

Introduction

As part of the Nantucket Disc Golf's current permit for permitted work at the existing disc golf course, Goddard Consulting (Goddard) prepared this updated Habitat Management Plan (HMP) Update to outline management procedures, methods, timing and reporting for continued management of habitats at this location. This HMP Update specifically addresses management of the following species:

- Melsheimer's Sack Bearer (*Cicinnus melsheimeri*)
- Heath Metarranthus (*Metarranthus pilosaria*)
- Pink Sallow (*Psectraglaea carnosus*)

The site is mapped as Priority Habitat for the above-mentioned species (PH 10). The site is currently under MA NHESP approval and an active Habitat Management Plan for an 18-hole disc golf course within the South and North Pasture of the Nantucket State Forest. Most of the ±83-acre site is wooded and undeveloped, apart from managed areas and an existing building (Pump Station) off Ticcoma Way, firebreaks, trails and permitted disc golf areas.

History

The site was initially permitted for use as a disc golf course by MA Department of Conservation of Recreation (DCR) and Nantucket Disc Golf (NDG), a local non-profit organization. As part of the use of the state's DCR land as active disc golf, the project was permitted through MA NHESP due to the presence of the three rare lepidoptera. DCR and NDG entered into a MOU for the joint management of the habitats associated with the site and to be in compliance with MA NHESP permit conditions.

In May 2012, NDG and DCR, were issued a conditional No Take letter, conditioned with the adoption of the original HMP drafted by Laurentide Environmental drafted February 2012.

Some of the management outlined in this HMP was conditioned on continued management and monitoring. Assessment of the on-going management was conducted by Goddard in 2023 and found minimal management occurred since the creation of the disc golf course, outside of routine management of the fairway areas. NDG, DCR and MA NHESP have been in discussions since 2003 about revising the HMP to a more reasonable management regime that would favor implementation by both NDG and DCR given funding and logistical constraints at this site.

HMP Goal

The goal of the HMP Update is to provide a management strategy that both allows for perpetual management of the site to allow for and continued use as a disc golf course given constraints of both DCR and the NDG while also effectively managing and enhancing habitats for the rare lepidoptera, potential expanding these habitats over time. Specifically, from the original HMP, the goals for the low shrub habitats, which are those conducive for the rare lepidoptera host plants, are to:

- Increase the cover of *V. angustifolium* to a minimum of 10-25%
- Maintain or decrease the cover of *G. baccata*. The cover of *G. baccata* should not exceed 50%
- Maintain or decrease the cover of medium and large sized *Q. ilicifolia* (<1.5m). The cover of medium or large *Q. ilicifolia* should not exceed 50%
- Tree canopy cover should not exceed 30%, ideally less to promote heavy mowing.

Site Conditions

Site conditions were documented in the original HMP in 2012 as well as a follow-up habitat assessment conducted by Goddard in November 2023. Comparison of these assessments found minimal change in the mature forested areas on site over this time. Summary of habitats found in 2023 are outlined below and depicted in Figure 1.

On Site Habitats

Mixed Oak – Scrub Oak (MO-SO)

This habitat is present across the majority of the northern parcel of the locus site (North Pasture), amounting to ± 26.1 acres (ac). This habitat is relatively uniform across this area, and intermixed with cleared and managed areas that are part of the active course. These wooded areas are dominated by tree oaks (black oak, red oak, white oak) and sparse red maple and interspersed with white pine, sassafras, cherry, and some pitch pine. The understory is dense consisting of patchy scrub oaks, low bush blueberry and huckleberry. Most areas are dominated by taller and more dense shrubs (maple leaf viburnum, bayberry, shadbush) as well as regenerating tree species. Much of this area appears unmanaged. Removal of tree oaks and white pines would encourage more successional growth of scrub oaks and heath (blueberry and huckleberry) species. Scrub oak and heath currently make up between 10-40% of this community, with some small patches of more dense populations of these plants, mostly along the edges of this habitat and the open disc golf course areas.

White Pine – Tree oak (WP-TO)

This community measures ± 29.8 ac and accounts for the majority of habitat found south of Ticcoma Way (South Pasture). This community is generally dominated by tall, mature, white and red pine. These trees are near 80 feet in height and shade the understory significantly. Also, many of these pines are in a state of decline and are dead and dying, with numerous snags present. Deciduous trees make up approximately 20% of this habitat, varying from areas that are near 100% coniferous to patches of 50/50 deciduous-coniferous species. Dominant deciduous trees are mostly red and white oak, with some red maple, birch, cherry, pitch pine and aspen. Some patches of Norway spruce area also present. Due to the understory shading the shrub layer is relatively open as is ground cover in most areas. Heath and scrub oak species are relatively lacking throughout most of this habitat, although patches and small clusters of heath species area present, mostly along the edges of the habitat or in open patches in area with more deciduous tree cover or opening created from dead or dying coniferous cover. Overall, scrub oak is a minor constituent of this community, while heath species vary from 0 to 20% cover. Invasive species are present here as well, with some areas containing Morrows honeysuckle at moderate densities.

Oak – Pine (O-P)

This habitat is found at the southwestern corners in both north and south area of the locus site, with an area of ± 3.13 ac. These areas are similar to the white pine-tree oak areas, although generally have a good mix of tree oaks, and pines the under story here is more open with some small parches of heath and some patches of scrub oak, although neither are dominant. Here scrub oak is patchily distributed, between 10-40% cover where present and heath species again vary in density and are between 20-60% cover, where present.

Low Shrub, Maintained Area (Shrub)

Several areas on site are heavily maintained with low shrubs, amounting to ± 4.8 ac. These areas are found on the southern parcel of the property. These areas exist along the firebreak on the south side of south pasture. These areas are open and were recently managed with a heavy mower, leaving some trees, mostly pitch pine. Blueberry and heath plants border this area as well as some dense patches of scrub oak. Regrowth here will likely be heath and small scrub oaks. This area appears to be actively managed for the rare lepidoptera found here.

Open, Maintained Area (Open)

Several areas, totaling to ± 23.6 ac, consist of open land. These are areas that were mowed in April of 2011, as permitted by the Massachusetts NHESP. These areas have no habitat value to the rare lepidoptera on-site in their current state. These areas are open and grassed. Shrub cover is mostly absent, save for the immediate perimeter where the open areas transition to the adjacent forest communities. The open areas do have some trees which have been retained and provide cover and shade, but the understory is absent. The areas around the remaining trees are managed from mowing as well as disc course users, hikers and walkers, many of which were observed utilizing the site during our assessment.

Rare Lepidoptera Habitats***Table 1. Rare Lepidoptera and Habitats***

Species	Status	Host Plant in Northeast	Habitat Potential On-Site	Host Vegetative Community On-Site
Melsheimer's Sack-Bearer (<i>Cicinnus melsheimeri</i>)	SC	Scrub oak and likely dwarf chinquapin oak	Low	MO-SO / SHRUB
Heath Metarranthis (<i>Metarranthis pilosaria</i>)	SC	Blueberry, cranberry, leatherleaf	Moderate-Low	MO-SO / SHRUB
Pink Sallow Moth (<i>Psectraglaea carnosa</i>)	SC	Ericaceous shrubs	Moderate-Low	MO-SO / SHRUB

Melsheimer's Sack-Bearer

The Melsheimer's Sack-Bearer occurs on Cape Cod and the offshore islands of Massachusetts. It inhabits sandplain pitch pine/scrub oak barrens, especially scrub oak thickets. It may also be found in shrubby grasslands and heathlands with a scrub oak component. Larvae overwinter and pupate in the spring, feeding on scrub oak from summer through fall and constructing a portable, protective "sack" made from leaves and silk. Adults fly in June and early July, with peak flight in late June.

On-site, potential habitat is generally lacking. The preference for Scrub oak limits potential habitat areas to the maintain firebreak corridor in the southern extreme as good habitat and patches in the northern pasture where scrub oak is present, but not dominant. The south pasture areas has virtually no scrub oak, other than trace occurrences along edges, this is due mostly to the tall dense white pine overstory.

Heath Metarranthis

The Heath Metarranthis occurs on the southeastern coastal plain and a small number of inland bogs. It inhabits sandplain pitch pine/scrub oak barrens and heathlands, as well as acidic swamps and bogs. The larvae feed throughout the summer on blueberry and cranberry, then pupate in September and overwinter. Adult Heath Metarranthis moths fly in June and early July.

Potential habitat for this species is also low to moderate. The maintained firebreak in the southern extreme is higher quality habitat for this species. South pasture generally lacks large patches of heath species, with some of these host plants present in low densities or small disparate clusters. The north pasture areas do contain a higher density of heath species, again patchily distributed, however the dominance of taller shrubs and tree oak species lessens the extent of these host plants here, in general the north pasture areas are moderate quality habitat for this species.

Pink Sallow

The Pink Sallow Moth occurs on the southeastern coastal plain, as well as Worcester and Franklin Counties. It is found in a variety of habitats with ericaceous vegetation. This includes pitch pine/scrub oak barrens, heathlands on sandplains or rocky summits and ridges, acidic bogs and swamps, and occasionally disturbed areas such as logged areas, old fields, and utility line rights-of-way. Pink Sallow Moth eggs overwinter and hatch in the spring. The larvae feed on lowbush blueberry and potentially other *Vaccinium* species from spring through early summer. The larvae pupate by July and diapause until the fall. Adult moths fly in late September and through October.

Potential habitat for this species is also low to moderate. The maintained firebreak in the southern extreme is higher quality habitat for this species. South pasture generally lacks large patches of heath species, with some of these host plants present in low densities or small disparate clusters. The north pasture areas do contain a higher density of heath species, again patchily distributed, however the dominance of taller shrubs and tree oak species lessens the extent of these host plants here, in general the north pasture areas are moderate quality habitat for this species.

2023 Habitat Assessment Conclusions

In general, most of the southern portion of the site is not potential habitat for the listed species, despite this being the area where the Priority Habitat is shown on current mapping. Within this area the areas along the fire break are high quality with the areas within the forest lower quality and limited to patchily distributed and disjunct areas of limited habitat. Heath species and scrub oak are relatively lacking save for within some areas with less white pine and more tree oak and pitch pine. Northern pasture, while mostly outside of Priority Habitat, is higher quality habitat, although, still patchily distributed. The presence of more tree oaks and tree canopy reduces the habitat potential as this more climax canopy restricts more successional scrub oak and heath species. Some of the edges along the transition of the managed disc golf course do contain higher quality habitat as this ecotonal area tends to support heath and scrub oaks. The open areas of the active course are not habitat for any of the above listed species.

Outside of the active management along the firebreak on the south side of south pasture, no management of the forested area appears to have occurred. Management of areas in both the north and south pasture appears difficult due to the density of tree species, manual removal of some trees may be needed to promote understory growth of heath and scrub oaks or to even allow brush mower access into these areas to promote management mowing. Within the white pine dominated areas in south pasture, establishment of suitable host plants will be difficult without removal of the white pine overstory. However, in many areas the white pine is current in decline or dying, creating openings where some blueberry is beginning to take hold, active removal of some of this dead wood and localized management of these opening can create and enhance this natural succession, to the benefit of the rare lepidoptera.

Habitat Management Plan Update (HMP)

In order to provide an effective management plan for the site, cost and logistics of the managing parties (DCR and NDG) were considered as well as current site conditions and habitat needs of the rare lepidoptera in conjunction with the goals set forth in the original NHESP approval and HMP. The Site was broken down into five (5) management types and several management methods to be used within these areas (Zones) described herein for management. Timing of this management within these zones is also proposed to be phased to promote varying successional stages to the habitats on site and also to promote successful management implementation.

Figure 2 depicts the management areas (zones) spread across the site.

Active Fairway Areas

These areas are the active open “holes” and “fairways” of the disc golf course. They consist of mainly low cut grass, and mostly absent of shrubs or any understory but do contain some canopy trees. The shrub and sub-canopy layers

are mostly lacking and the ground cover is mostly comprised of grasses and sedges, is regularly mown, and also contains walking trails as well as managed and constructed “tees” and “holes” of the disc golf course. Proposed management of these areas consists of continued regular maintenance which includes mowing, brush cutting and removal of dead trees and limbs that fall on the course.

Low Shrub Management Zone

This zone consists of the outer edges of the active fairway and play areas. This zone varies in width from 5 to 25' the goal is to make a consistent 25' zone of short shrubs (preferring ericaceous species and low scrub oak) around the perimeter of the active areas as well as along the edges of the primary DRC trails that crisscross the site. The creation of corridors of low shrub habitat throughout the site facilitates movement of lepidoptera across and through the site as well as maintains these areas as low shrub habitat critical to supporting the host plants and preventing succession to forested communities.

In order to maintain these areas in a low shrub state, regular management is needed. However, frequent management should be avoided to allow appropriate time for these communities to develop. Ideally these areas will be managed on a 4-5 year cycle, with no or minimal management occurring in “off” years and years of active management being aggressive to remove tree species, older scrub oak and also evenly cut back low shrubs to promote more vigorous growth of the preferred ericaceous species. Management here will consist mostly of heavy mowing of existing shrub areas; However, cutting of some trees, wood removal and mowing to expand these areas may also occur.

Shrub Management Areas

Located outside of the active playing surfaces and the managed low shrub edges, are the interior forest habitats. Currently the forests in the north pasture areas (Holes 1 to 5 and 16 to 18) are oak-pine dominated. There is high potential to create and manage these areas for the rare lepidoptera; However, the density and size of the tree species present here restricts heavy mowing to promote the desired low shrub understory composition. In order to promote the desired host plant community here, if opportunities for removal of some oaks in these areas exist and DCR has means and methods on-site, areas of these forested habitats can be, and are encouraged to be, converted to low shrub habitats, and maintained as such as described above.

Spot Treatment Areas

Areas in the southern pasture (Holes 6 to 10 and 11 to 15) are more white pine dominated. Here the white pine is dead and dying, and as these trees die and fall, creating canopy gaps, which are also conducive habitat for the rare lepidoptera. Management of these small patches that develop naturally or through the removal of downed woody debris followed by hand cutting successional pine and oak as well as mowing, if areas are accessible, are allowed and encouraged.

Fire Break

The southern limit of the south pasture contains a firebreak and dirt road which has edge habitats that appear to be occasional heavy mown to select for low shrub habitats. This continued management is proposed in this area.

Treatment Methods

Routine Mowing (RM): This method utilizes standard mowers and brush cutters to mow existing herbaceous and forb species. This management method can occur any time of year with no restriction.

Heavy Mowing (HM): Heavy mowing includes the use of larger mowers, flail mowers, or brush cutters to cut small woody stem species, usually mulching them in place. Use of this method should not cut lower than 3” to the ground surface as well as be timed to not mow areas that may support the rare lepidoptera during their active season. **NO HEAVY MOWING SHALL OCCUR 10/15 to 4/30.**

Tree Removal (TR): Tree removal includes standard tree cutting methods. Hand cutting may occur any time during the year; However, if machinery is used to cut and remove trees, it should be used during the be done during the 10/15 to 4/30 inactive period to avoid impacting native shrub habitat during the growing season. Once trees are felled, most of all of the wood should be removed to promote mowing and low shrub growth.

Wood Removal (WR): Wood removal includes hand removal and cutting of existing and future downed woody debris which is impeding mowing activities on site.

Table 2 below describes the proposed management zones and treatment methods.

Table 2: Management Types by Zone

Management Zone	Management Type	Notes
Active Fairway	RM, WR	Mow every year
Low Shrub	HM, TR, WR	Heavy Mow once per year, based on schedule, Mow only 10/15 to 4/30 based on schedule. Tree and wood removal as needed to maintain a 25' wide management area for low shrubs.
Shrub Management	TR, WR, HM	Tree cutting and removal where access and equipment is available. Wood removal and heavy mowing to promote low shrub habitat patches.
Spot Treatment	WR, HM	Wood removal as needed to create or enhance open areas. Heavy mow if possible/accessible, 10/15 to 4/30.
Firebreak	HM	Heavy mow 10/15 to 4/30 based on schedule.

Low Shrub Zone Management Schedule

In order to promote and maintain an early successional state of the low shrub habitats, as well as make management more suitable to be implemented by DCR and NDG, a four (4) year rotation for management of areas is proposed for the low shrub management areas.

Table 3: Management Schedule for Low Shrub Management Zone

Area	Timing	Notes
Holes 1-4	Year 1	
Holes 5; 16-18	Year 2	
Holes 6-10	Year 3	
Holes 11-15	Year 4	
Fire Break and Trail	TBD	Maintain once every 3-5 years
Spot Areas Created	TBD	Incorporate into management of nearest hole

Monitoring and Reporting

In order to both observe the success of the proposed management, regular monitoring and reporting of the implementation of the HMP is needed. A yearly report shall be prepared by DCR or NDG and submitted to MA NHESP. At a minimum this report shall include:

- Narrative description of the areas managed and type of management that occurred.
- Dates and parties performing management
- Photos of the areas managed, both pre and posts management
- Update to the habitat management map showing any areas of expansion of or newly created low shrub habitats
- Any notable invasive species or problems encountered
- Any notable deviations from the approved plan, i.e. if no management was proposed in a given year, that should also be stated

In addition to yearly reporting, more wholistic monitoring of the site should be performed to determine if current management methods and schedules are appropriate or if any modifications need to be made. To this effect, in years 5 and 10 of the management program, the following shall occur.

- Full site re-mapping of habitat areas, paying particular attention to the extent and composition of the low shrub management areas. Mapping shall also include any new or enhancement of low shrub habitats
- Summary and mapping showing all management activities and dates of occurrence since last full report
- A comparison of habitats depicted from 2023 (pre-HMP Update) to current (Year 5 and 10) conditions
- Notable invasive species found, extent and density, along with proposed action plan if necessary
- Site photos
- Any updates deemed necessary to the HMP for consideration by MA NHESP to allow for the continued management and maintenance of rare lepidoptera habitats
- Said report shall be submitted to MA HHESP for review and approval



Legend

Site Boundary

Natural Communities

- Mixed Oak - Scrub Oak
- Open, maintained
- Oak - Pine
- Low Shrub, maintained
- White Pine - Tree Oak



Date: 12/22/2023

GC Job Number:
197-005

Natural Communities Map

Nantucket State Forest
Nantucket, MA 02554

0 200 400
Feet

1 in = 400 ft

Map: 68, Lot: 70; 82

Figure 1

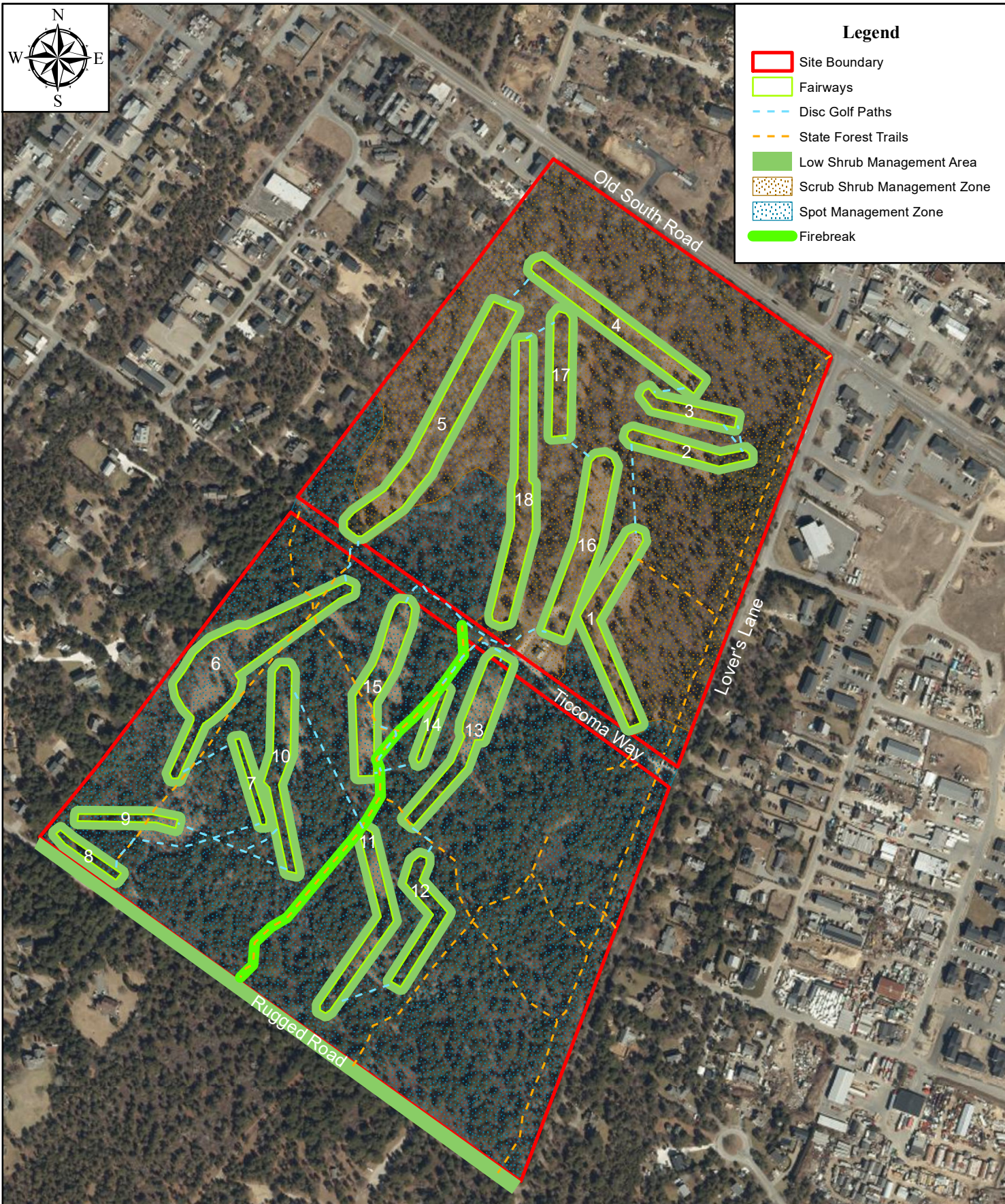


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Legend

- Site Boundary
- Fairways
- Disc Golf Paths
- State Forest Trails
- Low Shrub Management Area
- Scrub Shrub Management Zone
- Spot Management Zone
- Firebreak



Date: 5/1/2024

GC Job Number:
197-005

Habitat Management Area Map

Nantucket State Forest
Nantucket, MA 02554

0 200 400
Feet

1 in = 400 ft

Map: 68, Lot: 70; 82

Figure 2



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