Habitat Management Plan
for
Bog Brook Unique Area
2021 – 2030

Division of Fish and Wildlife
Bureau of Wildlife

Region 3 Headquarters
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SUMMARY

Bog Brook Unique Area (BBUA) consists of 131 acres of both wetland and upland habitats that were acquired by the state in 1981 to protect and perpetuate the significant natural communities found there. The Unique Area includes 32 acres of natural wetlands with emergent marsh and red maple swamp. The emergent marsh habitat is classified as a rich graminoid fen, a rare habitat type with only about fifty occurrences statewide according to the New York Natural Heritage Program. The surrounding uplands include deciduous second growth forest, old fields, shrublands, and several intermittent spring seeps that provide groundwater inputs to the wetland. Past management activities were primarily funded with monies from the NYS Natural Resource Damages Account and the State Wildlife Grants Program (SWG). Those activities focused primarily on the restoration of the rich graminoid fen on the property and included removal of overstory red maples in the wetland, phragmites control, and the removal of beavers. However, additional funding from DEC's Young Forest Initiative program will allow for future forest management on the property.

Rich graminoid fens are best known for being alkaline, mineral rich, and nutrient poor. These habitats often support a diverse plant community that may include rare plant species such as purple milkweed, small white lady's slipper, Northern reed grass, and a host of rare sedges. Unfortunately, the invasion of Phragmites at Bog Brook Unique Area has caused a shift in the plant community of the fen from high diversity to a monoculture with very low diversity. Impoundments created by beaver alter the hydrology, further threatening the plant diversity in these areas. The hydrology at Bog Brook has further been altered by development, including highways, that rapidly deliver high amounts of surface water runoff from the impermeable surfaces. High nutrient loads associated with human development from fertilized lawns has likely contributed to a eutrophic condition as well. Thus, past habitat management at Bog Brook Unique Area has focused primarily on the restoration of the wetland and this unique natural community. The wetland acreage at Bog Brook provides habitat for birds such as the common yellowthroat, the swamp sparrow and the American woodcock, as well as variety of reptile and amphibian species.

A rare mammal in New York, the New England cottontail has been documented at Cranberry Mountain and Great Swamp WMAs, both less than 3 miles away from Bog Brook Unique Area. Bog Brook, like Cranberry Mountain, falls within the Harlem-Housatonic Focus Area for New England cottontails, where habitat management for the species is a priority. This is one of seven Focus Areas (Rensselaer, Northern Columbia, Southern Columbia, Dutchess, Harlem-Housatonic, West Putnam, and Westchester) in NY that stretch over 5 counties where the rare rabbit remains. Unfortunately, New England cottontails have never been documented at Bog Brook Unique Area. State Route 22 serves as a significant physical barrier that may prevent nearby populations of New England cottontails from successfully reaching the available habitat at Bog Brook. Competition with Eastern cottontails may further reduce the likelihood of New England cottontails becoming established at Bog Brook.

As with Wildlife Management Areas (WMAs), Bog Brook Unique Area is open to public use, including hunting, trapping, bird watching, and hiking. Most public use at the area is

concentrated along a trail in the southwestern and western portion of the property, which includes a viewing tower that allows people to enjoy the wetland and the scenic natural beauty it provides in a relatively urban landscape.

Habitat management goals for Bog Brook MUA include:

- Creating approximately 23 acres of young forest (18% of the total WMA acreage/26% of total forested acreage including forested wetland) to provide habitat for American woodcock and young forest-dependent songbird species.
- Converting 7 acres of forested wetland to emergent marsh habitat by removing overstory trees to promote the establishment of native wetland herbaceous vegetation.
- Resetting 12 acres of shrubland and creating temporary wildlife openings (7% of total WMA acreage).
- Reducing the impounded wetland acreage from 2 acres to <1 acre (<1% of the total WMA acreage) through modification of the existing water control structure, contributing to a total emergent marsh of 22 acres.
- Restoring and maintaining native wetland vegetation through invasive vegetation (Phragmites) removal on all 22 acres of non-forested wetland (17% of the total WMA acreage).

I. Background and Introduction

Purpose of Habitat Management Plans

Background

Active management of habitats to benefit wildlife populations is a fundamental concept of wildlife biology, and has been an important component of wildlife management in New York for decades. Beginning in 2015, NYS Department of Environmental Conservation (DEC) Division of Fish and Wildlife (DFW) initiated a holistic planning process for wildlife habitat management projects. Habitat Management Plans (HMPs) are being developed for WMAs and other properties administered by DFW Bureau of Wildlife, including select Multiple Use and Unique Areas. The goal of HMPs is to guide habitat management decision-making on those areas to benefit wildlife and facilitate wildlife-dependent recreation. HMPs guide management for a ten-year time period, after which the plans and progress on implementation will be assessed and HMPs will be modified as needed.

HMPs serve as the overarching guidance for habitat management on WMAs. These plans incorporate management recommendations from Unit Management Plans (UMPs), existing WMA habitat management guidelines, NY Natural Heritage Program's WMA Biodiversity Inventory Reports, Bird Conservation Area guidelines, and other documents available for individual WMAs.

SCOPE AND INTENT

Primary purposes of this document:

- Provide the overall context of the habitat on the WMA and identify the target species for management;
- Identify habitat goals for WMA-specific target species, contemplating juxtaposition of all habitat types to guide the conservation and management of sensitive or unique species or ecological communities;
- Identify acreage-specific habitat goals for the WMA to guide management actions;
- Provide specific habitat management prescriptions that incorporate accepted best management practices;
- Establish a forest management plan to meet and maintain acreage goals for various forest successional stages;
- Address management limitations such as access challenges (e.g., topography); and
- Provide the foundation for evaluating the effectiveness of habitat management.

Within the next 5 years, this HMP will be integrated into a comprehensive WMA Management Plan that will include management provisions for facilitating compatible wildlife-dependent recreation, access, and facility development and maintenance.

Definitions are provided in Appendix A.

The effects of climate change and the need to facilitate wildlife adaptation under expected future conditions will be incorporated into the habitat management planning process and will be included in any actions that are recommended in the HMPs. For example, these may include concerns about invasive species, anticipated changes in stream hydrology, and the desirability for maintaining connectedness on and permeability of the landscape for species range adjustments.

This plan and the habitat management it recommends will be in compliance with the State Environmental Quality Review Act (SEQRA), 6NYCRR Part 617. See Appendix B. The recommended habitat management also requires review and authorization under the Endangered Species Act (ESA), National Environmental Policy Act (NEPA), and State Historic Preservation Act (SHPA), prior to implementation.

WMA OVERVIEW

LOCATION

Bog Brook Unique Area, Region 3, Towns of Patterson and Southeast, Putnam County (Figure 1).

TOTAL AREA

131 acres

HABITAT INVENTORY

A habitat inventory of Bog Brook was completed in 2018 and is proposed to be updated every ten to fifteen years to document the existing acreage of each habitat type and to help determine the location and extent of future management actions. Table 1 summarizes the current acreage by habitat type and the desired acreage after management. Desired conditions were determined with consideration of habitat requirements of target wildlife, current conditions on Bog Brook, and conditions in the surrounding landscape (see Landscape Context section below).

Table 1. Summary of current and desired habitat acreage on Bog Brook Unique Area.

Habitat Type	Current Conditions (as of 2018)			Desired Conditions	
	Acres	Percent of Area	Miles	Acres	Percent of Area
Forest [a]	90	68%		60	45% [b]
Young forest	0	0%		23	18%
Shrubland	19	15%		19	15%
Grassland	0	0%		0	0%
Agricultural land	0	0%		0	0%
Wetland (natural) [c]	20	15%		28	21%
Wetland (impounded) [c]	2	2%		<1	<1%
Open water	0	0%		0	0%
Roads	0	0%	0	0	0%
Rivers and streams			0.64		0.64
Total Acres:	131	100%		131	100%

[a] Forest acreage includes all mature and intermediate age classes of natural forest, and plantations. Young forest is reported separately. Definitions are provided in the Forest section of this plan.
[b] The forest management proposed in this plan aims to replace poor quality forest, promote regeneration of native species, and establish a healthy mature forest for the future. See Landscape Context and Forest sections.
[c] Wetland acreage does not include forested wetlands, since they are included in the Forest category.

ECOLOGICAL RESOURCES

Wildlife Overview:

Bog Brook Unique Area has a variety of habitats that, in turn, support a rich variety of wildlife species. Habitats include forested uplands, dense shrublands, and wetland, including some forested wetland/red maple swamp. Wildlife species that you might expect to find at Bog Brook Unique Area include, but are not limited to:

- American woodcock, wild turkey, great blue heron.
- Eastern cottontail, Eastern coyote, bobcat, white-tailed deer, river otter.
- Red-winged blackbird, tree swallow, yellow warbler, catbird, Northern cardinal, veery, ovenbird, tree swallow, willow flycatcher, black-billed cuckoo.
- Broad-winged hawk, red-shouldered hawk, barred owl.
- Painted turtle, green frog, spring peeper, gray tree frog.

Wildlife and Plant Species of Conservation Concern:

The following federal or state listed Endangered (E), Threatened (T), or Special Concern (SC) species and/or SGCN may occur on the WMA (Table 2). [1] SGCN listed below include species that have been documented on or within the vicinity of the Unique Area that are likely to occur in suitable habitat on the Area. Other SGCN may also be present on the Unique Area. Data sources include: the NY Natural Heritage Program, NY Breeding Bird Atlases,[2] NY Reptile and Amphibian Atlas,[3] DEC wildlife surveys and monitoring, and eBird.[4]

Table 2. Species of conservation concern that may be present on Bog Brook Unique Area, including state and federal Endangered (E) and Threatened (T) species, state Species of Special Concern (SC), High Priority SGCN (HP), and SGCN (x).

Species Group	Species	Federal Status	NY Status	NY SGCN Status
Birds	American woodcock			x
	Red-shouldered hawk			x
	Wood thrush			x
	Black-billed cuckoo			x
	Scarlet tanager			x
	Blue-winged warbler			x
Mammals	Northern myotis (Northern long-eared bat	T	T	HP
Amphibians and reptiles	Blue-spotted salamander			HP

Significant Ecological Communities:

There is one rare and significant natural community located on Bog Brook Unique Area as identified by the NY Natural Heritage Program. The state rank reflects the rarity within NY, ranging from S1, considered the rarest, to S5, considered stable; definitions are provided in Appendix A. The following significant ecological communities occur on the Area; community descriptions are from *Ecological Communities of New York State, Second Edition* [5] (Figure 2):

- **Rich graminoid fen (S1S2),** a strongly minerotrophic peatland in which the substrate is a predominantly graminoid peat that may or may not be underlain by marl. Rich fens are fed by waters that have high concentrations of minerals and high pH values, generally from 6.0 to 7.8. Rich graminoid fens are usually fed by water from highly calcareous springs or seepage.

[1] The 2015 New York State Wildlife Action Plan identifies 366 Species of Greatest Conservation Need (SGCN) including 167 High Priority SGCN. Available online at http://www.dec.ny.gov/animals/7179.html.
[2] Available online at http://www.dec.ny.gov/animals/7312.html.
[3] Available online at http://www.dec.ny.gov/animals/7140.html.
[4] Available online at http://ebird.org/content/ebird/about/. © Audubon and Cornell Lab of Ornithology.
[5] Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero. 2014. Ecological Communities of New York State, Second Edition. New York Natural Heritage Program, NYS Department of Environmental Conservation, Albany, NY. Available online at https://www.nynhp.org/ecological-communities/.

Additional information about significant ecological communities is available in the Bog Brook Unique Area Biodiversity Inventory Final Report (1997) prepared by the NY Natural Heritage Prograom.

Special Management Zones:

Special Management Zones (SMZs) are areas adjacent to wetlands, perennial and intermittent streams, vernal pool depressions, spring seeps, ponds and lakes, recreational trails, and other land features requiring special consideration. SMZs on Bog Brook Unique Area include:

- One wetland (BR-9) regulated by Article 24 of the Environmental Conservation Law (Figure 3). The state-regulated wetland is protected by a buffer zone of 100 feet from the delineated wetland boundary, known as the adjacent area. There may be forestry prescriptions associated with forested wetlands and adjacent areas, and each management prescription will be reviewed individually for determination of impacts.
- A segment (a stream that meanders in and out of the Area) of bog brook approximately 0.6 miles in length. Bog Brook is a class C stream, indicating that its best use is for fishing.[6]

Guidelines for habitat management projects within these areas are outlined in the Division of Lands and Forests *Rules for Establishment of Special Management Zones on State Forests and Wildlife Management Areas.*[7] Some habitat management activities may either be prohibited or restricted in order to protect these features. Any deviations from these guidelines will be addressed in the individual stand prescriptions.

Soils:

There are two major soil complexes found at the Bog Brook Unique Area; the Hollis-Chatfield-Charlton complex and the Woodbridge-Urban land-Paxton complex.[8] These soils are typical of the rolling hills, moraines and ridges formed from glacial till that are found in this area. Within these two major soil classifications are a number of soil types that exhibit very different characteristics. The mature forest stand on the western portion of the property is more steeply sloped and comprised primarily of the Charlton soil series. These soils are typically found on level to steep slopes and are characterized as very deep, rocky, and well-drained. The eastern portion of the property is more gently sloped and comprised primarily of Ridgebury sandy loam at the foot of the hillside and Paxton sandy loam higher up. The Ridgebury sandy loam is characterized as very deep and somewhat poorly to poorly drained, while the Paxton sandy loam is a very deep, well-drained soil. Nestled between the two hillsides is Bog Brook and its associated wetland comprised of rich, organic, very poorly drained to ponded Palms muck.

[6] Information about stream classification is available online at http://www.dec.ny.gov/permits/6042.html.
[7] Available online at http://www.dec.ny.gov/outdoor/104218.html.
[8] Soil classification information available from: US Department of Agriculture, Natural Resources Conservation Service. Available online at http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=NY.

LANDSCAPE CONTEXT

The goals of this HMP have been developed with consideration of surrounding landscape features, the availability of habitats, and other conservation lands adjacent to Bog Brook Unique Area (Figures 4 and 5). The landscape within a three-mile radius of the Bog Brook is primarily privately-owned land including:

- Deciduous forest (51%)
- Developed-open space (15%)
- Wooded wetland (11%)
- Developed-low intensity (6%)
- Open water (5%)
- Pasture (3%)
- Developed-medium intensity (3%)
- Developed-high intensity (1%)

Bog Brook Unique Area fits within a landscape that is dominated by deciduous forest. However, these forest tracts are fragmented with human development, which occupies approximately 25% of the total surrounding area within 3 miles (Figure 5). Developed areas are primarily open spaces (e.g., ball fields, parks, golf courses) but a significant percentage are patches of low to high intensity human development associated with the Interstate 84 and the State Route 22 corridors and the communities of Putnam Lake, Brewster Hill, Sears Corners, and Deforest Corners. State Route 22 runs directly adjacent to Bog Brook Unique Area and likely serves as a significant barrier to wildlife movements. Other State-owned lands within a 3-mile-radius are portions of the Great Swamp WMA and Cranberry Mountain WMA, both in the Town of Patterson. As with all WMAs in New York, these properties are managed to provide wildlife habitat and wildlife-related recreation. In addition to these properties, the New York City Department of Environmental Protection owns two larger properties associated with Bog Brook Reservoir (671 acres) and East Branch Reservoir (1079 acres). Both reservoirs are managed for water quality as part of the New York City drinking water supply, with ecosystem and forest health as primary concerns for protecting water quality. Public access is allowed on these properties for fishing only.

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

DEC will continue active management of wildlife habitats on Bog Brook Unique Area to provide the following benefits:

- Maintain habitat characteristics that will benefit wildlife abundance and diversity within the New York landscape.
- Promote Best Management Practices for targeted wildlife and habitats.
- Provide opportunities for wildlife-dependent recreation such as trapping, hunting, and bird watching compatible with the ongoing habitat management practices and species management considerations.

- Improve habitat quality by reducing invasive species, if present and identified for treatment.

FOREST

Forested acreage includes the following forest types:
Natural forest: naturally forested acres, including hardwoods and softwoods. Includes any upland forested acreage that is not young forest, i.e., pole stands, other intermediate forest age classes, mature forest, and old growth forest.
Plantation: planted forested acres, generally planted in rows dominated by one or two species.
Forested wetland: wetland acres where forest or shrub vegetation accounts for greater than 50% of hydrophytic vegetative cover and the soil or substrate is periodically saturated or covered with water.
Young forest: young or regenerating forested acres, which are typically aged 0-10 years since a disturbance or regeneration cut, depending upon the site conditions. May include both natural forest and plantations.
Young forest (forested wetland): young, regenerating forested wetland acres.
Forest management on Bog Brook Unique Area incorporates an approach to create and/or maintain the diversity of forest age classes that are required to support a diversity of wildlife. In 2015, DEC launched the Young Forest Initiative (YFI) to increase the amount of young forest on WMAs to benefit wildlife that require this transitional, disturbance-dependent habitat. [9]

MANAGEMENT OBJECTIVES

- Retain 53 acres of mature/maturing forest to provide habitat for forest nesting songbirds (e.g., wood thrush, scarlet tanager), American woodcock, wild turkey.
- Clearcut 23 acres of hardwood forest and remove barberry understory to create young hardwood forest habitat, reduce the invasive component, and re-establish native tree species.
- Convert 7 acres of red maple swamp to emergent marsh by removing overstory red maples.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

The existing forest stands at Bog Brook are influenced in large part by local hydrology and past land uses. There are 90 acres of forested habitats at Bog Brook Unique Area, including 14 acres of forested wetland. Evidence of past agricultural uses, including livestock grazing, is represented by stone walls that run throughout the forests on the property. Trees in this relatively new forest are predominantly in the intermediate age-class and pole timber size class, less than 12 inches in diameter. More mature trees in the saw timber size class (>12 inches in diameter) are found along the stone walls, likely trees that were left when clearing for agriculture occurred.

[9] Additional information about DEC's Young Forest Initiative and the YFI Strategic Plan is available online at http://www.dec.ny.gov/outdoor/104218.html.

As Bog Brook is a smaller property, there are only 5 forest stands in total (Figure 6). The forested wetland, comprised primarily of red maple, divides the property. Red maple is in the dominant canopy position in much of the forested acreage on the property, along with other components typical of Northern hardwood forests including sugar maple, black birch, red oak, and black cherry. There are also some smaller components of Eastern hemlock and red cedar. On the eastern half of the property, there is a stand of dead and dying white ash due to the relatively recent invasion of the emerald ash borer. All the forest on the eastern half of the property have a dense, shrub understory, in some stands due to the more open canopies (<50%). Japanese barberry is a dominant component of this shrub layer, but other shrub species that can be found include speckled alder, dogwoods, raspberry, autumn olive and multiflora rose, to name just a few.

Stone walls run throughout the forest stands at Bog Brook Unique Area as evidence of past cattle grazing activity prior to State ownership.

Photo: Sarah Travalio, DEC

Table 3. Summary of the acreage and dominant overstory species for each forest type present on Bog Brook Unique Area.

Forest Type	**Acres (as of 2018)**	**Desired Acres**	**Overstory species**
Natural forest (mature/intermediate)	76	53	Black birch, sugar maple, red oak, red maple
Forested wetland	14	7	red maple
Young forest	0	23	Red oak, red maple, black birch
Total Forested Acres:	90	83	

The creation of young forest habitat is not necessarily a priority at Bog Brook Unique Area since there is already a preponderance of early successional, shrubland habitat, and much of the existing forest stands contain a dense, shrub understory that benefit many of the species that utilize young forest. However, species such as American woodcock would benefit directly from the addition of regenerating hardwood forest stands. American woodcock, although a game species in NY, are listed as a Species of Greatest Conservation Need (SGCN) in NY and, thus, are a candidate for habitat management to enhance their populations at Bog Brook. Regenerating hardwood stands are also utilized for nesting and foraging by a number of songbird species, including the black-billed cuckoo and the blue-winged warbler, also SGCN in NY whose populations have been in decline over the past few decades. Although we don't expect New England cottontails to colonize Bog Brook over the next 10 years, the creation of young forest provides habitat in case they were to arrive since populations can be found nearby.

The more mature forest stands on the property will provide habitat for songbirds, deer, turkey, a host of small mammal species, forest nesting raptors and any species that require cavities for nesting. Among the songbirds that utilize mature forests in NY, including smaller woodlots in relatively fragmented landscapes, is the wood thrush. The wood thrush is another SGCN in NY and their potential use of the forest stands on the property justify leaving some mature forest acreage. Wood thrushes prefer mature forest stands with some type of shrub understory, especially red maple with a spicebush understory such as what can be found in the forest bordering the wetland at Bog Brook. It is likely that they utilize the mature uplands where barberry grows in the understory.

Habitat requirements for a few of the species that will benefit from both mature and young forest habitats at Bog Brook are as follows:

- American woodcock:
    - Singing/Peenting Ground – Open areas from 1 to >100 acres, usually in an abandoned field.
    - Foraging – Moist, rich soils with dense overhead cover of young alders, aspen or birch.
    - Nesting – Young, open, second growth woodlands.
    - Brood rearing – Similar to nesting, except also including bare ground and dense ground cover.
    - Roosting – Open fields (minimum of 5 acres) or blueberry fields and reverting farm fields.[12]

- Willow flycatcher:
    - Breeding – Shrub/scrub in wet areas.
    - Diet – Insects.
    - Nesting – Nests are built 2-3 feet off the ground in shrubs or ferns, often in willows, dogwood, box elder or bracken fern.
    - Overwintering – Central America in pastures, shrublands and forest edges.

- Black-billed cuckoo:
    - General habitat – Woodland edges and thickets in the Northeast.
    - Breeding – Thickets associated with woodland edges, often adjacent to marshes or in second growth, mixed forests.
    - Nesting – Shrubs or low trees up to 20’ off the ground.
    - Diet – Primarily insects, especially caterpillars. Will also feed on snails and other invertebrates and soft mast.
    - Overwintering – South America.

- Blue-winged warbler:
    - Breeding – Young forests, shrublands, forest edges associated with old fields and sometimes wetlands.
    - Diet – Insects.

[12] US Department of Agriculture, Natural Resources Conservation Service. 2010. American Woodcock: Habitat Best Management Practices for the Northeast by Scot J. Williamson. Wildlife Insight. Washington, DC.

- Nesting – On or near the ground in forest edges associated with shrublands and young forest.
- Overwintering – Mexico and Central America.

- Wood thrush:
  - Breeding – Mature deciduous and mixed forests, typically with red maple, American beech, American hornbeam, oaks, pines and Eastern hemlock in the Northeast. Prefer a somewhat shrubby understory that includes spice bush among other species.
  - Nesting – Mature tree in forests as well as fragmented habitats and even park lands if larger trees are present.
  - Diet – primarily insects but also includes soft mast.
  - Overwintering – Tropics.

MANAGEMENT HISTORY

Prior to acquisition by the State in 1981, the area that is now Bog Brook Unique Area was privately owned and in agricultural use. Livestock grazing occurred on the property right up to the time of acquisition by the State. These activities have shaped the forests into what we currently see throughout most of the property. The only forest management that has occurred since 1981 was within the forested wetlands between 2007 and 2015. During that time, mature red maples were removed by DEC Wildlife staff (Figure 6). This was done to provide greater light penetration into the wetland and promote and establish native herbaceous wetland vegetation such as tussock sedge, an important component of these wetland ecosystems.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

The following management is proposed over the next ten years:

- **Management planned for 2020-2024** (Table 4, Figure 6):
  - Clearcut 23 acres of hardwood forest in Stand 04 to create young forest habitat (oaks and red maple) to benefit species such as American woodcock.
  - Canopy reduction in 14 acres of red maple swamp, Stand 02, to convert 7 acres to emergent marsh.
- **Management planned for 2025-2029** (Table 5, Figure 6):
  - Continued canopy reduction in 14 acres of red maple swamp, Stand 02, to convert 7 acres to emergent marsh.

Table 4. Forest management schedule for the first five-year period of this HMP (2020-2024).

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
02	7	Pole timber 6”-11” DBH	Red maple swamp	Emergent marsh	Reptile and amphibian habitat	Canopy reduction
04	23	Pole timber 6”-11” DBH	Hardwood forest	Young hardwood forest	Invasive control and wildlife habitat	Clearcut

Table 5. Forest management schedule for the second five-year period of this HMP (2025-2029)

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
02	7	Pole timber 6”-11” DBH	Red maple swamp	Emergent marsh	Reptile and amphibian habitat	Canopy reduction

Stand locations and planned management actions are also summarized in Figure 6. Specific forest stand descriptions and detailed management prescriptions will be prepared for each proposed forest management area prior to implementation (see template, Appendix C). Briefly, habitat management for each of these stands will include the following:

- **Stand 02:** The canopy of this forested wetland stand is dominated by red maple, and white ash. The trees in this stand are pole timber size class. They are not at a stage of merchantability, nor should they be expected to attain this stage. Understory woody vegetation is mostly limited to alder and dogwood, with common marsh sedges and multi-flora rose also abundant. There is little to no advanced regeneration in this stand. Canopy trees will be removed to convert this stand to emergent marsh habitat to benefit reptile and amphibian species.

- **Stand 04:** There is good access to this stand from the upper parking area off NY Rt. 22, with an existing access route leading to the southern portion of the stand, making it an excellent candidate for management. The stand’s canopy is dominated by red oak, black birch, and red maple. Lower canopy positions contain those species, as well as black cherry, white oak, and white ash. The understory in Stand 04 is dominated by Japanese barberry. In managed areas, it may be necessary to treat barberry directly to encourage regeneration of native tree and shrub species. There are also significant patches of multi-flora rose within the stand, particularly in the southern portion. Advanced regeneration of red maple and black birch, as well as a few red and white oaks can be found throughout the stand.

BEST MANAGEMENT PRACTICES

Forest management on all WMAs follows Best Management Practices to protect soil and water resources, promote quality wildlife habitat, and establish healthy forests (Table 6).

Table 6. Best Management Practices for forest management on WMAs.

Resource	Guidance Document [10]
Soils	*Rutting Guidelines for Timber Harvesting on Wildlife Management Areas*
Water quality	*NYS Forestry Best Management Practices for Water Quality*
Wildlife	*Retention Guidance on Wildlife Management Areas*
Plantations	*Plantation Management Guidance on Wildlife Management Areas*

[10] All guidance documents referenced here are available online at http://www.dec.ny.gov/outdoor/104218.html.

Wildlife Considerations:

Considerations will be taken to avoid negative impacts on non-target species, including Indiana and Northern long-eared bats, forest nesting raptors, primarily red-shouldered and sharp-shinned hawks, as well as other species for which potential impacts should be avoided. Although not year-round residents, Northern long-eared bats may use habitats on Bog Brook Unique Area for summer feeding and roosting. Surveys for both bat species will be conducted from May 15 to August 15, prior to harvest activities. If present, timber harvest will be restricted to the period of December 1st - March 31st. Nesting raptor surveys will be conducted during the early nesting period of the spring prior to any timber harvest activities. Any nesting trees identified during these surveys will be avoided during timber harvest activities. A minimum buffer of approximately 100 feet will be designated around any known nests within which no trees will be harvested.

Forest Health Considerations and Control Measures:

There will likely be little done to combat forest insect pests at Bog Brook Unique Area. The one exception could involve the use of biocontrol to combat the recent invasion of the emerald ash borer in the Hudson Valley. However, white ash stands at Bog Brook have already been decimated by the emerald ash borer and there is not likely to be any existing population of the ash borer on the property. White-tailed deer impacts can be assessed following any forest management activities. It is likely that deer herbivory will suppress hardwood tree regeneration on the property, especially due to the small size of the area to be cut. The plan to fell and leave cut trees in place should provide a barrier that will reduce the impacts of deer on tree and shrub regeneration by creating a barrier that is difficult for deer to penetrate. Red maple, although highly preferred by deer, are also fairly browse tolerant.

Pre- and Post-treatment Considerations:

Pre- and post-treatment actions to promote the desired species composition of tree regeneration will be addressed in detail in the silvicultural prescriptions prepared for each project area. There is a significant component of invasive plant species at Bog Brook Unique Area, with the two most dominant species being Japanese barberry to the west of Bog Brook and multiflora rose in the transitional forest to the east of the brook. This is especially true in hardwood Stand 04 that is slated for harvest. These species could potentially interfere with the establishment of desired shrub species and tree regeneration. It would be difficult to treat the entire infestation of barberry on the entire western portion of the property. However, measures will be used to suppress barberry within the 23-acre hardwood stand being harvested in an attempt to establish native vegetation and promote hardwood regeneration within that stand. Methods may involve a combination of mechanical removal (pulling and/or cutting) and targeted herbicide applications both pre- and post-treatment. The nature of the landscape surrounding Bog Brook would make it impossible to eliminate invasive plant species completely from the property. Other efforts to restore native vegetation could include tree and shrub plantings and controlled burns.

MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife response(s) have been achieved by the management outlined above, pre- and post-management assessments will be conducted in accord with guidelines that will be established in a Young Forest Initiative

Monitoring Plan (in prep). The Monitoring Plan will establish statewide standards for evaluating vegetation and target wildlife responses to forest management to determine if the outcome is as prescribed. Regeneration assessments will be conducted within one year of harvest completion, three, and five years after the harvest or until the forester determines adequate natural or artificial (i.e., planting) regeneration has been securely established. YFI wildlife target species selected for Bog Brook Unique Area, which may be assessed to determine response to management, include:

- American woodcock
- Songbirds
- New England cottontail

Although it is unlikely that New England cottontail will ever arrive at Bog Brook Unique Area on their own, DEC staff surveyed the area using genetic analysis of rabbit pellets collected in the winter of 2018 as part of a greater monitoring effort within the Harlem-Housatonic Focus Area. Future monitoring will include vegetation sampling and rabbit pellet collection that will be conducted both prior to and following any habitat management activities. The habitat monitoring data can also be used to supplement the post-treatment vegetation monitoring as laid out in the Young Forest Initiative Monitoring Plan. Rabbit pellet collection for DNA testing takes place during winter months to determine presence/absence of New England cottontails.

Monitoring for American woodcock and songbirds began in 2019 and will continue into the future following the YFI Monitoring Plan. Woodcock sampling will vary from the typical woodcock survey route protocol across the State, as this property is a small area and managed areas may not be observable from nearby roads due to high traffic noise, thus requiring sampling to be done on foot, walking the routes at night. Point counts will be used to monitor songbird species across the property, especially in the forest treatment area (Figure 6), to determine species composition and habitat use on the property.

SHRUBLAND

Shrublands are early successional habitats dominated by woody plants typically less than ten feet tall with scattered open patches of grasses and forbs that provide floristic diversity. Typically characterized by >50% cover of shrubs and <25% canopy cover of trees.

MANAGEMENT OBJECTIVES

- Mow approximately two-thirds (12 acres) of the total shrubland acreage with a forestry cutter (Figure 6) to create temporary wildlife openings as part of a 15-year-rotation to reset all 19 acres of shrubland.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

There is 19 total acres of shrubland habitat at Bog Brook Unique Area, all found east of the wetland (Figure 6). These shrubland patches occur within a matrix of forest stands with a similarly dense understory of shrubs that form a seemingly contiguous patch of shrub cover on the eastern half of the property. The species composition in these shrublands is a mix of both native and non-native that provide a dense canopy of cover and food for wildlife. Non-native

species in these thickets include multiflora rose, glossy buckthorn, autumn olive and Japanese barberry. Native shrub species include rubus species (e.g., blackberry, black raspberry, and raspberry), poison and staghorn sumac, speckled alder, gray-stemmed dogwood and a variety of willow species. Shrublands at Bog Brook were once openings mowed and maintained by DEC Operation's staff. Mowing of these openings ceased sometime in the last decade and have since succeeded to their current state.

Speckled alder is one of many shrub species found in the shrublands at Bog Brook Unique Area.

Photo: Kevin G. Clarke, DEC

Shrublands and early successional habitats in general play an important role for wildlife. They provide habitat for a large number of songbird species that depend upon these dense habitats for foraging and nesting. The presence of these shrublands near a wetland, as is the case at Bog Brook, make these habitats favorable for species like the blue-winged warbler, black-billed cuckoo and willow flycatcher, all species in decline across their range. As mentioned in the forest management section, both blue-winged warblers and black-billed cuckoos are SGCN in NY. American woodcock would benefit most from the management of these habitats that involved mowing to reset the shrublands as that would create temporary openings. Open spaces, even if temporary, are an important habitat component for woodcock as a place to perform their aerial breeding displays. The temporary openings would also likely be used by wild turkey for courtship displays and numerous other species for foraging.

MANAGEMENT HISTORY

Open field habitats likely dominated Bog Brook at one point in the past as there is evidence of livestock grazing that used to occur throughout the property. After State acquisition, approximately 20 acres of openings on the east side of the property were maintained by DEC Operations Staff. Mowing with a brush hog occurred approximately every 3 years to maintain these openings. Although they were not planted, regrowth after mowing provided excellent forage for wildlife. Periodic mowing provided permanent openings that were beneficial to a variety of species, especially woodcock, wild turkey, rabbits and a host of small mammal species. However, over the last decade, maintenance of these habitats ceased, and the fields have succeeded into old field/shrubland habitat (Figure 6).

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2024** (Figure 6):
  - Mow 6 acres of existing shrubland with a forestry cutter.
- **Management planned for 2025-2029** (Figure 6):

- Mow 6 additional acres of existing shrubland with a forestry cutter.

The goal for this habitat type is to periodically reset the shrublands by mowing with a forestry cutter to provide higher quality habitat in terms of both cover and forage. Consistent with the treatment of other habitat types, efforts will be made to ensure that negative impacts on wildlife related to the mowing of shrublands are minimized. Shrublands will be mowed on a 5-year-rotation with only one third of the total shrubland acreage treated every 5 years. This approach will provide temporary wildlife openings in the treated areas and ensure that there is always early successional habitat ranging from 0-15 years old. Openings created by mowing, although not permanent field habitat, will provide excellent strutting areas for turkeys and courtship display areas for woodcock. New growth in those areas will provide high quality nutrition for a variety of species as well. As the mowed areas succeed over the 15 years until they are treated again, they will provide excellent nesting cover and forage for shrubland dependent songbirds and small mammals.

BEST MANAGEMENT PRACTICES

Wildlife Considerations:

Mowing of the shrubland habitats at Bog Brook will be done from August 15-April 15 so as not to interfere with shrub-nesting songbirds. Further, since shrubland habitats are important for migrating songbirds and other species for overwinter cover, only one third of the shrubland acreage will be mowed every five years. That will ensure that there is always some acreage of shrubland habitat available for wildlife on the property.

Pre- and Post-treatment Considerations:

Pre- and post-treatment actions to promote the desired species composition of tree regeneration will be addressed in detail in the silvicultural prescriptions prepared for each project area. Invasive plant species are a significant concern at Bog Brook Unique Area and a major component of the shrublands already. Japanese barberry and multiflora rose are the two most common invasive plants, currently. These species will interfere with the establishment of desired shrub species after mowing. Efforts to control invasive plants in the shrublands could be accomplished through a combination of mechanical and chemical (herbicide) treatments, after mowing, to give native vegetation the best chance to get established. Efforts to restore native vegetation could also include plantings of native shrubs. The use of herbicides will be targeted to specific plants to minimize the impacts and protect the quality of Bog Brook and its associated wetlands. Although efforts will be made to control invasives in treatment areas, it would not be possible to eliminate invasives completely from the landscape at Bog Brook Unique Area as they are persistent throughout the property and the surrounding landscape as well.

MANAGEMENT EVALUATION:

Since Bog Brook Unique Area falls within a New England cottontail focus area and contains suitable habitat, DEC has conducted presence/absence surveys for the species at the area. This monitoring has consisted of the collection of rabbit pellets for genetic analysis during the winter months. The dense, somewhat impenetrable nature of the shrubland habitats at Bog Brook has complicated the implementation of the standard NEC sampling methodology and by necessity, pellet collection has generally been more opportunistic than systematic. Thus far, the presence of NEC has not been detected at Bog Brook and due to the local landscape, which is generally

suburban and fragmented by development, it may be unlikely that New England cottontails will ever colonize the area on their own. Despite the low probability of colonization, DEC staff will continue to periodically survey Bog Brook for NEC during the 10-year life of this plan.

Monitoring for American woodcock will also be conducted throughout Bog Brook, including the shrubland habitats. It is likely that this sampling effort will vary from the typical woodcock survey route protocol across the State, as this property is a small area and managed areas may not be observable from nearby roads due to high traffic noise, thus requiring sampling to be done on foot, walking the routes at night.

Grassland and Other Open Space

Grasslands are open, grassy areas with a minimal amount of shrub and tree cover (<35%) that are maintained, or could be maintained, without significant brush cutting. Grasslands may include areas where hay is harvested by late season mowing once per year. Other open spaces may include fields that are maintained by mowing to provided wildlife habitat. These may not function as grasslands, primarily due to their limited size on the landscape, but serve to promote diversity of habitats on the property and necessary food and/or cover for wildlife.

There is no grassland or open field habitat at Bog Brook Unique Area. However, there are old fields that are currently succeeding and are described in the Shrubland habitat section. As previously described for the management of shrublands on the property, mowing 12 acres of existing old field/shrubland habitat will create temporary wildlife openings expected to convert back to shrubland habitat. These openings would benefit woodcock by providing areas for aerial breeding displays/peenting. There are no plans to create or maintain new open field habitats.

Agricultural Land

Agricultural lands on WMAs include any acreage on which crops are grown, primarily areas that are under cooperative agreements or farming contracts, but also including wildlife food plots. There is no agricultural land on Bog Brook Unique Area, nor are there any plans to develop such habitat.

Wetlands (Natural and Impounded)

Natural wetlands are areas where the soil or substrate is periodically saturated or covered with water, including emergent (perennial herbaceous vegetation accounts for >50% of hydrophytic vegetative cover) and scrub-shrub wetlands (woody vegetation under 20 feet tall accounts for >50% of hydrophytic vegetative cover). Impounded wetlands are areas similar to natural wetlands, but where water is held back by a berm, road, or other structure. Forested wetlands are addressed in the Forest section above.

MANAGEMENT OBJECTIVES

- Continue Phragmites control to minimize its occurrence in wetland habitat and allow for the establishment native wetland herbaceous vegetation, primarily tussock sedge.
- Maintain water in the wetland at the lowest possible level (<1 acre ponded) to encourage the establishment of native wetland herbaceous vegetation.
- Create 7 additional acres of tussock sedge/emergent marsh in red maple swamp by removing overstory red maples.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

The Unique Area has 36 acres of wetland (Figure 3) habitats that include approximately 2 acres of ponded water created by a water level control structure, 20 acres of emergent marsh, and 14 acres of red maple swamp. The wetlands consist primarily of rich graminoid fen and emergent marsh. The main body of the wetland is being degraded by significant infestations of common reed (*Phragmites* spp.), purple loosestrife (*Lythrum salicaria*), and reed canarygrass (*Phalaris arundinacea*). *Phragmites* is especially problematic at the Unique Area and currently dominates approximately 8 acres of wetland habitat. In addition to invasive species, woody vegetation, mainly red maple and alder, are encroaching around the periphery of the wetland and are contributing to habitat loss for wetland species because of the high shade levels found under their canopies that shade-out important herbaceous wetland vegetation.

The presence of wetlands not only add to the habitat diversity at Bog Brook, but even more so to the overall species diversity on the property. Wetlands typically have among the highest species diversity of all ecosystems on the planet. According to the United States Environmental Protection Agency EPA, one third of all species listed as threatened or endangered in the United States live solely in wetlands[11]. Wetlands are especially critical for reptile and amphibian species as either year-round habitat or breeding habitat. Wetland protection is of even greater importance in the Northeast considering annual losses of wetland acreage to human development. Their protection is important both as habitat and for ecosystem health based on their many functions that include flood mitigation, improvement of water quality, and recharging ground aquifers to name a few.

Species that may utilize the wetland and benefit from its management at Bog Brook include but are not limited to:

- Muskrat, American beaver, raccoon, mink, otter, Southern bog lemming
- Wood frog, green frog, American toad, red-spotted newt, blue-spotted salamander.
- Swamp sparrow, common yellowthroat, red-winged blackbird, yellow warbler, Eastern kingbird, willow flycatcher.

[11] United States Environmental Protection Agency (USEPA). *America's Wetlands: Our Vital Link Between Land and Water.* Washington, DC: Office of Water, Office of Wetlands, Oceans, and Watersheds, 1995.

- Virginia rail, sora rail, mallard, wood duck, great blue heron

MANAGEMENT HISTORY

Prior to state acquisition in 1981, the wetland area at Bog Brook (as well as much of the upland area surrounding the wetland) was periodically grazed. Remnants of stone walls used for livestock grazing are still evident in the northern section of the wetland, crossing at regular intervals. It is likely this grazing, as well as intermittent beaver activity, helped to hinder the encroachment of woody vegetation and maintain the wetland in an open condition, dominated by emergent marsh vegetation and sedge tussocks.

Because Bog Brook was acquired specifically to protect the area's unique wetland communities, the area has been the subject of significant management and research attention. Activities such as prescribed fire, pothole creation, water control structure installation and subsequent water level manipulations, management of beaver, periodic removal of woody vegetation, and control of invasive plant species have been implemented in an ongoing effort to preserve the vegetation communities at the site. Annual vegetation monitoring suggests these management efforts have been only partly successful, as the wetland vegetation at Bog Brook has significantly changed in the 35 years since state acquisition.

Over time, invasive plant species have posed the biggest threat to the Unique Area's natural wetland community. Common reed (*Phragmites australis*) now dominates much of the wetland acreage. But species like purple loosestrife, reed canary grass, glossy buckthorn, Japanese barberry, and others have also staked their claim in the wetland community. Prescribed fire and water level manipulations have been frequently employed to combat the spread of invasive plants. The wetland was burned by DEC staff in the springs (late February to early April) of 1987, 1988, 1992, 1998, 2005, 2006, and 2017. The burns have provided a temporary increase in the amount of sunlight reaching the marsh surface and a subsequent increase in soil temperature and a flush of seed germination. However, this effect has proven to be fleeting as Phragmites quickly reoccupies the site and shades out native vegetation. Prescribed fire as a

Bog Brook wetland in the winter.
Photo: Kevin Clarke, DEC

stand-alone management tool has never proven to be effective for reducing Phragmites cover or density at Bog Brook.

Water level management at Bog Brook has proven to be equally problematic. At the time of state acquisition, Bog Brook exited the south end of the wetland (and the Unique Area) via a basic culvert under Foggintown Road. In the 1990s, the culvert was replaced with a reinforced concrete drop box with stop boards and 24" of head capacity for more precise control of the water level. The structure was constructed by the town highway department. Both the old and new structures have been highly susceptible to beaver damming over the years, allowing water levels to exceed historic levels. The Department exacerbated this problem by releasing a pair of American beaver in the main pond in July 1988 with the goal of controlling the encroachment of woody vegetation within the wetland. From the late 1990s to 2013, beaver were absent from the wetland. In 2013, however, the site was re-occupied, and a single beaver was trapped and dam material was removed from the water level control structure to lower the wetland to historic levels.

In addition to prescribed fire and water level manipulation, numerous other wetland management actions have been undertaken by DEC at Bog Brook. In the 1980s, explosives were used to create potholes of deep, open water habitat within the marsh matrix with the goal of increasing the area's use by breeding waterfowl; these potholes have gradually filled in and today are barely recognizable. Purple loosestrife biocontrol agents have been released multiple times at the area; in general, these releases and the residual populations of the agents have successfully maintained loosestrife abundance at acceptable levels. Woody vegetation, primarily red maple and speckled alder have been periodically removed during the winter months from the periphery of the wetland. Until 2003, this work was conducted on a 5 to 8-year rotation by an inmate crew from a nearby correctional facility. In recent years, the work has been accomplished by DEC regional staff with significant clearing accomplished in 2007, 2010, 2013, and 2015. In recognition that a different approach was needed for Phragmites, the infestation was treated with herbicide in 2013. This treatment took place over 5 days in September and utilized a tracked amphibious vehicle equipped with an elevated spray tower. A partial follow-up treatment using backpack sprayers was completed in 2016. While these treatments were initially quite effective, the surviving Phragmites has reoccupied a large percentage of the southern area and additional herbicide treatments are required to prevent complete recolonization of the site.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figure 6):
    - Treat existing Phragmites in all 22 acres of non-forested, wetland habitat with techniques that may include the use of cattle grazing, herbicide or prescribed fire.
    - Create 7 additional acres of emergent marsh by removing overstory red maples in the forested wetland habitat.
    - Remove beaver whenever necessary to prevent damming of water control structure and minimize ponding within the wetland.

BEST MANAGEMENT PRACTICES

Herbicide treatment of Phragmites will occur in the late summer or early fall, when plants are at peak height and most actively drawing nutrients.

MANAGEMENT EVALUATION

Significant ecological threats to Bog Brook's wetland habitats include invasive species and changes to hydrology and water quality. Annually conduct surveys of wetland areas to determine effectiveness of Phragmites and purple loosestrife management and to detect other significant emerging wetland invasive species threats.

OPEN WATER (WATERBODIES AND WATERCOURSES)

There is no open water habitat on Bog Brook Unique Area, nor any plans to develop such habitat.

HABITAT MANAGEMENT SUMMARY

In summary, Table 7 lists the habitat management actions planned for Bog Brook Unique Area over the next ten years. Any substantive changes will be appended to this HMP annually or as needed (Appendix D).

Table 7. Summary of habitat management actions recommended for Bog Brook Unique Area, 2020-2029. (Also see Figures 3 and 6.)

Habitat	Management Action	Acres	Timeframe
Forest	Seed tree cut hardwood forest Stand 04 to regenerate native hardwood species and manage invasive Japanese barberry.	23	2020-2024
Shrubland	Mow shrubland Stands 07 and 08 to reset shrubs and create temporary wildlife openings.	6	2020-2024
Shrubland	Mow shrubland Stands 07, 08, and 09 to reset shrubs and create temporary wildlife openings.	6	2025-2029
Forested wetland	Convert a portion of wetland Stand 02 to emergent marsh by removing overstory red maples to promote tussock sedge.	7	2020-2029
Wetland	Remove Phragmites with herbicide and/or fire to allow for the establishment of native wetland vegetation.	22	2020-2029
Wetland	Use water control structure to minimize ponded water to less than one acre.	2	2020-2029
Wetland	Fence wetland acreage to use cattle for the removal of Phragmites.	20	2020-2029

III. FIGURES

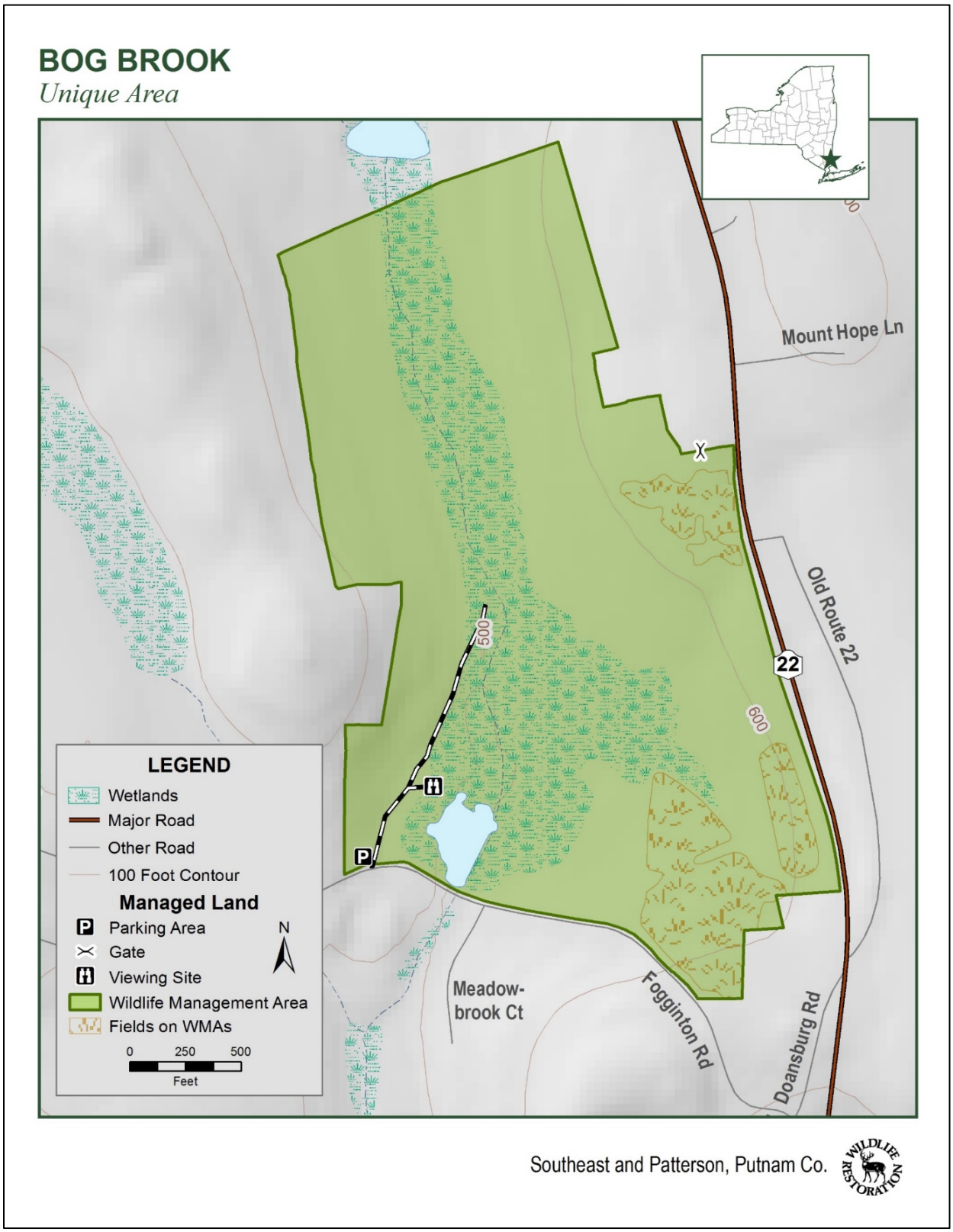

FIGURE 1. Location and access features at Bog Brook Unique Area WMA.

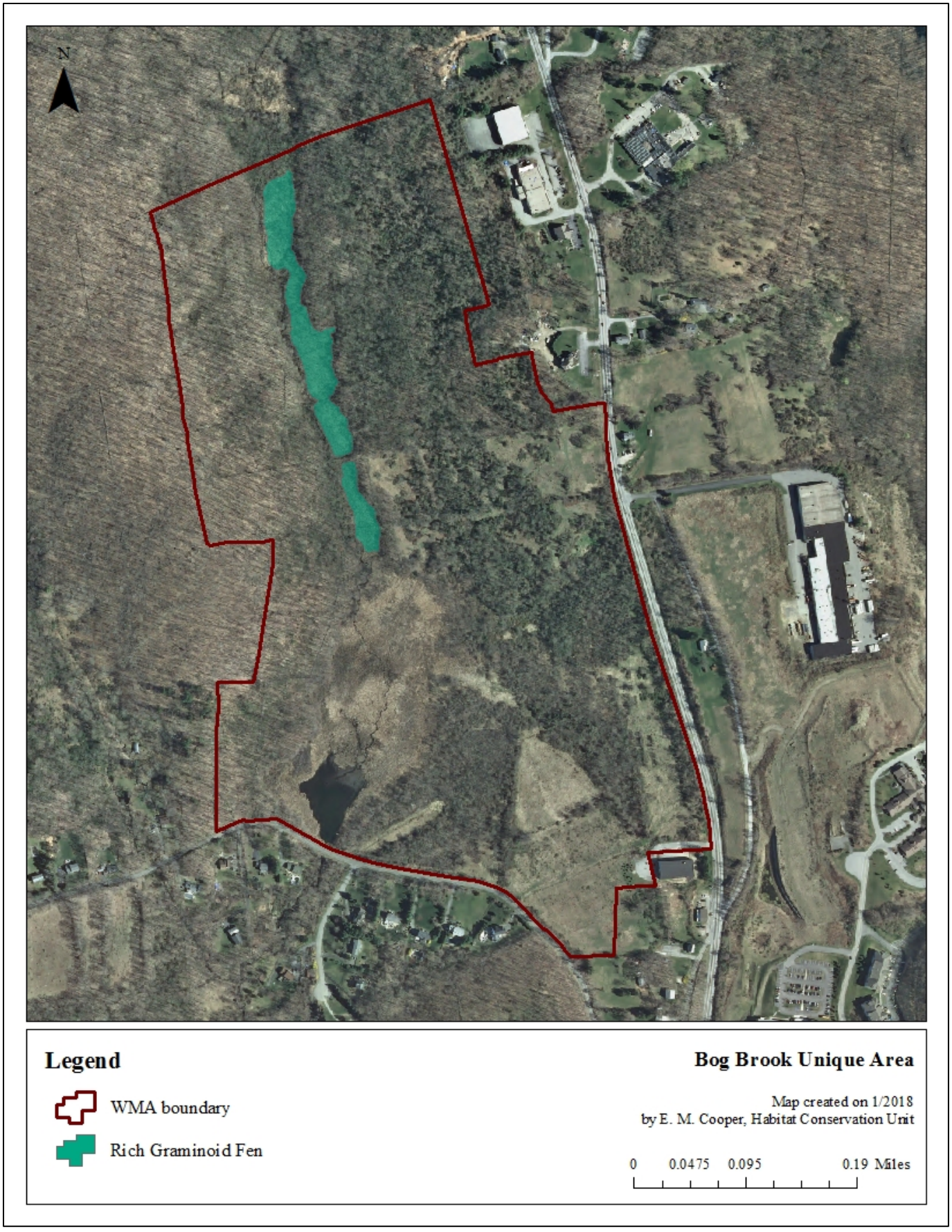

FIGURE 2. Significant ecological communities on Bog Brook Unique Area. Data from the NY Natural Heritage Program.

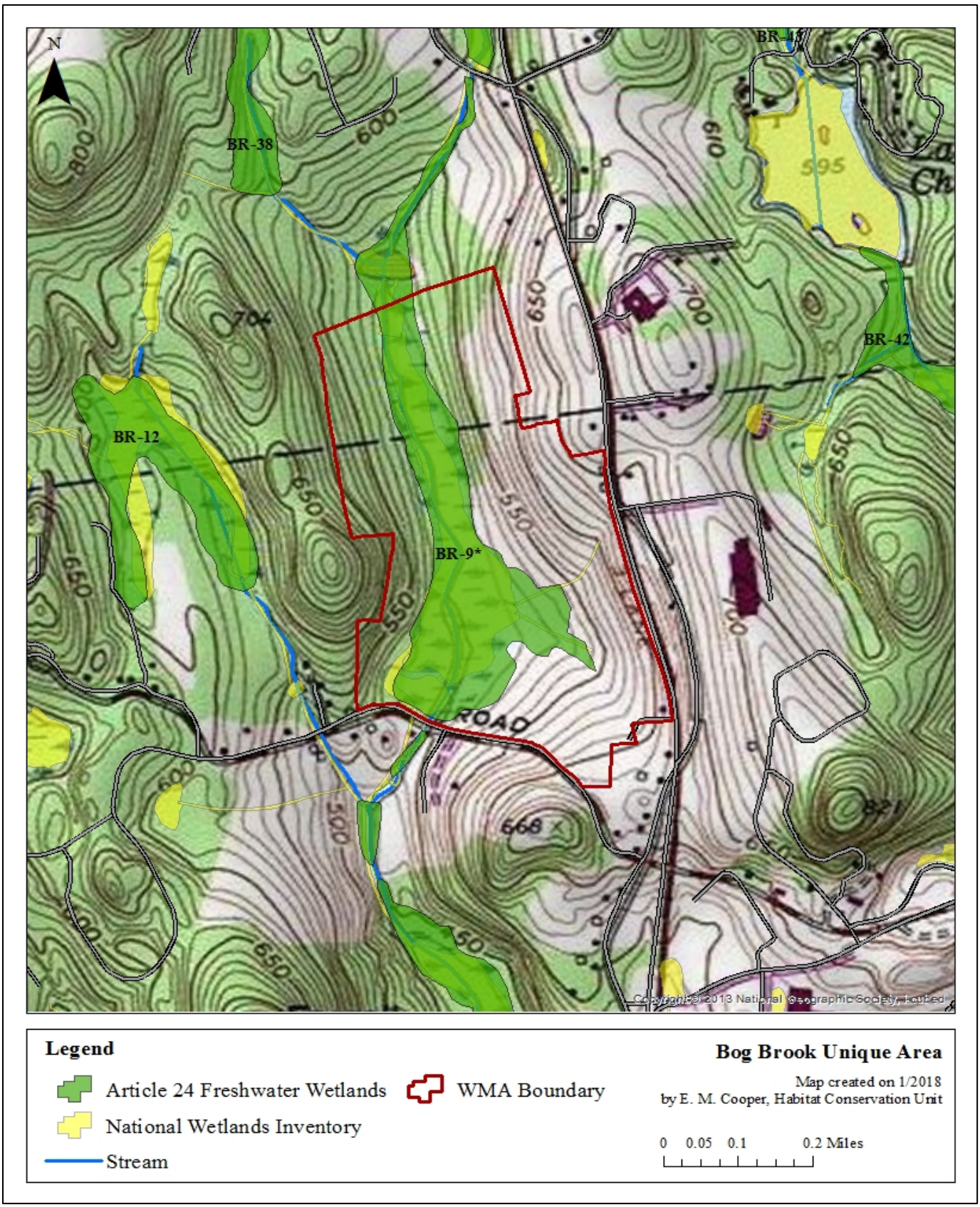

FIGURE 3. Wetlands, open water, and streams of Bog Brook Unique Area. Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

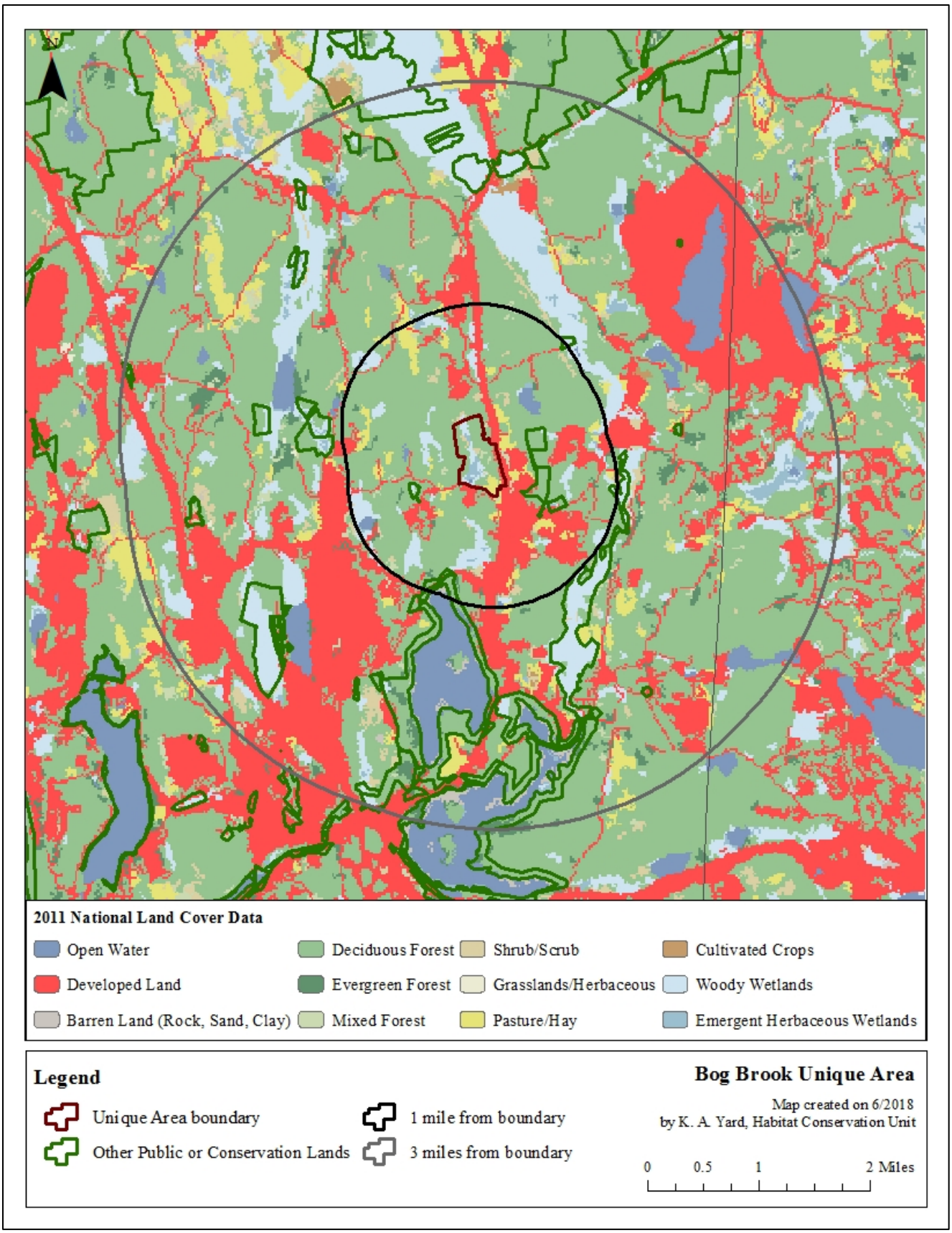

FIGURE 4. Land cover types and conservation lands in the landscape surrounding Bog Brook Unique Area. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at https://www.mrlc.gov/data/nlcd-2011-land-cover-conus-0.

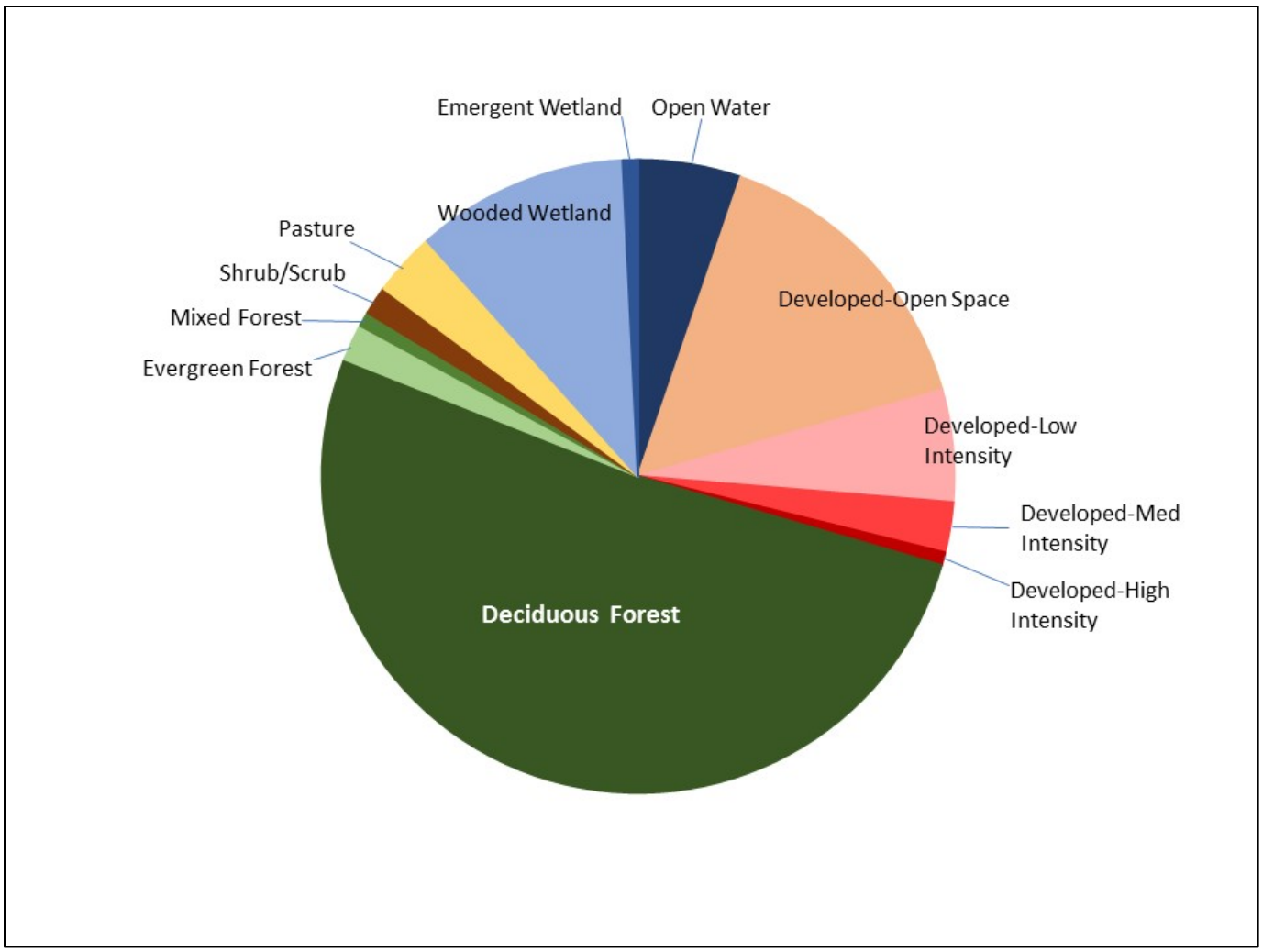

FIGURE 5. Percent cover of land cover types within three miles of Bog Brook Unique Area.

Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at https://www.mrlc.gov/data/nlcd-2011-land-cover-conus-0 .

FIGURE 6. Habitat types and location(s) of proposed management on Bog Brook Unique Area. Numbers indicate the stand number from habitat inventory.

IV. APPENDICES

APPENDIX A: DEFINITIONS

The following key words were used in the development of this Habitat Management Plan. Definitions are from The Dictionary of Forestry, Society of American Foresters, J. A. Helms, Editor, unless otherwise noted.

Best Management Practices: (BMP) A practice or combination of practices that are determined to be the most effective and practicable means of avoiding negative impacts of habitat management.

Biodiversity: The variety and abundance of life forms, processes, functions, and structures of plants, animals, and other living organisms, including the relative complexity of species, communities, gene pools, and ecosystems at multiple spatial scales.

Clearcut: A forest regeneration or harvest method that entails the cutting of essentially all trees, producing a fully exposed microclimate for the development of a new age class. Depending on management objectives, a clearcut may or may not have reserve trees left to attain goals other than regeneration.

Community: An assemblage of plants and animals interacting with one another, occupying a habitat, and often modifying the habitat; a variable assemblage of plant and animal populations sharing a common environment and occurring repeatedly in the landscape. (NY Natural Heritage Program)

Endangered Species: Any species listed on the current state or federal endangered species list as being in danger of extinction throughout all or a significant portion of its range.

Forb: Any broad-leafed, herbaceous plant other than those in the Poaceae (Gramineae), Cyperaceae, and Juncaceae families (i.e., not grass-like).

Forest: An ecosystem characterized by a dense and extensive tree cover, often consisting of stands varying in characteristics such as species composition, structure, age class, and associated processes, and commonly including meadows, streams, fish, and wildlife.

Forest Health: The condition of a forest derived from concerns about such factors as its age, structure, composition, function, vigor, presence of unusual levels of insects or disease, and resilience to disturbance.

Grassland Focus Area: Regions of NY that support key, residual populations of grassland birds. There are currently eight focus areas, within which there is a concentrated conservation effort for these species. (A Plan for Conserving Grassland Birds in New York, Audubon NY.)

Habitat: A place that provides seasonal or year round food, water, shelter, or other environmental conditions for an organism, community, or population of plants or animals.

Hardwood: A broad leaved, flowering tree belonging to the botanical group Angiospermae, such as red maple, yellow birch, American beech, black cherry, etc.

Impoundment: A pond caused by a dam across a stream and used for purposes such as water supply, water power, or wildlife habitat. (Edinger et al. 2002. Ecological Communities of New York State, Appendix B)

Landscape: A spatial mosaic of several ecosystems, landforms, and plant communities across a defined area irrespective of ownership or other artificial boundaries and repeated in similar form throughout.

Mast: The fruit of trees considered as food for wildlife. Hard mast is the fruits or nuts of trees such as oak, beech, walnut, and hickories. Soft mast is the fruits and berries from plants such as dogwood, viburnum, elderberry, huckleberry, hawthorn, grape, raspberry, and blackberry.

Multiple Use Area: Lands that were acquired by DEC to provide outdoor recreation and wherever possible the conservation and development of natural resources. As their name suggests, they are to be managed for a broader range of public use. (Public Use of Lands Managed by the Bureau of Wildlife)

Native: A plant or animal indigenous to a particular locality.

Old Growth Forest: Forest with an abundance of late successional tree species, at least 180 - 200 years of age in a contiguous forested landscape that has evolved and reproduced itself naturally, with the capacity for self-perpetuation, arranged in a stratified forest structure consisting of multiple growth layers throughout the canopy and forest floor, featuring canopy gaps formed by natural disturbances creating an uneven canopy, and a conspicuous absence of multiple stemmed trees. (Adapted from the NYS Strategic Plan for State Forest Management)

Pole: A tree of a size between a sapling (1" to 5" diameter at breast height) and a mature tree.

Regeneration Cut: A cutting procedure by which a new forest age class is created; the major methods are clearcutting, seed tree, shelterwood, selection, and coppice. The Young Forest Initiative includes these silvicultural treatments: clearcuts, seed tree cuts, and shelterwood cuts. Salvage (following a natural disturbance) will be considered based on the size and scope of the disturbance.

Seed Tree Method: A forest regeneration or harvest method that entails cutting of all trees except for a small number of widely dispersed trees retained for seed production and to produce a new age class in fully exposed microenvironment.

Shelterwood Method: A forest regeneration or harvest method that entails the cutting of most trees, leaving those needed to produce sufficient shade to produce a new age class in a moderated microenvironment.

Shrubland: A community dominated by woody plants typically less than ten feet tall with scattered open patches of grasses and forbs that provide floristic diversity. Typically characterized by >50% cover of shrubs and <25% canopy cover of trees. (Adapted from Edinger et al. 2002. Ecological Communities of New York State, Appendix B)

Softwood: A coniferous tree belonging to the botanical group Gymnospermae, such as white pine, Eastern hemlock, balsam fir, red spruce, etc.

Special Management Zone: A vegetation strip or management zone extending from wetland boundaries, high-water marks on perennial and intermittent streams, vernal pool depression, spring seeps, ponds and lakes, and other land features requiring special consideration. (Adapted from DEC Division of Lands and Forests Management Rules for Establishment of Special Management Zones on State Forests)

State Rank of Significant Ecological Communities:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 = Apparently secure in New York State.
S5 = Demonstrably secure in New York State.
SH = Historically known from New York State, but not seen in the past 15 years.
SX = Apparently extirpated from New York State.
SE = Exotic, not native to New York State.
SR = State report only, no verified specimens known from New York State.

SU = Status unknown.
(Edinger et al. 2002. Ecological Communities of New York State, Appendix A)

Stand: In forestry, a contiguous group of trees sufficiently uniform in age-class distribution, composition, and structure, and growing on a site of sufficiently uniform quality, to be a distinguishable and manageable unit. In this HMP, the term "stand" is also applied to other habitat types (e.g., grassland, shrubland) to describe an area composed of similar vegetation composition and structure, as delineated during the habitat inventory.

Stand Prescription: A planned series of treatments designed to change current stand structure to one that meets management goals. Note: the prescription normally considers ecological, economic, and societal constraints.

Target Species: A suite of high priority wildlife species of conservation interest that are being targeted to benefit from management of a particular habitat type.

Unique Area: Lands that were acquired by DEC for their special natural beauty, wilderness character, geological, ecological, or historical significance for inclusion in the state nature and historical preserve. The primary purpose of these lands is to protect the feature of significance that led to the land being acquired by the state. (Public Use of Lands Managed by the Bureau of Wildlife)

Upland: Sites with well-drained soils that are dry to mesic (never hydric). (Edinger et al. 2002. Ecological Communities of New York State, Appendix B)

Wetland: "Freshwater wetlands means lands and waters of the state as shown on the freshwater wetlands map which contain any or all of the following:

(a) lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic or semi-aquatic vegetation of the following types: wetland trees, wetland shrubs, emergent vegetation, rooted, floating-leaved vegetation, free-floating vegetation, wet meadow vegetation, bog mat vegetation, and submergent vegetation;
(b) lands and submerged lands containing remnants of any vegetation that is not aquatic or semi-aquatic that has died because of wet conditions over a sufficiently long period, provided that such wet conditions do not exceed a maximum seasonal water depth of six feet and provided further that such conditions can be expected to persist indefinitely, barring human intervention;
(c) lands and waters substantially enclosed by aquatic or semi-aquatic vegetation as set forth in paragraph (a) or by dead vegetation as set forth in paragraph (b) the regulation of which is necessary to protect and preserve the aquatic and semi-aquatic vegetation as set forth in paragraph (a) or by dead vegetation as set forth in paragraph (b) the regulation of which is necessary to protect and preserve the aquatic and semi-aquatic vegetation; and
(d) the waters overlying the areas set forth in (a) and (b) and the lands underlying."

(Refer to NYS Environmental Conservation Law, Article 24 § 24-0107 for full definition.)

Wildlife Management Area: Lands that were acquired by DEC primarily for the production and use of wildlife, including hunting and trapping. These areas provide and protect wildlife habitats that are particularly significant in their capacity to harbor rare, threatened or endangered species, host unusual concentrations of one or more wildlife species, provide an important resting and feeding area for migratory birds, provide important nesting or breeding area for one or more species of wildlife, or provide significant value for wildlife or human enjoyment of wildlife. (Public Use of Lands Managed by the Bureau of Wildlife)

Young Forest: Forests that result from a regeneration cut, typically having a dense understory where tree seedlings, saplings, woody vines, shrubs, and herbaceous vegetation grow together. Young forests are typically 0-10 years old. (Adapted from www.youngforest.org). It is acknowledged that "young forests" will differ in their character in different ecological areas of the state and that 0-10 years is a continuum into more mature forest types. (Refer to: A DEC Strategic Plan for Implementing the Young Forest Initiative on Wildlife Management Areas 2015-2020)

APPENDIX B. COMPLIANCE WITH STATE ENVIRONMENTAL QUALITY REVIEW

This plan identifies habitat management activities to be conducted on the Wildlife Management Area. These activities were analyzed in the 1979 *Programmatic Environmental Impact Statement on Habitat Management Activities of the Department of Environmental Conservation; Division of Fish and Wildlife* (PEIS), as updated and amended in 2017 by the *Supplemental Final Environmental Impact Statement* (SFEIS).[12] Any activity that exceeds the thresholds of, or was not analyzed in the 1979 PEIS as amended in 2017, will require individual, site-specific environmental review. Environmental assessment forms prepared as a result of this review will be posted on the Environmental Notice Bulletin (ENB).[13]

The activities recommended in this plan:

- Will not adversely affect threatened or endangered plants or animals or their habitat.
    - Prior to implementation of any activity, staff review the NY Natural Heritage Program's "Natural Heritage Element Occurrence" database and perform field surveys when necessary. If a protected species is encountered in a project area, staff may establish buffer zones around the occurrence, move the project area, follow time-of-year restrictions, or cancel the project.
- Will not induce or accelerate significant change in land use.
    - All lands and waters within the WMA system are permanently protected as wildlife habitat.
- Will not induce significant change in ambient air, soil, or water quality.
    - Activities are designed to protect air, soil, and water quality through careful project planning, use of appropriate Best Management Practices, and establishment of Special Management Zones around sensitive land and water features requiring special consideration.
- Will not conflict with established plans or policies of other state or federal agencies.
    - Activities will follow established plans or policies of other state and federal agencies, including all relevant U.S. Fish and Wildlife Service rules and regulations.
- Will not induce significant change in public attraction or use.
    - The WMA system is part of a long-term effort to establish permanent access to lands in New York State for the protection and promotion of its fish and wildlife resources. Proposed activities will continue to protect, promote, and maintain public access to WMAs and their wildlife resources.
- Will not significantly deviate from effects of natural processes which formed or maintain an area or result in areas of significantly different character or ecological processes.
    - Activities will be conducted in a manner that maintains, enhances, or mitigates ecological processes and/or natural disturbances as appropriate for each WMA and habitat type. Some activities, such as even-aged forest management, intentionally result in areas of different character and ecological processes; however, they are not considered significant because they are ephemeral or transitional and will not permanently alter the landscape.
- Will not affect important known historical or archeological sites.
    - Activities that may result in ground disturbance are reviewed by DEC's State Historic Preservation Officer (SHPO) and/or the NYS Office of Parks, Recreation and Historic Preservation (OPRHP) to identify potential impacts to historical or archeological sites. Sensitive sites will be protected under the direction of DEC's SHPO and the OPRHP Archaeology Unit.
- Will not stimulate significant public controversy.
    - It is not anticipated that activities on WMAs will stimulate significant public controversy. A public comment period was held during development of both the PEIS and the SFEIS; no relevant comments in opposition of proposed management activities were received during the SFEIS public comment period. Staff also hold a public information session after completing each HMP, consider feedback from these sessions, and may adjust management as deemed appropriate. Kiosks, signs, webpages, articles, demonstration areas, and other outreach materials also raise awareness about habitat management activities.

[12] Available online at http://www.dec.ny.gov/regulations/28693.html.
[13] Available online at http://www.dec.ny.gov/enb/enb.html.

APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS

PRESCRIPTION FOR WILDLIFE MANAGEMENT AREA TIMBER HARVEST

Region: **Wildlife Management Area:** **Stand number:** **Stand acreage:**

Species composition:

Basal area: **Trees per acre:** **Mean stand diameter:**

Stand inventory or analysis date:

Regeneration data:

Natural Heritage Element Occurrence layer review:

SMZ layer review:

Retention data:

Soil types and drainage:

Interfering vegetation:

Acres to be treated: **Target basal area:**

Technical guidance/stocking guide:

Treatment purpose:

Management Objective: Even aged or Uneven Aged

-If even aged, specify treatment (i.e. shelterwood, seed tree, clearcut)

Clearcut acreage and configuration: (if applicable)

Natural Heritage /MHDB considerations and mitigation: (if applicable)

Retention considerations and adjustments:

Treatment descriptions:

Name and Title of Preparer:

Central Office Lands and Forests Staff **Date**

Regional Wildlife Manager **Date**

PRESCRIPTION NOTES

Species Composition: At a minimum, the three most common species found in the overstory should be included, assuming at least three species comprise the stand. Species that individually constitute less than 5% of the stand may be lumped together as "Other" or "Miscellaneous." For instance, if beech, hemlock and yellow birch each make up 3% of the stand, they may be lumped together as "Other – 9%."

Natural Heritage Element Occurrence layer review: List those species that the Natural Heritage Element Occurrence (EO) data layer indicates are or were known to be present in the stand, or could be affected by treatments to the stand. For instance, if a rare fish was indicated in a water body that is a short distance downstream of a creek that flows through the stand, it should be listed in the prescription.

SMZ layer review: The SMZ data layer includes Special Management Zones around all streams and wetlands, as well as vernal pools, spring seeps and recreation areas that staff have mapped and digitized. If any of these features are mapped incorrectly or are missing from current data layers, staff can correct their locations by editing their office layers.

Retention data: Include numbers of existing snags, cavity trees, Coarse Woody Material, Fine Woody Material, and legacy trees. Ocular estimates are acceptable.

Soil types and drainage: Specifically named soil types are useful, but not necessarily required. "Flat, sandy, well-drained hilltop" or "Steep, gravelly, moderately well-drained mid-slope" may be just as useful as "Hershiser-Koufax Sandy Silt Loam" in describing the soil conditions as they relate to management decisions. The important point is to note those characteristics that may limit equipment operation or establishment of regeneration. Soil type data is available for some counties on the Data Selector.

Interfering vegetation: Indicate the existing amount of interfering vegetation such as beech, striped maple, fern, etc. This may be quantified using mil-acre plots or by ocular estimate.

Technical guidance used: This may include stocking guides, articles found in technical journals, textbooks or other silviculture-related publications. Other sources of guidance may be acceptable as well.

Treatment purpose: As used here, "treatment purpose" and "management objective" (see below) are two different things. Also, "treatment purpose" is not what is to be done (i.e., "reduce basal area by 25%" or "remove every third row"), but rather is an explanation of why it is being done (i.e., "stimulate regeneration and increase growth of residual stand" or "regenerate current stand and convert to young forest").

Management objective: As used here, the term "management objective" is somewhat general. At a minimum, the prescription should indicate the desired future age structure and stand type. An entry as general as "Even aged hardwood" is acceptable, but regional staff may be more specific if they so choose. The management objective for a stand may be specified in the Habitat Management Plan (HMP) for the Wildlife Management Area in question. If the existing HMP does not specify the management objective regional staff should choose the management objective when the prescription is written.

Clearcut acreage and configuration: If the harvest involves one single clearcut, indicate the total contiguous area, in acres. If the harvest comprises more than one clearcut, indicate the total combined area of clearcuts, as well as the area of the largest clearcut.

Natural Heritage/MHDB considerations: Indicate what measures will be taken to protect those elements or features that were found in the review of the Natural Heritage Element Occurrence and Special Management Zone (not applicable yet) layers.

Retention considerations: Indicate whether or not existing levels meet the standards set forth in the Division's policy on Retention on State Forests, or whether they are expected to do so as a result of the proposed treatment. Also indicate if or how the treatment was adjusted in order to improve compliance with the policy standards.

Treatment description: The intended treatment should be clearly described. The amount of information necessary to accomplish this will vary greatly. For instance, in a row thinning of a pole timber sized plantation that had no SMZs or other special features, it may be sufficient to simply indicate "Remove two out of every six rows, taking two adjacent rows and leaving four rows between successive pairs being removed." An intermediate thinning in a sawtimber sized hardwood stand with a recreational trail, two streams and a known occurrence of an endangered plant community would require significantly more detail. One rule of thumb that could be used is to describe the treatment so that a qualified forestry professional could use it to assist in marking the harvest.

Additionally, since we are focused on creating young forests you should also address the presence/absence of advanced regeneration. If you are planning on clearcutting without advanced regeneration, address how you are going to mitigate that. For example, "This aspen stand will be clearcut and it is anticipated that future regeneration will be established through aspen root sprouting". Or, "This stand will be clearcut and replanted with Norway spruce to establish conifer cover."

Furthermore, if you are planning on conducting a shelterwood or seed tree cut, please indicate when you are planning on returning to the stand to conduct the final harvest (overstory removal).

APPENDIX D: AMENDMENTS

Any substantive changes to the habitat management described in this plan will be amended to the plan annually or as needed. Such changes may include: land acquisition, unforeseen natural disturbance, or any other change that alters the need for or the scope, method, or timing of management.