# Habitat Management Plan
# for
# Pharsalia Wildlife Management Area
# 2016 – 2025

Division of Fish and Wildlife
Bureau of Wildlife

1285 Fisher Ave
Cortland, NY 13045

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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## TABLE OF CONTENTS



## LIST OF FIGURES

# SUMMARY

In 1928, Pharsalia Wildlife Management Area (WMA) became the first State Game Refuge Area in New York State purchased with Conservation Fund monies. At that time, the property was only about 2,015 acres in size, increasing to 4,550 in 1937 when the first management plan was written and standing at 4,689 acres today.[1] At the time of acquisition, the property was only 1/3 forested and the remaining acreage was abandoned farmland. Extensive reforestation projects following its purchase transformed the WMA's old farmlands back into forests, mainly softwoods. Commercial forest thinning projects began in 1961 and marked the first commercial harvest. For 20 years the WMA was home to National Ruffed Grouse dog trials and was long known as an excellent grouse hunting location. Routine harvest, thinnings, and habitat clear-cuts have occurred since then, but the overall forested area of the WMA has continued to expand and mature.

This WMA has been identified as a Bird Conservation Area (BCA) and it has also been included in the Pharsalia Woods Important Bird Area.[2] These designations are attributed to the elevation at which this WMA is located and its subsequent forest composition and connectivity with neighboring forest blocks. Further discussion of the BCA and how it affects management decisions can be found in 'Wildlife Considerations' under the 'Forest' section of 'Management Strategies by Habitat Type.'

Habitat management goals for Pharsalia WMA include:

- Manage 23% of the total forested area (21% of the WMA) as young forest habitat.
- Increase shrubland habitat to 2% to provide habitat for shrubland obligate species.
- Maintain grassland habitat at 2% of the total WMA acreage.
- Decrease the WMA's forested acreage to 68% to provide habitat diversity.
- Maintain the remaining 7% of the WMA in its various habitats as they are now.
- Improve the existing shrub and grassland areas for food and cover for forest wildlife.
- Provide habitat for a variety of wildlife species and permit wildlife-dependent recreational uses compatible with wildlife.

[1] Pharsalia Game Management Area Management Plan, Summer 1969, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY.

[2] Information about the Bird Conservation Area can be found on the NYS DEC website at: http://www.dec.ny.gov/animals/27045.html and on the Audubon website at: http://www.audubon.org/important-bird-areas/pharsalia-woods

# 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

Pharsalia WMA is located in DEC Region 7, Towns of Otselic and Pharsalia, Chenango County (Figure 1).

### Total Area

4,689 acres

### Habitat Inventory

A habitat inventory of the WMA was completed 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 Pharsalia WMA.

| Habitat Type | Current Conditions | | | Desired Conditions [b] | |
|---|---|---|---|---|---|
| | Acres | Percent of WMA | Miles | Acres | Percent of WMA |
| Forest [a] | 4,248 | 91% | | 3,196 | Decrease to 68% |
| Young forest | 9 | <1% | | 988 | Increase to 21% |
| Shrubland | 18 | <1% | | 91 | Increase to 2% |
| Grassland | 79 | 2% | | 79 | No change |
| Agricultural land | 0 | 0% | | 0 | No change |
| Wetland (natural) [c] | 72 | 2% | | 72 | No change |
| Wetland (impounded) [c] | 0 | 0% | | 0 | No change |
| Open water | 70 | 1% | | 70 | No change |
| Other (quarry) | 3 | <1% | | 3 | No change |
| Roads | 190 | 3% | 16.9 | 190 | No change |
| Rivers and streams | | | 4.7 | | N/A |
| **Total Acres:** | 4,689 | 100% | | 4,689 | |

[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] Desired conditions represent long-term goals for the WMA. Work to be done in the next 10 years toward this goal is described in the body of this plan.
[c] Wetland acreage does not include forested wetlands, since they are included in the Forest category.

## ECOLOGICAL RESOURCES

### *Wildlife Overview:*

Wildlife present on Pharsalia WMA includes species typical of central New York forested uplands such as:

- White-tailed deer, beaver, coyote
- Ruffed grouse, wild turkey, American woodcock
- Snapping turtle, wood turtle, Spotted salamander
- Barred owl, sharp-shinned hawk, hooded merganser

### *Wildlife and Plant Species of Conservation Concern:*

The following federal or state listed Endangered (E), Threatened (T), or state Special Concern (SC) species and/or Species of Greatest Conservation Need (SGCN) may occur on the WMA (Table 2). [3] 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,[4] NY Reptile and Amphibian Atlas,[5] DEC wildlife surveys and monitoring, and eBird.[6]

[3] 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.
[4] Available online at http://www.dec.ny.gov/animals/7312.html.
[5] Available online at http://www.dec.ny.gov/animals/7140.html.
[6] Available online at http://ebird.org/content/ebird/about/. © Audubon and Cornell Lab of Ornithology.

Table 2. Species of conservation concern that may be present on Pharsalia 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 |
|---|---|---|---|---|
| Birds[7] | American bittern | | SC | X |
| | American black duck | | | HP |
| | American kestrel | | | X |
| | American woodcock | | | X |
| | Bald eagle | | T | X |
| | Black-billed cuckoo | | | X |
| | Black-throated blue warbler | | | X |
| | Blue-winged warbler | | | X |
| | Brown thrasher | | | HP |
| | Canada warbler | | | HP |
| | Cape May warbler | | | HP |
| | Cooper's hawk | | SC | |
| | Golden-winged warbler | | SC | HP |
| | Louisiana waterthrush | | | X |
| | Northern goshawk | | SC | X |
| | Osprey | | SC | |
| | Pied-billed grebe | | T | X |
| | Prairie warbler | | | X |
| | Red-headed woodpecker | | SC | HP |
| | Red-shouldered hawk | | SC | X |
| | Ruffed grouse | | | X |
| | Rusty blackbird | | | HP |
| | Scarlet tanager | | | X |
| | Sharp-shinned hawk | | SC | |
| | Vesper sparrow | | SC | HP |
| | Wood thrush | | | X |
| | | | | |
| Mammals | Eastern red bat | | | X |
| | Hoary bat | | | X |
| | Little brown bat (myotis) | | | HP |
| | Northern long-eared bat | T | T | HP |
| | Silver-haired bat | | | X |
| | Small-footed bat | | | X |
| | Tri-colored bat (myotis) | | | HP |
| | | | | |
| Amphibians and reptiles | Common ribbonsnake | | | X |
| | Eastern snapping turtle | | | X |
| | Smooth greensnake | | | X |

[7] Several listed bird species only utilize this WMA as migratory habitat and are considered as such in management plans.

*Table 2. Continued*

| Species Group | Species | Federal Status | NY Status | NY SGCN |
|---|---|---|---|---|
| | Wood turtle | | | HP |
| | | | | |
| Fish | Brook trout | | | X |
| | | | | |
| Invertebrates | None known | | | |
| | | | | |
| Plants | None known | | | |

***Significant Ecological Communities:***

There are no rare and significant natural communities located on Pharsalia WMA as identified by the NY Natural Heritage Program.[8] Additional information about significant ecological communities is available in the Pharsalia WMA Biodiversity Inventory Final Report (1998) prepared by the NY Natural Heritage Program.

***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 Pharsalia WMA include:

- 1 wetland (OT-6) regulated by Article 24 of the Environmental Conservation Law, and 81 additional wetlands shown on the National Wetlands Inventory (NWI; 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.
- 7 streams (a watercourse entirely within the WMA) or segments of streams (a stream that meanders in and out of the WMA). The highest stream classification is C(T).[9] Streams designated as class C(T) or higher are regulated by Article 15 of the Environmental Conservation Law. Water quality standards will be adhered to on all streams.

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.*[10] 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.

[8] 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.
[9] Information about stream classification is available online at http://www.dec.ny.gov/permits/6042.html.
[10] 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 and the availability of habitats and other conservation lands adjacent to Pharsalia WMA (Figures 4 and 5). The landscape within a three mile radius of the WMA is approximately half public land and half private land and is comprised of:

- Forest (71%)
- Agriculture (16% combining cultivated crops and hay)
- Early successional (5% combining grasslands and shrublands)
- Wetlands (5% combining open water, emergent and woody wetlands)
- Developed areas (3%)

The majority of the landscape surrounding the WMA is contiguous forest. The three mile buffer includes sections of eight different DEC State Forests including:

- Pigeon Hill State Forest (736 acres)
- Beaver Meadow State Forest (5,816 acres)
- Otselic State Forest (1,043 acres)
- Bucks Brook State Forest (2,178 acres)
- Perkins Pond State Forest (1,895 acres)
- Pitcher Springs State Forest (1,835 acres)
- Pharsalia Woods State Forest (6,192 acres)
- New Michigan State Forest (2,971 acres)

State Forests are managed for multiple uses including water quality protection, recreation, wildlife habitat protection and the production of forest products. While WMAs are managed for many of the same uses as State Forests, WMAs differ in that they are managed primarily for the purposes of wildlife reproduction and survival in addition to wildlife related recreation. The production of forest products on WMAs is generally a byproduct of management activities related to the creation and improvement of wildlife habitat. Due to the temporary nature of young forest habitat, it is important for wildlife species that a percentage of the landscape be maintained in such an age class in perpetuity, which is not often the case on State Forests, but is a targeted goal on Pharsalia WMA. As part of DFW's Young Forest Initiative (YFI) on WMAs, future habitat management for Pharsalia WMA will enhance young forest habitat across the landscape as well as maintain important contiguous forest habitat identified as important within the BCA. Areas selectively harvested or even clear cut to create young forest actually benefit many of the forest species. Young forests quickly regenerate to more mature forest and, while in a younger state, provide cover to different species and a new food source for forest interior species.
More information about New Michigan, Pharsalia Woods, Pitcher Springs, Perkins Pond and Pigeon Hill State Forests can be found in the Pharsalia Woods Unit Management Plan (UMP).[11]
Information about Beaver Meadow, Otselic and Bucks Brook State Forests can be found in the Northern Chenango Highlands UMP.[12]

[11] Available online at http://www.dec.ny.gov/lands/67631.html
[12] Available online at http://www.dec.ny.gov/lands/22566.html

In addition, this plan provides for more non-forested areas, such as open areas and shrublands, distributed throughout the WMA, which will benefit overall species diversity. Further details on management of each habitat type can be found in the next section of this plan.

# *II. Management Strategies by Habitat Type*

DEC will continue active management of wildlife habitats on Pharsalia 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.
- 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.

Pharsalia WMA clearcut after 8 years.

Photo: Adam Perry, DEC

***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 Pharsalia 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 YFI to increase the amount of young forest on WMAs to benefit wildlife that require this transitional, disturbance-dependent habitat.[13] One of the goals of the Young Forest Initiative is within the next ten years, to create a minimum of 10% of the WMA's forested habitat as young forest habitat and maintain that level in perpetuity on each WMA included in the YFI program.

## MANAGEMENT OBJECTIVES

- Increase young forest cover from 9 acres (<1% of total forested area) to 988 acres (23% of total forested area, 21% of the WMA) over the next 10 years to improve habitat for young-forest dependent wildlife.
- Retain the rest of the forested acreage as a healthy forest of various age classes.

## DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

As shown in Table 1, 91% of the total area of Pharsalia WMA is forested, (4,257 acres). Of this habitat type approximately 99% is composed of natural or plantation forest (4,232 acres), <1% is forested wetlands (16 acres), and <1% is young forest (9 acres). Compared to the surrounding landscape, Pharsalia WMA has more forest habitat but less early successional or wetland habitat (Figure 6). Table 3 provides a more detailed description of the types of forest found on Pharsalia WMA and the most common types of trees found in each.

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

| Forest Type | Acres (as of 2016) | Desired Acres | Overstory species |
|---|---|---|---|
| Natural forest (mature/intermediate) | 2,694 | 1,992 | Red maple, black cherry, sugar maple |
| Plantation | 1,538 | 1,197 | Norway spruce, red pine, white pine |
| Forested wetland | 16 | 7 | Eastern hemlock, red maple, aspen |
| Young forest | 9 | 979 | |
| Young forest (forested wetland) | 0 | 9 | |
| **Total Forested Acres:** | 4,257 | 4,184 | |

[13] 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.

There are 4,257 acres of forest on Pharsalia WMA, and that area is divided into many separate and distinct forest stands, with a large portion of those being less than 5 acres. Management over the next ten years may involve many individual stands, but it is important to note that many stands are small, not the entirety of each stand will be treated at once, and many treatments will effect stands on multiple locations on the WMA. This approach will serve to provide diversity to a greater area on the WMA and ensure mature areas are maintained for species that rely on those areas.

Soils on the WMA are of the Volusia-Mordin-Lordstown group. These soils are very deep, somewhat-poorly to very well drained and productive. Forests grow well and regenerate quickly on disturbed sites.[14]

***Target Species:***

Target species for young forest include American woodcock, ruffed grouse and wild turkey. These species rely on a mixture of mature and young forest habitats and by providing such variety through timber management, we can create a landscape that meets the following requirements:

- 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 high midstory stem density.[15] [16]
- Wild turkey:
  - Foraging areas – Mast producing hardwood stands and open areas.
  - Nesting – Hardwood or mixed-forest, brushy areas, old fields, downed trees.
  - Roosting – Large stands of open-crowed, mature timber.
  - Brood rearing – Open riparian areas, forest openings, herbaceous cover. [17]
- American woodcock:
  - Singing/peenting ground – Open areas from 1 to >100 acres, usually in an abandoned field.
  - Daytime areas – 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.

[14] 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.
[15] 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.
[16] Jones, B.C. et al. Habitat Management of Pennsylvania Ruffed Grouse. Pennsylvania Game Commission. 10 pp.
[17] US Department of Agriculture, Natural Resources Conservation Service. 1999. Wild Turkey. Wildlife Habitat Management Institute. 12 pp.

- Roosting – Open fields (minimum of 5 acres) or blueberry fields and reverting farm fields.[18]

## MANAGEMENT HISTORY

Aspen regeneration treatment.

Photo: DEC Region 7 Bureau of Wildlife

Immediately after DEC's acquisition of the property, extensive efforts were undertaken to restore thousands of acres to forest by planting 1.8 million seedlings. Most of this planting was done by the Civilian Conservation Corps (CCC), presumably in the 1930s. Most plantations were of Norway spruce, red pine, European larch, and other softwood species. In the 1960s, forests had reached the point where select thinnings could be undertaken to improve residual stands. Some of the work was done through timber sales, but from 1958-1962, 2,800 man days of labor was provided by inmates from the Pharsalia and Georgetown Correction Camps.[19] The inmates cleared access lanes and boundary lines, repaired and constructed roads, and improved (thinned) conifer plantations. Timber sales have occurred regularly since the mid-1960s to maintain the forest and create a diversity of habitats, but as a whole the forests of the WMA have continued to age beyond the best stages for young forest wildlife habitat (Figure 6).

## IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

The following management strategy is planned in order to reach and eventually exceed, the YFI goal of establishing a minimum of 10% of the total forested area (4,257 acres) as young forest (425 acres) within ten years.

In Tables 4 and 5, more acreage is identified than is needed to reach the 10-year goal for young forest habitat. Stands are identified as a whole, but only part of some of those stands may be treated at a time to increase habitat diversity and provide options and flexibility to tailor management actions on a case-by-case basis. In addition to the areas identified for young forest habitat treatments (979 acres), 115 acres are also identified for uneven aged treatments and 73 acres for shrubland. Achieving this proposed level of management is subject to: changing timber markets, concerns over rare, threatened or endangered species, cultural/historical features on the property, wet ground conditions, or changes in level of staff and funding support.

The following management is proposed:

[18] 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.
[19] Pharsalia Game Management Area Management Plan, Summer 1969, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY.

- **Management planned for 2016-2020** (Table 4, Figure 6):
    - Conduct a clearcut treatment on the following stands: B36, D6, F55.2, G56, H44, H45 and H47 totaling approximately 191 acres.
    - Conduct a seed tree treatment on the following stands: C132, E9, E13, E23, E34, E38, E60, G55, G58, G67, H33.1 and H46 totaling approximately 277 acres.
    - Conduct either seed tree or clearcut treatments to create both young forest and shrubland in the following stands: D9 and H13 totaling approximately 40 acres of young forest and 4 acres of shrubland.
    - Conduct a clearcut treatment on the following stands to create shrubland: A4, A26, B4, B33, B38, C110, C950, D950, D951, E1, E59, F16, F44, F78, H34 and H48 totaling approximately 65 acres.
    - Conduct a timber stand improvement treatment on the following stands: D53, F51 and G65 totaling approximately 36 acres.
    - Conduct a crop tree release treatment on the following stands: E5, F36, F37, F54, F55.1, H20, I1 and I7 totaling approximately 46 acres.
    - Conduct an apple tree release treatment on the following stands: F58, G1 and H35 totaling approximately 12 acres.
    - Conduct a shelterwood treatment on stand H32.1 totaling approximately 4 acres.
- **Management planned for 2021-2025** (Table 5, Figure 6):
    - Conduct a clearcut treatment on the following stands: B11, B41, C128, D12, F9, F10, F18, F19, F30, F84, G4, G6, G8, G11, G26, G43, G45, G84, H1, H4, H5, H7, H9, H15, H19, H30, H31, H53, and H54 totaling approximately 187 acres.
    - Conduct a seed tree treatment: A50, C141, D1, D2, D3, D21, D51, D52, D57, E55, G35, G37, G38, G57, G59, H21, H22, H33.2, and I20 totaling approximately 261 acres.
    - Conduct either seed tree or clearcut treatments to create both young forest and shrubland in stand C74 to create approximately 2 acres of young forest and 2 acres of shrubland.
    - Conduct a clearcut treatment in stand C42 to create shrubland totaling approximately 2 acres.
    - Conduct a group selection treatment in stand D59 totaling approximately 21 acres.
    - Conduct a patch clearcut treatment in stand F63 totaling approximately 17 acres.

Table 4. Forest management schedule for the first five-year period of this HMP (2016-2020).

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| A-4 | 6 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |
| A-26 | 12 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |

*Table 4. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| B-4 | 6 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |
| B-33 | 5 | Pole Timber 6”-11” DBH | Natural Forest: Other | Non-Forest: Shrubland | Even Aged | Clearcut |
| B-36 | 115 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Clearcut |
| B-38 | 4 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |
| C-110 | 2 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |
| C-132 | 13 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood, Hemlock | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| C-950 | 2 | N/A | Non-Forest: Shrubland | Non-Forest: Shrubland | Even Aged | Clearcut |
| D-6 | 13 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Clearcut |
| D-9 | 4 | Small Sawtimber 12”-18” DBH | Natural Forest: Pioneer Hardwood | Natural Forest: Seedling/Sapling and Non-Forest: Shrubland | Even Aged | Clearcut |
| D-53 | 21 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Timber Stand Improvement Thinning |
| D-950 | 2 | N/A | Non-Forest: Shrubland | Non-Forest: Shrubland | Even Aged | Clearcut |
| D-951 | 2 | N/A | Non-Forest: Shrubland | Non-Forest: Shrubland | Even Aged | Clearcut |

*Table 4. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| E-1 | 7 | Pole Timber 6”-11” DBH | Natural Forest: Other | Natural Forest: Other And Non-Forest: Shrubland | Even Aged | Clearcut |
| E-5 | 26 | Seedling Sapling 1”-5” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Crop Tree Release |
| E-9 | 14 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| E-13 | 9 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| E-23 | 28 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| E-34 | 17 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| E-38 | 32 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| E-59 | 4 | Pole Timber 6”-11” DBH | Plantation: Red Pine | Non-Forest: Shrubland | Even Aged | Clearcut |
| E-60 | 72 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| F-16 | 6 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood-Eastern Hemlock | Natural Forest: Northern Hardwood-Eastern Hemlock And Non-Forest: Shrubland | Even Aged | Clearcut |
| F-36 | 3 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Crop Tree Release |

*Table 4. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| F-37 | 1 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Crop Tree Release |
| F-44 | 8 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |
| F-51 | 3 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Timber Stand Improvement Thinning |
| F-54 | 2 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Crop Tree Release |
| F-55.1 | 5 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Crop Tree Release |
| F-55.2 | 1 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Clearcut |
| F-58 | 9 | Pole Timber 6”-11” DBH | Natural Forest: Other | Natural Forest: Other | Even Aged | Apple Tree Release |
| F-78 | 2 | Small Sawtimber 12”-18” DBH | Natural Forest: White Pine-Natural | Non-Forest: Shrubland | Even Aged | Clearcut |
| G-1 | 1 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Apple Tree Release |
| G-55 | 47 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| G-56 | 21 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Clearcut |
| G-58 | 2 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |

*Table 4. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| G-65 | 12 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Timber Stand Improvement Thinning |
| G-67 | 24 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| H-13 | 40 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling and Non-Forest: Shrubland | Even Aged | Seed Tree |
| H-20 | 1 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Northern Hardwood | Even Aged | Crop Tree Release |
| H-32.1 | 9 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Eastern Hemlock | Natural Forest: Northern Hardwood-Eastern Hemlock | Even Aged | Shelterwood |
| H-33.1 | 17 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood-Eastern Hemlock | Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| H-34 | 3 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Clearcut |
| H-35 | 2 | Pole Timber 6”-11” DBH | Natural Forest: Other | Non-Forest: Shrubland | Even Aged | Apple Tree Release |
| H-44 | 5 | Pole Timber 6”-11” DBH | Natural Forest: Pioneer Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Clearcut |
| H-45 | 9 | Pole Timber 6”-11” DBH | Forested Wetland: Pioneer Hardwood | Forested Wetland: Seedling/Sapling | Even Aged | Clearcut |

*Table 4. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| H-46 | 21 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood-Eastern Hemlock | Natural Forest: Northern Hardwood-Eastern Hemlock And Natural Forest: Seedling/Sapling | Even Aged | Seed Tree |
| H-47 | 27 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/Sapling | Even Aged | Clearcut |
| H-48 | 9 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Non-Forest: Shrubland | Even Aged | Apple Tree Release |
| I-1 | 2 | Pole Timber 6”-11” DBH | Natural Forest: Pioneer Hardwood | Natural Forest: Pioneer Hardwood | Even Aged | Crop Tree Release |
| I-7 | 6 | Pole Timber 6”-11” DBH | Natural Forest: Pioneer Hardwood | Natural Forest: Pioneer Hardwood | Even Aged | Crop Tree Release |

a- The letter and number designation shows which compartment and stand number is to be treated.
b- The total number of acres in each stand is listed in the table. All numbers are rounded off to the nearest acre. Not all of the acres in each stand may necessarily be treated during the time period this plan covers.
c- DBH: diameter of the main tree stem at breast height or 4.5ft from the ground.
d- There may be instances where further analysis of a stand may warrant changing the treatment type prior to writing the prescription.

Table 5. Forest management schedule for the second five-year period of this HMP (2021-2025).

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| A-50 | 25 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine-White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| B-11 | 3 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| B-41 | 8 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Hemlock | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |

*Table 5. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| C-42 | 2 | Small Sawtimber 12”-18” DBH | Plantation: Pine-Natural Species | Non-Forest: Shrubland | Even Aged | Clearcut |
| C-74 | 4 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling and Non-Forest: Shrubland | Even Aged | Seed Tree |
| C-128 | 16 | Small Sawtimber 12”-18” DBH | Plantation: Scotch Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| C-141 | 15 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Hemlock | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-1 | 27 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-2 | 14 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Hemlock | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-3 | 23 | Small Sawtimber 12”-18” DBH | Plantation: White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-12 | 9 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| D-21 | 21 | Small Sawtimber 12”-18” DBH | Plantation: White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-51 | 21 | Small Sawtimber 12”-18” DBH | Plantation: White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-52 | 14 | Small Sawtimber 12”-18” DBH | Plantation: White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |

*Table 5. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| D-57 | 8 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| D-59 | 21 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Hemlock | Natural Forest: Northern Hardwood-Hemlock | Uneven Aged | Group Selection |
| E-55 | 31 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine-White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| F-9 | 28 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| F-10 | 12 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine-Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| F-18 | 4 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| F-19 | 3 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| F-30 | 13 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| F-63 | 17 | Small Sawtimber 12”-18” DBH | Plantation: Pine-Natural Species | Natural Forest: Northern Hardwood | Even Aged | Patch Clearcut |
| F-84 | 6 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-4 | 7 | Small Sawtimber 12”-18” DBH | Plantation: Scotch Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-6 | 1 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |

*Table 5. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| G-8 | 2 | Pole Timber 6”-11” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-11 | 1 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-26 | 5 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-35 | 2 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| G-37 | 2 | Small Sawtimber 12”-18” DBH | Plantation: White Pine | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| G-38 | 5 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| G-43 | 5 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-45 | 17 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| G-57 | 10 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| G-59 | 4 | Pole Timber 6”-11” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| G-84 | 2 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-1 | 2 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |

*Table 5. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| H-4 | 2 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-5 | 2 | Small Sawtimber 12”-18” DBH | Plantation: Japanese Larch | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-7 | 3 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-9 | 4 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-15 | 9 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-19 | 3 | Small Sawtimber 12”-18” DBH | Plantation: Red Pine | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-21 | 8 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| H-22 | 7 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |
| H-30 | 2 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Hemlock | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-31 | 7 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood-Hemlock | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-33.2 | 11 | Pole Timber 6”-11” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |

*Table 5. Continued*

| Stand[a] | Acres[b] | Size Class[c] | Forest Type | | Management Direction | Treatment Type[d] |
|---|---|---|---|---|---|---|
| | | | Current | Future | | |
| H-53 | 10 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| H-54 | 5 | Small Sawtimber 12”-18” DBH | Plantation: Norway Spruce | Natural Forest: Seedling/ Sapling | Even Aged | Clearcut |
| I-20 | 13 | Small Sawtimber 12”-18” DBH | Natural Forest: Northern Hardwood | Natural Forest: Seedling/ Sapling | Even Aged | Seed Tree |

a- The letter and number designation shows which compartment and stand number is to be treated.
b- The total number of acres in each stand is listed in the table. All numbers are rounded off to the nearest acre. Not all of the acres in each stand may necessarily be treated during the time period this plan covers.
c- DBH: diameter of the main tree stem at breast height or 4.5ft from the ground.
d- There may be instances where further analysis of a stand may warrant changing the treatment type prior to writing the prescription.

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:

**Management planned for 2016-2020** (Figure 6):

- **Stands B36, D6, F55.2, G56 and H47**: These stands are natural hardwood forests that will be clearcut and converted to young forest (177 acres).
- **Stand H44**: This is mostly aspen with some black cherry and Norway spruce that will be clearcut to encourage the regeneration of aspen (5 acres).
- **Stand H45**: This is a mix of red maple, aspen and Norway spruce that will be clearcut to encourage the regeneration of aspen (9 acres).
- **Stand C132**: This is a mix of red maple, black cherry, hard maple and a small amount of eastern hemlock. Removing the majority of the trees and leaving a few of the best quality trees scattered throughout the stand will serve to provide a seed source for the next generation of trees (13 acres).
- **Stands E9, E13, E23, E34, E38, E60, G55, G58 and G67**: These stands are natural hardwood forests where the majority of the trees will be removed, leaving a few of the best quality trees scattered throughout the stand to provide a seed source for the next generation of trees (245 acres).
- **Stands H33.1 and H46**: These are a mix of eastern hemlock, red maple and yellow birch. Removing the majority of the trees and leaving a few of the best quality trees scattered throughout the stand will serve to provide a seed source for the next generation of trees (19 acres).

- **Stand D9**: This is composed of red maple, black cherry and American beech. The entire stand will be clearcut with a small part converted to shrubland and the rest left to become young forest (4 acres).
- **Stand H13**: This is a mix of red maple, sugar maple and eastern hemlock. By removing the majority of the trees and leaving a few of the best quality trees scattered throughout the stand, they will serve to provide a seed source for the next generation of trees. A small part of the stand will be converted to shrubland and the rest left to become young forest (40 acres).
- **Stands A4, A26, B4, B33, B38, C110, F44, H34 and H48**: These stands are natural hardwood forests that will be clearcut and converted to shrubland (53 acres).
- **Stands C950, D950 and D951**: These stands are shrublands that are partially forested. The trees will be clearcut to convert the rest of the stands into shrubland (4 acres).
- **Stands E1, F16**: Stand E1 is a mix of red maple, white ash and scattered apple trees. Stand F16 is a mix of red maple, aspen and eastern hemlock. Portions of these stands will be clearcut and converted into shrubland (3 acres).
- **Stand E59**: This stand is a red pine plantation that will be clearcut and converted into shrubland (4 acres).
- **Stand F78**: This stand is a mix of white pine with black cherry and red maple that will be clearcut and converted to shrubland (1 acre).
- **Stands D53, F51 and G65**: These stands are a mix of black cherry, red maple, sugar maple and white ash. These areas will be thinned to remove the low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (36 acres).
- **Stands E5, F36, F37, F54, F55.1, H20, I1 and I7**: These are stands that were clearcut during previous timber harvests in the last 20+ years. Currently, they are a mix of black cherry, red maple, hard maple, yellow birch and American beech. A crop tree release in these stands will be for future sawtimber and mast production for wildlife (46 acres).
- **Stands F58, G1 and H35**: These are old apple orchards where the apple trees are becoming overtopped by other trees and brush. The apple trees will be released by cutting the brush and trees immediately adjacent to each apple tree to provide them with more sunlight so they can continue to produce apples for wildlife forage (12 acres).
- **Stand H32.1**: This is a mix of eastern hemlock, red maple and sugar maple. A portion of the stand will have a shelterwood thinning to establish new seedling/sapling regeneration (4 acres).

**Management planned for 2021-2025** (Figure 6):

- **Stands B11 and D12**: These are a mix of black cherry, red maple, white ash and American beech that will be clearcut and converted to young forest (12 acres).
- **Stands B41, H30 and H31**: These are a mix of black cherry, red maple and eastern hemlock that will be clearcut and converted to young forest (17 acres).
- **Stands C128 and G4**: These are Scotch pine plantations that will be clearcut and converted to young forest (23 acres).
- **Stands F9, F18, F19, G6, G8, G11, G26, G43, G45, H1, H7, H9, H15, H53 and H54**: These are Norway spruce plantations that will be clearcut and converted to young forest (95 acres).

- **Stand F10**: This is a mix of Norway spruce, red pine and black cherry that will be clearcut and converted to young forest (12 acres).
- **Stands F30, F84, G84, H4 and H19**: These are red pine plantations that will be clearcut and converted to young forest (26 acres).
- **Stand H5**: This is a Japanese larch plantation that will be clearcut and converted to young forest (2 acres).
- **Stands A50, E55**: These stands are a mix of red pine, white pine and black cherry. A seed tree cut will remove the majority of the trees and leave a few of the best quality trees scattered throughout the stand to serve as a seed source for the next generation of trees (56 acres).
- **Stands C141 and D2**: These stands are a mix of red maple, white ash, black cherry and eastern hemlock. Removing the majority of the trees and leaving a few of the best quality trees scattered throughout the stand will serve to provide a seed source for the next generation of trees (29 acres).
- **Stands D1, D57, G35, G38, H21, H33.2 and I20**: These stands are natural hardwood forests where we plan to remove the majority of the trees and leave a few of the best quality trees scattered throughout the stand to provide a seed source for the next generation of trees (74 acres).
- **Stands D3, D21, D51, D52 and G37**: These stands are white pine plantations where we will remove the majority of the trees and leave a few of the best quality trees scattered throughout the stand to provide a seed source for the next generation of trees (81 acres).
- **Stands G57, G59 and H22**: These stands are Norway spruce plantations where we will remove the majority of the trees and leave a few of the best quality trees scattered throughout the stand to provide a seed source for the next generation of trees (21 acres).
- **Stand C74**: This is a mix of red maple, black cherry and eastern hemlock. We will clearcut a portion of the stand and convert it to shrubland and the rest of the stand will have the majority of the trees removed while leaving a few of the best quality trees scattered throughout the stand to provide a seed source for the next generation of trees (4 acres).
- **Stand C42**: This is a Scotch pine plantation with some white pine and red maple mixed in. The entire stand will be clearcut and converted to shrubland (2 acres).
- **Stand D59**: This is a mix of eastern hemlock with red maple and black cherry. A group selection thinning will focus on removing most of the hardwood trees creating openings in the canopy to encourage the regeneration of eastern hemlock (21 acres).
- **Stand F63**: This is a red pine plantation with some red maple and black cherry. The red pine is scattered throughout the stand, mostly in patches. We will remove all of the red pine to encourage new hardwood regeneration to take its place (17 acres).

## 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** [20] |
|---|---|
| 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:***

There are no known state or federally listed endangered or threatened species confirmed on the property at this time. Within the surrounding areas, bald eagle and pied-billed grebe have been identified, both of which are State threatened. There are no nesting bald eagles at this time on the WMA and very limited habitat exists that could sustain pied-billed grebe, a waterbird which would not be negatively impacted by upland forestry work. Fall and winter harvest dates will be used whenever possible to minimize or prevent disturbance to nesting bird species and prescriptions may include language to require a percentage of dead standing trees to be left or created to provide habitat for cavity nesting wildlife. Depending on location of the treatment, cutting during the summer season may be required due to limited accessibility in the core of the property during winter months. In such cases, efforts will be made to avoid the months of April-July and standard contractual language will be included to limit or prevent damage to wetlands, stream disturbance and sedimentation, and excessive ground disturbance to protect reptiles, amphibians, fish and wetland-dependent mammals and birds. Pre-treatment surveys for bats, especially the northern long-eared bat, will be conducted for treatment sites that might involve timber management during the summer months. In the event such surveys detect protected species, management plans will be amended to mitigate those potential impacts.

Pharsalia WMA is part of a BCA and is part of the Pharsalia Woods Important Bird Area. Maintaining large blocks of forest with dense understory along with increasing early successional habitat are management actions identified as important for the species of birds identified in the BCA.[21] The BCA encourages the use of even aged forest management to create those types of critical habitat and to retain existing shrublands and early successional habitat.. The contiguous forest nature of Pharsalia WMA would be maintained as less than 2% of the current forest habitat is proposed to be converted into shrubland and a significant amount of young forest is scheduled to be created, which will provide needed early successional habitat. Created young forest is still forest and will regenerate quickly to continue to provide the contiguous forest layout recommended in the BCA guidelines.

The Pharsalia Woods Important Bird Area not only provides contiguous forest cover but also large softwood plantations (pine and spruce) whose seeds provide a source of food for winter finches during irruptive (high visitation) years.[22] Proposed management will largely maintain the contiguous forest cover. Table 3 identifies 1,538 acres of coniferous plantations currently on

[20] All guidance documents referenced here are available online at http://www.dec.ny.gov/outdoor/104218.html.
[21] Information about the Bird Conservation Area can be found on the NYS DEC website at: http://www.dec.ny.gov/animals/27045.html
[22] Audubon website at: http://www.audubon.org/important-bird-areas/pharsalia-woods

the WMA and it is proposed to convert 341 acres (roughly one fifth) into young forest over the next 10 years leaving the majority (1,137 acres) intact.

***Forest Health Considerations:***

In stands where native and non-native vegetation has been identified as interfering with desirable regeneration, additional treatment of that interfering vegetation may be required to promote desired regeneration. Currently, there are no major insect pests such as Emerald Ash Borer (EAB), Asian Longhorned Beetle (ALB) or Hemlock Wooly Adelgid (HWA) on Pharsalia WMA.

The most pressing forest health concern to address in the near future are large patches of natural forest that is experiencing a significant mortality of mature trees. Stands E23, E38, E60, G55, G56, G67, H13, H33.1 and H47, totaling approximately 300 acres, are in the worst condition. Around 2009, parts of Pharsalia WMA experienced heavy defoliation by Eastern Tent caterpillar which may be a contributing factor to these stands' current decline.

The exact cause of the mortality is unknown but signs of Armillaria root rot have been found. Armillaria is a type of fungus that occurs naturally in the forest and lives on the roots and lower stems of conifers and broad leaved trees. Armillaria can infest and kill trees that have been weakened by some other factor such as infestation by insect pests, other plant diseases, being damaged by storms or drought but it can also infest and kill otherwise healthy trees.[23] The mortality appears to have been ongoing for some years now and has resulted in an understory of mostly undesirable regeneration, (briars, striped maple and American beech). These stands will be some of the first to be treated to create young forest habitat due to the rapidly declining condition of these stands.

***Pre- and Post-treatment Considerations:***

Where invasive and other undesirable plant species are significantly abundant, pre-treatment mechanical cutting or herbicide application may be necessary. If it is determined that deer browse is intense enough to prevent regeneration of desired tree species, fencing in of treatment areas may be necessary. Also, if it is concluded post-treatment that desired tree species are not regenerating in a high enough frequency, or that undesirable species are dominating the area and suppressing regeneration, then the stand may be re-treated. This may include mechanical and/or chemical control of undesirable species, removal of additional trees to increase available sunlight, scarification of the forest floor to stimulate seedling establishment, and/or the direct seeding of desired tree species. Pre- and post-treatment actions to promote the desired forest or shrubland regeneration will be addressed in detail in the silvicultural prescriptions. In order to successfully establish new shrubland after the initial tree harvesting is done, planting native shrub species and additional mechanical or chemical treatments of trees or non-native/invasive shrubs may be required.

## MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife response have been achieved by the management outlined above, pre- and post-management assessments will be

[23] Armillaria Root Disease https://www.na.fs.fed.us/spfo/pubs/fidls/armillaria/armillaria.htm

conducted in accordance with guidelines in the Young Forest Initiative Monitoring Plan.[24] 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. YFI wildlife target species selected for Pharsalia WMA, which may be assessed to determine response to management, include:

- Wild turkey
- American woodcock
- Ruffed grouse

Breeding bird surveys will be conducted routinely to determine species present in various habitats and assess the response of individual species to forest management techniques. Before any cutting of trees or brush in excess of 3" DBH, between the months of April 1st and September 30th, pre-treatment acoustic surveys for forest dwelling bats, specifically northern long-eared bats, will be conducted. If it is determined there are sensitive bat species present on a site, management will be restricted to October 1st –March 31st to prevent negative impacts.

## 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

- Increase the amount of shrubland habitat on the property from 18 acres (<1% of the WMA) to 91 acres (2% of the WMA) through a combination of timber management and shrub plantings.
- In the long term (beyond 2025), increase the amount of shrubland habitat on the property to approximately 234 acres (5% of the WMA).
- Establish native, food-producing shrubland species in buffer areas around wetlands and existing fields.
- Create a "soft-edge effect" around select existing fields.
- Monitor for invasive species and treat as necessary with mechanical or when appropriate, chemical means.

### DESCRIPTION OF EXISTING SHRUBLAND HABITAT

Currently, there are approximately 18 acres of shrubland on Pharsalia WMA scattered among 8 small areas ranging from 1 to 3 acres in size. These shrublands originated from grasslands and old agricultural fields not being maintained and either naturally succeeded into a shrub-dominated community or the shrubs were planted mostly during the era of the CCC (circa

[24] May be found online at http://www.dec.ny.gov/outdoor/104218.html

1930s).[25] These stands are mostly dense shrub thickets with clumps of trees.

Due to a lack of management, over time an abundance of non-native species have become established in the shrubland habitat, including autumn olive, buckthorn, honeysuckle, and multiflora rose. Due to the invasive biology of these species, they quickly can establish in an unmaintained field and become dominant. Although these invasive species are dominant in most of these shrublands, native shrubs are present. Species of hawthorn, dogwood and viburnum can be found and provide a valuable soft mast resource for wildlife. Shrublands contain unique food and cover options that differ from young forest and can often persist longer as a habitat type due to shrub thicket exclusion of tree growth. Shrublands provide habitat for many wildlife species, including several that also use young forests. Although young forest and shrubland provide habitat for similar species, both are needed to provide for the full range of disturbance-dependent wildlife species.

## MANAGEMENT HISTORY

During the earliest decades of DEC ownership, extensive efforts were undertaken to reforest, and in some locations, reestablish shrub species on the WMA. The areas that were originally planted with shrub species have been repopulated by tree species at this time.

## IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2016-2020** (Table 4 and Figure 6):
  - Conduct either seed tree or clearcut treatments to create both young forest and shrubland in the following stands D9 and H13, resulting in approximately 40 acres of young forest and 4 acres of shrubland.
  - Conduct a clearcut treatment in stands A4, A26, B4, B33, B38, C110, C950, D950, D951, E1, E59, F16, F44, F78, H34 and H48 to create shrubland on approximately 65 acres.
  - Monitor for invasive species.
  - Evaluate the need for supplemental shrub planting.
- **Management planned for 2021-2025** (Figure 6):
  - Conduct either seed tree or clearcut treatments to create both young forest and shrubland in stand C74 to create approximately 2 acres of young forest and 2 acres of shrubland.
  - Conduct a clearcut treatment in stand C42 to create approximately 2 acres of shrubland.
  - Monitor for invasive species.
  - Evaluate the need for supplemental shrub planting.
  - Evaluate the need to reset shrublands with brush mower or forestry mower to maintain proper species and structure.

## BEST MANAGEMENT PRACTICES

Before any cutting of trees or brush in excess of 3" DBH, between the months of April 1st and September 30th, pre-treatment acoustic surveys for forest dwelling bats, specifically northern

[25] Pharsalia Game Management Area Management Plan, Summer 1969, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY.

long-eared bats, will be conducted. If it is determined there are sensitive bat species present on a site, management will be restricted to October 1st –March 31st to prevent negative impacts.

### MANAGEMENT EVALUATION

Routine monitoring and forest inventory projects will ensure pioneer tree species do not become established within identified shrubland areas. Through various bird surveys, wildlife response to the creation and further maintenance of shrublands can be determined, and adjustments can be made to the management plans to continually benefit the changing species diversity.

## 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. In the case of Pharsalia WMA, open areas do not meet the threshold in size or composition to benefit grassland-dependent species. Areas on the WMA that are described in this section are designed to provide forest openings and edge habitat for those species that benefit from such habitat diversity.

### MANAGEMENT OBJECTIVES

- Maintain the existing 79 acres of grassland habitat through rotational mowing.
- Monitor for invasive plant species.
- Improve existing acreage as needed with soil amendments and/or re-seeding.

### DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

Current grassland habitats on Pharsalia WMA are small, ranging from 0.1 to 11 acres, and scattered throughout the property. Just over 60% of the existing grassland habitat are in stands 5 acres or smaller in size. These areas were created to provide brood-rearing cover for upland game birds and white-tailed deer and have been managed accordingly.

Species that benefit from grassland best management practices include:

- Wild turkey, American woodcock, ruffed grouse
- White-tailed deer, black bear

### MANAGEMENT HISTORY

By 1935, aerial photographs indicated that the habitat on Pharsalia WMA was roughly evenly split between open space (grassland and agriculture fields) and forest and shrubland. Between 1935 and 1940, many open fields were planted to conifers and hardwoods by the CCC.[26] The planting was so extensive and rapidly undertaken that when the first management plan for Pharsalia was done in 1937, it reported that the property was 80% forest. Since then, grassland habitat has remained a minor component of Pharsalia WMA. More recent additions to grassland habitat have been created as part of timber sales. They have been maintained with occasional

[26] Pharsalia Game Management Area Management Plan, Summer 1969, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY

fertilizer and lime application and routine mowing to prevent tree species from becoming reestablished.

## IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2016-2025** (Figure 6):
    - Rotationally mow 50% of the grasslands per year (approximately 40 acres).
    - Evaluate adding soil amendments (nutrients) and re-seed as needed.
    - Monitor for invasive plant species and consider control if/when those species occur and become a threat to native vegetation.

## BEST MANAGEMENT PRACTICES

The following sub-sections provide guidelines for grassland habitat management on all WMAs in NY. For more detailed information and recommendations see *A Plan for Conserving Grassland Birds in New York*.[27] In particular, refer to the plan for species-specific habitat requirements and detailed recommendations regarding grassland management and restoration techniques.

### *General Management Recommendations*

- Target management for grassland bird species known to be in the vicinity, and consider the needs of both breeding and wintering grassland bird species.
- Consider the surrounding landscape when making management decisions.
- Conduct baseline grassland bird surveys on newly acquired fields or fields targeted for management changes to determine species present.
- Increase field size by hedgerow removal, removing trees, etc. to benefit species that require large fields.
- Conduct invasive species control (glossy buckthorn, pale and black swallowwort, Canada thistle, Phragmites, etc.) to improve habitat quality.
- Consider a variety of factors, such as the targeted grassland bird species, pollinators, seed mix (warm versus cool season grasses, forbs, wildflower mixes, grass height and density), timing of planting, existing conditions, and vegetation removal techniques (including herbicide and intensive disking) in developing grassland planting or restoration projects.
- Utilize mowing, haying, burning, and grazing for maintaining grassland habitat, after evaluating the appropriateness of these methods relative to site conditions and management objectives. In particular, burning cool season grasses is not advisable in most situations in New York.

### *Timing of Management*

- Fields under 25 acres (including all contiguous fields) with no history of listed species:
    - Field can be managed/mowed within the period April 23 and August 15 if necessary to accomplish other goals and priorities that benefit other species that use the habitat. If early management is proposed, then the habitat requirements

[27] Morgan, M. and M. Burger. 2008. A Plan for Conserving Grassland Birds in New York: Final Report to the New York State Department of Environmental Conservation under Contract #C005137. Audubon New York, Ithaca, NY.

and nesting periods of other species should be considered (e.g., nesting waterfowl, American bittern, reptiles and amphibians).

***Additional Mowing Guidelines***

- Frequency of mowing, size of area mowed, and mowing techniques should be based on species present and current and desired habitat conditions.
- Block or spot mowing is preferred and strip mowing should be limited (especially in fields over 25 acres).
- Unmowed blocks should be in the shape of a square as opposed to long rectangles.
- When mowing, consider mowing from one side of the field to the other side or start in the center and mow outwards to avoid concentrating animals in the area yet to be mowed.
- In general, mow grass to a residual height of 6-12 inches.

### MANAGEMENT EVALUATION

Wildlife surveys, specifically of grassland areas on Pharsalia WMA are not conducted currently and there is no plan to begin such surveys.

## 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 are no managed agricultural lands on Pharsalia WMA at this time and there is no plan to create such habitats.

## 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 the current acreage and quality of existing vernal pools and wetlands.
- Maintain existing wetland infrastructure (e.g.,-dikes, water control structures).
- Create new vernal pools.
- Monitor and treat for invasive aquatic vegetation as needed.

## DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

Most of the wetlands are a mixture of herbaceous plants, shrubs, and widely scattered trees and are located directly adjacent to open water (ponds). Ongoing beaver activity has made a significant contribution to the current amount of wetland habitat on Pharsalia WMA. Currently, 72 acres are managed as natural wetlands on Pharsalia WMA. There is one NYS regulated wetland as well as 81 wetlands mapped by the NWI. NWI wetlands typically overlap with New York State regulated wetlands. Wetlands classified as freshwater ponds, lacustrine, and riverine are considered open water habitat types in this plan and are further discussed in that section.

There are multiple small wetlands located on Pharsalia WMA. Most were created via timber sale trade-off work in the past to benefit species such as:

- Green frog, bullfrog, vernal pool salamanders
- Wood duck, mallard, hooded merganser
- Beaver

## MANAGEMENT HISTORY

Management has focused on periodic drawdowns to maintain existing habitats and monitoring for invasive plants. The Upper Susquehanna Coalition (USC) began a series of new vernal pool construction in 2015 and removed four outdated and non-functional water control structures to restore a stream to its natural state. USC completed another round of vernal pools in 2016 and a wetland shrub restoration project. The constructed vernal pools are designed to provide breeding habitat for amphibian species. They also provide possible nesting areas for some ducks, as well as migration/feeding areas for migrating ducks.

## IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2016-2020** (Figure 6):
    - Maintain the current acreage and quality of wetlands (72 acres)
    - Construct vernal pools
    - Monitor and control invasive plants as needed
    - Restore (if feasible) the water control structure located on stand F913
    - Routinely mow dikes, periodically operate water control structures, and as needed, repair wetland infrastructure (e.g.-dikes, water control structures)

- **Management planned for 2021-2025** (Figure 6):
    - Continue routine mowing of dikes, periodic operation of water control structures, and as needed, repair wetland infrastructure (e.g.-dikes, water control structures).
    - Continue construction of new vernal pools.
    - Monitor and control invasive plants as needed.

## BEST MANAGEMENT PRACTICES

- Protect vernal pools from runoff and sedimentation
- To the extent possible, avoid the use of pesticides in surrounding areas
- Maintain upland habitat buffer for non-breeding habitat

- Avoid human disturbance to vernal pools during watered periods[28]

Habitat management activities will be conducted in accordance with the NYSDEC General Permit (GP-0-16-003) and the New York State Freshwater Wetlands Act (ECL Article 24) and Water Resources Law (ECL Article 15, Title 5).

### MANAGEMENT EVALUATION

Routine monitoring to ensure adequate habitats are present and infrastructure sound.

## 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., Perch Lake, South Colwell Pond).

### MANAGEMENT OBJECTIVES

- Maintain existing pond infrastructure (e.g.-dikes, water control structures).
- Maintain the current acreage and quality of the existing open water habitat as it currently exists.
- Monitor and control invasive plants as needed.
- Periodic drawdowns to encourage emergent vegetation growth.
- Coordinate with Region 7 Bureau of Fisheries the water withdraw from Jackson Pond to feed adjoining (downstream side of water control structure) C(t) stream.

### DESCRIPTION OF EXISTING OPEN WATER HABITAT AND TARGET SPECIES

Pharsalia WMA includes multiple areas (stands) of open water consisting of both manmade and natural ponds, totaling 70 acres. These areas are managed to provide habitat and associated emergent vegetation for species such as:

- Wood duck, hooded merganser, Canada goose
- Green frog, bullfrog, wood turtle, snapping turtle
- Beaver, muskrat, mink

### MANAGEMENT HISTORY

In 1936, the CCC completed dams that created Jackson and Bear Wallow ponds (stands E911 and G911, respectively).[29] In the 1950s, Turkey Feeder (stand C912) and Jackson #2 (stand F913) ponds were constructed to provide additional habitats. Occasional drawdowns have occurred for repairs to water control structures or dikes and to improve emergent vegetation.

[28] Mitchell, J.C., A.AR. Breisch, and K.A. Buhlmann. 2006. Habitat Management Guidelines for Amphibians and Reptiles of the Northeastern United State. Partners in Amphibian and Reptile Conservation, Technical Publication HMG-3, Montgomery, AL. 108pp.

[29] Pharsalia Game Management Area Management Plan, Summer 1969, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY

## IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2016-2025** (Figure 6):
    - Survey ponds to evaluate existing fish species
    - Maintain the current acreage and quality of ponds (70 acres)
    - Continue routine mowing of dikes, periodic operation of water control structures, and as needed, repair pond infrastructure (e.g.-dikes, water control structures)
    - Occasional drawdowns to encourage vegetation growth
    - Coordinate with Region 7 Bureau of Fisheries the water withdraw from Jackson Pond to feed adjoining (downstream side of water control structure) C(t) stream.

## BEST MANAGEMENT PRACTICES

Habitat management activities will be conducted in accordance with the NYSDEC General Permit (GP-0-16-003) and the New York State Freshwater Wetlands Act (ECL Article 24) and Water Resources Law (ECL Article 15, Title 5).

## MANAGEMENT EVALUATION

Water bodies on Pharsalia are not regularly surveyed. Fisheries surveys were conducted in 2016 and determined no sensitive species were identified that will require special conditions for forest management.

## HABITAT MANAGEMENT SUMMARY

In summary, Table 7 lists the habitat management actions planned for Pharsalia WMA 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 Pharsalia WMA, 2016-2025. (Also see Figures 3 and 6.)

| Habitat | Management Action | Acres | Time frame |
|---|---|---|---|
| Forest | Clearcut stands B36, D6, F55.2, G56, H44, H45, H47 | 191 | 2016-2020 |
| Forest | Seed tree cut stands C132, E9, E13, E23, E34, E38, E60, G55, G58, G67, H33.1 and H46 | 277 | 2016-2020 |
| Forest | Timber stand improvement cut stands D53, F51 and G65 | 36 | 2016-2020 |
| Forest | Crop tree release stands E5, F36, F37, F54, F55.1, H20, I1 and I7 | 46 | 2016-2020 |
| Forest | Apple tree release stands F58, G1 and H35 | 12 | 2016-2020 |
| Forest | Shelterwood cut stand H32.1 | 4 | 2016-2020 |
| Forest/ Shrubland | Use either seed tree or clearcut treatments to create both young forest and shrubland in the following stands: D9 and H13 totaling approximately 40 acres of young forest and 4 acres of shrubland. | 44 | 2016-2020 |
| Shrubland | Create new shrubland through clearcut of stands A4, A26, B4, B33, B38, C110, C950, D950, D951, E1, E59, F16, F44, F78, H34 and H48 | 65 | 2016-2020 |
| Wetland | Restore (if feasible) the water control structure located on stand F913 | | 2016-2020 |
| Forest | Clearcut stands B11, B41, C128, D12, F9, F10, F18, F19, F30, F84, G4, G6, G8, G11, G26, G43, G45, G84, H1, H4, H5, H7, H9, H15, H19, H30, H31, H53, H54 | 187 | 2021-2025 |
| Forest | Seed tree cut stands A50, C141, D1, D2, D3, D21, D51, D52, D57, E55, G35, G37, G38, G57, G59, H21, H22, H33.2, I20 | 261 | 2021-2025 |

*Table 7. Continued*

| Habitat | Management Action | Acres | Time frame |
|---|---|---|---|
| Forest | Group selection cut stand D59 | 21 | 2021-2025 |
| Forest | Patch clearcut stand F63 | 17 | 2021-2025 |
| Forest/ Shrubland | Use either seed tree or clearcut treatments to create both young forest and shrubland in stand C74 to create approximately 2 acres of young forest and 2 acres of shrubland | 4 | 2021-2025 |
| Shrubland | Create new shrubland through clearcut of stand C42 | 2 | 2021-2025 |
| Shrubland | Reset shrublands with brush mower or forestry mower to maintain proper species and structure | | 2021-2025 as needed |
| Grassland | Rotationally mow 50% of the grasslands per year, monitor and treat invasive species, and apply soil amendments/seed as needed | 79 | 2016-2025 |
| Shrubland | Evaluate the need for supplemental shrub planting | | 2016-2025 as needed |
| Wetland | Construct vernal pools | | 2016-2025 |
| Wetland | Routinely mow dikes, periodically operate water control structures, and as needed, repair wetland infrastructure (e.g.-dikes, water control structures) | | 2016-2025 as needed |
| Open Water | Coordinate with Region 7 Bureau of Fisheries the water withdraw from Jackson Pond to feed adjoining (downstream side of water control structure) C(t) stream. | | 2016-2025 as needed |

# III. FIGURES

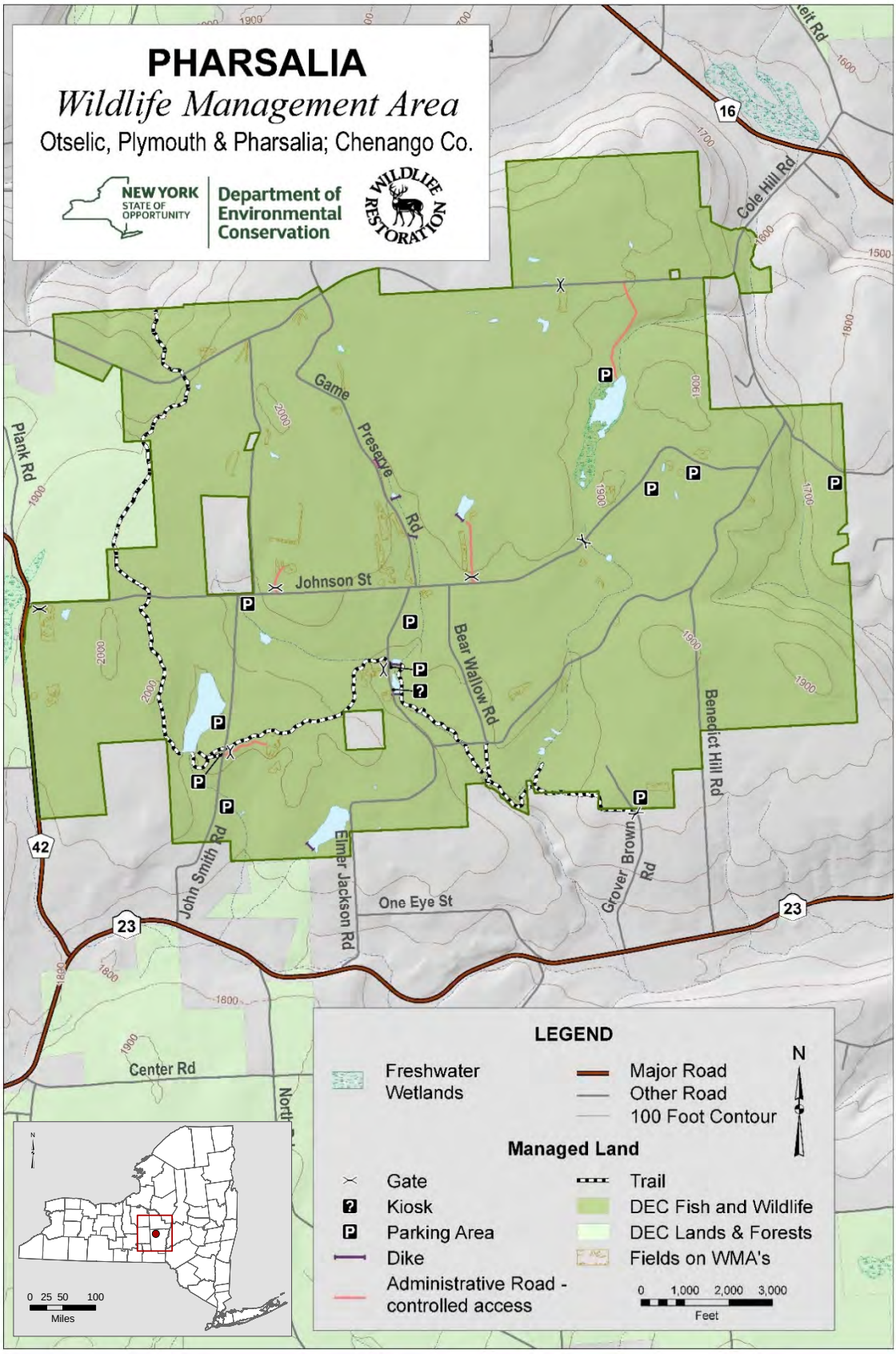


FIGURE 1. Location and access features at Pharsalia WMA.

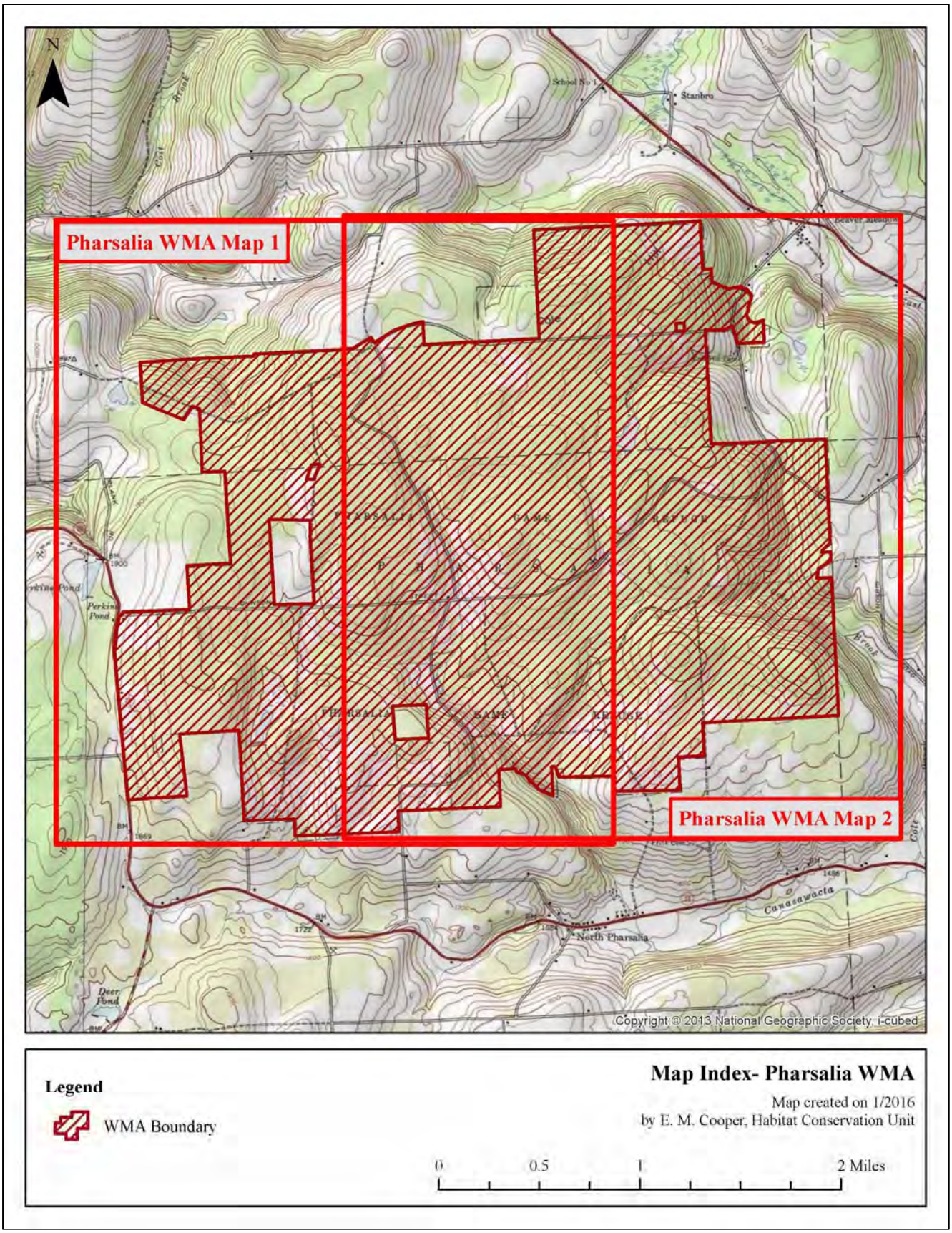


FIGURE 2. Map index for Pharsalia WMA.

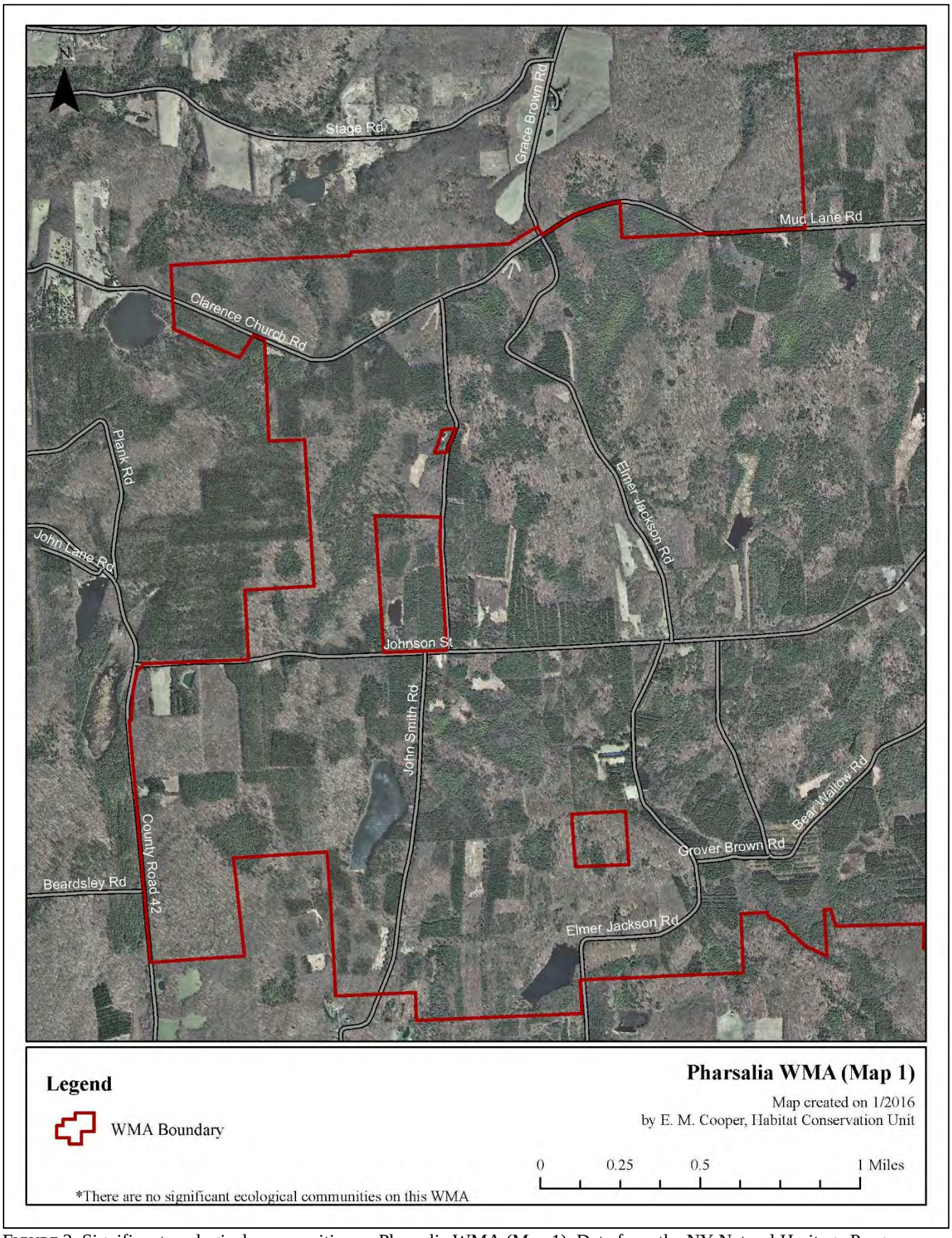


FIGURE 3. Significant ecological communities on Pharsalia WMA (Map 1). Data from the NY Natural Heritage Program.

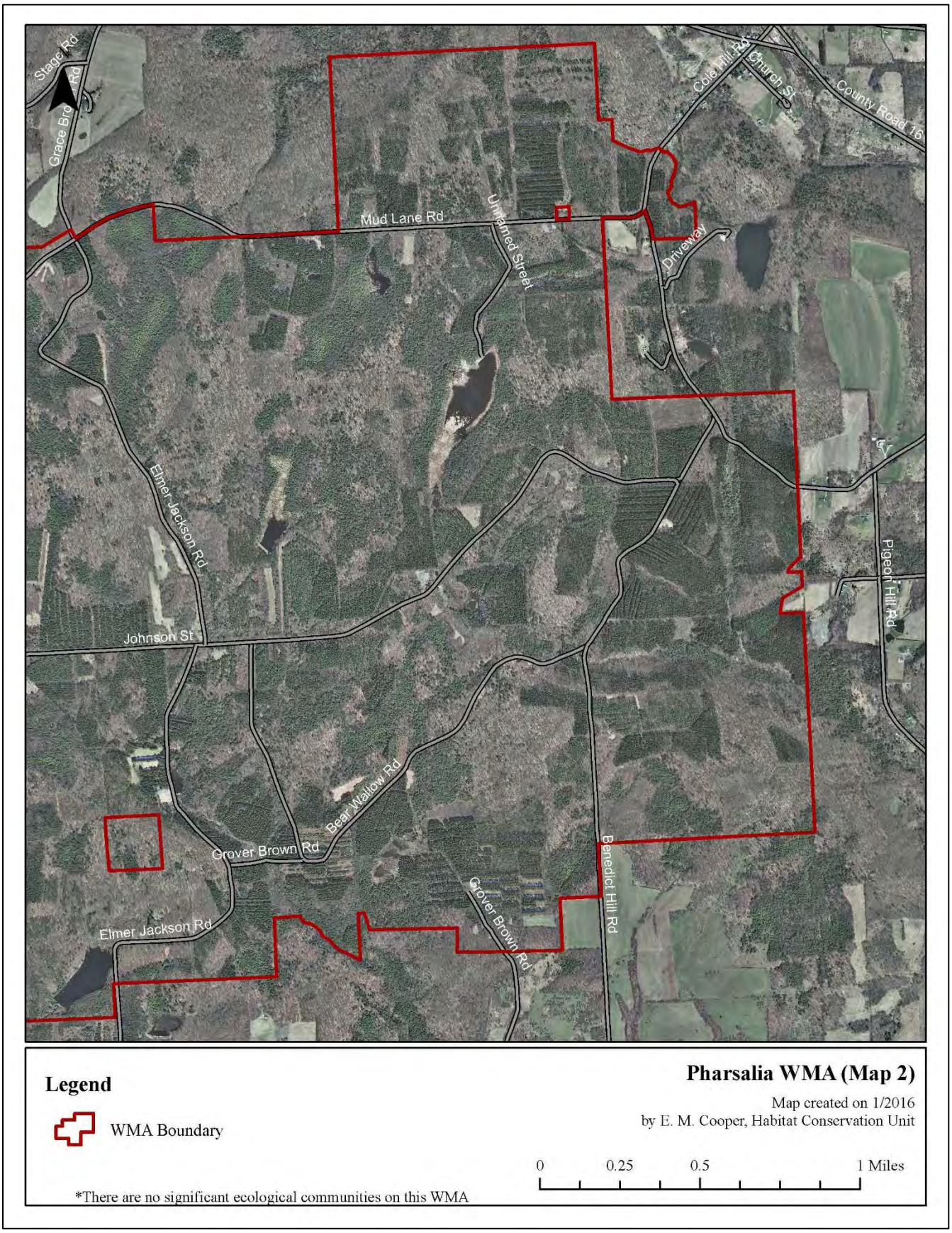


FIGURE 4. Significant ecological communities on Pharsalia WMA (Map 2). Data from the NY Natural Heritage Program.

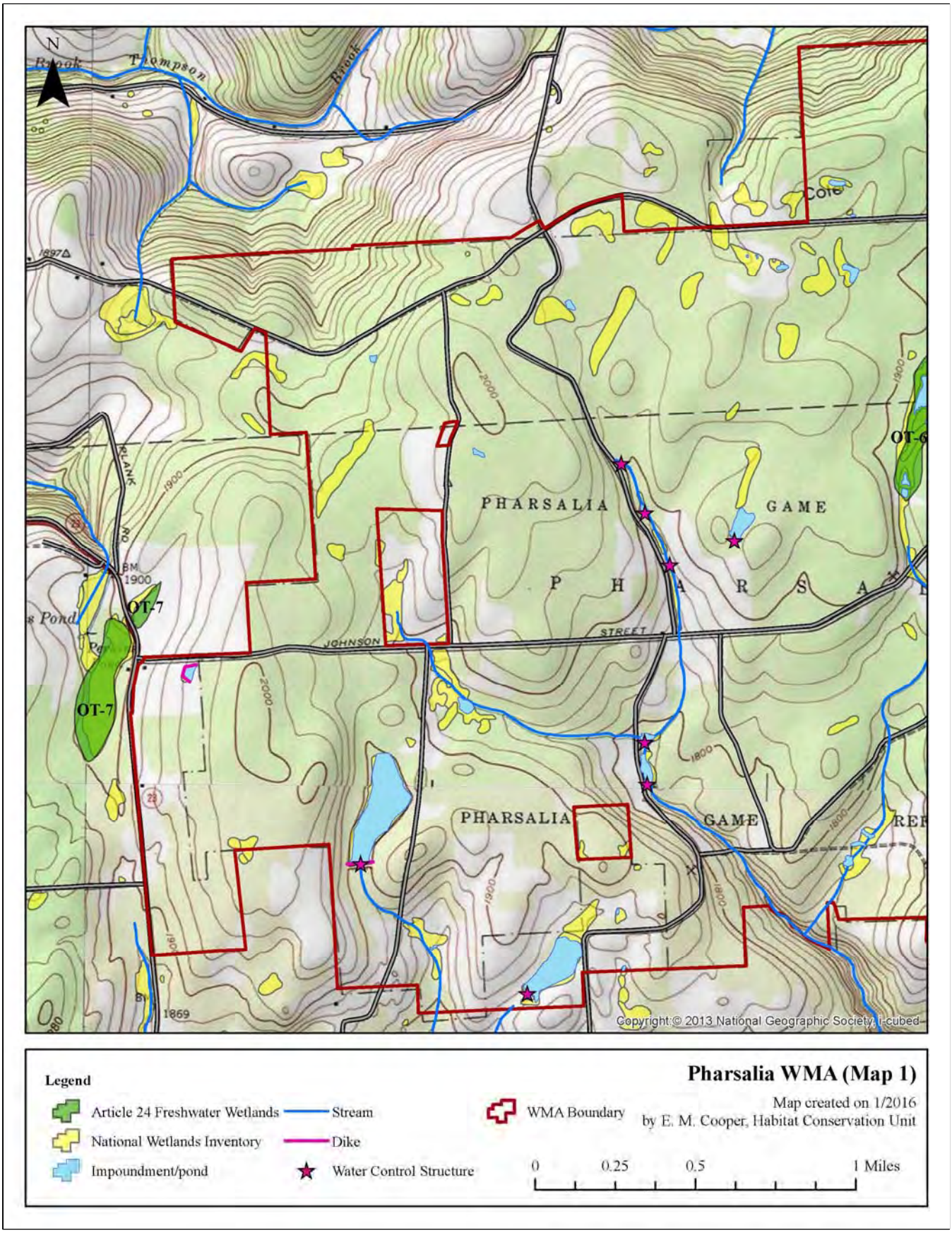


FIGURE 5. Wetlands, open water, and streams of Pharsalia WMA (Map 1). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

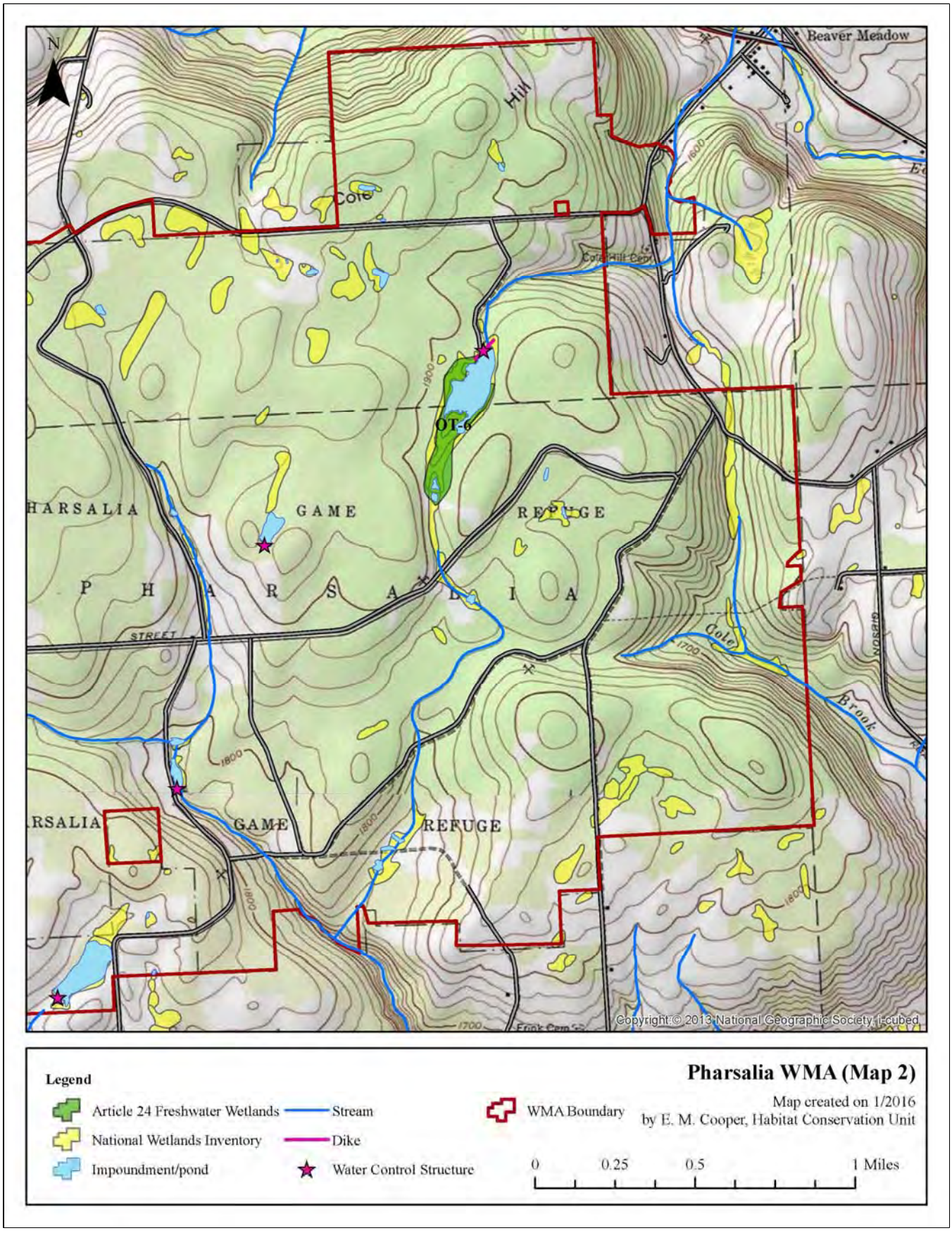


FIGURE 6. Wetlands, open water, and streams of Pharsalia WMA (Map 2). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

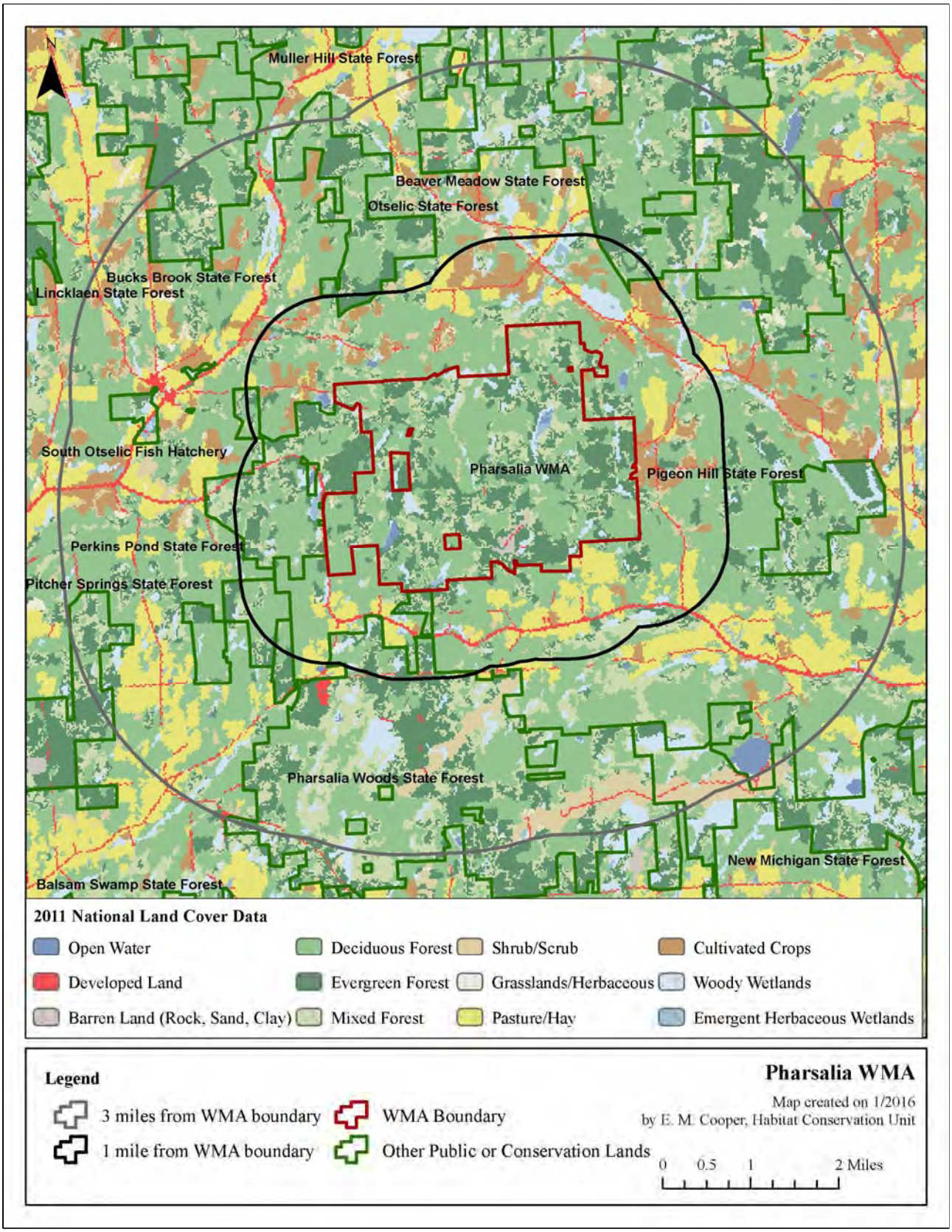


FIGURE 7. Land cover types and conservation lands in the landscape surrounding Pharsalia WMA. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at http://www.mrlc.gov/nlcd2011.php.

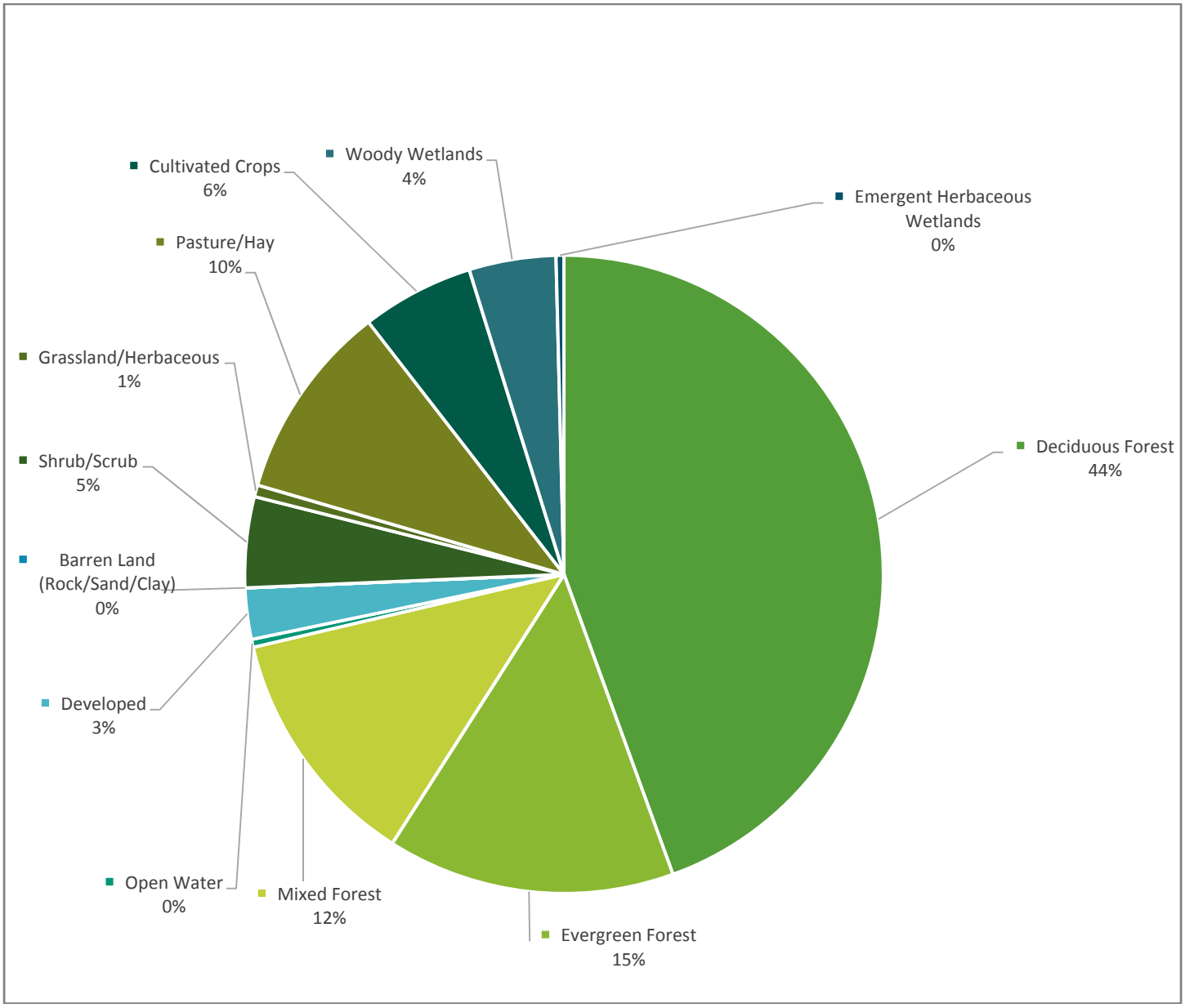


FIGURE 8. Percent cover of land cover types within three miles of Pharsalia WMA.

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.

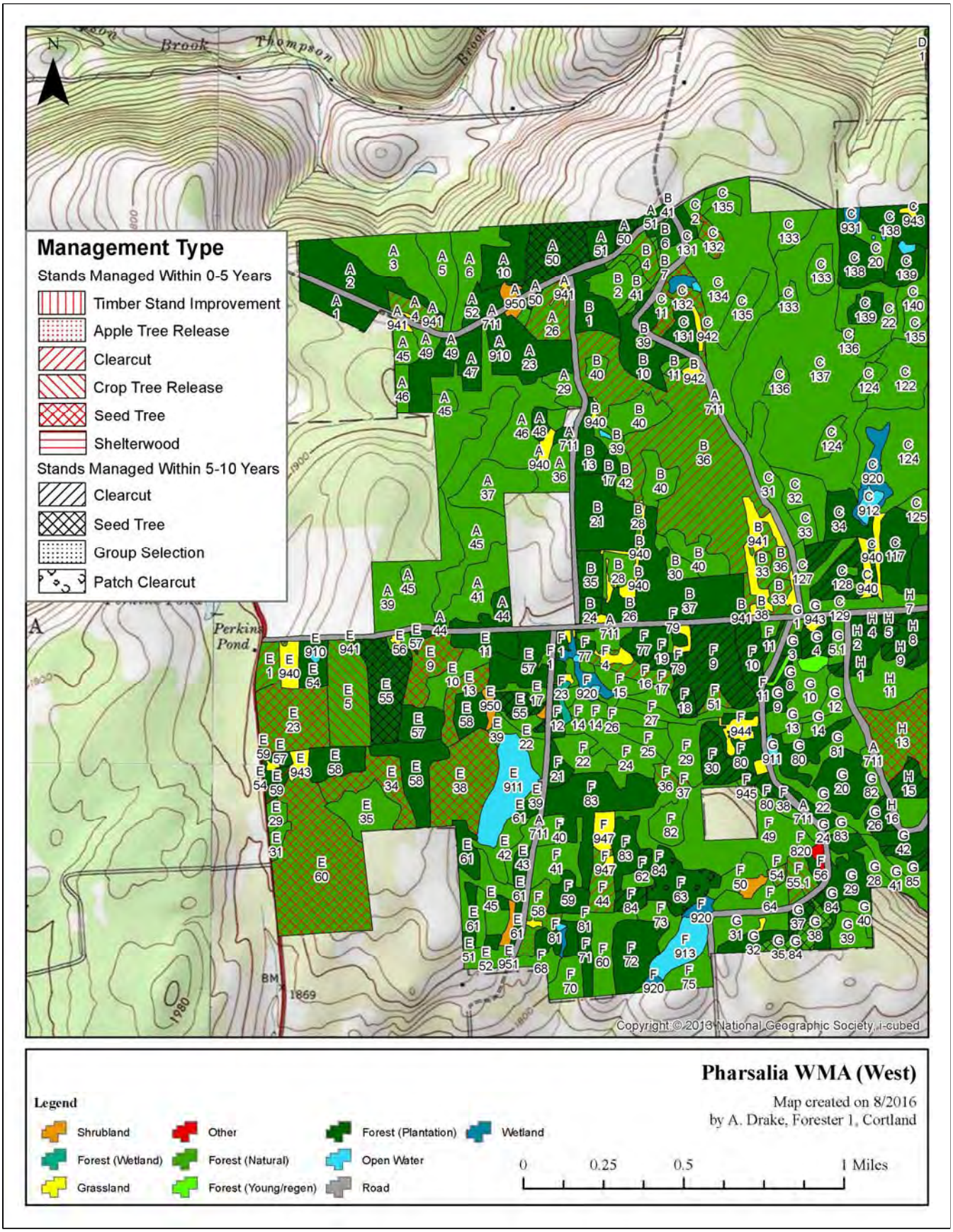


FIGURE 9. Habitat types and location(s) of proposed management on Pharsalia WMA (Map 1). Numbers indicate the stand number from habitat inventory.

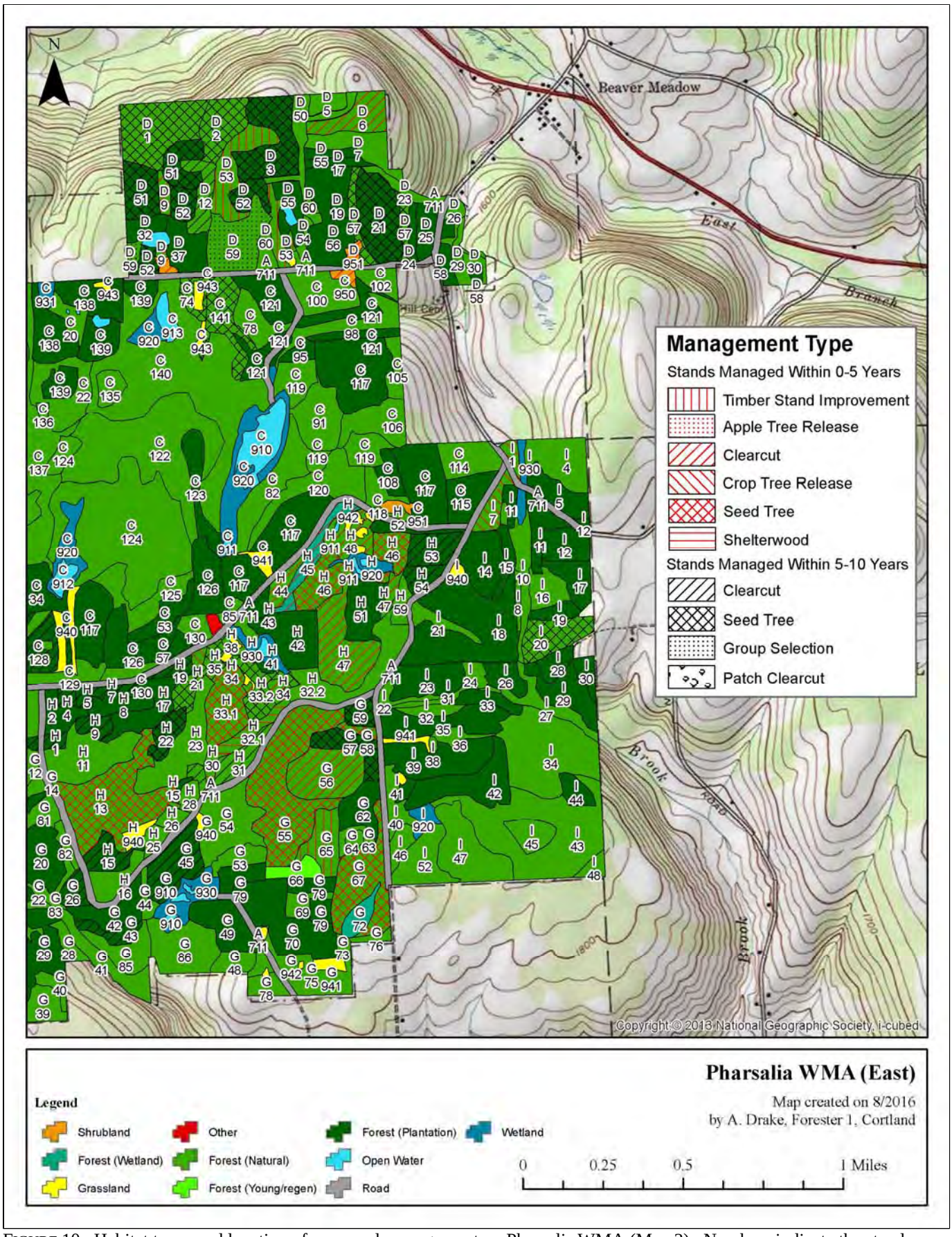


FIGURE 10. Habitat types and location of proposed management on Pharsalia WMA (Map 2). Numbers indicate the stand number from habitat inventory.

# 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)

***Crop Tree Release***: The selection and release of desirable trees by removing adjacent competing trees. This thinning technique is meant to increase the health and present value of a stand and also enhance the stand's future value by concentrating growth on the most desirable trees.

***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.

***Even Age:*** A stand of trees composed of a single age class in which the range of tree ages is usually +/- 20% of rotation (see *Rotation*)

***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.)

***Group Selection:*** Trees are removed and new age classes are established in small groups.

***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.

***Rotation:*** The period of time, (usually measured in years) between regeneration establishment and final cutting.

***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)

***Uneven Age:*** A stand with trees of three or more distinct age classes, either intimately mixed or in small groups.

***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. STATEMENT OF CONFORMITY WITH SEQRA

Habitat Management Plans will be in compliance with the 1979 *Programmatic Environmental Impact Statement on Habitat Management Activities of the Department of Environmental Conservation; Division of Fish and Wildlife* by following the criteria for site specific assessments included in this Programmatic Environmental Impact Statement (EIS) and by discussing further in Appendix B, Statement of Conformity with the State Environmental Quality Review Act (SEQRA). Appendix B will be included in each plan, thereby satisfying overall compliance with 6 NYCRR Part 617, the State Environmental Quality Review. If any of these criteria are exceeded an additional site specific environmental review will be required.

Most activities recommended in this HMP are a continuation of habitat management that DEC routinely conducts under the Programmatic EIS. Beginning in 2015, DEC's Young Forest Initiative (YFI) will considerably increase forest management on Wildlife Management Areas (WMA); YFI's conformity with SEQRA is specifically addressed below. The overarching goal of the YFI is to restore and maintain young forest habitat on WMAs in order to address the declining amount of young forest habitat in the state and provide habitat for key species of conservation interest, including both at-risk and game species. The habitat management activities to be carried out under the YFI are in compliance with the above referenced document and these management activities:

- Will not adversely affect threatened or endangered plants or animals or their habitat.
    - Careful review of the NY Natural Heritage Program's "Natural Heritage Element Occurrence" database in conjunction with a field survey when necessary prior to management activities taking place allows field staff to assess the presence or absence of threatened and endangered species. Appropriate actions will be taken if a threatened or endangered plant or animal is encountered in the project area including, but not limited to: establishing adequate buffer zones around known occurrences, moving the project area, or aborting the project altogether.
- Will not induce or accelerate significant change in land use.
    - The forestland affected by the YFI will be regenerated and remain forested land, therefore no land use change will take place.
- Will not induce significant change in ambient air, soil, or water quality.
    - All projects carried out under the YFI will protect air, soil and water quality through careful project planning, use of appropriate NYS Best Management Practices for Water Quality, 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.
    - YFI projects will follow established plans or policies of other state and federal agencies. Additionally, all YFI projects will be in compliance with all relevant US Fish and Wildlife Service rules and regulations.
- Will not induce significant change in public attraction or use.
    - The WMA program 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. Projects carried out under the YFI 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 area.
    - Habitat management projects under the YFI will be carried out primarily through even-aged forest management. Even-aged silvicultural systems are designed to mimic natural disturbances, such as flooding, wildfire, insect and disease outbreaks and storm damage often found in nature.
- Will not result in areas of significantly different character or ecological processes.
    - The even-aged silvicultural techniques that will be employed for habitat management projects under the YFI intentionally result in areas of different character and ecological processes. However, they are not considered significant as they are ephemeral or transitional and will not permanently alter the landscape.
- Will not affect important known historical or archeological sites.
    - Each YFI project will be reviewed by DEC's State Historic Preservation Officer (SHPO) as well as the Office of Parks, Recreation and Historic Preservation (OPRHP) to determine whether

project sites may potentially affect any historical or archeological sites. In addition, thorough field review prior to management activities taking place allows field staff to assess the presence or absence of any apparent historical or archeological sites that may not be found during the review process. Should known important historical or archeological sites present themselves necessary actions will be taken to protect these resources under the direction of DEC's SHPO and the OPRHP Archaeology Unit staff.

- Will not involve the application of herbicides, pesticides or other such chemicals.
    - YFI projects may involve the judicious use of pesticides which may be necessary to control invasive species, to protect rare and endangered plants from competition, or to control vegetation interfering with forest regeneration. If projects do require the use of herbicides or pesticides an additional site-specific environmental review will be required.
- Will not stimulate significant public controversy.
    - It is not anticipated that YFI projects will stimulate significant public controversy. A significant amount of public outreach and notification will be conducted on an on-going basis as well as prior to projects being implemented on the ground including, but not limited to: public information sessions regarding the Habitat Management Plans for each WMA, signage installation at project sites informing the public of the scope and purpose of the project, establishment of one demonstration area in each region to showcase YFI management techniques to the public, periodic informational articles published in local media outlets and the development of a public YFI website. The YFI has one full time position dedicated to facilitating the program's public outreach and communication efforts.

## 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:**

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**Central Office Lands and Forests Staff** **Date**

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**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.

**FY 16-17 (4/1/16 - 3/31/17)**