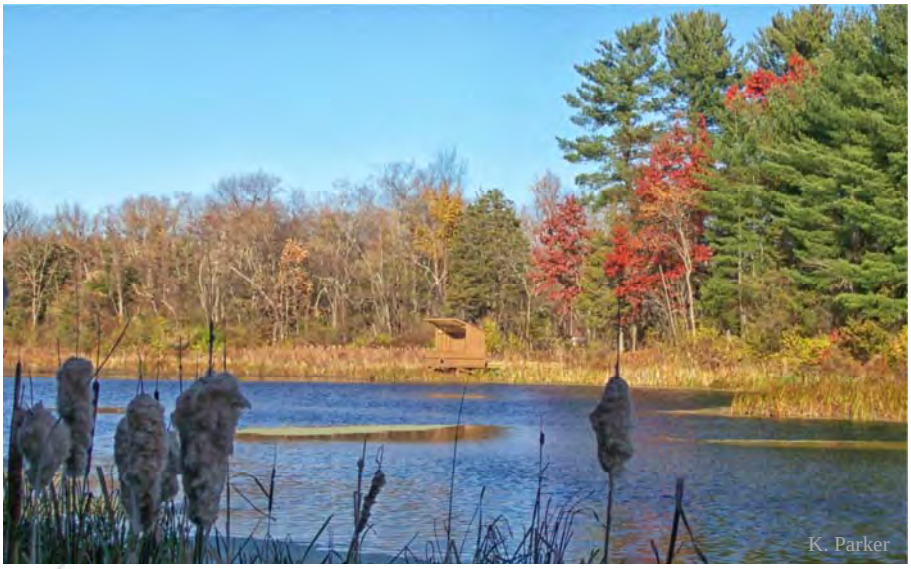
Habitat Management Plan
for
Vosburgh Swamp Wildlife Management Area
2018 – 2027



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SUMMARY

Vosburgh Swamp Wildlife Management Area (WMA) consists of 311.2 acres of forested uplands, tidal forested wetlands, tidal marsh and small areas of freshwater wetlands located along the banks of the Hudson River. A portion of Vosburgh Swamp, a partially impounded wetland, falls within the northern and eastern boundaries of the WMA. Historically Vosburgh Swamp was directly tidal, but due to the installation of a road and dam at the southern end of the wetland in the 1800s, it is now tidally influenced. The WMA was acquired from Scenic Hudson in 2012 and 2015. This WMA is located within the state-designated Columbia-Greene North Scenic Area of Statewide Significance and Middle Ground Flats Significant Coastal Fish and Wildlife Habitat. Wildlife species commonly found on the WMA include bald eagle, wild turkey, white-tailed deer, beaver, mallard and mink. This property is an important feature of the Hudson River Estuary, providing spawning and nursery habitat for striped bass, American shad, shortnose sturgeon and alewives. Waterfowl, wading birds and shorebirds use the wetlands and marshes as breeding and nesting habitat. This WMA affords multiple recreational opportunities including hunting, trapping, bird watching and is a popular and productive waterfowl hunting area. An accessible waterfowl hunting blind was constructed in 2016 to provide improved hunting access to the WMA.

Habitat management goals for Vosburgh Swamp WMA include:

- Managing approximately 7.0% of the WMA as young forest (10.5% of the total forested area) to promote wild turkey, ruffed grouse and white-tailed deer habitat;
- Maintaining approximately 60.4% as mature forest to provide habitat for forest interior species;
- Managing approximately 0.3% as shrublands;
- Maintaining approximately 12.1% as wetlands;
- Maintaining approximately 16.5% as open water; and
- Maintaining approximately 3.7% of the WMA as roads, trails and parking lots.

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 five 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

Vosburgh Swamp WMA is located in DEC Region 4, Towns of Coxsackie and Athens, Greene County (Figure 1).

TOTAL AREA

311.2 acres

HABITAT INVENTORY

A habitat inventory of the WMA was conducted in 2016 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 targeted wildlife, current conditions on the WMA, and conditions in the surrounding landscape (see Landscape Context section below).

Table 1. Summary of current and desired habitat acreage on Vosburgh Swamp WMA.

Habitat Type	Current Conditions (as of 2016)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Forest [a]	210.0	67.4%		188.0	Decrease to 60.4%
Young forest	0	0%		22.0	Increase to 7.0%
Shrubland	0.9	0.3%		0.9	No change
Grassland	0	0%		0	No change
Agricultural land	0	0%		0	No change
Wetland (natural) [b]	20.1	6.5%		20.1	No change
Wetland (impounded) [b]	17.5	5.6%		17.5	No change
Open water	51.3	16.5%		51.3	No change
Other (parking area, quarry)	1.5	0.5%		1.5	No change
Roads	9.9	3.2%		9.9	No change
Rivers and streams			0.8		No change
Total Acres:	311.2	100%		311.2	

[a] Forest acreage includes all mature and intermediate age classes of natural forest, plantations, and forested wetlands. Young forest is reported separately. Definitions are provided in the Forest section of this plan.
[b] Wetland acreage does not include forested wetlands, since they are included in the Forest category.

ECOLOGICAL RESOURCES

Wildlife Overview:

Wildlife present on Vosburgh Swamp WMA includes many species commonly found throughout Eastern New York and the Hudson River Estuary, such as:

- Wild turkey, pied-billed grebe, bald eagle, Virginia rail, ducks and Canada geese

- Beaver, mink, white-tailed deer, muskrat, otter
- Gray treefrog, Northern leopard frog, Northern two-lined salamander
- Common garter snake, Eastern milk snake, snapping turtle
- Striped bass, alewife, short-nosed sturgeon, American eel

Wildlife and Plant Species of Conservation Concern:

The following federal or state listed Endangered (E), Threatened (T), state species of Special Concern (SC), and/or Species of Greatest Conservation Need (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 WMA that are likely to occur in suitable habitat on the WMA. Other SGCN may also be present on the WMA. 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 Vosburgh Swamp WMA, 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 black duck			HP
	American kestrel			x
	American woodcock			x
	Bald eagle		T	x
	Blue-winged warbler			x
	Brown thrasher			HP
	Least bittern		T	x
	Northern harrier		T	x
	Osprey		SC	
	Prairie warbler			x
	Ruffed grouse			x
	Scarlet tanager			x
	Sharp-shinned hawk		SC	
	Short-eared owl			HP
	Wood thrush			x
Mammals	Indiana bat	E	E	HP
	Northern long-eared bat	T	T	HP
Amphibians and reptiles	Marbled salamander			x
	Northern map turtle			x
	Snapping turtle			x

[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.

Table 2. Continued

Species Group	Species	Federal Status	NY Status	NY SGCN Status
Fish	Alewife			x
	American shad			HP
	Blueback herring			x
	Shortnose sturgeon			x
Invertebrates	Russet-tipped clubtail			x
Plants	None known to occur			

Significant Ecological Communities:

There are four rare and/or significant natural communities located on Vosburgh Swamp WMA 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 WMA; the community descriptions are from *Ecological Communities of New York State, Second Edition* [5] (Figure 2):

- **Tidal river (S3):** the aquatic community of continuously flooded substrates that support no emergent vegetation. Within the river there are two zones; the deepwater zone includes areas where substrates are usually over 2 m (6 ft) deep at low tide, the shallow zone includes submerged areas less than 2 m (6 ft) deep at low tide that lack rooted aquatic vegetation. In the river there is a vertical salinity gradient through most of the year, with a surface layer of fresh water (salinity less than 0.5 ppt) floating over a deeper layer of brackish water (salinity between 0.5 and 18.0 ppt). Salinities at any one place in the river may fluctuate as the tides flow in and out because the "salt wedge" of brackish water alternately rises and falls with the tides. The wedge also fluctuates seasonally and with precipitation runoff.
- **Freshwater intertidal mudflats (S2):** a sparsely vegetated, to non-vegetated, community characterized by low rosette-leaved aquatics. This community occurs on exposed intertidal mudflats, or muddy sand, where the water is fresh (salinity less than 0.5 ppt). This community is best developed where mudflats are nearly level so that broad expanses are exposed at low tide. The plants are completely submerged in 0.9 to 1.2 m (3 to 4 ft) of water at high tide; and they are usually coated with mud.
- **Freshwater tidal swamp (S1):** a forested or shrub-dominated tidal wetland that occurs in lowlands along large river systems characterized by gentle slope gradients coupled with tidal influence over considerable distances. The swamp substrate is always wet and is subject to semidiurnal flooding by fresh tidal water (salinity less than 0.5 ppt).
- **Freshwater tidal marsh (S2):** a marsh community that occurs in shallow bays, shoals, and at the mouth of tributaries of large tidal river systems, where the water is usually fresh (salinity less than 0.5 ppt), and less than 2 m (6 ft) deep at high tide. The vegetation

[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 http://www.dec.ny.gov/animals/97703.html.

is dominated by aquatics that are emergent at high tide. Typically, there are two zones in a freshwater tidal marsh: a low-elevation area dominated by short, broad-leaf emergent plants bordering mudflats or open water, and a slightly higher-elevation area dominated by tall graminoids.

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 Vosburgh Swamp WMA include:

- One wetland regulated by Article 24 of the Environmental Conservation Law and several additional wetlands shown on the National Wetlands Inventory (Figure 3). Each 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.
- Two streams (a watercourse entirely within the WMA) or segments of streams (a stream that meanders in and out of the WMA). The Hudson River runs along the eastern border of the WMA. Streams designated as class C(T) or higher are regulated by Article 15 of the Environmental Conservation Law. Both streams located on this property are classified as Class A. Water quality standards will be adhered to on all streams.
- A number of vernal pools exist on the WMA. Management activities will follow SMZ guidelines established on WMAs.

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*.[6] 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:

Soil types across Vosburgh Swamp WMA vary greatly as does the topography. The rolling hills on the southeastern peninsula of the property are composed of very rocky, Nassau channery silt loams which have rock outcroppings and are somewhat excessively drained. The perimeter of the peninsula is composed of Medistaprists and Hydraquaents, better known as tidal marsh. The northern portion of the property is generally less well drained and soils vary from moderately well drained Hudson & Vergennes clay silt loams to poorly drained Covington/Madalin soils. There are two areas on the WMA where the soils have been significantly altered by human activity. The northern portion has the remains of an old railroad bed and the middle of the property has some small areas where the soil has been removed to access glacial deposits of gravel, and are now gravel pits.

[6] Available online at http://www.dec.ny.gov/outdoor/104218.html.

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 Vosburgh Swamp WMA (Figures 4 and 5). The landscape within a three-mile radius of the WMA is primarily privately-owned land including:

- Forest (35% combining deciduous, evergreen and mixed forests)
- Pasture/hay (22%)
- Development (16%)
- Open water (10%)
- Wetlands (8% combining woody and emergent herbaceous wetlands)
- Cultivated crops (7%)
- Shrub/scrub (2%)

Over a third of the landscape surrounding Vosburgh Swamp WMA consists of forested habitats. These forested habitats are fragmented and surrounded by farmland and developed land. Any young forest habitat created within these habitats is usually allowed to secede to mature forest. Timber management on WMAs occur to create and maintain a young forest component within the landscape to provide quality wildlife habitat. Due to the absence of young forest habitat on this WMA and the limited amount in the surrounding landscape, it is the goal of this plan to create young forest habitat in perpetuity on Vosburgh Swamp WMA. This increase in habitat diversity benefits many different species of wildlife and ensures a healthy forest in the future.

Nearby conservation lands include:

- Stockport WMA (354 acres)
- Stockport Flats site of the Hudson River National Estuarine Research Reserve (1,543 acres)[7]
- Hudson River Islands State Park (59 acres)
- Middle Ground Flats Unique Area (372 acres)
- Four Mile Point Preserve by Scenic Hudson (7 acres)
- Several town/state owned boat launches

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

DEC will continue active management of wildlife habitat on Vosburgh Swamp WMA 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.

[7] Additional information about the Stockport Flats site of the Hudson River National Estuarine Research Reserve is available online at http://www.dec.ny.gov/lands/92355.html.

- 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 Vosburgh Swamp WMA 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.[8] The Initiative's goal is to increase forest management so that a minimum of 10% of the WMA's forested acreage is classified as young forest habitat. The goal at Vosburgh Swamp WMA is to create approximately 22 acres of young forest habitat, 10.5% of the forested acreage.

MANAGEMENT OBJECTIVES

- Retain the majority of the existing forest (188.0 acres) for forest interior species.
- Increase young forest from 0 to 22 acres (10.5% of the total forested area) to improve habitat for young forest-dependent wildlife, targeting wild turkey, ruffed grouse and white-tailed deer.
- Encourage dispersal of native hardwoods (oak and hickory) to promote regeneration and increase availability of hard mast for wildlife.
- Monitor the impact invasive vegetation has within the forested habitats and control invasives if deemed necessary.

[8] 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.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

There are 210 forested acres on Vosburgh Swamp WMA. These forested acres are mainly located where soils are sufficiently drained enough to support tree growth, mainly the upland sections of the WMA surrounding the wetland habitat (Table 3; Figure 6). The forests consist mainly of transitional hardwoods and cedar. A section of forested wetland does occur in the southern portion of the WMA, where it is influenced by tidal inflows from the Hudson River. Table 3 provides a summary of the forested areas, including the most common species found in the WMA's forests.

Table 3. Summary of the acreage and dominant overstory species for each forest type present on Vosburgh Swamp WMA.

Forest Type	Acres (as of 2016)	Desired Acres	Overstory species
Natural forest (mature/intermediate)	196.3	174.3	red oak, red cedar, white pine
Plantation	0	0	
Forested wetland	13.7	13.7	white ash, silver maple, red oak
Young forest	0	22	
Young forest (forested wetland)	0	0	
Total Forested Acres:	210.0	210.0	

Target species for young forest include wild turkey, ruffed grouse, and white-tailed deer. These species rely on forest and young forest areas for nesting, foraging, and cover and will benefit from management that creates the following habitat requirements:

- Wild turkey:
  - Strutting areas – Open fields with short vegetation, <12 inches preferred, and mature hardwoods.
  - Nesting cover – Blowdowns and the bases of trees and stumps in open hardwoods and brushy cover in early successional habitats and field edges.
  - Brood rearing – Best brooding cover are fields with herbaceous vegetation from 12 to 18 inches preferred.

Wild turkey is a target species at Vosburgh Swamp WMA.

Photo: National Wild Turkey Federation

  - Foraging – The habitat required ranges from open field areas to mature forests:
    - Spring diet – Tubers and invertebrates.
    - Summer diet – Poult diets consist primarily of invertebrates. Adult diets consist of invertebrates and tubers, switching over to herbaceous vegetation and soft mast as summer progresses.

        - Fall diet – Hard and soft mast, seeds, and invertebrates.
        - Winter diet – Hard and soft mast, seeds (birch if available) and hardwood buds.
    - Winter cover – Mature conifer stands.
    - Roosting – Mature hardwoods and softwoods. Adults with poults tend to roost on the ground under large trees with a dense understory of young trees, shrubs, downed trees, rock outcrops, or brushy fields. [9, 10]
- Ruffed grouse:
    - Drumming areas – Downed trees surrounded by small diameter woody cover.
    - Foraging areas – Open areas with dense overhead cover of young forest with good mast production.
    - Nesting – Young, open forest stands or second growth woodlands.
    - Brood rearing – Herbaceous ground cover with a high midstory stem density.[11, 12]
- White-tailed deer (in Northern Hardwood Forests):
    - Fawning areas – Vary from open forest to hay fields to brushy cover.
    - Spring/summer diet – Primarily herbaceous vegetation (clover, *Rubus* sp., forbs, etc.), hardwood foliage, soft mast, and agricultural crops where available.
    - Fall diet – Hard mast, preferably acorns, hardwood foliage, and agricultural crops where available.
    - Winter diet – Hardwood buds, fallen leaves, hard mast and conifers, preferably white cedar.
    - Bedding cover – Varies from open hardwoods with laydowns to dense thickets of early succession shrublands or hard and softwood regeneration.[13]

MANAGEMENT HISTORY

Vosburgh Swamp WMA was acquired from Scenic Hudson in two parcels, one in 2012 and the remainder in 2015. Little is known about the history of forest management on the property. There has been no forest management activity on the property since it was acquired by DEC.

Portions of this WMA were likely utilized for farmland in the past. There is evidence of open fields and fruit orchards within the last century. These open areas have since regenerated into forested habitat, with hardwoods and conifers shading out the orchards. This property is at the site of a former icehouse that shipped ice down the Hudson River. This fact may allow some insight into past forest management. Forest products were likely harvested “as needed” to support industry. For example, if the icehouse needed pilings for their dock they might utilize black locust from the property. The railroad grade on the property also probably supported the ice trade.

[9] USDA – NRCS. 1999. Wild Turkey (*Meleagris gallopavo*) Fish and Wildlife Habitat Management Leaflet. 12 pp.
[10] Dickson, J. G. 1992. The Wild Turkey: Biology and Management. National Wild Turkey Federation and USDA Forest Service. Stackpole Books, PA. 480 pp.
[11] Dessecker, D. R., G. W. Norman, and S. J. Williamson. 2006. Ruffed Grouse Conservation Plan. Association of Fish & Wildlife Agencies: Resident Game Bird Working Group. 94 pp.
[12] Jones, B. C. et al. Habitat Management for Pennsylvania Ruffed Grouse, Pennsylvania Game Commission. 10 pp.
[13] Halls, L. K., ed. 1984. White-tailed Deer: Ecology and Management. The Wildlife Management Institute. Stackpole Books, PA. 864 pp.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

The following management is proposed in order to reach the young forest acreage goal of 22 acres within ten years:

- **Management planned for 2018-2022:**
  - No management planned
- **Management planned for 2023-2027** (Table 4, Figure 6):
  - Perform a seed tree cut in Stands B-9, B-10 and B-16 (22 acres)

Table 4. Forest management schedule for the second five-year period of this HMP (2023-2027).

Compartment -Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
B-9	14	Small saw timber 12”-17” DBH	Natural Forest-Transition Hardwoods	Young forest	Wildlife	Seed Tree
B-10	7	Small saw timber 12”-17” DBH	Natural Forest-White pine-Natural	Young forest	Wildlife	Seed Tree
B-16	1	Pole Timber 6”-11” DBH	Natural Forest-Cedar	Young forest	Wildlife	Seed Tree

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 B-9:** Stand B-9 is a transitional hardwoods stand. A portion of the stand (14 acres) will be harvested using a seed tree method. Oak, cherry, maple and pine will be retained within the stand for the purpose of providing wildlife habitat as well as a mast and seed source. Increasing the young forest habitat as proposed will establish more habitat for wild turkey, ruffed grouse and white-tailed deer. The invasive species within the stand, including buckthorn and oriental bittersweet, will be removed if deemed necessary. Pre- or post-treatment herbicide applications may be necessary to assist in the establishment of desired species.
- **Stand B-10:** Stand B-10 is a white pine stand. A portion of the stand (7 acres) will be harvested using a seed tree method and allowed to regenerate naturally to provide nesting areas, cover and a food source for the targeted species.
- **Stand B-16:** Stand B-16 is a cedar stand. A portion of this stand (1 acre) will be harvested using a seed tree method, favoring cedar as residuals to provide mast for wildlife and seed for natural regeneration.

Natural regeneration of the stands will be allowed to occur to create quality habitat for wild turkey, ruffed grouse and white-tailed deer. Best Management Practices will be incorporated into the young forest acreage created. Forest management prescriptions on this WMA will focus on promoting regeneration will a high stem count per acre (i.e., stump sprouting of native hardwoods).

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 5).

Table 5. Best Management Practices for forest management on WMAs.

Resource	**Guidance Document** [14]
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*

Wildlife Considerations:

Treatments will be chosen to minimize impact to bald eagles and other nesting raptors that might utilize the WMA. Considerations will be taken to avoid negative impacts on Indiana and Northern long-eared bats. Seasonal restrictions will be implemented on any timber harvests occurring within the WMA to ensure bats are protected during the breeding season. Raptor call back surveys will be conducted during the nesting season to identify nesting trees and 100 foot buffers will be designated around any identified nests.

Forest Health Considerations:

Soil quality is not expected to inhibit the ability of trees to regenerate in most areas within the WMA. Where soils are poorly drained in low lying areas, regeneration may be slower than well-drained sites.

This WMA contains mainly natural forest stands with invasive ingrowth. This ingrowth is well established in many areas and may need to be addressed with each forest treatment. Observed vegetation includes: honeysuckle, Japanese barberry, buckthorn, tree-of-heaven, privet and Japanese knotweed, along with other plant species. These species can inhibit or outcompete desirable native species. Management options may include mechanical or chemical treatment and likely a combination of both.

Emerald Ash Borer (EAB) is present on the property due to its location in Greene County and its proximity to the Hudson River and many major highways. These invasive pests can have a detrimental effect on the health of forest stands. Removal of dead or dying ash may occur within the WMA if deemed a safety risk.

Pre- and Post-treatment Considerations:

If soil conditions limit regeneration following treatment, planting of desirable species may supplement natural regeneration.

Invasive and undesirable species may outcompete desirable regeneration. In stands where such understory plants occur, herbicide or mechanical control may be utilized pre- and/or post-harvest.

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

White-tailed deer herbivory may pose a threat to forest regeneration in certain areas of the WMA. If this is determined to be a major threat to desirable forest regeneration, deer exclosures may be erected around harvested areas.

The possibility exists that desirable forest regeneration may not occur after treatment. If this is determined to be the case, the stand(s) may be re-treated to attempt to improve the quality or quantity of desired regeneration. This may include removal of undesirable regeneration using mechanical or chemical methods to restart the regeneration process, and may include planting of desirable tree or shrub species. Pre- and post-harvest actions will be specifically addressed in detail in silvicultural prescriptions.

MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife responses have been achieved by the management outlined above, pre- and post-management assessments will be conducted in accord with guidelines in the *Young Forest Initiative Monitoring Plan: 2016-2025*.[15] The Monitoring Plan establishes 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. A deer exclosure will be installed and regeneration within the exclosure will be monitored annually. YFI wildlife target species selected for Vosburgh Swamp WMA, which may be assessed to determine response to management, include:

- Wild turkey
- Ruffed grouse
- White-tailed deer

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. Shrublands are typically characterized by >50% cover of shrubs and <25% canopy cover of trees.

MANAGEMENT OBJECTIVES

- Maintain current acreage of shrubland habitat for wildlife.
- Monitor and control invasives when feasible.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

There are 0.9 acres of shrubland on Vosburgh Swamp WMA (Figures 6). This shrubland is located at the entrance to the original private property that was not maintained and naturally succeeded to a shrub-dominated community. This stand varies from sparse shrubs and grasses to extensive and dense shrub thickets with clumps of trees. This form of early successional habitat provides habitat for many different species of wildlife throughout the year, such as:

[15] Available online at http://www.dec.ny.gov/outdoor/104218.html.

- Wild turkey
- Northern cardinal
- Eastern cottontail
- White-tailed deer

MANAGEMENT HISTORY

No management of the shrubland has occurred since DEC purchased the property.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2018-2027** (Table 6, Figure 6):
    - Maintain 0.9 acres of shrubland habitat.
        - Brush cutting using a forestry mower will be utilized to maintain desired shrubland habitat.
        - Monitor and control invasive plants as needed.

BEST MANAGEMENT PRACTICES

In order to minimize disturbance to shrubland wildlife species, brush-cutting, if possible, should be done outside the bird nesting and brood rearing part of the year (April 15 to August 15). However, management may occur within this timeframe if the intent of management is to provide long term benefits to the habitat/wildlife (such as invasive species management).

MANAGEMENT EVALUATION

Visual evaluations of the shrublands will be conducted annually to assess needed management actions.

GRASSLAND

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.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

There is no acreage on Vosburgh Swamp WMA managed as grassland and no plan to develop such habitat.

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.

DESCRIPTION OF EXISTING AGRICULTURAL LANDS AND TARGET SPECIES

There is no acreage on Vosburgh Swamp WMA that is currently managed as agricultural land. Review of historic aerial photographs indicates that much of the land around Vosburgh Swamp was planted to orchards, presumably apple trees, as recently as the 1950s. Some of those trees

still exist on the property, though woods have grown up around them. Efforts will be made to release healthy apple trees, as they provide important food for wildlife. This will be accomplished by removing competing trees that shade and overtop the apple trees.

As time and opportunity present, small food plots for wildlife may be established in clearings or forest openings. These generally will not exceed 0.5 acre in size and will not number more than 5 on the property.

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

- Maintain 37.6 acres of existing wetlands to provide quality habitat for wildlife.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

A single state wetland, HN-109, is mapped on the WMA and is approximately 91 acres (Figure 6).[16] This wetland consists of Hudson River floodplains, Hudson River submerged aquatic vegetation, freshwater tidal marsh, and Vosburgh Swamp itself. Several federal wetlands exist on the WMA and consist of low-lying wet areas disconnected from the state wetland. Portions of these wetlands are being invaded by non-native Phragmites.

The wetlands provide habitat for species such as:

- American woodcock, pied-billed grebe, least bittern
- Muskrat, beaver, river otter
- Migratory waterfowl
- Snapping turtle, painted turtle
- Spring peeper, Northern leopard frog, spotted salamander

MANAGEMENT HISTORY

Wetland management has focused on control of invasive plants. Work to control water chestnut, a non-native invasive plant found in Vosburgh Swamp, began in 2014. After two years of hand-pulling, in 2016 and 2017 the southern portion of Vosburgh Swamp was treated to control this plant. Hand-pulling continued in the north end, and in the Hudson River tidal wetlands below the dam at the south end of Vosburgh Swamp. In 2016, stands of Phragmites within several of

[16] Wetland acreage within this HMP may not reflect the same acreage as the state regulated wetland. Due to habitat type definitions, land falling within the state regulated wetland boundary has been further defined as wetland, forested wetland, open water and forest.

the federal wetlands were cut and treated with herbicide. In 2016 and 2017, Galerucella beetles were released in Vosburgh Swamp to control the non-native plant purple loosestrife.

Implementation Plan and Anticipated Schedule

- **Management planned for 2018-2027** (Table 6, Figure 6):
    - Control Phragmites both mechanically and chemically, when weather conditions allow.
    - Control purple loosestrife by use of biological agents.
    - Control water chestnut by use of hand-pulling and chemical treatment in Vosburgh Swamp. As control is achieved, reduce and then eliminate the usage of herbicide treatment.

Best Management Practices

Timing of the management activities will be limited to ensure impacts to the habitat and wildlife are kept to a minimum. Projects will take into account seasonal weather conditions, along with the breeding and nesting period of wildlife species found on the WMA. Herbicide applications will comply with all applicable state laws, rules and regulations.

Management Evaluation

Periodic surveys for amphibians in the wetlands may occur as opportunity arises. Water chestnut, purple loosestrife, and Phragmites stands will continue to be monitored and identified for control.

Open Water (Waterbodies and Watercourses)

Open water is defined as any area of open water, generally with less than 25% cover of vegetation or soil and typically named (e.g., Hudson River).

Management Objectives

- Maintain the existing 51.3 acres of open water to provide habitat for breeding, nesting and wintering bird species.
- Monitor for invasive species and control where feasible.

Description of Existing Open Water and Target Species

There are 51.3 acres of open water on Vosburgh Swamp WMA consisting of natural ponds, streams and the Hudson River (Figure 6). These areas provide aquatic habitat for many species of amphibians, reptiles and waterfowl.

There are two streams or segments of streams (approximately 0.8 miles) that occur on the WMA. The Hudson River runs along the eastern boundary of the WMA and is classified as a Class A (drinking water) stream. The headwater of a small un-named tributary of the Hudson is located along the southern boundary of the WMA and is also classified as Class A.

Species that benefit from open water habitat include:

- Striped bass
- Pied-billed grebe
- Northern leopard frog
- Snapping turtle

MANAGEMENT HISTORY

Open water habitat has not been managed on Vosburgh Swamp WMA, except to hand-pull water chestnut plants to prevent establishment in shallow embayments and tidal marshes within the WMA.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

Management to control non-native invasive species will continue. No other management of open water areas is planned in the next 10 years.

BEST MANAGEMENT PRACTICES

To the degree possible, control of non-native plants will be achieved through use of hand control or biological agents. Some species, such as Phragmites and water chestnut, will likely necessitate chemical control to eliminate the problem in an efficient manner. Herbicides will be applied by licensed pesticide applicators following all label directions. Any necessary permits will be obtained prior to implementation of chemical control.

MANAGEMENT EVALUATION

Open water areas will be assessed annually for the presence of non-native invasive plant species.

HABITAT MANAGEMENT SUMMARY

In summary, Table 6 lists the habitat management actions planned for Vosburgh Swamp WMA over the next ten years. Any substantive changes will be appended to this HMP annually or as needed (Appendix D).

Table 6. Summary of habitat management actions recommended for Vosburgh Swamp WMA, 2018-2027. (Also see Figure 6.)

Habitat	Management Action	Acres	Timeframe
Forest	Perform a seed tree cut in Stands B-9, B-10 and B-16.	22	2023-2027
Shrubland	Continue mowing shrubland (Stand B-11) every 3-7 years to maintain shrub density.	≤0.9	2018-2027
Wetland	Monitor and control phragmites, purple loosestrife and water chestnut within wetlands as needed.	≤37.6	2018-2027
Open Water	Monitor and control invasive species as needed.	≤51.3	2018-2027

III. FIGURES

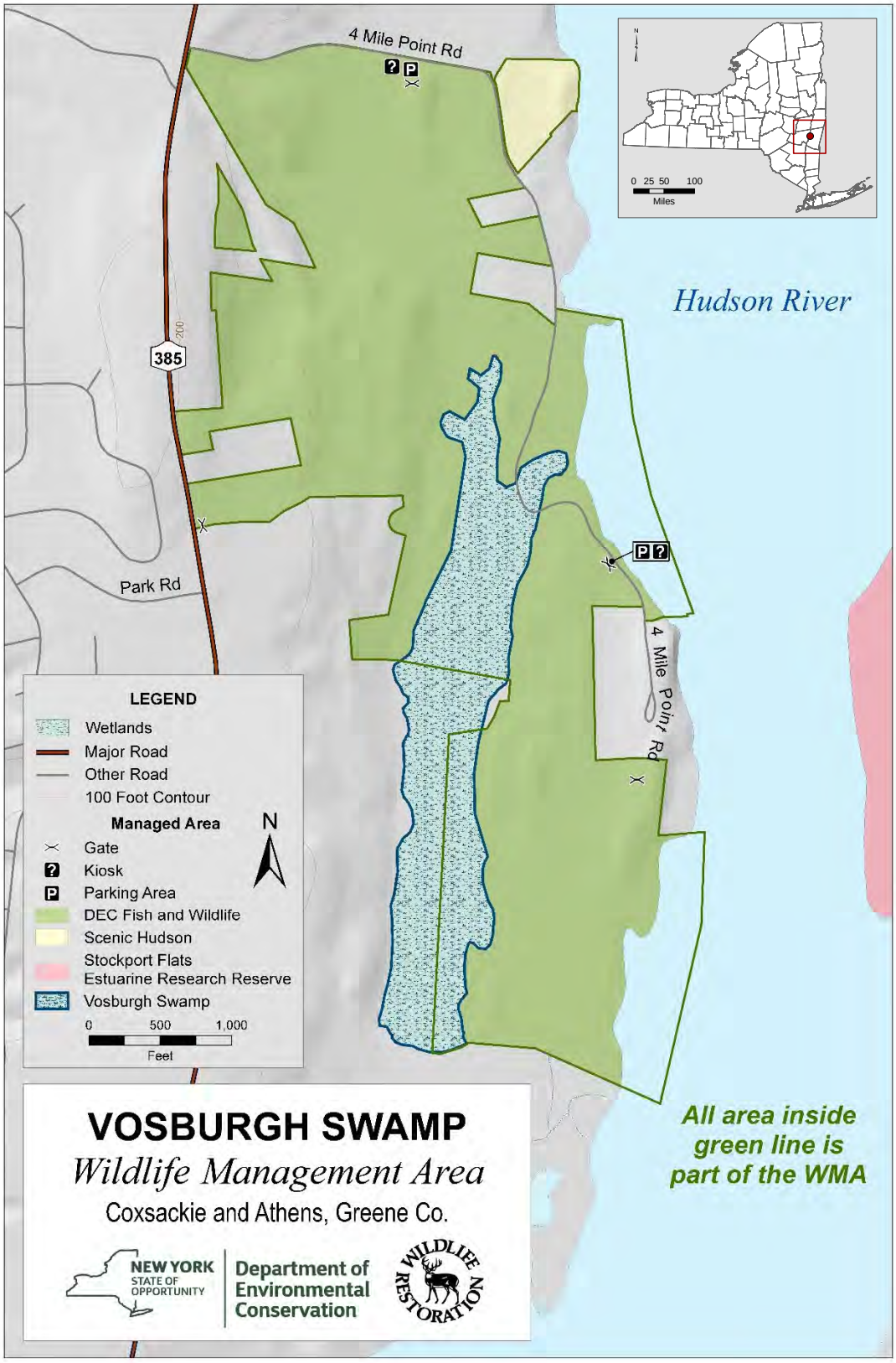

FIGURE 1. Location and access features at Vosburgh Swamp WMA.

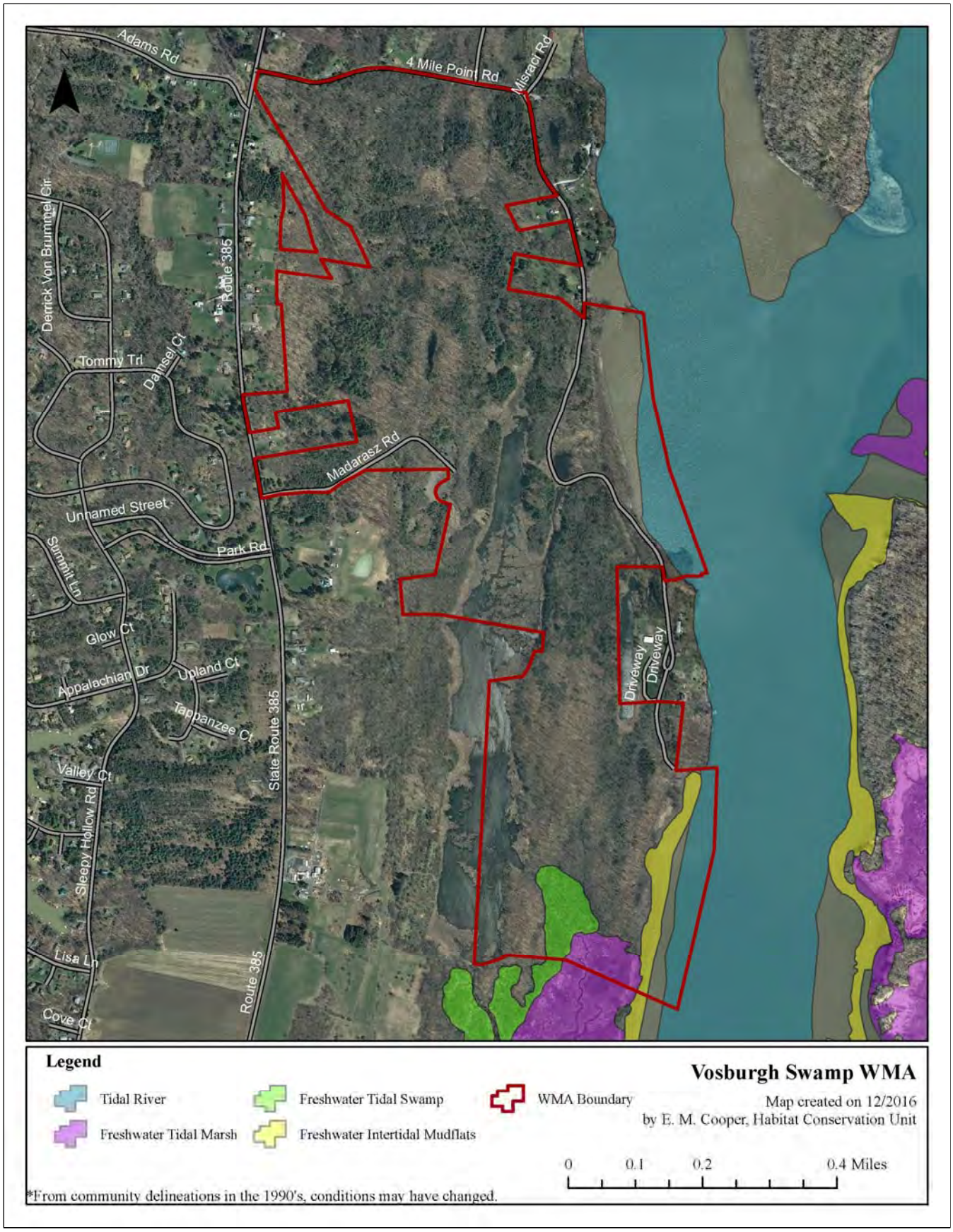

FIGURE 2. Significant ecological communities on Vosburgh Swamp WMA. Data from the NY Natural Heritage Program.

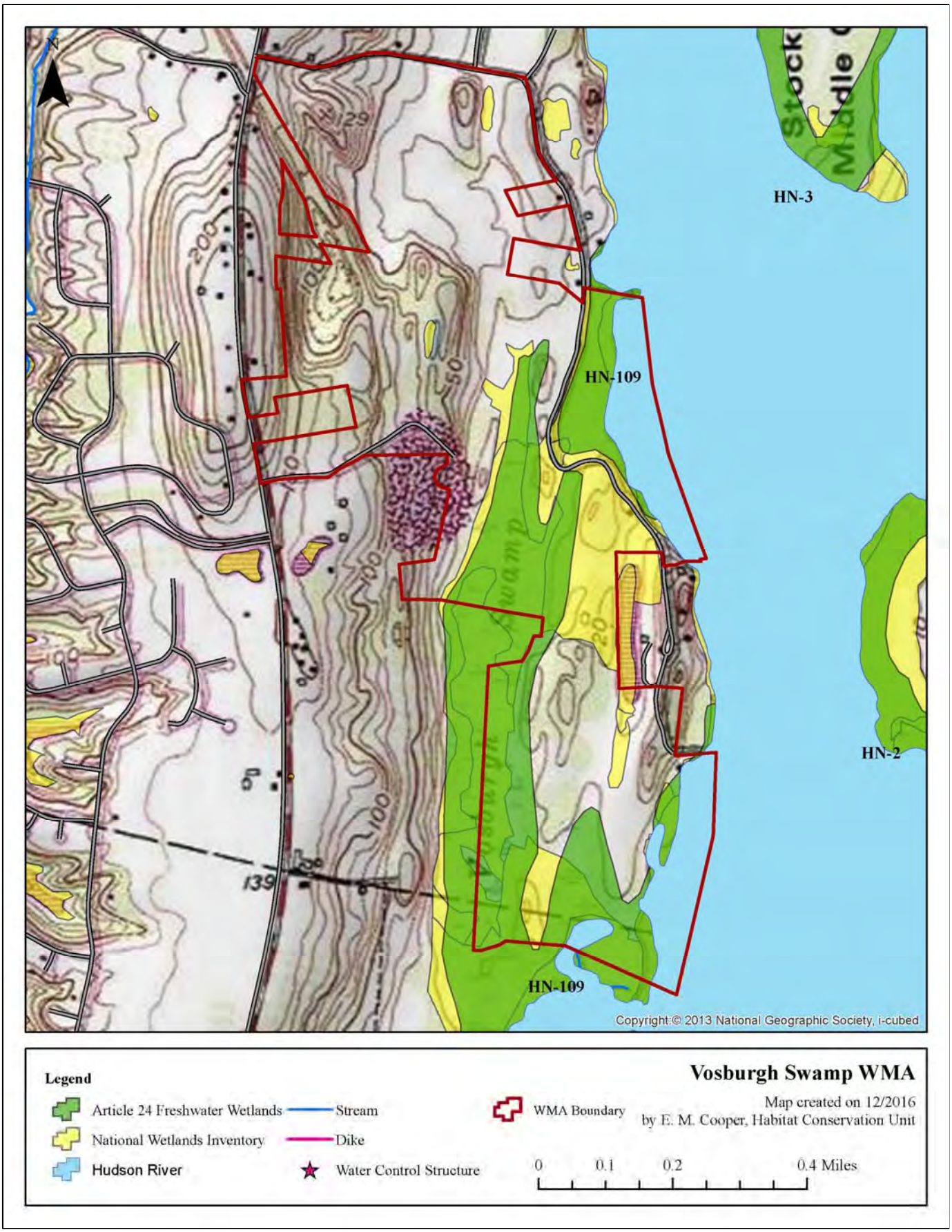

FIGURE 3. Wetlands, open water, and streams of Vosburgh Swamp WMA. Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

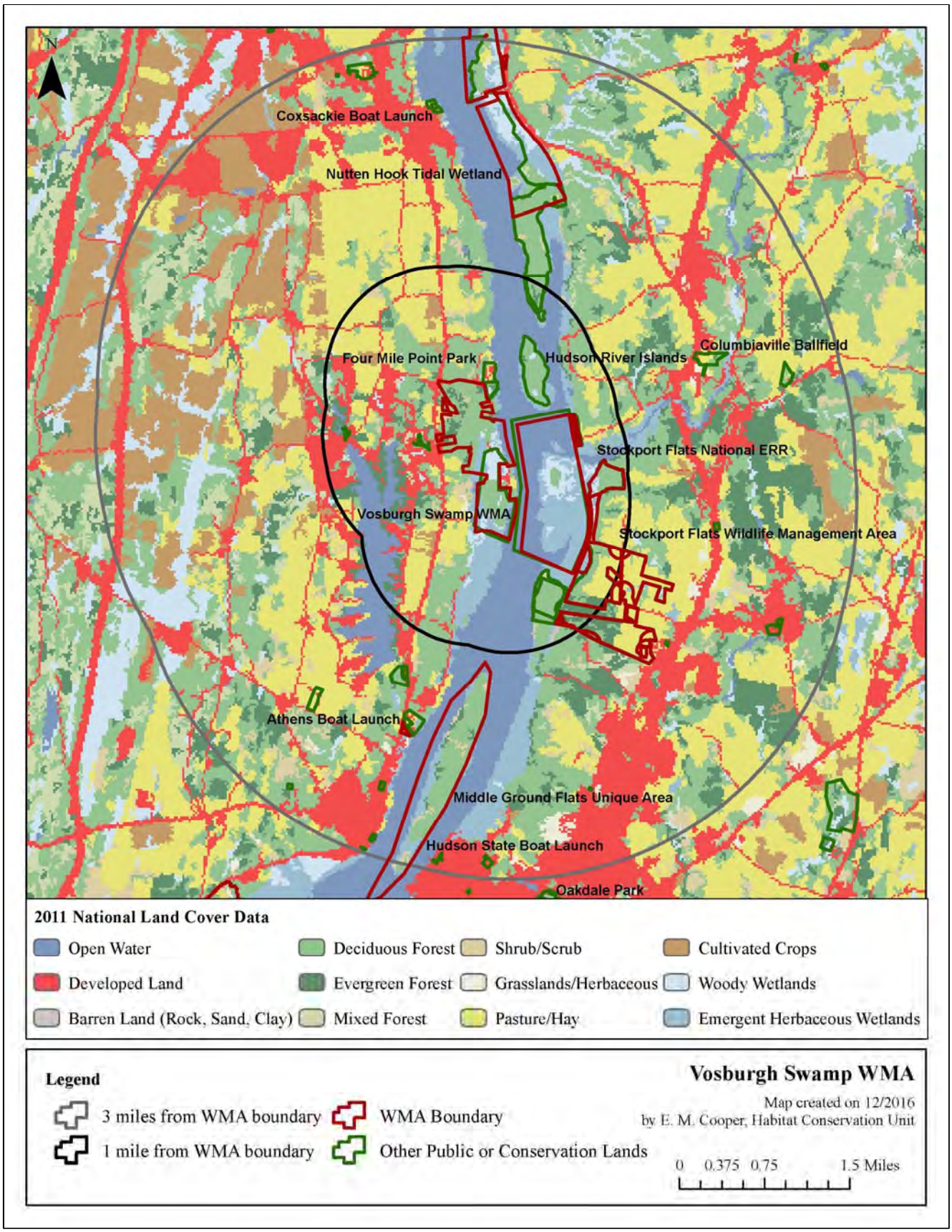

FIGURE 4. Land cover types and conservation lands in the landscape surrounding Vosburgh Swamp WMA. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at http://www.mrlc.gov/nlcd2011.php.

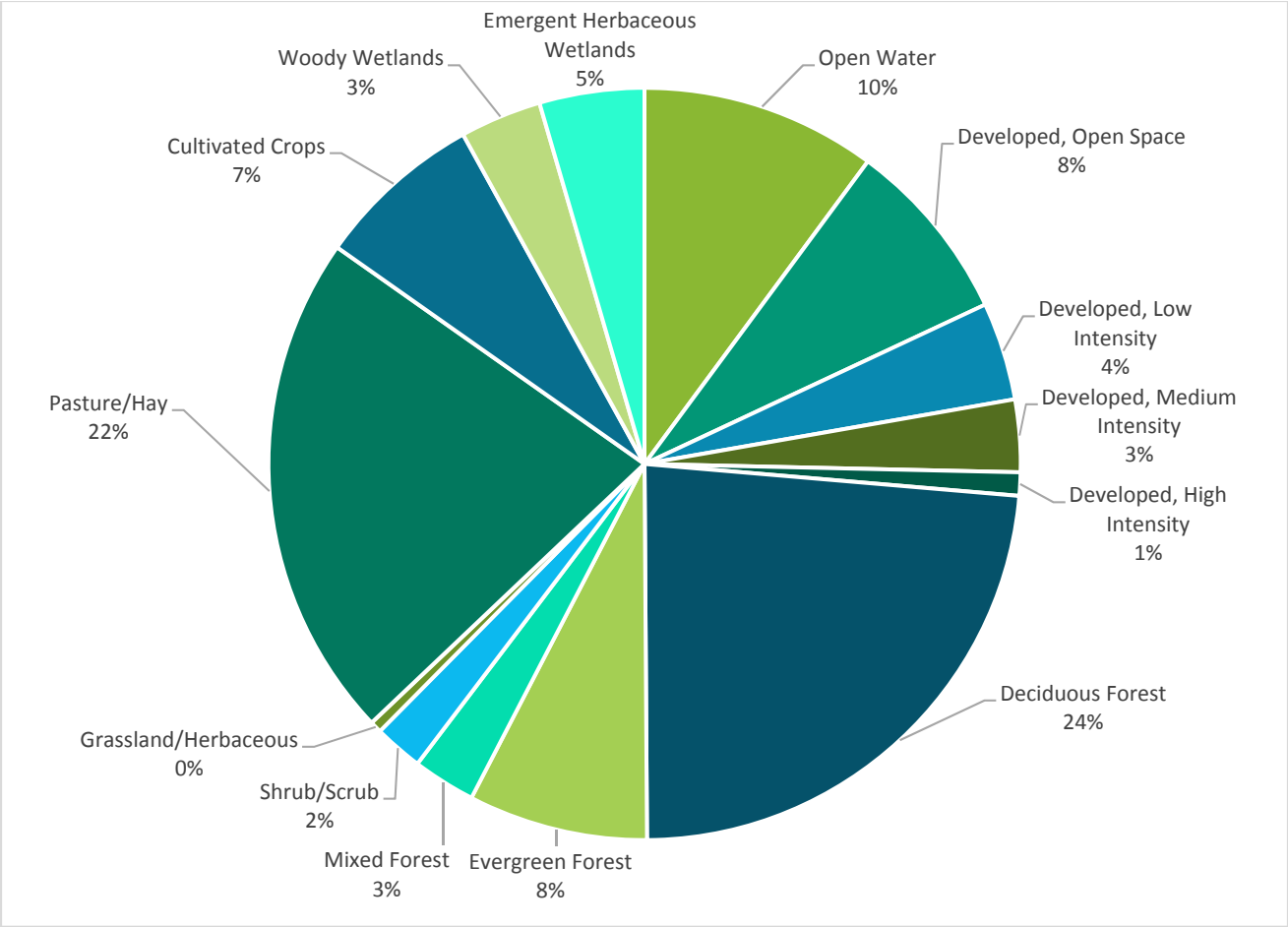

FIGURE 5. Percent cover of land cover types within three miles of Vosburgh Swamp WMA.

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 http://www.mrlc.gov/nlcd2011.php.

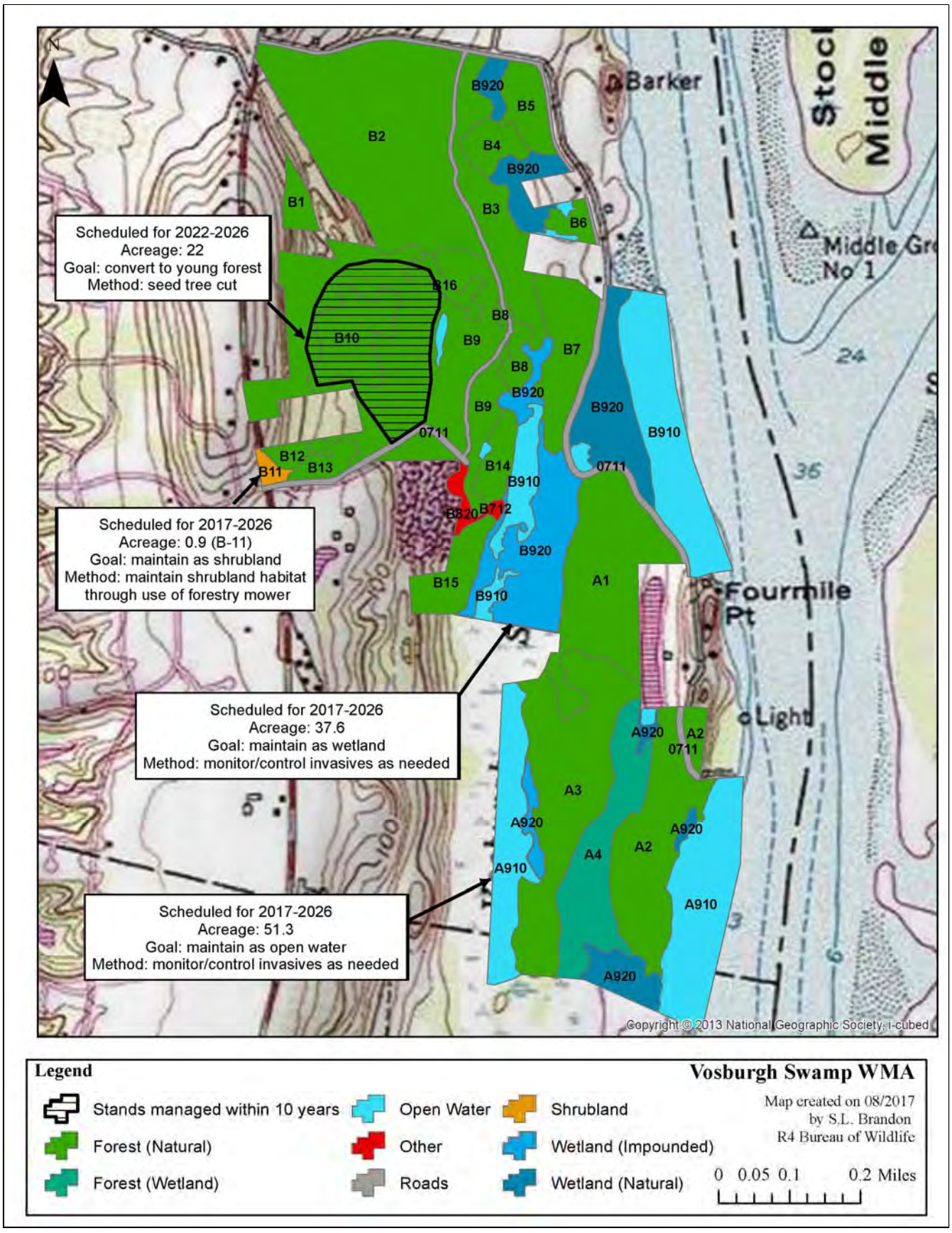

FIGURE 6. Habitat types and locations of proposed management on Vosburgh Swamp WMA. Numbers indicate the stand number from habitat inventory.

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. For example, young forest target species at Vosburgh Swamp WMA include wild turkey, ruffed grouse, and white-tailed deer.

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).[17] 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).[18]

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.

[17] Available online at http://www.dec.ny.gov/regulations/28693.html.
[18] 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.