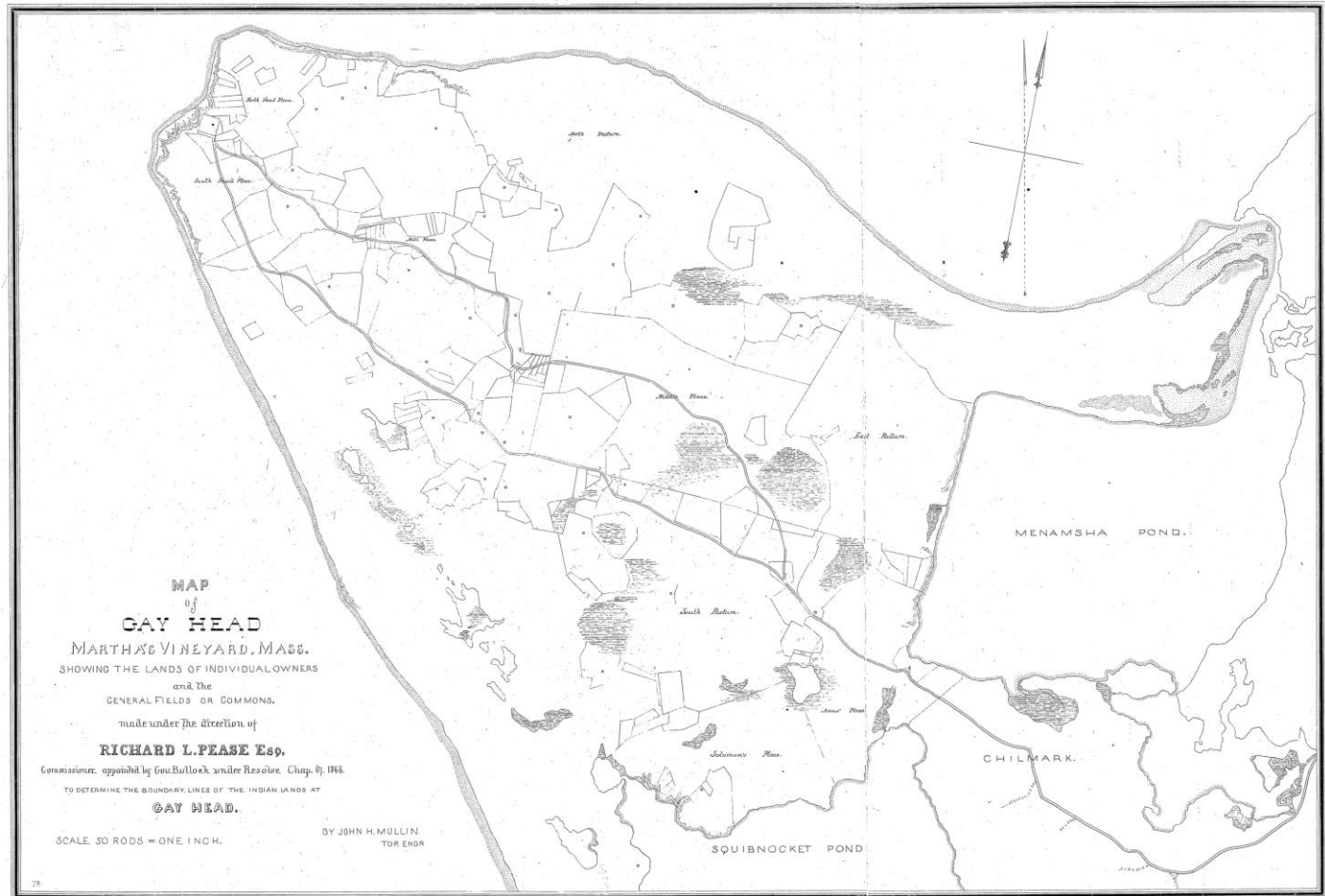
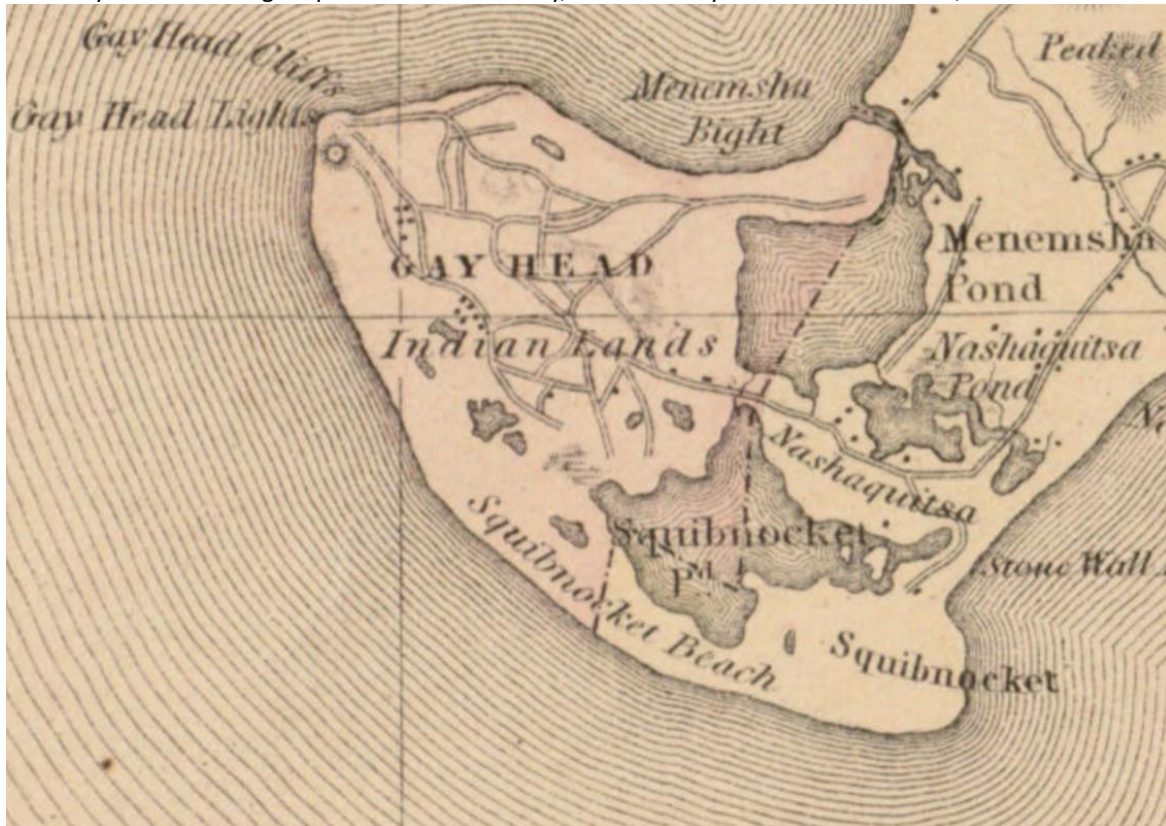


Figure 49: U.S. Coast and Geodetic Survey from Muskeget Channel to Buzzard's Bay and entrance to Vineyard Sound, Mass 1860



Figure 50: Henry Francis Walling Map of Barnstable County, Dukes County and Nantucket Island, Massachusetts 1871



In 1870, Gay Head was incorporated as a town. As described earlier Indian homestead lands were surveyed and common lands were divided into lots and set-off to individuals of the tribe.

Figure 51: Foundation remains of the the Wamsley family homesteads



Appendix G. Endangered Species

A. Priority and Estimated Habitat Maps and Species

Portions of Toad Rock Reservation fall within Priority Habitat of Rare species, as established by the Natural Heritage and Endangered Species Program (**Error! Reference source not found.**, page **Error! Bookmark not**

defined.) Rare species for which the property is designated were surveyed for in the appropriate habitat during the appropriate time of year (Table 29, page 145**Error! Reference source not found.**). Of the species listed for the property by NHESP, three of the moth species were observed during surveys. While the remaining species were not discovered on the property additional listed species were observed and submitted to the NHESP Heritage Hub database. Regardless of species observation during surveys, protecting and minimizing impacts to their habitat requirements is important. This plan includes management goals that balance the needs of 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. Impacts of the proposed management activities on the property in priority habitat are outlined in Table 28, page 144**Error! Reference source not found.** and displayed on Map 17, page 45.

Table 28: Area of proposed management impact in NHESP priority habitat on Toad Rock Reservation, Aquinnah

Activity	Linear feet	Area of impact ft ²
Proposed trail	4,946	39,568
Proposed boardwalk	682	126
Proposed stairs	80	18

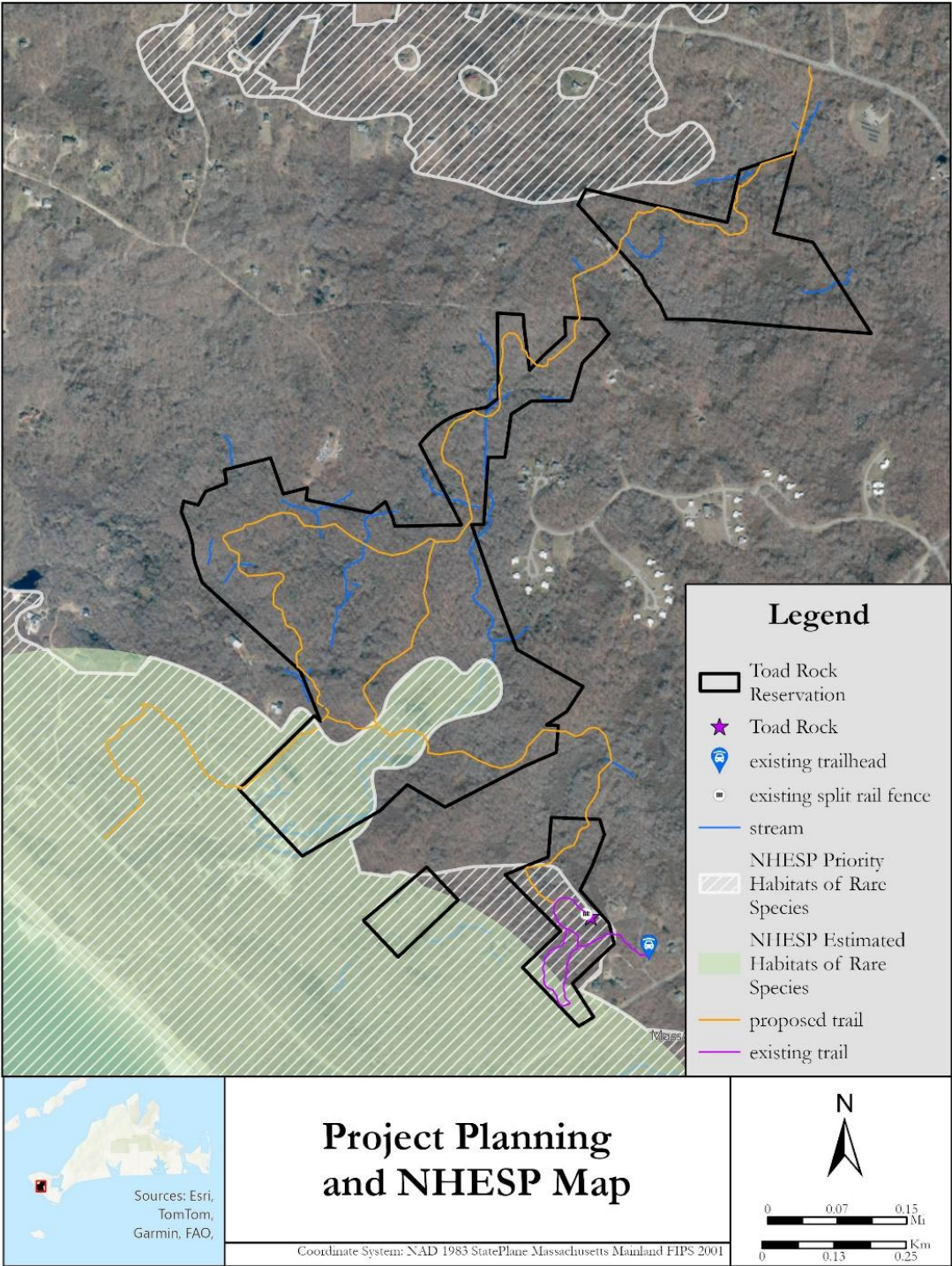
Table 29: Commonwealth listed-species observed (highlighted in yellow) or designated for Toad Rock Reservation by NHESP

Status	Type	status	Habitat	Survey dates	Flowering period	Flight periods	Method/effort	Observed
NHESP-recorded	moth	SC	maritime dune shrubland	5/28/08, 6/12/08, 05/20/10, 6/14/17		May 15 - June 15	black light, 4 trap nights	Negative search
NHESP-recorded	moth	SC	maritime dune shrubland	9/16/08, 9/22/09, 9/24/09, 9/8/08, 9/18/08, 10/2/08		Sept 1-20	black light 6 trap nights	Negative search
NHESP-recorded	moth	SC	maritime dune shrubland	7/2/08, 7/22/08, 8/4/08, 9/8/08, 7/22/09, 7/28/09, 07/20/17, 08/3/17		July 15 - Sept 7	black light 8 trap nights	7/2/2008, 8/4/2008,
NHESP-recorded	moth	T	emergent marsh	9/22/09, 9/24/09, 09/7/2021		Sept 15/30 larva holes		Negative search
NHESP-recorded	moth	SC	maritime dune shrubland	6/12/08, 6/25/08, 7/2/08, 06/17/09, 7/14/09, 6/23/17, 7/5/17		June 15-july 15		6/25/08, 7/2/08, 7/14/09, 7/22/09, 7/20/2017
NHESP-recorded	moth	SC	maritime dune/swale and red	07/22/08, 8/4/08, 7/14/09,		July 7 - Aug 7		7/14/2009

			maple/black gum swamp	7/22/09, 7/28/09, 7/20/17, 8/3/17				
NHESP- recorded	moth	T	maritime dune shrubland	07/22/08, 8/4/08, 7/14/09, 7/22/09, 7/28/09, 7/20/17, 8/3/17		July 15 - Aug 15		7/22/09, 7/20/17
NHESP- recorded	moth	SC	maritime dune shrubland	6/2/08, 6/25/08, 7/2/08, 06/17/09, 6/14/17, 6/23/17, 7/5/17		June 7 - July 7		Negative search
NHESP- recorded	moth	SC	maritime dune shrubland	9/8/08, 9/18/08, 10/2/08		Sept 20-Oct 20		Negative search
NHESP- recorded	moth	T	maritime dune shrubland	6/25/08, 7/2/08, 7/22/08, 06/17/09, 7/14/09, 7/22/09, 7/28/09, 6/14/17, 7/5/17, 7/20/17		June 15 - July30		Negative search
NHESP- recorded	moth	T	maritime dune shrubland	5/5/08, 5/28/08, 6/12/08, 7/2/08, 7/22/08,		May 15 - June 15, July 15-Aug 15		Negative search

				8/4/08, 7/14/09, 5/20/10, 7/22/09, 7/28/09, 6/14/17, 7/20/17, 8/3/17				
NHESP- recorded	plant	SC	maritime dune shrubland	7/11/25, 8/23/07, 7/27/11, 8/17/17	June 1 - Aug 15			Negative search
NHESP- recorded	bird	T	maritime dune shrubland	5/7/08, 5/15/08, 3/23/04, 6/15/17, 6/22/17	March 1 - June 30			Negative search
New	plant	T	red maple/black gum swamp	8/15/17, 9/1/09, 8/23/07, 9/16/08, 8/14/08, 7/11/25	June 15 - Sept 15			7/24/2025
New	bird	SC	dune					9/28/2009
New	bat	SC	woodland, pond, dune					07/23- 8/12/2025
New	bat	SC	woodland, dune					07/23- 8/12/2025
New	bat	SC	woodland, ponds, streams					07/23- 8/12/2025
New	bat	E	red maple/black gum swamp					07/23- 8/12/2025
New	bat	E	woodland					07/23- 8/12/2025

New	moth	SC	coastal woodland, dune shrubland					7-28-2009, 7/20/2017, 8/3/2017
New	moth	T	pine barrens/woodland					7/28/2009, 7/5/2017, 7/20/2017, 8/3/2017



Sources: MassGIS 2023 Massachusetts Aerial; property boundary and trail features: MV Land Bank; NHESP layer: MassGIS, MASSEOEAA. 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. Project Review Checklist



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 Disturbance¹: _____
 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 information²

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 Owner³ 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 request⁵: _____

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.

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C. 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

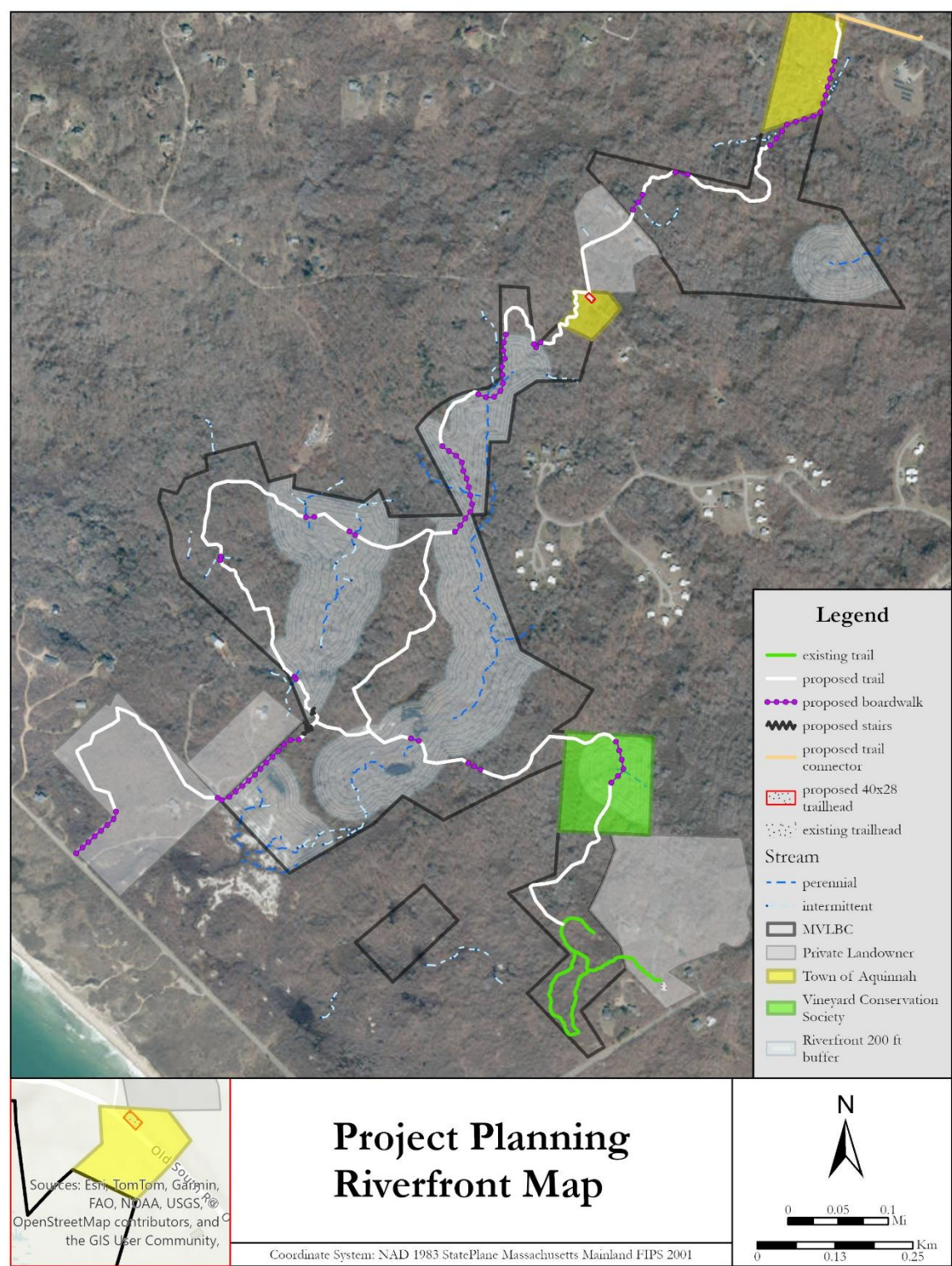
A. Project Planning Wetland Maps and Tables

The implementation of Toad Rock Reservation impacts 0.01 acres of wetland resource and 1.86 acres of wetland buffer. Additionally, 0.43 acres of the project is within the 200-foot riverfront area. 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.

Table 30: Wetland resource and buffer zone project impacts at Toad Rock Reservation, Aquinnah

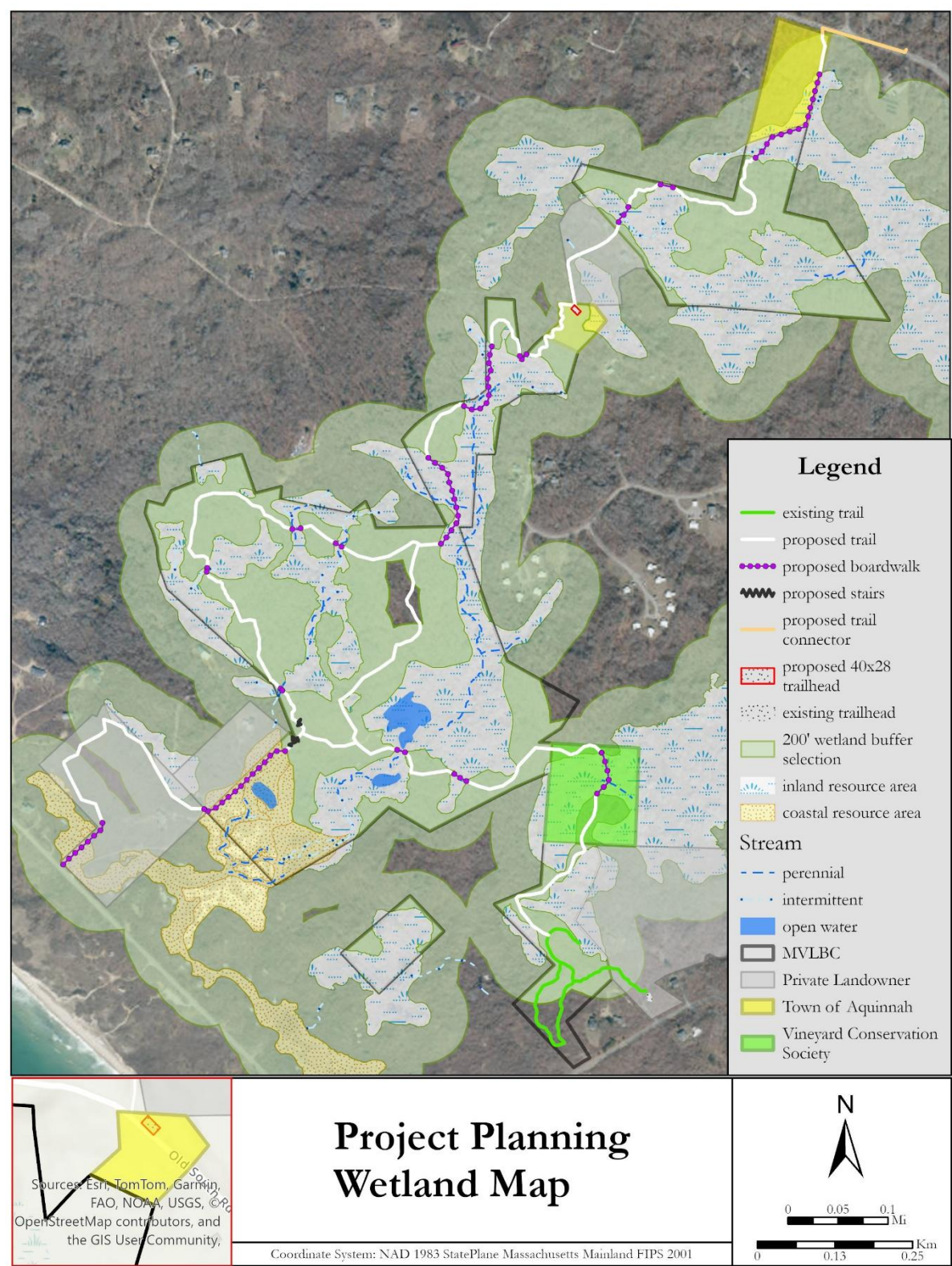
Action	Resource Area/Buffer/Riverfront	Linear feet	Area of impact (Ft ²)
Proposed boardwalk	Resource Area	3,118	565
Proposed trail	Buffer	11,635	80,424
Proposed stairs	Buffer	80	18
Trailhead	Buffer	40x28	1,120
Proposed trail alternatives #8	Buffer	1,705	13,643
Proposed boardwalk	Riverfront (200')	1840	333
Proposed trail	Riverfront (200')	2582	18,734
Proposed stairs	Riverfront (200')	19	5.5

Map 37: Project planning in riverfront areas for perennial streams for Toad Rock Reservation



Sources: MassGIS 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.

Map 38: Project planning for wetland resource areas and buffer on Toad Rock Reservation



Sources: MassGIS 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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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.

B. 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 CITY	OWNER STATE	OWNER ZIP CODE

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 originally 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

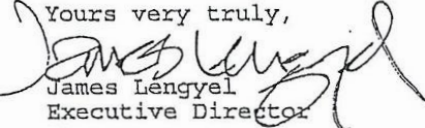
Ms. Patricia Kellogg
July 12, 1993
Page 2

"... [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

EC-COI-92-40
December 10, 1992
Page 4

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

^{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).

EC-COI-92-40

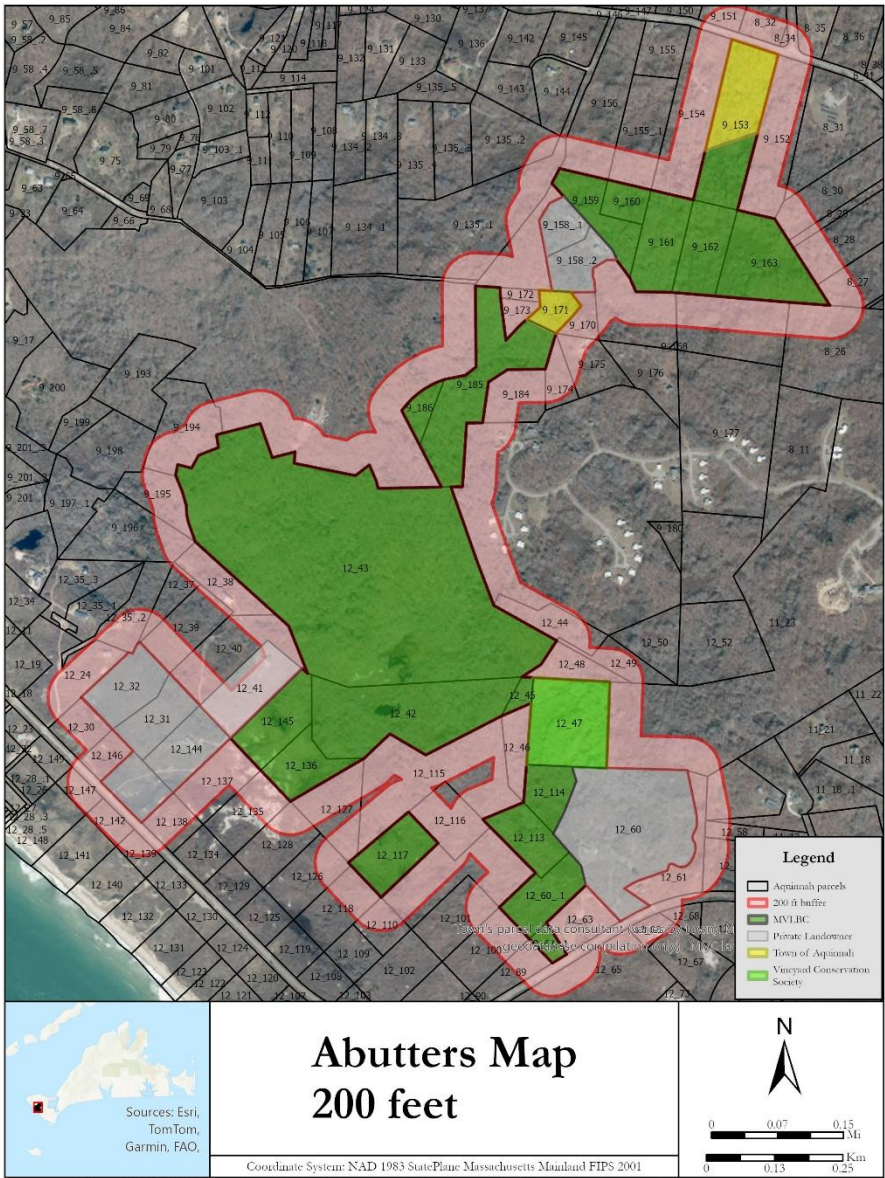
December 10, 1992

Page 5

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.

Appendix I. Abutters

Map 39: Abutters within 200 feet of boundary of Toad Rock Reservation and any easement.



Sources: MassGIS 2023 Massachusetts Aerial; property boundary: MV Land Bank; parcels: MVC 2021. 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 52: AxisGIS Aquinnah assessors map (2026)

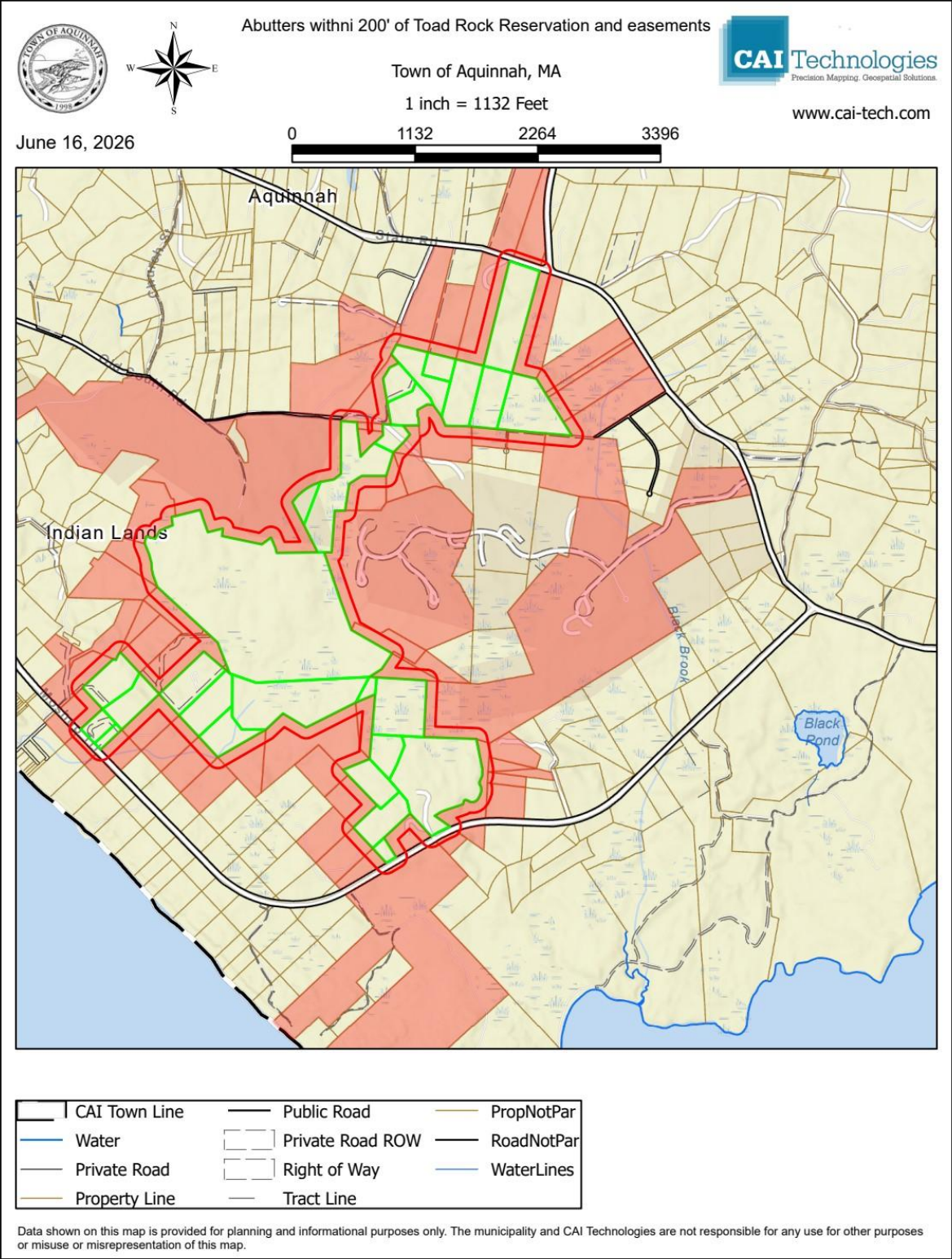


Table 31: List of Abutters that are within 200 ft of the Toad Rock Reservation boundary as well as those owning property that the land bank has an easement over.

Parcel #	Property Address	Owner Name	Co-Owner Name	Owner Address	Owner City	Owner State	Owner Zip
11-23	BLACK BROOK ROAD	USA BIA TRUSTEE	WAMPANOAG TRIBAL COUNCIL OF GAY HEAD INC	20 BLACK BROOK RD	AQUINNAH	MA	02535
12-100	MOSHUP TRAIL	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
12-101	MOSHUP TRAIL	VINEYARD CONSERVATION SOCIETY INC		PO BOX 2189	VINEYARD HAVEN	MA	02568
12-112	MOSHUP TRAIL	VINEYARD CONSERVATION SOCIETY		P.O. BOX 2189	VINEYARD HAVEN	MA	02568
12-115	MOSHUP TRAIL	KITRAS MARIA A TR	BEAR REALTY TRUST	38 BOW ROAD	BELMONT	MA	02478
12-116	MOSHUP TRAIL	KITRAS MARIA A TR	BEAR II REALTY TRUST	38 BOW ROAD	BELMONT	MA	02478
12-127	MOSHUP TRAIL	KITRAS MARIA A TR	BEAR REALTY TRUST	38 BOW ROAD	BELMONT	MA	02478
12-128	MOSHUP TRAIL	HARDING MARK		25 DEVON ST	MASHPEE	MA	02649
12-135	MOSHUP TRAIL	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
12-137	51 HEBRONS WAY	VINEYARD CONSERVATION SOCIETY		P.O. BOX 2189	VINEYARD HAVEN	MA	02568
12-142	MOSHUP TRAIL	02535 PARTNERS LLC	TUMBLEBROOK PARTNERS LLC	1025 SEVEN OAKS LN	MAMARONECK	NY	10543
12-143	10 HEBRONS WAY	FRUCHTMAN JACK JR TRUSTEE	FRUCHTMAN JOANN TRUSTEE	42 HEBRONS WAY	AQUINNAH	MA	02535
12-144	42 HEBRONS WAY	FRUCHTMAN JACK JR	FRUCHTMAN JOANN	42 HEBRONS WAY	AQUINNAH	MA	02535
12-146	MOSHUP TRAIL	LIEFF JON DR TRUSTEE	SANDY BEACH TRUST	305 BURR HALL RD	MIDDLEBURY	CT	06762
12-147	MOSHUP TRAIL	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
12-31	MOSHUP TRAIL	WEST HILLSIDE LLC	FRUCHTMAN JOANN - MGR	42 HEBRONS WAY	AQUINNAH	MA	02535
12-38	108 HEBRONS WAY	SCHWARTZ ELI NICHOLAS		1 WARREN SQUARE	JAMAICA PLAIN	MA	02130
12-40	72 HEBRONS WAY	HALL BENJAMIN L TR	HALL BRAIN M TR	PO BOX 5039	EDGARTOWN	MA	02539

Parcel #	Property Address	Owner Name	Co-Owner Name	Owner Address	Owner City	Owner State	Owner Zip
12-41	63 HEBRONS WAY	MILLER AARON C	MILLER NICOLE M NELSON	9306 OLD MANSION RD	ALEXANDRIA	VA	22309
12-44	MOSHUP TRAIL	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
12-46	MOSHUP TRAIL	KITRAS MARIA A TR	BEAR REALTY TRUST	38 BOW RD	BELMONT	MA	02178
12-48	MOSHUP TRAIL	KITRAS MARIA TR	GORDA REALTY TRUST	38 BOW ROAD	BELMONT	MA	02478
12-49	MOSHUP TRAIL	VINEYARD CONSERVATION SOCIETY INC		PO BOX 2189	VINEYARD HAVEN	MA	02568
12-60	1 TOWHEE LANE	WICE DAVID H	WICE BETSY W	1901 WALNUT ST APT. 1201	PHILADELPHIA	PA	19103-4643
12-63	4 TOWHEE LANE	OBERG KEITH	OBERG KATHLEEN	5707 DURBIN RD	BETHESDA	MD	20817
12-65	MOSHUP TRAIL	MARTHA'S VINEYARD LAND BANK COMM	SHERIFF'S MEADOW FOUNDATION	PO BOX 2057	EDGARTOWN	MA	02539
12-89	MOSHUP TRAIL	VINEYARD CONSERVATION SOCIETY INC		PO BOX 2189	VINEYARD HAVEN	MA	02568
8-26	STATE ROAD	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
8-27	636 STATE ROAD	WAMPONOAG TRIBE OF GAY HEAD		20 BLACKBROOK RD	AQUINNAH	MA	02535
8-28	648 STATE ROAD	HART RICHARD J		749 MAIN ST	HINGHAM	MA	02043
8-29	670 STATE ROAD	YORKE VIRGINIA		670 STATE ROAD	AQUINNAH	MA	02535
8-30	682 STATE ROAD	MAHONEY JULIANNE G VANDERHOOP		682 STATE RD	AQUINNAH	MA	02535
8-32	2 LOBSTERVILLE ROAD	PHILLIPS CLYDE B	LANCELLOTTI JANE	2660 TOWNSGATE RD	WESTLAKE VILLAGE	CA	91361
8-34	LOBSTERVILLE ROAD	ATTAQUIN BEN		P.O. BOX 479	FAIRHAVEN	MA	02719
9-135.1	32 OLD SOUTH ROAD	GREENMAN RICHARD L TR	HELLER-GREENMAN BERNADINE TR	32 OLD SOUTH ROAD	AQUINNAH	MA	02535
9-135.2	BRIAR PATH	RICCIARDI WALTER G	RICCIARDI CLARA F	830 STATE RD	AQUINNAH	MA	02535
9-151	739 STATE ROAD	MAHONEY JAMES	MAHONEY MELISSA J	PO BOX 648	CHILMARK	MA	02535

Parcel #	Property Address	Owner Name	Co-Owner Name	Owner Address	Owner City	Owner State	Owner Zip
9-152	720 STATE ROAD	VANDERHOOP PAULINE ETALS	C/O PAUL GALBRAITH	280 BOYLSTON ST #905	CHESTNUT HILL	MA	02467
9-154	750 STATE ROAD	CUNNINGHAM JOSEPH COTTEN	CUNNINGHAM GWIN DAVIS	5731 STONEWALL RD	LITTLE ROCK	AR	72207
9-155.1	764 STATE ROAD	HALL BENJAMIN L TR	HALL BRIAN M TR	PO BOX 5039	EDGARTOWN	MA	02539
9-156	780 STATE ROAD	VANDERHOOP MARTHA H TR	VANDERHOOP CHARLES W III TR	306 LAKE AVE	NEWTON	MA	02461
9-157	STATE ROAD	USA BIA TRUSTEE	EASTERN REG OFF, FRANKLIN KEEL, REG DIR	545 MARRIOTT DR STE 700	NASHVILLE	TN	37214
9-158.1	42 OLD SOUTH ROAD	SKIDMORE RICHARD	LELACHEUR JOAN	PO BOX 41	CHILMARK	MA	02535
9-158.2	44 OLD SOUTH ROAD	VANDERHOOP WILLIAM DURWOOD		44 OLD SOUTH RD	AQUINNAH	MA	02535
9-164	STATE ROAD	SHERIFFS MEADOW FOUNDATION		PO BOX 1088	VINYARD HAVEN	MA	02568
9-166	STATE ROAD	SHERIFFS MEADOW FOUNDATION		PO BOX 1088	VINYARD HAVEN	MA	02568
9-169	STATE ROAD	USA BIA TRUSTEE	EASTERN REG OFF, FRANKLIN KEEL, REG DIR	545 MARRIOTT DR STE 700	NASHVILLE	TN	37214
9-170	OLD SOUTH ROAD	WAMPANOAG TRIBE OF GAY HEAD (AQUINNAH)		20 BLACK BROOK RD	AQUINNAH	MA	02535
9-172	OLD SOUTH ROAD	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
9-173	OLD SOUTH ROAD	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
9-174	OLD SOUTH ROAD	HOBBS, LINDA T	MANNING, JUNE D	245 TATE AVE	BUCHANAN	NY	10511
9-175	25 OLD SOUTH ROAD	BRICKLEY SKYLER D	HARKINS JESSICA	1211 HERKIMER ST	BROOKLYN	NY	11233
9-182	TOTOPINNUM MAY	USA BIA TRUSTEE	AQUINNAH WTHA	PO BOX 479	CHILMARK	MA	02535
9-184	OLD SOUTH ROAD	AQUINNAH TOWN OF		955 STATE RD	AQUINNAH	MA	02535
9-194	OLD SOUTH ROAD	VANDERHOOP WILLIAM EST	C/O JOHN VANDERHOOP	1854 AVACADO COURT	HENDERSON	NV	89014
9-195	MAPLE HILL DRIVE	YAFFEE STEVE		P.O. BOX 382	CHILMARK	MA	02535

Parcel #	Property Address	Owner Name	Co-Owner Name	Owner Address	Owner City	Owner State	Owner Zip
9-196	6 MAPLE HILL DRIVE	YAFFEE STEVEN		P.O. BOX 382	CHILMARK	MA	02535
9-20	OLD SOUTH ROAD	USA BIA TRUSTEE	WAMPANOAG TRIBAL COUNCIL OF GAY HEAD INC	20 BLACK BROOK RD	AQUINNAH	MA	02535

Appendix J. Universal Access

The Recreational Opportunities Spectrum (ROS) classification for Toad Rock 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 32: Universal access opportunities at Toad Rock Reservation, Aquinnah, MA

Property Name	Toad Rock Reservation
Size (101 acres)	
Primary activities	Hiking, bird watching
Primary elements	Trailhead, cultural features
Primary spaces	Pond, dune
Obstacles that limit accessibility	Archaeological sensitive areas, topography, soil, distance
Existing and potential alternatives	Moshup circle
Proposed ROS classification	Semi-primitive, non-motorized
Proposed expectation of accessibility	none

For all less-developed land bank, 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 is not feasible for Toad Rock Reservation. The distance from the trailhead to primary features and spaces is too great from both trailheads, the topography is greater than 30 degrees from the northern trailhead and the soils are sandy at the southern trailhead. These factors are limiting the ability to provide universal access at Toad Rock Reservation.