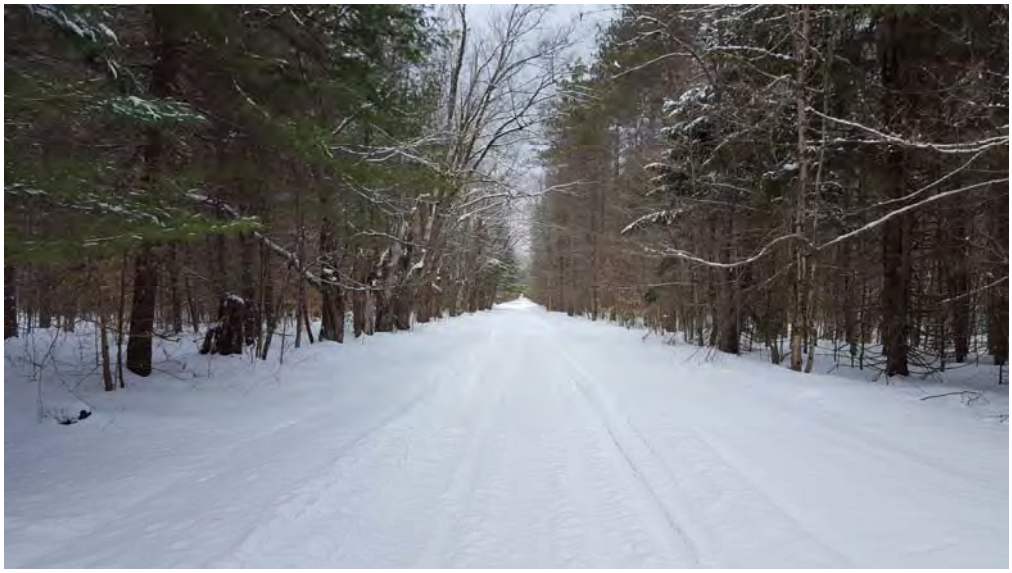
Habitat Management Plan for
Happy Valley Wildlife Management Area
2018 – 2027



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SUMMARY

During the mid-1800s, the area that is now Happy Valley Wildlife Management Area (WMA) was cleared and intensively farmed. During the Great Depression in the 1930s, the Federal Resettlement Administration bought properties that were no longer able to support farming activities. These acquisitions, totaling approximately 8,500 acres, became the initial acreage for Happy Valley WMA. The property was developed for upland game, and in the late 1930s many softwood plantations were established by the Works Project Administration and the Civilian Conservation Corps (CCC). Three deep-water impoundments were also constructed during this time, and the remaining abandoned farmland became reforested through natural succession.

In 1946 the area was turned over to the NYS Conservation Department on a 99-year lease program. In 1961 the Federal government cancelled the lease, giving the State full responsibility for the property. Since 1961, smaller acquisitions have been added to the property, resulting in the current total of 8,810 acres.

Happy Valley WMA has also long been associated with wildlife research. Between 1969-80, students from State University of New York College of Environmental Science and Forestry (SUNY ESF) conducted six projects evaluating how ruffed grouse, woodcock, and snowshoe hare utilized different types of habitat on the WMA. In 2006, NYS Department of Environmental Conservation (DEC) and the Ruffed Grouse Society collaborated on a project that used clearcutting to create and maintain young forest and study how ruffed grouse, woodcock, and other young forest dependent wildlife species responded to the newly created habitat. Today the WMA has become largely mature and intermediate forest due to limited resources available with which to conduct forest management. The current forest structure does well at attracting the typical forest wildlife species such as white-tailed deer, fisher, snowshoe hare, red-shouldered hawk, and many forest songbirds but lacks critical variety to encourage increased wildlife diversity.

Habitat management goals for Happy Valley WMA include:

- Maintain the WMA's intermediate and mature forested acreage at approximately 67% to continue to provide habitat diversity for forest species.
- Manage approximately 19% of the WMA as young forest (22% of the forested area) within the next 10 years to improve habitat for snowshoe hare, ruffed grouse, American woodcock, and wild turkey.
- Maintain the remaining 14% of the WMA as grassland, wetland, open water, and road/other.
- Provide habitat for a variety of wildlife species and permit wildlife-dependent recreational uses that are compatible with wildlife conservation.

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

Happy Valley WMA is located in DEC Region 7, Towns of Albion, Amboy, Parish, and Williamstown, Oswego County (Figure 1).

TOTAL AREA

8,810 acres

HABITAT INVENTORY

A habitat inventory of the WMA was completed in 2014 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 Happy Valley WMA.

Habitat Type	Current Conditions (as of 2014)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Forest [a]	7,163	81%		5,867	Decrease to 67%
Young forest	361	4%		1,657	Increase to 19%
Shrubland	0	0%		0	No change
Grassland	29	<1%		29	No change
Agricultural land	0	0%		0	No change
Wetland (natural) [b]	714	8%		714	No change
Wetland (impounded) [b]	385	4%		385	No change
Open water	20	<1%		20	No change

Table 1. Continued

Habitat Type	Current Conditions (as of 2014)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Other (parking, facilities, cemetery, utility ROW)	4	<1%		4	No change
Roads	134	2%	25	134	No change
Rivers and streams			28		No change
Total Acres:	8,810	100%		8,810	

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

Interestingly, past conditions were documented in a management plan written for Happy Valley in 1984, providing insight into habitat changes over nearly half a century (Table 2). The habitat conditions from 1974 were derived from a re-inventory of the WMA by DEC.

Table 2. Summary of past habitat acreage on Happy Valley WMA in 1974.

Habitat Type	Conditions 1974	
	Acres	Percent of WMA
Forest [a]	6,378	78%
Young forest [b]	406	5%
Field, brushy field	667	8%
Lakes, ponds and swamp	748	9%
Total Acres:	8,199	100%

[a] Forest acreage includes natural, plantation and wetland forest.
[b] While unable to determine if these acres were actually young forest as defined in this plan, these acres in 1974 were classified as seedling/sapling size class, so for the purposes of comparison it is assumed this is indeed young forest.

While the habitat types listed in Tables 1 and 2 differ slightly, this does illustrate the history of the abandonment of farmland and subsequent growth of forest – a classic example of natural succession. The lack of active management in grassland and shrubland areas have allowed them to be colonized by trees to eventually become young forest, resulting in the proportion of young forest on Happy Valley WMA remaining relatively the same. However, with no shrubland and very little grassland habitat left on Happy Valley WMA, active management of the forest habitat is needed to continually provide young forest habitat for wildlife use.

ECOLOGICAL RESOURCES

Wildlife Overview:

Happy Valley WMA is a mixture of intermediate and mature forest, wetland, and open water with some young forest and small, scattered patches of grassland. This WMA is located in the southwestern portion of the Tug Hill Plateau, a geographic area in New York noteworthy for its

large amount of lake effect snow as compared to other areas of the state. Wildlife species present on the WMA are typical of central New York mature forests and include:

- Beaver, mink, fisher, snowshoe hare, white-tailed deer
- Broad-winged hawk, northern goshawk, American woodcock, ruffed grouse, wild turkey
- Spotted turtle, eastern snapping turtle
- Scarlet tanager, black-throated blue warbler, wood thrush

Wildlife and Plant Species of Conservation Concern:

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

Table 3. Species of conservation concern that may be present on Happy Valley 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	American bittern		SC	X
	American black duck			HP
	American kestrel			X
	American woodcock			X
	Bay-breasted warbler			HP
	Black tern		E	HP
	Black-billed cuckoo			X
	Black-throated blue warbler			X
	Blue-winged warbler			X
	Brown thrasher			HP
	Canada warbler			HP
	Cape May warbler			HP
	Cerulean warbler		SC	X
	Common nighthawk		SC	HP
	Cooper's hawk		SC	
	Golden-winged warbler		SC	HP
	Northern goshawk		SC	X
	Northern harrier		T	X
	Osprey		SC	
	Pied-billed grebe		T	X

[1] The 2015 New York State Wildlife Action Plan identifies 366 Species of Greatest Conservation Need (SGCN) including 167 High Priority SGCN. Available online at http://www.dec.ny.gov/animals/7179.html.
[2] Available online at http://www.dec.ny.gov/animals/7312.html.
[3] Available online at http://www.dec.ny.gov/animals/7140.html.
[4] Available online at http://ebird.org/content/ebird/about/. © Audubon and Cornell Lab of Ornithology.

Table 3. Continued

Species Group	Species	Federal Status	NY Status	NY SGCN
	Prairie warbler			X
	Red-shouldered hawk		SC	X
	Ruffed grouse			X
	Rusty blackbird			HP
	Scarlet tanager			X
	Sharp-shinned hawk		SC	
	Vesper sparrow		SC	HP
	Whip-poor-will		SC	HP
	Wood thrush			X
Mammals	Eastern red bat			X
	Hoary bat			X
	Little brown bat (myotis)			HP
	Northern long-eared bat (myotis)	T	T	HP
	Silver-haired bat			X
	Small-footed bat (myotis)			X
	Tri-colored bat (eastern pipistrelle)			HP
Amphibians and reptiles	Bog turtle	T	E	HP
	Common ribbonsnake			X
	Four-toed salamander			HP
	Jefferson salamander		SC	
	Smooth greensnake			X
	Snapping turtle			X
	Spotted turtle		SC	HP
	Wood turtle		SC	HP
Fish	None known			
Invertebrates	None known			
Plants	Creeping sedge		T	
	Spotted pondweed		T	
	Swamp pink	T	T	

Significant Ecological Communities:

There are several rare and significant natural communities located on Happy Valley WMA as identified by the NY Natural Heritage Program. The state rank reflects the rarity within NY, ranging from S1, considered the rarest, to S5, considered stable; definitions are provided in Appendix A. The following significant ecological communities occur on the WMA; community

descriptions are from *Ecological Communities of New York State, Second Edition* [5] (Figures 3-6):

- **Medium Fen** (S2) A moderately minerotrophic peatland (intermediate between rich fens and poor fens) in which the substrate is a mixed peat composed of graminoids, mosses and woody species.
- **Hemlock-Hardwood Swamp** (S4) A mixed swamp that occurs on mineral soils in depressions which receive groundwater discharge, typically in areas where the aquifer is a basic or acidic substrate.
- **Red-maple Tamarack Peat Swamp** (S2) A mixed swamp that occurs on organic soils (peat or muck) in poorly drained depressions.

Additional information about significant ecological communities is available in the Happy Valley WMA Biodiversity Inventory Final Report (1995) 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 Happy Valley WMA include:

- 10 wetlands regulated by Article 24 of the Environmental Conservation Law and several additional wetlands shown on the National Wetlands Inventory (NWI; Figures 7 and 8). 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).[6]

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

LANDSCAPE CONTEXT

The goals of this HMP have been developed with consideration of surrounding landscape features, the availability of habitats, and other conservation lands adjacent to Happy Valley WMA (Figures 9 and 10). The landscape within a three-mile radius of the WMA is primarily privately-owned land including:

[5] Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero. 2014. Ecological Communities of New York State, Second Edition. New York Natural Heritage Program, NYS Department of Environmental Conservation, Albany, NY. Available online at http://www.dec.ny.gov/animals/97703.html.
[6] Information about stream classification is available online at http://www.dec.ny.gov/permits/6042.html.
[7] Available online at http://www.dec.ny.gov/outdoor/104218.html.

- Forest (59%)
- Agriculture (8% combining cultivated crops and hay)
- Early successional (13% combining grasslands and shrublands)
- Wetlands (18% combining open water, emergent and woody wetlands)
- Developed areas (2%)

A significant portion of the surrounding landscape, like the WMA, is forest. Although some of the early successional lands surrounding the WMA may be considered young forest, they are likely not managed and maintained as young forest. As part of DFW's Young Forest Initiative (YFI) on WMA's, future habitat management for Happy Valley WMA will enhance young forest across the landscape. The YFI goal of creating and maintaining 10% of the forested area as young forest will provide managed and maintained young forest habitat that is lacking both within the WMA and the surrounding landscape in perpetuity.

Within the area surrounding Happy Valley WMA are multiple public-owned properties including Altmar State Forest (959 acres), Kasoag State Forest (909 acres), Stone Hill State Forest (866 acres), Orton Hollow State Forest (507 acres), Oswego County Reforestation/County Forest (2,069 acres), Oswego County Nature Park (299 acres), Salmon River Fishing Access (12 miles), Salmon River Fish Hatchery (504 acres), and Fish Creek Fishing Access (28 miles). State Forests may have occasional areas of young forest, but they are managed for multiple uses including water quality protection, recreation, wildlife habitat protection, and the production of forest products. WMAs differ in that they are managed to provide quality wildlife habitat and populations by promoting ecosystem health, enhancing landscape biodiversity, and protecting soil productivity and water quality. 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. This is not often the case on State Forests, but is a targeted goal on Happy Valley WMA. County-owned forests in Oswego County are managed for timber production and may contain some young forest; Oswego County Nature Park is managed for recreation and may also contain some young forest, however these properties are not specifically managed for young forest habitat. Salmon River Fish Hatchery and fishing access sites are managed for recreation and likely contain little or no young forest.

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

DEC will continue active management of wildlife habitats on Happy Valley 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 that are compatible with the ongoing habitat management practices and species management considerations.

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

FOREST

Forested acreage includes the following forest types:

Natural forest: naturally forested acres, including hardwoods and softwoods. Includes any upland forested acreage that is not young forest, i.e., pole stands, other intermediate forest age classes, mature forest, and old growth forest.
Plantation: planted forested acres, generally planted in rows dominated by one or two species.
Forested wetland: wetland acres where forest or shrub vegetation accounts for greater than 50% of hydrophytic vegetative cover and the soil or substrate is periodically saturated or covered with water.
Young forest: young or regenerating forested acres, which are typically 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 Happy Valley 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 YFI to increase the amount of young forest on WMAs to benefit wildlife that require this transitional, disturbance-dependent habitat.[8]

MANAGEMENT OBJECTIVES

- Maintain the WMA's intermediate and mature forested acreage at approximately 67% (5,867 acres) to continue to provide habitat diversity for forest species.
- Increase young forest cover from 361 acres (4% of the forested area) to 1,657 acres (22% of the forested area; 19% of the WMA) over the next 10 years to improve habitat for young forest-dependent wildlife.
- Increase the amount of young forest softwood cover to improve habitat for snowshoe hare and ruffed grouse.

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

The long-term management direction for Happy Valley WMA is to substantially increase the early successional forest habitats on the property to improve habitat for snowshoe hare, ruffed grouse, American woodcock, and wild turkey. Taking into account the size of the WMA, its position on the landscape relative to other managed and unmanaged lands, and its current and future potential as wildlife habitat was important when developing a young forest target percentage. Targeting a higher percentage of young forest will ensure species such as snowshoe hare that exist on the WMA currently but are limited to small pockets across the state can thrive on the property. Approximately three-quarters of the proposed new young forest will be created through the treatment of natural hardwood stands and mixed hardwood-softwood stands. The rest will be created through the regeneration or conversion of softwood plantations that were originally planted in the late 1930s.

While focusing on four young forest target species, a host of other species are also taken into consideration when planning the size and arrangement of forest treatments. Proposed young forest will mostly be created in patches distributed over the entire WMA. Combined with retained and healthy mature forest stands distributed through the property, many species of songbird, upland game bird, large and small mammals, amphibians, and reptiles will also be able to utilize the WMA and surrounding landscape to a greater extent.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

As shown on Table 1, 85% of the total area of Happy Valley WMA is forested (7,524 acres). Of this, approximately 68% is natural forest (5,127 acres), 13% is plantation (996 acres), 14% is forested wetland (1,041 acres), and 5% is young forest (361 acres). Compared to the surrounding landscape, Happy Valley WMA has more forest habitat but less early successional habitat (Figures 9 and 10). Table 4 provides a detailed description of the types of forest found on Happy Valley WMA and the most common types of trees found in each.

Table 4. Summary of the acreage and dominant overstory species for each forest type present on Happy Valley WMA.

Forest Type	Acres (as of 2014)	Desired Acres	Overstory species
Natural forest (mature/intermediate)	5,126	4,305	Eastern hemlock, sugar maple, red maple, white ash, black cherry
Plantation (mature/intermediate)	996	521	Red pine, white pine, Norway spruce, Scotch pine, larch
Forested wetland	1,041	1,041	Red maple, ash
Young forest	361	1,657	
Young forest (forested wetland)	0	0	
Total Forested Acres:	7,524	7,524	

The northwestern half of the WMA is comprised of soils from the Worth-Empeyville-Bice and the southeastern half by the Worth-Westbury-Empeyville series. Soils in these groups are typically very deep, moderately well drained and coarse with fragipan.[9]

[9] 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.

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

- Snowshoe hare:
    - Foraging areas – In the early spring and summer, herbaceous vegetation on field edges and in small forest openings.[10] During the winter hares browse taller shrubs and young trees not covered by snowfall.[11]
    - Protective cover – Very dense woody understory, covered fields and thickets. Ideally, dense conifer stands (8-15ft tall) for daytime sanctuary from visual predators.
    - Travel cover – Conifer stands (16-50ft tall) with a moderately dense understory are used by hares at night to travel between foraging areas and protective cover.[12]
- 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.[13, 14]
- 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.
    - Roosting – Open fields (minimum of 5 acres) and reverting farm fields.[15]
- 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-crowned, mature timber.
    - Brood rearing – Open riparian areas, forest openings, herbaceous cover.[16]

[10] Brocke, R.H., R.W. Sage Jr., M.J. Tracy, R.D. Masters. 1980. Observing Snowshoe Hares in Adirondack Forest Openings and Management Implications. Final Report (in part) for W-105-R, Study X, Jobs 1,2,3 and 4. 62pp.
[11] Gilbart, M. 2012. Under Cover: Wildlife of Shrublands and Young Forest. Wildlife Management Institute. Cabot VT. 87 pp.
[12] Brocke, R.H. 1975. Preliminary Guidelines for Managing Snowshoe Hare Habitat in the Adirondacks. Trans. 32nd Northeast Fish and Wildlife Conference. New Haven, Conn. pp. 42-66.
[13] 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.
[14] Jones, B.C. et al. Habitat Management of Pennsylvania Ruffed Grouse. Pennsylvania Game Commission. 10 pp.
[15] U.S. Department of Agriculture, Natural Resources Conservation Service. 2010. American Woodcock: Habitat Best Management Practices for the Northeast by S.J. Williamson. Wildlife Insight. Washington, DC.
[16] U.S. Department of Agriculture, Natural Resources Conservation Service. 1999. Wild Turkey. Wildlife Habitat Management Institute. 12 pp.

MANAGEMENT HISTORY

In the late 1930s many softwood plantations were established by the Works Project Administration and the CCC. Much of the unplanted areas were allowed to naturally grow back into mature forest. The earliest records of timber sales date back to 1972 (Table 5).

Table 5. Summary of forest products sold from Happy Valley WMA.

Date of Sale	# of Sales	Acres Treated	Maple Taps	Firewood (cords)	Pulp-wood (tons)	Cabin Logs/ Red Pine Poles	Sawtimber, Thousands of Board Feet (MBF)	Value ($)[a]
1972-79	725	490	0	9,228	2,609	4,263	1,534.5	$135,796.50
1980-89	392	348	110	6,918	3,569	4,459	895.8	$180,460.82
1990-99	66	246	0	1,167	2,282	450	252	$79,239.89
2000-09	33	160	0	1,525	0	0	2,097.8	$271,536.23
2010-18	4	71	0	548	1,499	0	721.2	$64,550.20
Totals	1,220	1,315	110	19,386	9,959	9,172	5,501.3	$731,583.64

[a] Value has not been adjusted to reflect inflation.

The acres treated column in Table 5 does not reflect the acreage from most of the smaller scale timber sales (generally valued at <$10,000) due to the fact that acres were not recorded for those sales. Likely that is due to a combination of record keeping practices at the time, those sales treated small portions of larger forest stands, and most of the smaller timber sales involved small volumes of forest products.

The 1970s saw the largest number of timber sales in the recorded history of the WMA. Most of those sales were either firewood or cabin logs/red pine poles sold to individuals and small logging businesses. On average, each small sale involved an average of 5-20 cords of firewood or 200-300 cabin logs/red pine poles. There were also five larger timber sales (generally valued at >$10,000) that accounted for all of the pulpwood and virtually all of the sawtimber sold during that time.

From 1980-89 there was a significant decline in small firewood sales, but the sale of cabin logs/red pine poles remained about the same. The large amount of cabin logs/red pine poles being sold was likely due to the softwood trees planted in the 1930s having grown to the ideal size to be sold as logs and poles. There were five more large timber sales during this time period. Three of them involved salvaging some of the trees that were damaged in a 1984 summer storm that affected approximately 265 acres on Happy Valley WMA. This time period also saw the sale of maple taps to harvest sap for maple syrup production, and appears to have been a one-time event.

During the 1990s the sale of cabin logs/red pine poles came to an end, and since then softwood (such as pine and spruce) has been sold as either sawtimber or pulpwood. During this time the total number of sales continued to decline, and subsequently the volume of annually sold sawtimber reached its lowest point. The trend of fewer sales and fewer acres treated has continued since the 1990s, reflecting limited staffing and a high demand for forest management on other WMAs throughout Region 7.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

The following management is proposed to reach the goal of 1,657 acres of young forest in ten years, and to maintain the WMA's intermediate and mature forested acreage at approximately 5,867 acres. In addition to the cutting to create young forest, approximately 425 acres have been selected for intermediate treatments such as thinnings and release cuts. Achieving this level of proposed management is subject to: changing timber markets, concerns over rare, threatened or endangered species, cultural/historical features of the property, wet ground conditions, or changes in level of staff and funding support.

- **Management planned for 2018-2022** (Table 6, Figures 11-14):
    - **Stand A1:** This is a white pine plantation with a mix of white pine, eastern hemlock, and red maple. This stand will be patch clearcut to create young forest with a mix of hardwood and softwood regeneration (30 acres).
    - **Stands A2.1, A5, A7.1, D16, H3, and K7:** These are red pine plantations that will be clearcut and planted with softwoods such as balsam fir, spruce (red, white, Norway), and/or white pine depending upon availability and site conditions. The goal is to create young forest softwood cover (80 acres).
    - **Stand A2.2:** This is a red pine/white pine plantation that will be clearcut and planted with softwoods to create young forest softwood cover (8 acres).
    - **Stand A4.3:** This is a northern hardwood-eastern hemlock stand with a mix of eastern hemlock, red maple, and yellow birch. This stand will be shelterwood cut to encourage the regeneration of eastern hemlock seedlings. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest (10 acres).
    - **Stands A6:** This is a northern hardwood-eastern hemlock stand with a mix of eastern hemlock, red maple, and black cherry. The stand will be patch clearcut to create young forest with a mix of hardwood and softwood regeneration (10 acres).
    - **Stand B3.3:** This is a plantation with a mix of white pine, scotch pine, and red maple. This stand will be clearcut to create young forest with a mix of softwood and hardwood regeneration (10 acres).
    - **Stand C9.2:** This is a northern hardwood stand with a mix of sugar maple, black cherry, and red maple. Part of the stand will be patch clearcut to create young forest and part of the stand will be thinned to remove the low-quality trees to provide the higher quality trees with more room to grow. The thinning will maintain intermediate-mature aged forest (25 acres patch clearcut, 97 acres thinned).
    - **Stand C11:** This is a northern hardwood-eastern hemlock stand with a mix of eastern hemlock, red maple, and white pine. A portion of this stand will be patch clearcut to create young forest (15 acres).
    - **Stand C12:** This is a northern hardwood-white pine stand with a mix of red maple, white pine, and black cherry. A portion of this stand will be patch clearcut to create young forest and part of the stand will be thinned to remove low-quality trees to provide the higher quality trees more room to grow. The thinning will maintain intermediate-mature aged forest (33 acres patch clearcut, 17 acres thinned).

- **Stands C15, C16.1, and E21:** These are northern hardwood stands with a mix of red maple, white ash, black cherry, American beech, and sugar maple. They will be clearcut to create young forest (22 acres).
- **Stands D10 and L14:** Stand D10 is northern hardwood-white pine with a mix of red maple, black cherry, and white pine and stand L14 is a pioneer hardwood with a mix of red maple and trembling aspen. These stands both contain apple trees that will be released by removing trees and brush adjacent to each apple tree to provide them with more sunlight. This will encourage apple production to provide forage for wildlife (3 acres).
- **Stand D17:** This is a Norway spruce plantation that will be clearcut to create young forest (3 acres).
- **Stand D19:** This is a Norway spruce plantation that will be shelterwood cut to encourage regeneration of spruce seedlings. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest habitat (7 acres).
- **Stand D22:** This is a red pine plantation that will be clearcut to create young forest. Desirable hardwood and softwood regeneration has already been established (5 acres).
- **Stands E2, E17, and E110:** These are northern hardwood-eastern hemlock stands with a mix of eastern hemlock, red maple, and black cherry. The stands will be shelterwood cut to encourage the regeneration of eastern hemlock seedlings. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest habitat (36 acres).
- **Stand E19:** This is a northern hardwood stand with a mix of red maple, sugar maple, and yellow birch. A portion of this stand will be thinned to remove the low-quality trees to provide the higher quality trees with more room to grow. The thinning will maintain intermediate-mature aged forest (18 acres).
- **Stands E22, L1, and L9.1:** These are northern hardwood-white pine stands with a mix of red maple, eastern hemlock, white pine, and black cherry. These stands will be thinned to remove the low-quality trees to provide the higher quality trees with more room to grow. The thinning will maintain intermediate-mature aged forest (48 acres).
- **Stand E44:** This is a Norway spruce plantation. A portion will be seed tree cut to create young forest and encourage the regeneration of spruce (4 acres).
- **Stand E71:** This is a northern hardwood stand with a mix of red maple, sugar maple, and black cherry. A portion of this stand will be patch clearcut to create young forest (60 acres).
- **Stand G1.1:** This is a northern hardwood-eastern hemlock stand with a mix of red maple, eastern hemlock, and sugar maple. This stand will be seed tree cut to create young forest (20 acres).
- **Stand G8:** This is a pioneer hardwood stand with a mix of red maple, aspen, and black cherry. The stand will be clearcut to create young forest and encourage the regeneration of aspen (6 acres).
- **Stands H10 and L9.2:** These are white pine plantations that will be clearcut to create young forest (36 acres).

- **Stands I2, J2, and J8.2:** These are white pine plantations that will be patch clearcut to create young forest (90 acres).
- **Stands J8.1 and J11.1:** These are northern hardwood-white pine stands that will be patch clearcut to create young forest (14 acres).
- **Stand J11.2:** This is a natural white pine forest with some red maple and black cherry. The stand will be patch clearcut to create young forest (14 acres).
- **Stand K10:** This is a Japanese larch plantation that will be clearcut and planted with softwoods such as balsam fir, spruce (red, white, Norway), and/or white pine depending upon availability and site conditions. The goal is to create young forest softwood cover (13 acres).
- **Stand K11:** This is a mixed softwood plantation of Scotch pine, jack pine, and white pine and a mix of red maple, sugar maple, and black cherry. This stand will be thinned to remove low-quality trees to provide the higher quality trees more room to grow. The thinning will maintain intermediate-mature aged forest (9 acres).
- **Stand K16:** This is a northern hardwood-white pine stand with a mix of white pine, red maple, and black cherry. The stand will be clearcut to create young forest (22 acres).
- **Stand L11:** This is a northern hardwood-eastern hemlock stand with a mix of red maple, yellow birch, and eastern hemlock. The stand will be shelterwood cut to encourage the regeneration of eastern hemlock seedlings. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest habitat (138 acres).
- **Stand L12:** This is a northern hardwood-oak stand with a mix of red oak, white ash, and black cherry. The stand will be thinned to remove low-quality trees to provide the higher quality trees more room to grow. The thinning will maintain an intermediate-mature aged forest (10 acres).

- **Management planned for 2023-2027** (Table 7, Figures 11-14):
  - **Stand A12:** This is a Norway spruce plantation that will be shelterwood cut to encourage the regeneration of Norway spruce seedlings. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest habitat (8 acres).
  - **Stand A15.1:** This is a northern hardwood stand with a mix of red maple, black cherry, and sugar maple. The stand will be patch clearcut to create young forest (25 acres).
  - **Stand B4:** This is a plantation of Japanese larch and Scotch pine that will be clearcut and planted with softwoods such as balsam fir, spruce (red, white, Norway), and/or white pine depending upon availability and site conditions. The goal is to create young forest softwood cover (27 acres).
  - **Stand B5:** This is an oak stand with a mix of red oak, red maple, and white pine. The stand will be thinned to remove low-quality trees to provide the higher quality trees more room to grow. The thinning will maintain intermediate-mature aged forest (10 acres).
  - **Stands D13, J6, and K8:** These are northern hardwood-eastern hemlock stands with a mix of eastern hemlock, red maple, yellow birch, black cherry, and sugar maple. These stands will be treated with shelterwood cuts to encourage the

regeneration of eastern hemlock seedlings. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest habitat (190 acres).

- **Stands C8, C13, D1, D5.2, E44, E45, E46, E49, E51, E60, E61, and E62:** These are small, overstocked Norway spruce plantations that will be clearcut to create young forest (67 acres).
- **Stands C9.2 and K9:** These are northern hardwood stands with a mix of sugar maple, black cherry, and red maple. These stands will be thinned to remove low-quality trees to provide the higher quality trees more room to grow. The thinning will maintain intermediate-mature aged forest (159 acres).
- **Stands C14, E9, J9, and L2:** These are red pine plantations that will be clearcut and planted with softwoods such as balsam fir, spruce (red, white, Norway), and/or white pine depending upon availability and site conditions. The goal is to create young forest softwood cover (46 acres).
- **Stand E121:** This is a pioneer hardwood stand with a mix of aspen, red maple, and black cherry and will be clearcut to create young forest and encourage the regeneration of aspen (10 acres).
- **Stand F2:** This is a white pine plantation that will be clearcut to create young forest (5 acres).
- **Stand F5:** This is a red pine and Norway spruce plantation that will be shelterwood cut to encourage the regeneration of spruce. The overstory trees will eventually be removed in the future when desirable regeneration has become established. The result will be young forest habitat (54 acres).
- **Stands F15.2 and G1.2:** These are stands of sapling size approaching pole timber size trees. A crop tree release will provide more room and sunlight for higher quality trees to grow and help to maintain the health of the stands (38 acres).
- **Stand H4:** This is a northern hardwood stand with a mix of red maple, black cherry, and sugar maple that will be seed tree cut to create young forest (44 acres).
- **Stand I5:** This is a plantation of red pine and white pine that will be clearcut to create young forest (7 acres).
- **Stands I7 and K2:** These are northern hardwood stands with a mix of red maple, sugar maple, yellow birch, and black cherry that will be patch clearcut to create young forest (85 acres).
- **Stand J10.1:** This is a plantation of Japanese larch and white spruce that will be clearcut to create young forest (11 acres).
- **Stand J10.2:** This is a Norway spruce plantation that will be clearcut to create young forest (4 acres).
- **Stand J12:** This is a pioneer hardwood stand with a mix of red maple, aspen, and apple trees. The apple trees will be released by removing trees and brush adjacent to each apple tree to provide them with more sunlight. This will encourage apple production to provide forage for wildlife (2 acres).

In Tables 6 and 7, the total acres of each stand are listed in the ‘Acres’ column. In this plan the entire area of each stand is planned to be treated unless otherwise noted under ‘Treatment Type’

column. For example, stand C9.2 has a total size of 251 acres but we only plan to treat 122 acres during this plan period.

Table 6. Forest management schedule for the first five-year period of this HMP (2018-2022).

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
A1	62	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Plantation: White Pine and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (30 acres)
A2.1	4	Medium Sawtimber >18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
A2.2	8	Small Sawtimber 12”-18” DBH	Plantation: Red Pine, White Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
A4.3	10	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood
A5	7	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
A6	21	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Northern Hardwood-Eastern Hemlock and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (10 acres)
A7.1	6	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
B3.3	10	Small Sawtimber 12”-18” DBH	Plantation: White Pine, Scotch Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C9.2	251	Medium Sawtimber >18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling and Natural Forest: Northern Hardwood	Even and Uneven Aged	Patch Clearcut (25 acres) and Thinning (97 acres)
C11	73	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling and Natural Forest: Northern Hardwood-Eastern Hemlock	Even Aged	Patch Clearcut (15 acres)
C12	124	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Seedling/Sapling and Natural Forest: Northern Hardwood-White Pine	Even and Uneven Aged	Patch Clearcut (33 acres) and Thinning (17 acres)
C15	14	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut

Table 6. Continued

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
C16.1	5	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D10	3	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Northern Hardwood-White Pine	Even Aged	Apple Tree Release (1 acre)
D16	4	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
D17	3	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D19	7	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood
D22	5	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E2	15	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood
E17	52	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Northern Hardwood Hemlock and Natural Forest: Seedling/Sapling	Even Aged	Shelterwood (15 acres)
E19	21	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning (18 acres)
E21	3	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E22	9	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Northern Hardwood-White Pine	Uneven Aged	Thinning
E44	19	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree (4 acres)
E71	123	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (60 acres)
E110	6	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood

Table 6. Continued

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
G1.1	20	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
G8	6	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
H3	50	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
H10	32	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
I2	56	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Plantation: White Pine and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (38 acres)
J2	93	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Plantation: White Pine and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (40 acres)
J8.1	19	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Northern Hardwood-White Pine and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (3 acres)
J8.2	13	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Plantation: White Pine and Natural Forest: Seedling Sapling	Even Aged	Patch Clearcut (12 acres)
J11.1	46	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Northern Hardwood-White Pine and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (11 acres)
J11.2	19	Small Sawtimber 12”-18” DBH	Natural Forest: White Pine	Natural Forest: White Pine and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (14 acres)
K7	9	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
K10	13	Small Sawtimber 12”-18” DBH	Plantation: Japanese Larch	Plantation: Seedling/Sapling	Even Aged	Clearcut
K11	9	Pole Timber 6”-11” DBH	Plantation: Bucket Mixes	Plantation: Bucket Mixes	Uneven Aged	Thinning

Table 6. Continued

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
K16	22	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
L1	28	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Northern Hardwood-White Pine	Uneven Aged	Thinning
L9.1	11	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Seedling/Sapling	Even Aged	Thinning
L9.2	4	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
L11	138	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood
L12	10	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Oak	Natural Forest: Northern Hardwood-Oak	Uneven Aged	Thinning
L14	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood	Even Aged	Apple Tree Release

Table 7. Forest management schedule for the second five-year period of this HMP (2023-2027).

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
A12	8	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood
A15.1	57	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (25 acres)
B4	27	Small Sawtimber 12”-18” DBH	Plantation: Japanese Larch, Scotch Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
B5	10	Small Sawtimber 12”-18” DBH	Natural Forest: Oak	Natural Forest: Oak	Uneven Aged	Thinning
C8	12	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C9.2	251	Medium Sawtimber >18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning (97 acres)

Table 7. Continued

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
C13	3	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C14	10	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
D1	11	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D5.2	6	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D13	102	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood (60 acres)
E9	4	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
E44	19	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (15 acres)
E45	3	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E46	2	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E49	2	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E51	1	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E60	6	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E61	4	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E62	2	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E121	10	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
F2	5	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
F5	54	Small Sawtimber 12”-18” DBH	Plantation: Red Pine, Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Shelterwood
F15.2	36	Sapling <9” DBH	Natural Forest: Seedling/Sapling	Natural Forest: Seedling/Sapling	Even Aged	Crop Tree Release
G1.2	2	Sapling <9” DBH	Natural Forest: Seedling/Sapling	Natural Forest: Seedling/Sapling	Even Aged	Crop Tree Release

Table 7. Continued

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
H4	44	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
I5	7	Small Sawtimber 12”-18” DBH	Plantation: Red Pine, White Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
I7	70	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (35 acres)
J6	135	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Easter Hemlock	Natural Forest: Northern Hardwood-Hemlock and Natural Forest: Seedling/Sapling	Even Aged	Shelterwood (100 acres)
J9	7	Pole Timber 6”-11” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut
J10.1	11	Small Sawtimber 12”-18” DBH	Plantation: Japanese Larch, White Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
J10.2	4	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
J12	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood	Even Aged	Apple Tree Release
K2	85	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut (50 acres)
K8	44	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Eastern Hemlock	Natural Forest: Northern Hardwood Hemlock and Natural Forest: Seedling/Sapling	Even Aged	Shelterwood (30 acres)
K9	62	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning
L2	25	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Plantation: Seedling/Sapling	Even Aged	Clearcut

Stand locations and planned management actions are also summarized in Figures 11-14. Specific forest stand descriptions and detailed management prescriptions will be prepared for each proposed forest management area prior to implementation (see template, Appendix C).

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 8).

Table 8. Best Management Practices for forest management on WMAs.

Resource	**Guidance Document** [17]
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:

In general, forest management from April-July will be kept to a minimum to avoid bark-slip season, avoid what are typically wet ground conditions, and minimize negative impacts to a host of forest-dwelling wildlife that is breeding and rearing young during those months. However, some areas of Happy Valley WMA may be managed during the summer and fall due to inaccessibility during the winter because of the seasonal nature of the roads. Given that large parts of the property are accessible only by using miles of seasonal roads, logging and contractor access to the core areas of the property may only be an option during the summer and fall months. Timber management on trees greater than three-inch diameter at breast height (DBH) will be restricted to October 1 through March 31 unless acoustic surveys are conducted to determine the presence/absence of protected bat species on the work locations. If species such as Northern long-eared bat and tri-colored bat are not found to be using project sites, the seasonal restrictions can be modified. While not yet listed, tri-colored bat is likely to be listed in the near future and we will add extra precautions to sites found to have this species.

Given the WMA's dense and expansive forests, it is a known location for nesting red-shouldered and broad-winged hawks. The area is historically so well known for forest-nesting raptors, it has been identified as an Important Bird Area (IBA)[18] by the Audubon Society specifically for its value to those species. These species utilize a mix of mature hardwood/coniferous forest, while frequenting other stands for feeding. With responsible forest management, additional young forest acreage will provide healthy populations of small mammals in close proximity to more mature forests. Thinning and selective harvest of mature forests can also benefit these forest raptors by increasing understory growth while maintaining large nesting trees and an intact yet thinned canopy. Many times, red-shouldered hawks prefer very wet locations for their nest sites, and with the nature of logging, those particular sites may not overlap with proposed management. Pre-harvest surveys using acoustic call-back techniques may be used to determine current use of a project area by raptors. With or without surveys, if an active nest is located within a project site, the nest can be buffered from cutting operations, or the project may be suspended until nesting is complete. Many of the other forest species of concern likely to be present on Happy Valley WMA will likely benefit from the increased forest diversity the young forest project will create. While they may not nest in young forest, many species use freshly cut areas to feed on the abundant vegetation and resulting invertebrate populations. Maintaining a

[17] All guidance documents referenced here are available online at http://www.dec.ny.gov/outdoor/104218.html.
[18] 2005. Burger, M.F. and J.M. Liner. 2005. Important Bird Areas of New York. Audubon New York. Albany, NY.

healthy percentage of both mature and young forest ensures habitat is available for a variety of species throughout the year.

Forest Health Considerations:

In stands where native and non-native vegetation has been identified as interfering with desirable regeneration, additional treatments of that interfering vegetation may be required to promote the development of desired regeneration. Currently, major insect pests such as Asian longhorn beetle (ALB) or emerald ash borer (EAB) are not known to occur on Happy Valley WMA. However, EAB has become established in New York and its population continues to expand. The closest known occurrence of EAB is in nearby Onondaga County. It is likely that EAB could eventually become established at Happy Valley WMA. If that occurs, the plan will be amended to reflect that new development and any additional amendments (such as changing the implementation plan and anticipated schedule) will depend on the scope and severity of the infestation. Currently, managers do take into consideration the likelihood of an EAB infestation when preparing timber sales and generally tend to mark many, if not all, ash trees for cutting in the sale area when possible. DEC staff will continually monitor for invasive pests and will utilize adaptive management when necessary.

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 of the 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, 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 or planting of desired tree species. Pre- and post-treatment actions to promote the desired forest regeneration will be addressed in detail in the silvicultural prescriptions.

MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife responses have been achieved by the management outlined above, pre- and post-management assessments will be conducted in accord with guidelines in the *Young Forest Initiative Monitoring Plan*.[19] 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 Happy Valley WMA, which may be assessed to determine response to management, include:

- Snowshoe hare
- Ruffed grouse
- Wild turkey
- American woodcock

[19] The Young Forest Initiative Monitoring Plan is available online at http://www.dec.ny.gov/outdoor/104218.html.

Seasonal songbird monitoring via point counts will also be used on select sites to better evaluate and understand the songbird response to forest management. Acoustic bat surveys may be used to determine the presence of at-risk bats and management actions can then be tailored to mitigate any potential disturbance to those species. Non-YFI target species of forest and young forest habitats of interest on Happy Valley WMA may include:

- Canada warbler, brown thrasher, golden-winged warbler
- Northern goshawk, red-shouldered hawk, broad-winged hawk
- Northern long-eared bat, tri-colored bat, little brown bat
- Black-throated blue warbler, wood thrush

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.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

Currently, there are no managed shrublands on Happy Valley WMA. Shrubland habitat does exist on the property in wetland areas and along drainages and these shrublands have been included in the Wetland (natural) cover type in this plan. Considering its location geographically, the current makeup of habitat and our target species for management, creating additional shrubland habitat is not a priority at this time.

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. Grassland management will restore and maintain habitat that will be used by migratory birds as well as contribute to the goal of building self-sustaining grassland bird populations. However, in the case of Happy Valley WMA, open areas do not meet the standards in size or composition to benefit grassland-dependent species. Areas on the WMA that are described in this section are maintained as forest openings and edge habitat for species that benefit from habitat diversity.

MANAGEMENT OBJECTIVES

- Maintain the existing 29 acres of grassland habitat through rotational mowing and other grassland improvement projects.
- Monitor for invasive plant species.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

There are currently 29 acres of grassland/open space habitat split between 13 stands. They range from 1-4 acres in size and are scattered across property. These small open areas are designed and maintained as habitat for wild turkey poults, white-tailed deer, and other species that benefit from forest openings.

Species that benefit from grassland best management practices include:

- American woodcock, wild turkey
- Field sparrow, song sparrow, Eastern towhee
- White-tailed deer, Eastern cottontail

MANAGEMENT HISTORY

Open areas have been maintained through mowing to provide habitat diversity and edge habitat. Between 2006 and 2008, these open areas were limed, fertilized, and planted with cool season grasses such as birdsfoot trefoil, clover, and Canada wild rye. Unfortunately, these seeding attempts were thwarted by off road use of motorized vehicles. Current efforts involve asset protection through the installation of barriers and/or gates followed by rut leveling and replanting. In 2016, a gate and barrier were installed at Stand J940 followed by rut leveling and clover planting in 2017.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2018-2027** (Figures 11-14):
    - **Stands B940, C940, C941, D940, E940, E941, E942, G940, H940, J940, J941, K940, and L940:** Continue rotational mowing as needed. Establish and maintain feathered edges along field margins by removing trees and brush around field edges.
    - **Stands B940, D940, E940, E941, and G940:** Evaluate soil pH - lime if needed, and reseed with mixture of clover and/or deer tongue. Establish and maintain feathered edges along field margins by removing trees and brush around field edges.

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*.[20] In particular, refer to the plan for species-specific habitat requirements and detailed recommendations regarding grassland management and restoration techniques.

General Management Recommendations

- Consider the surrounding landscape when making management decisions.
- 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.

[20] 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.

- 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 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.
- 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

No evaluation of grassland habitat or the species using them specifically is planned or needed at this time.

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 Happy Valley WMA at this time. Future agricultural agreements may be evaluated or considered on a case-by-case basis to assist in the creation or improvement of grassland/open space habitat on the WMA.

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 of quality wetlands (1,099 acres).
- Maintain existing infrastructure (e.g., dikes, water control structures).
- Conduct periodic drawdowns to encourage emergent vegetation growth.
- Maintain wetland habitat to provide for species such as wood ducks, otters, and amphibians.
- Monitor for and treat invasive vegetation.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

Presently there are 714 acres of natural wetland and 385 acres of impounded wetland. There are eight named impoundments including Mosher Pond (stand D910), Long Pond (stand F910), Whitney Pond (stand I910), St. Mary's Pond (stand G911), Fredrick Britton Pond (stand B910), Guy Stevens Pond (stand E910, Dams #4, #8, and #9), Howard Nelson (stand D911, Dam #5) and Slippery Corner (stand G910, Dam #7) totaling 345 acres. Stands E911 (Dam #3), H910 (Dams #1 and #2), and L910 (Dam #6) are unnamed impoundments (40 acres). Ten wetlands are regulated by Article 24 of the Environmental Conservation Law and multiple additional wetlands are shown on the National Wetlands Inventory. Wetlands classified as freshwater ponds, lacustrine, and riverine are considered open water habitat types in this plan and are further discussed in that section.

Forested wetland at Happy Valley WMA.

Photo: Region 7 Bureau of Wildlife

The wetlands provide habitat for species such as:

- Wood duck, hooded merganser, mallard, American black duck
- Beaver, otter, mink
- Bog turtle, four-toed salamander, Jefferson salamander

MANAGEMENT HISTORY

Many of the ponds (impoundments) on Happy Valley WMA are manmade. From 1937-38 the Works Project Administration and CCC constructed Mosher, Whitney and Long Ponds.[21] During the 1950s, emphasis on waterfowl management saw the construction of Frederick Britton, Guy Stevens, Howard Nelson and Slippery Corners Ponds along with the seven other unnamed ponds. It is unknown when St. Mary's Pond was created but the work was likely done prior to 1940.

[21] Happy Valley Wildlife Management Area Source Book, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY.

Throughout the 1960s, '70s and into the '80s, water levels were actively managed in many of these impoundments. Beaver activity has had a profound influence on all of these impoundments, which has led to dike stabilization and water control repairs on Happy Valley Dams 1, 3, 5, 6, and Mosher Pond. Additional repairs are need for Long and Whitney Ponds, Slippery Corners Marsh, Frederick Britton Marsh and Happy Valley Dam #6. Due to these needed repairs, water levels have remained high in these impoundments causing increased coverage of white water lily and a decrease in the diversity of emergent vegetation. Aside from perpetual beaver activity, staff spend additional resources on annual dike mowing.

Whitney Pond (impoundment) on Happy Valley WMA.

Photo: Region 7 Bureau of Wildlife

ANTICIPATED SCHEDULE

- **Management planned for 2018-2027** (Figures 11-14):
  - Maintain the current acreage and quality of wetlands (1,075 acres).
  - **Stands B910, D910, D911, E910, E911, F910, G910, G911, H910, I 910, and L910:** continue routine mowing of dikes, periodic operation of water control structures, and as needed, repair impoundment infrastructure (e.g. dikes, water control structures). Conduct occasional drawdowns to encourage emergent vegetation growth.
  - **Stand F910:** continue repair recommendations identified in Dam Safety Inspection & Hazard Class Screening Report for Long Pond Dam.
  - **Stand I910:** continue repair recommendations identified in Dam Safety Inspection & Hazard Class Screening Report for Whitney Pond Dam.
  - **Stand B910:** revisit former lease agreement with adjoining landowner.
  - **Stand L910:** investigate necessity of impoundment and if feasible, repair dike and water control structure.
  - **Stand G910:** Technical Service Request **(**TSR) previously submitted for this impoundment to evaluate options for future repair or replacement.
  - **Stand H910:** repair water control structure and dike.
  - Monitor for beaver activity and keep control structures and spillways clear of debris.
  - Monitor for invasive plants and evaluate control as needed.

BEST MANAGEMENT PRACTICES

- Protect wetlands from runoff and sedimentation.
- To the extent possible, avoid use of pesticides in surrounding areas.
- Maintain upland habitat buffer for non-breeding habitat.
- Avoid human disturbance during watered periods.[22]

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

MANAGEMENT EVALUATION

DEC staff will conduct routine monitoring to ensure habitats are stable and infrastructure is sound.

A drawdown at Mosher Pond (impoundment) on Happy Valley WMA.

Photo: Region7 Bureau of Wildlife

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 current acreage and quality of open water (20 acres).
- Monitor and control invasive plants as needed.

DESCRIPTION OF EXISTING OPEN WATER HABITAT AND TARGET SPECIES

Portions of Grindstone Creek and North Branch Little Salmon River pass through Happy Valley WMA. In addition, there are two areas (stands) of open water consisting of both man-made and

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

natural ponds totaling 20 acres. Stand J910 is a natural pond, and stand C910 is man-made. These ponds are managed to provide habitat for species such as:

- Wood duck, hooded merganser
- Bog turtle, snapping turtle, spotted turtle

Ponds with dikes and/or control structures are considered impounded wetlands in this plan and are discussed in the Wetlands section above.

Slippery Corners Marsh (impoundment) on Happy Valley WMA.

Photo: Region 7 Bureau of Wildlife

MANAGEMENT HISTORY

Stand C910 is a cluster of three small ponds that appear to be man-made. At this time, no records have been found that show when these ponds were constructed.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2018-2027** (Figures 11-14):
  - **Stands J910 and C910:** Maintain the current acreage and quality of ponds (20 acres).

BEST MANAGEMENT PRACTICES

- Protect ponds from runoff and sedimentation.
- To the extent possible, avoid use of pesticides in surrounding areas.

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

Typical small pond at Happy Valley WMA.

Photo: Region 7 Bureau of Wildlife

MANAGEMENT EVALUATION

Water bodies on Happy Valley WMA are not regularly surveyed. Fisheries surveys may be performed in the future. If any significant species are present, adjustments can be made to the treatment schedule if necessary.

HABITAT MANAGEMENT SUMMARY

In summary, Table 9 lists the habitat management actions planned for Happy Valley WMA over the next ten years. Any substantive changes will be appended to this HMP annually or as needed (Appendix D).

Table 9. Summary of habitat management actions recommended for Happy Valley WMA, 2016-2025. (Also see Figures 11-14.)

Habitat	Management Action	Acres	Timeframe
Forest	Clearcut stands A2.1, A2.2, A5, A7.1, B3.3, C15, C16.1, D16, D17, D22, E21, G8, H3, H10, K7, K10, K16, and L9.2	205	2018-2022
Forest	Patch clearcut stands A1, A6, C9.2, C11, C12, E71, I2, J2, J8.1, J8.2, J11.1, and J11.2	291	2018-2022
Forest	Thin stands C9.2, C12, E19, E22, K11, L1, L9.1, and L12	199	2018-2022
Forest	Release apple trees in stands D10 and L14	3	2018-2022
Forest	Shelterwood cut stands A4.3, D19, E2, E17, E110, and L11	191	2018-2022
Forest	Seed tree cut stands E44 and G1.1	24	2018-2022
Forest	Shelterwood cut stands A12, D13, F5, J6, and K8	252	2023-2027
Forest	Clearcut stands B3, C8, C13, C14, D1, D5.2, E9, E45, E46, E49, E51, E60, E61, E62, E121, I5, J9, J10.1, J10.2, and L2	162	2023-2027
Forest	Thin stands B5, C9.2 and K9	169	2023-2027
Forest	Patch clearcut stands A15.1, E44, I7, and K2	125	2023-2027
Forest	Release crop trees in stands F15.2 and G1.2 and release apple trees in stand J12	40	2023-2027
Forest	Seed tree cut stand I14	44	2023-2027
Grassland	Maintain stands B940, C940, C941, D940, E940, E941, E942, G940, H940, J940, J941, K940, and L940 as needed.	29	2018-2027
Impounded Wetlands	Maintain stands B910, D910, D911, E910, E911, F910, G910, G911, H910, and I910 and L910 as needed.	404	2018-2027

III. FIGURES

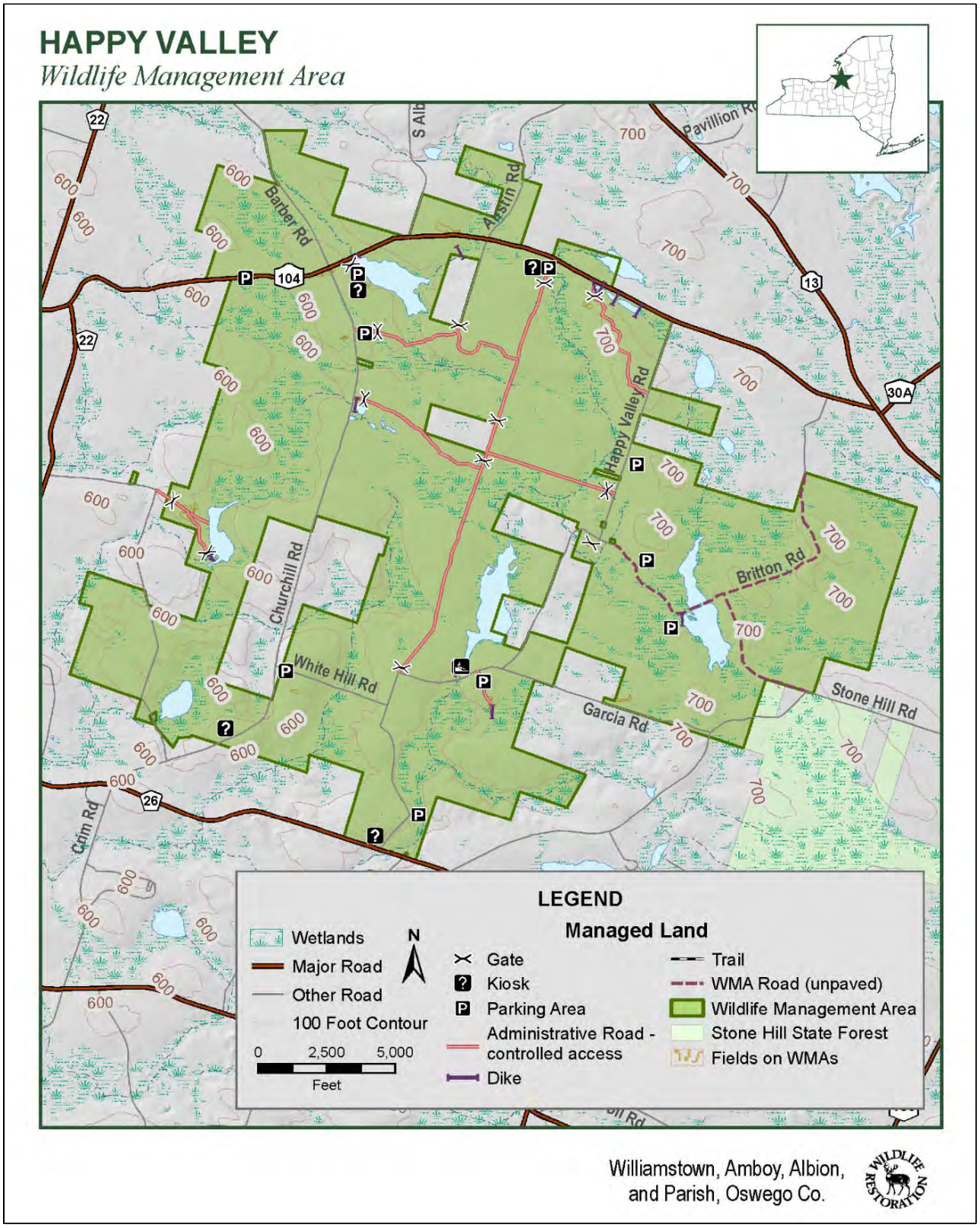

FIGURE 1. Location and access features at Happy Valley WMA.

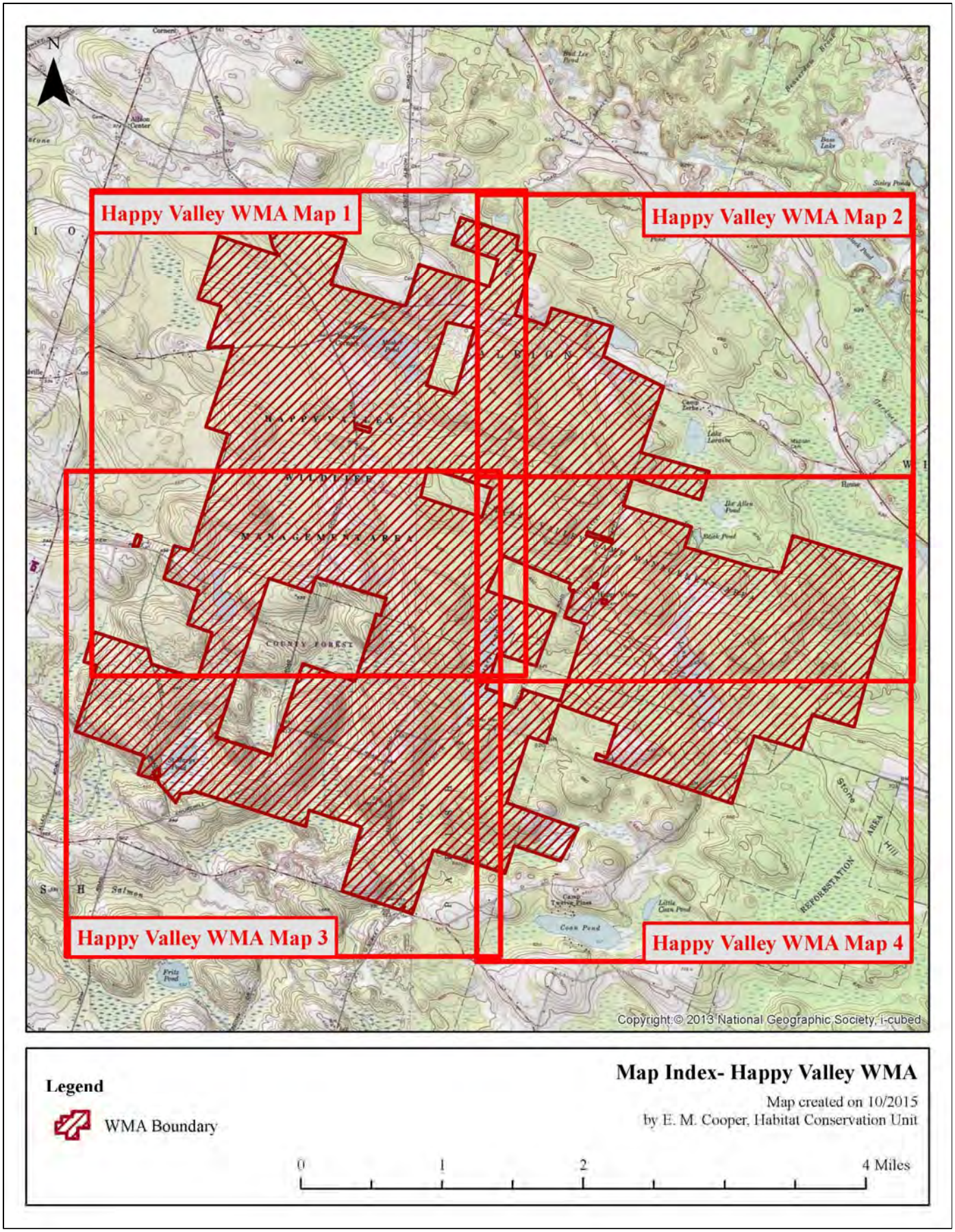

FIGURE 2. Locator map for the ecological communities and habitat maps for Happy Valley WMA.

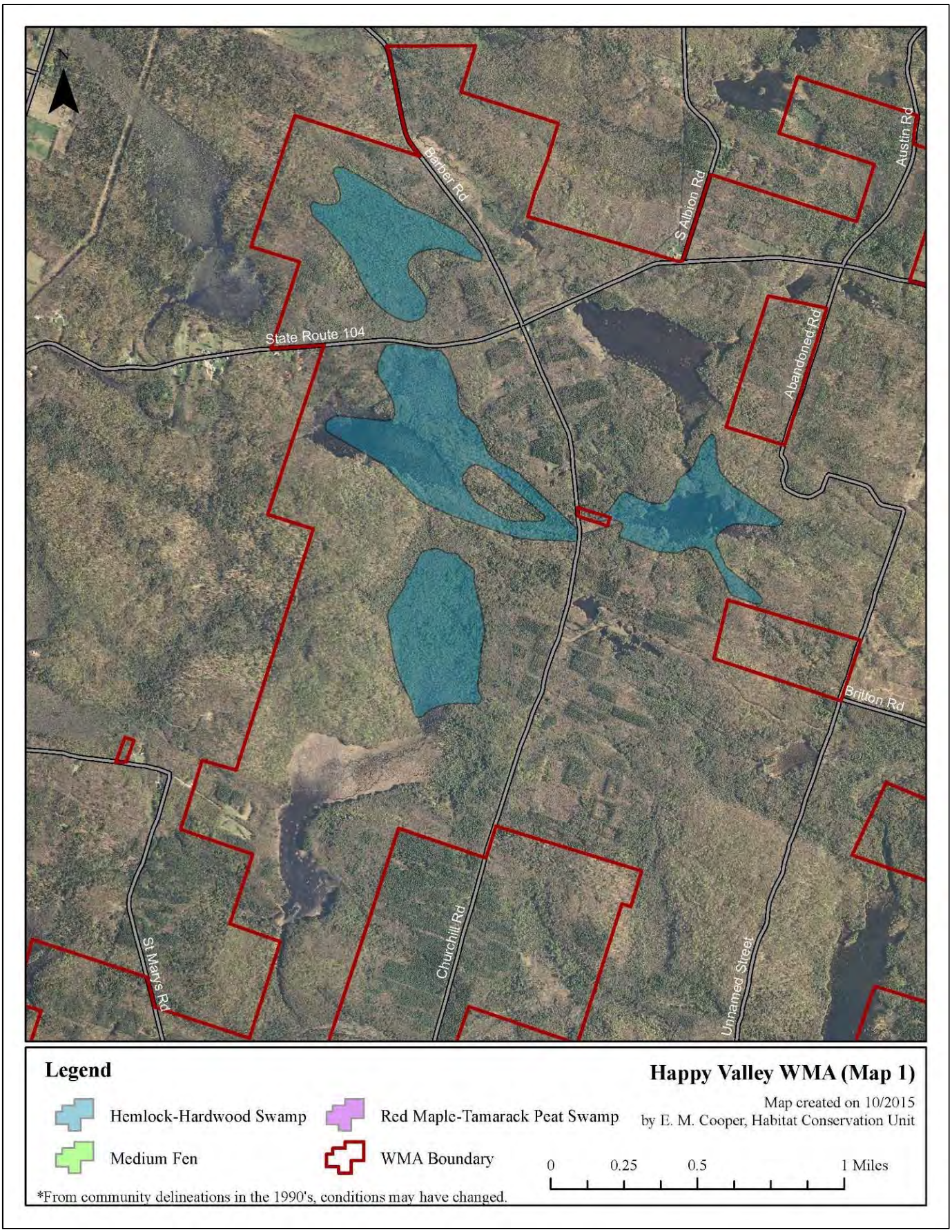

FIGURE 3. Significant ecological communities on Happy Valley WMA (Map 1 of 4). Data from NY Natural Heritage Program.

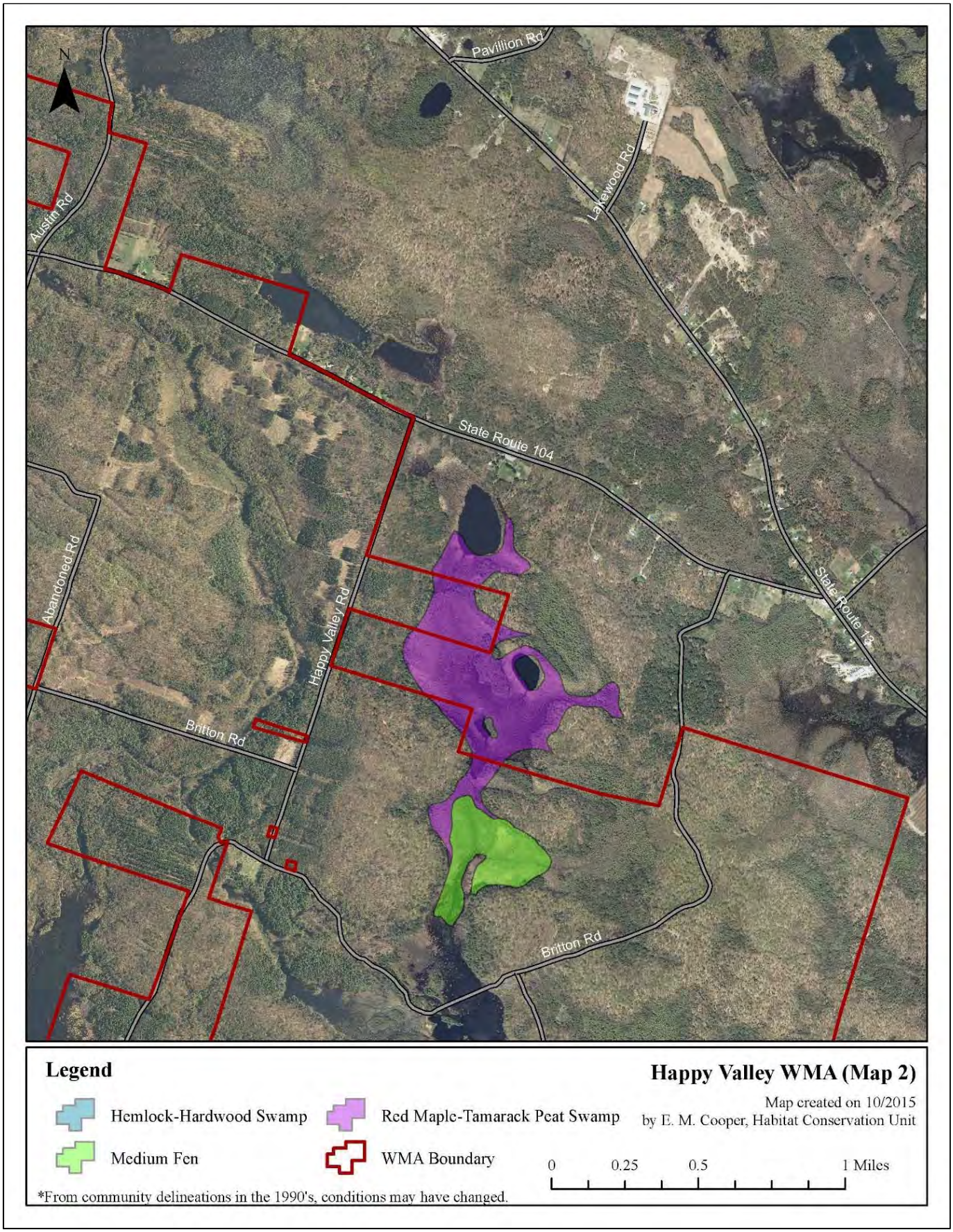

FIGURE 4. Significant ecological communities on Happy Valley WMA (Map 2 of 4). Data from NY Natural Heritage Program.

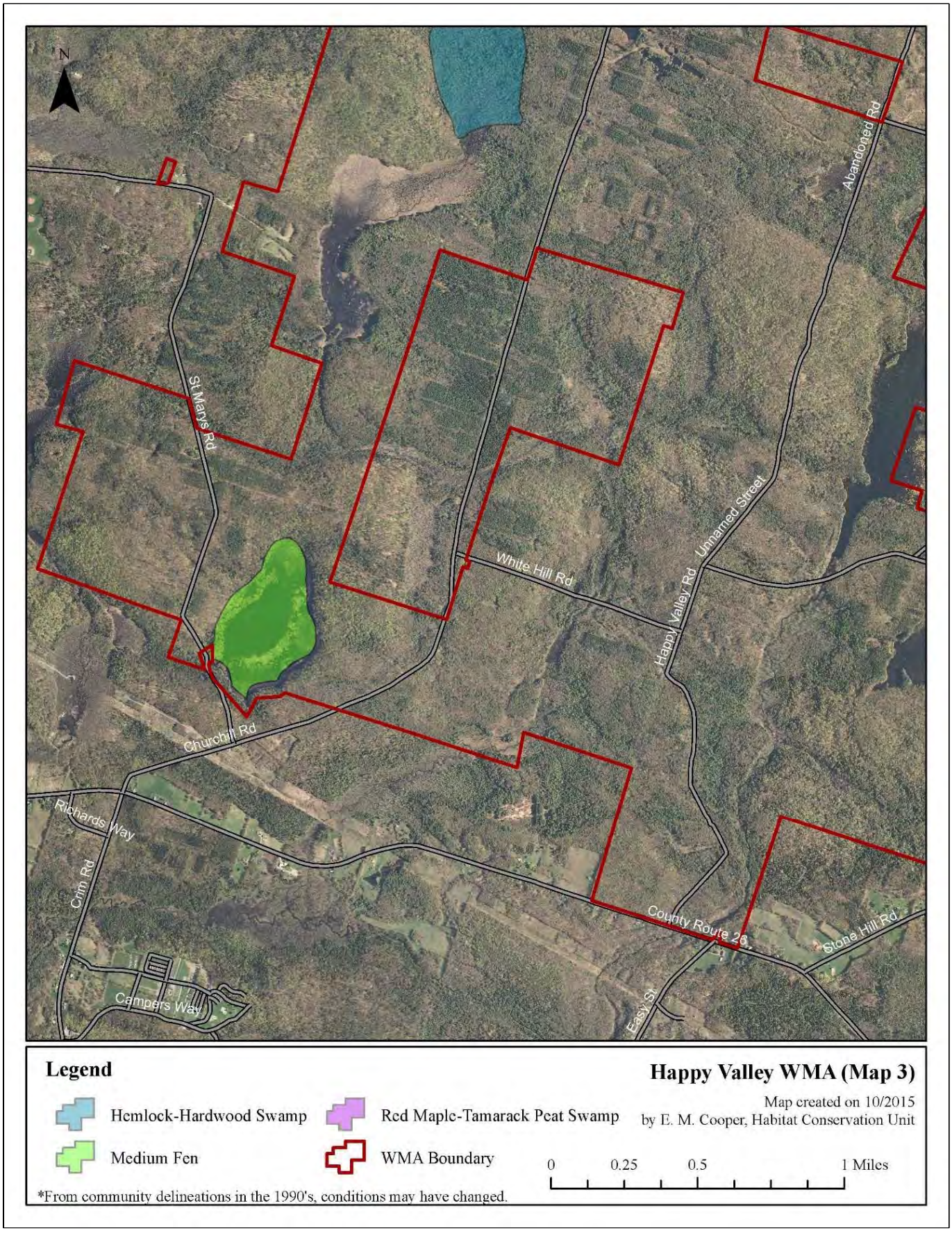

FIGURE 5. Significant ecological communities on Happy Valley WMA (Map 3 of 4). Data from NY Natural Heritage Program.

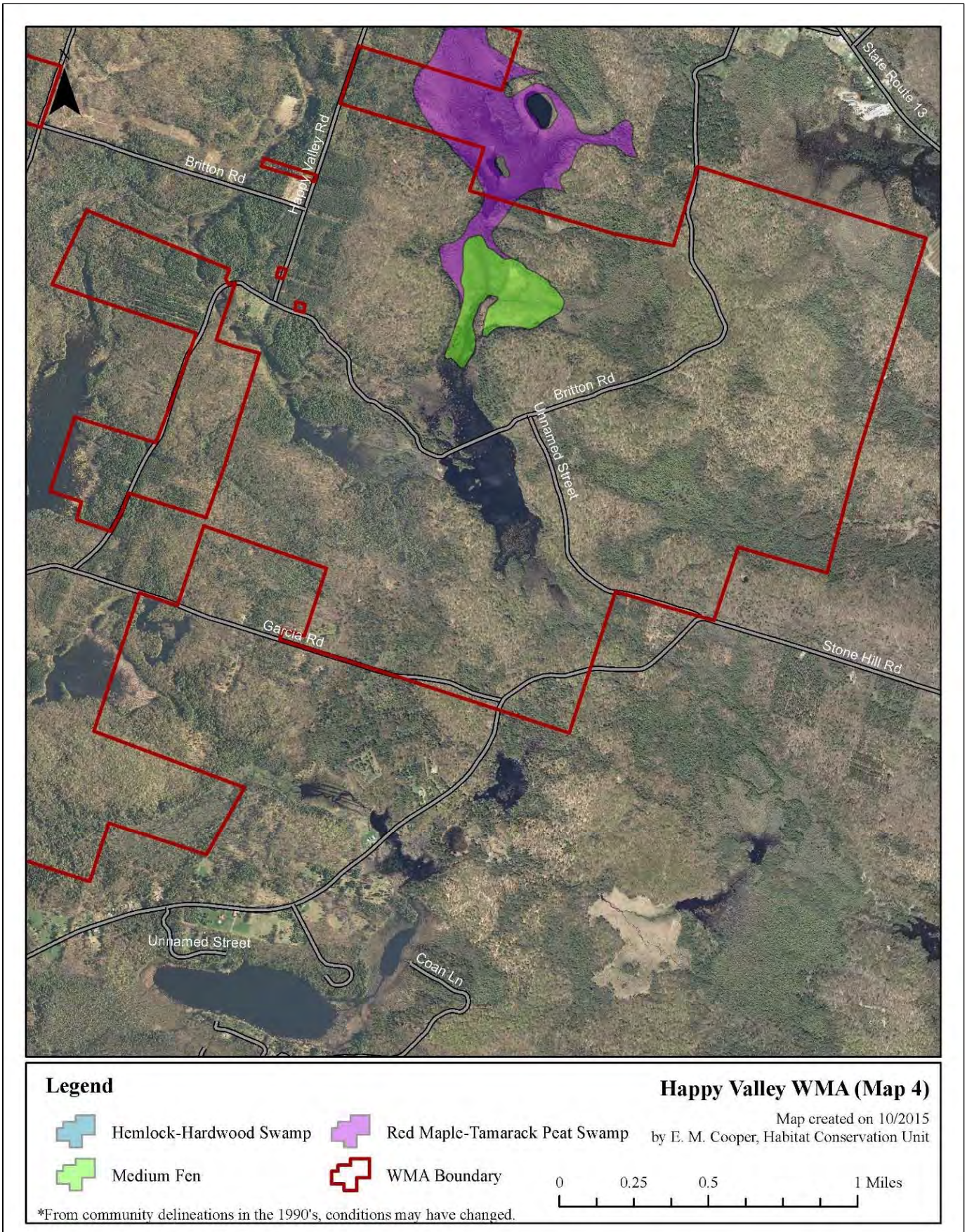

FIGURE 6. Significant ecological communities on Happy Valley WMA (Map 4 of 4). Data from NY Natural Heritage Program.

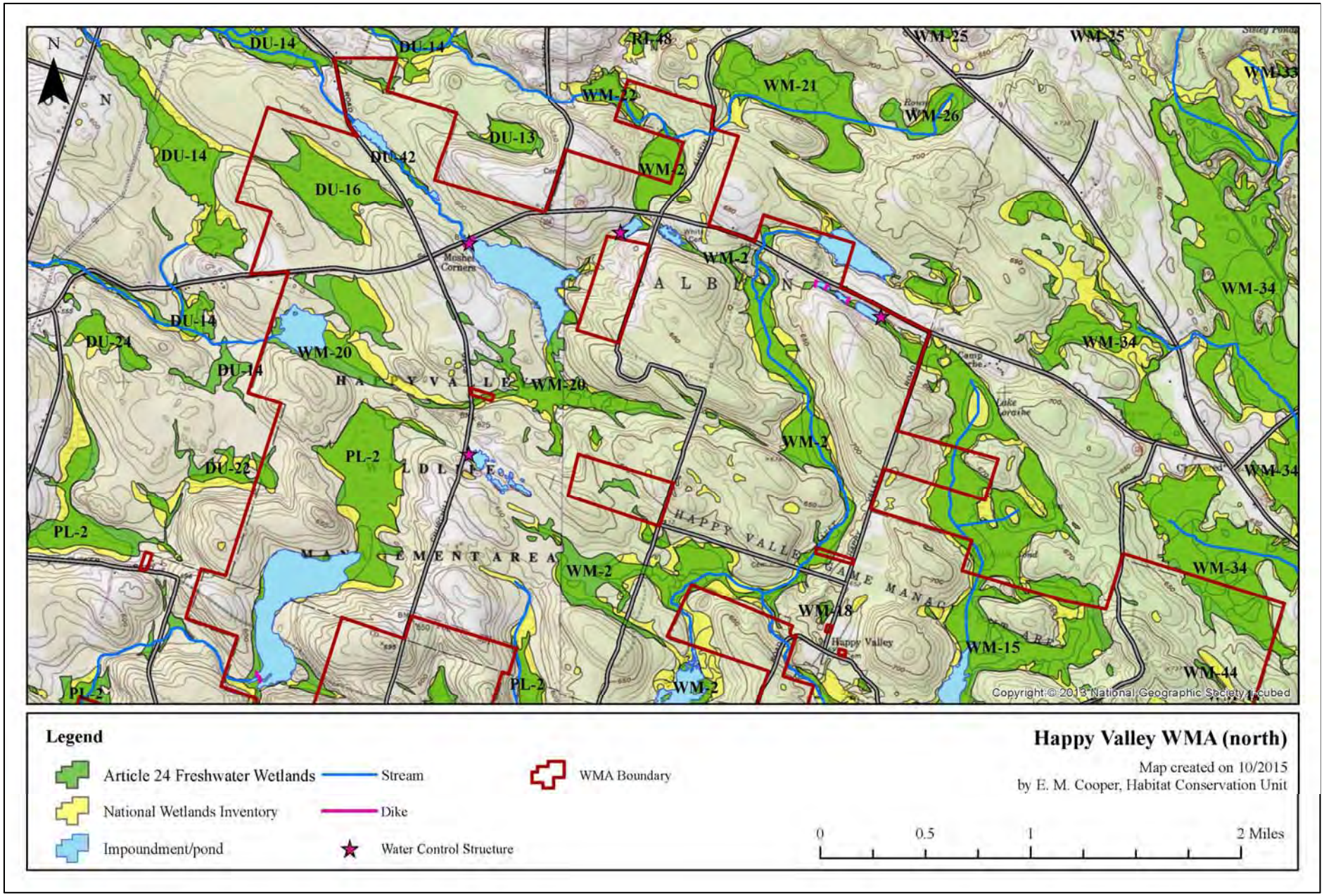

FIGURE 7. Wetlands, open water, and streams of Happy Valley WMA (north). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

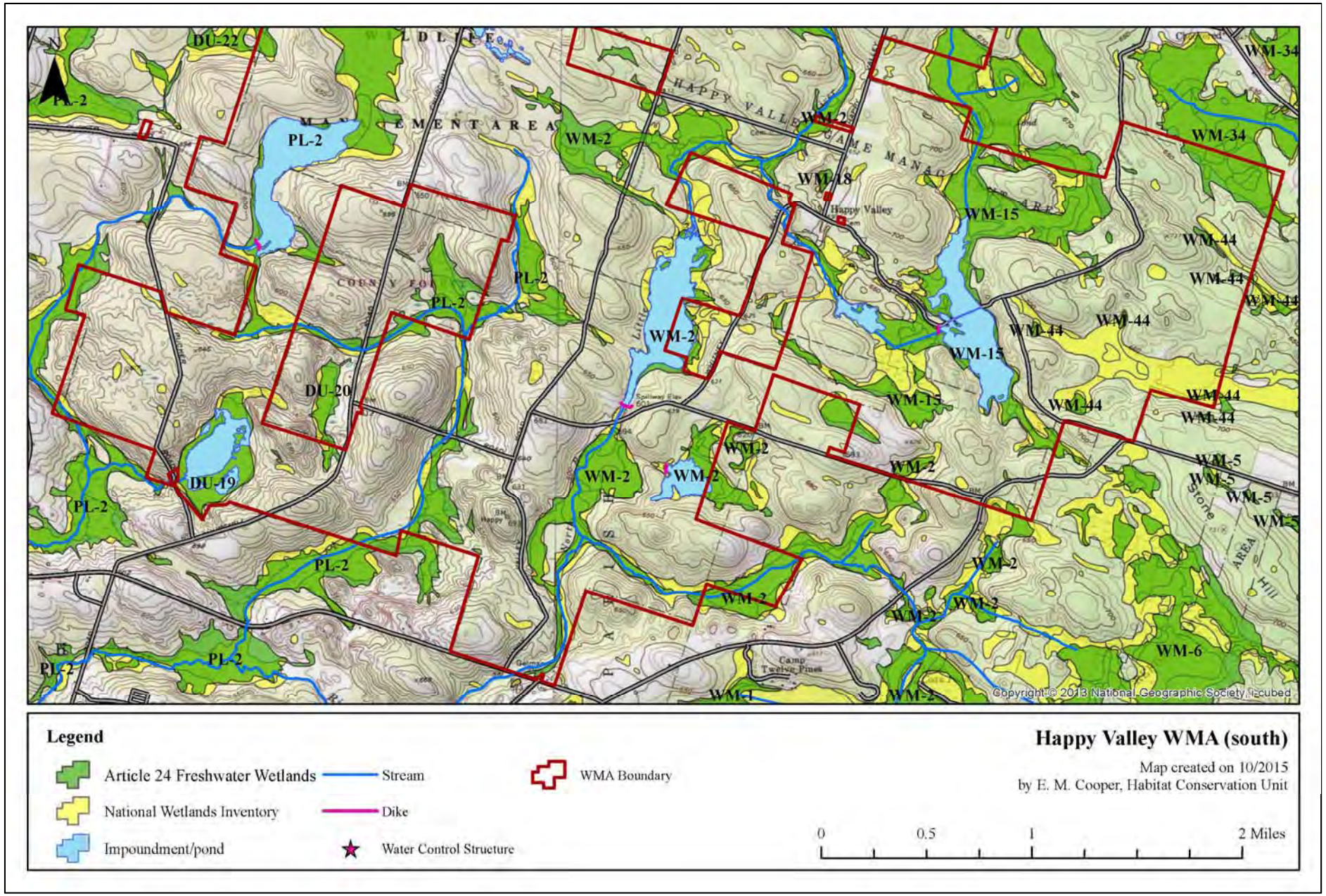

FIGURE 8. Wetlands, open water, and streams of Happy Valley WMA (south). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

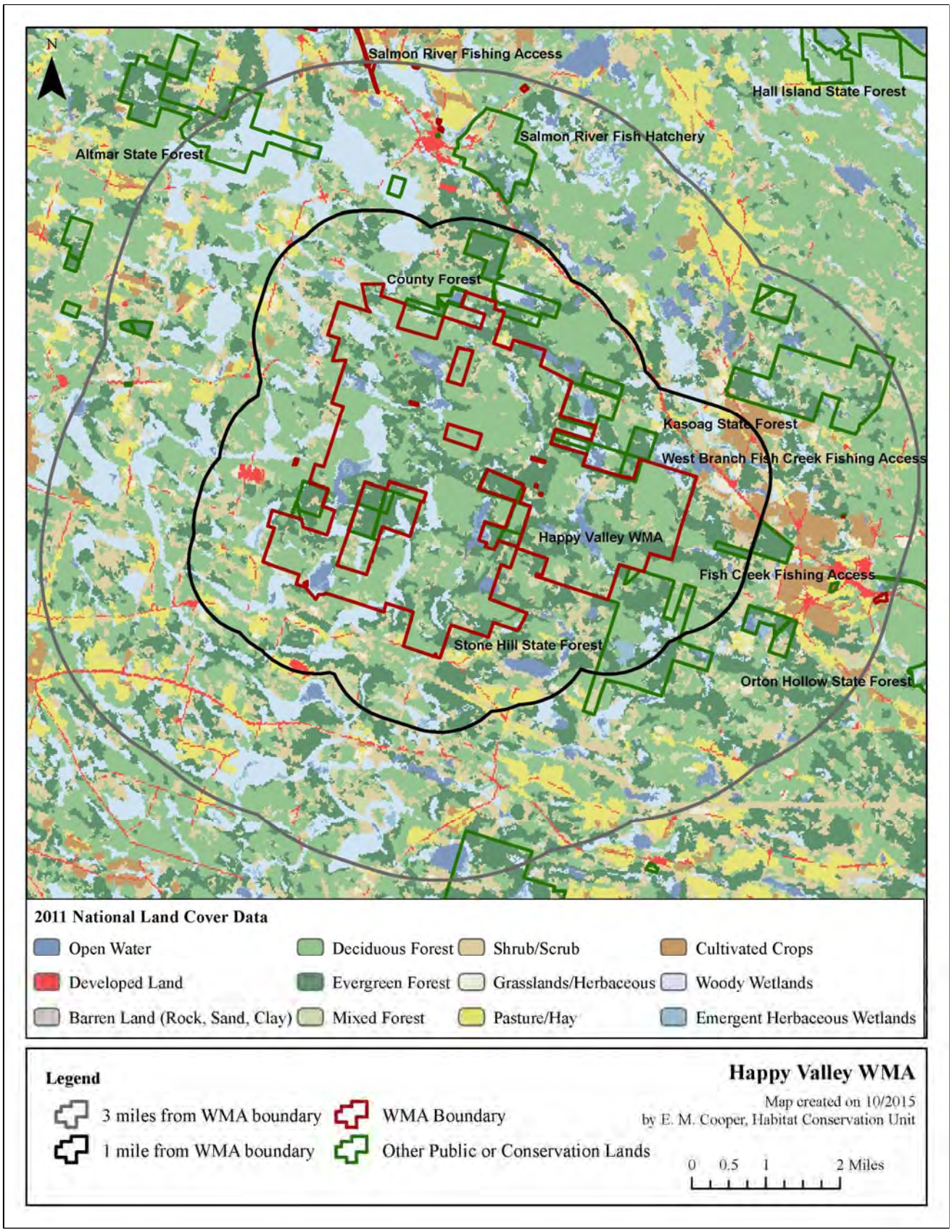

FIGURE 9. Land cover types and conservation lands in the landscape surrounding Happy Valley WMA. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at http://www.mrlc.gov/nlcd2011.php.

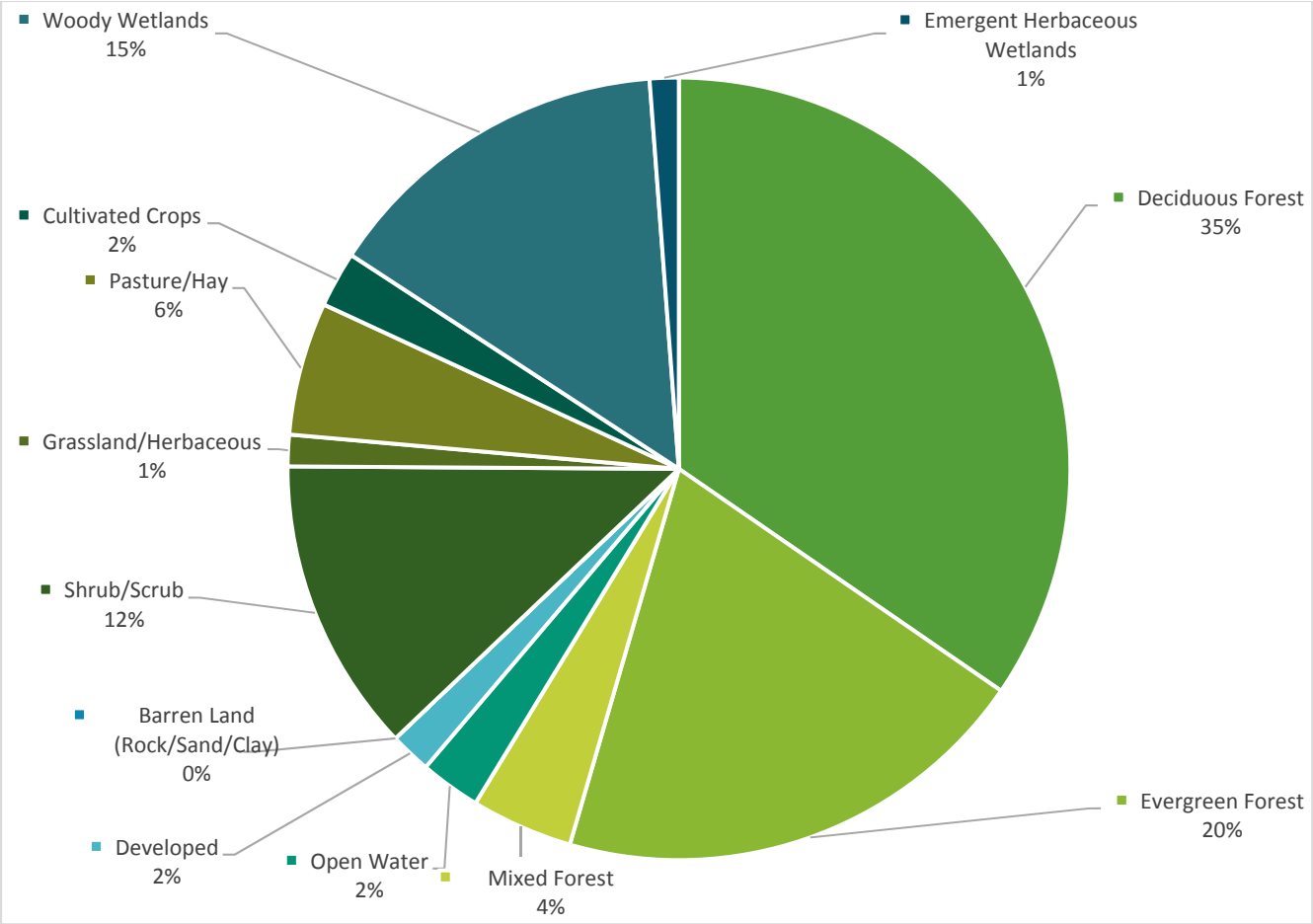

FIGURE 10. Percent cover of land cover types within three miles of Happy Valley WMA.

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.

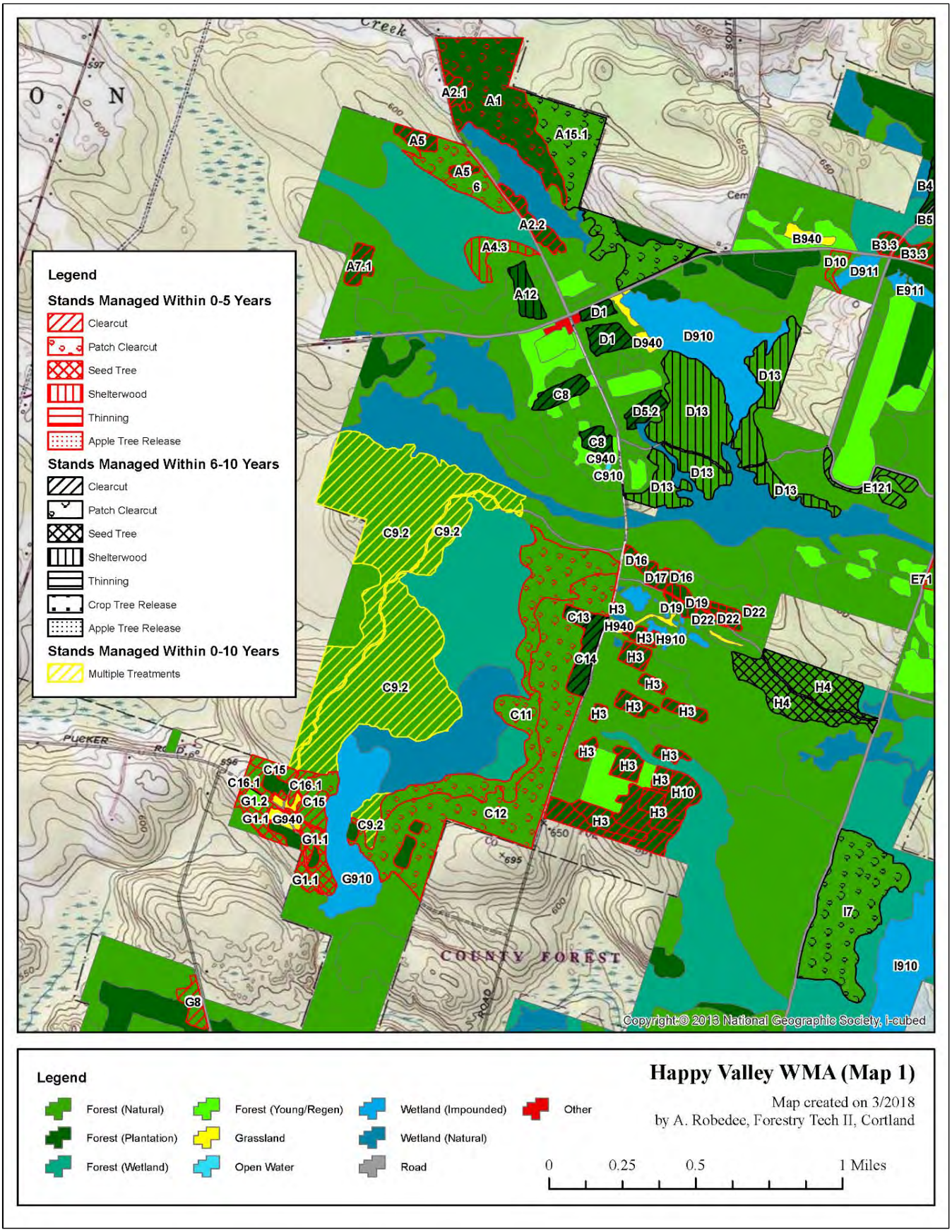

FIGURE 11. Habitat types and locations of proposed management on Happy Valley WMA (Map 1 of 4). Numbers indicate the stand number from habitat inventory.

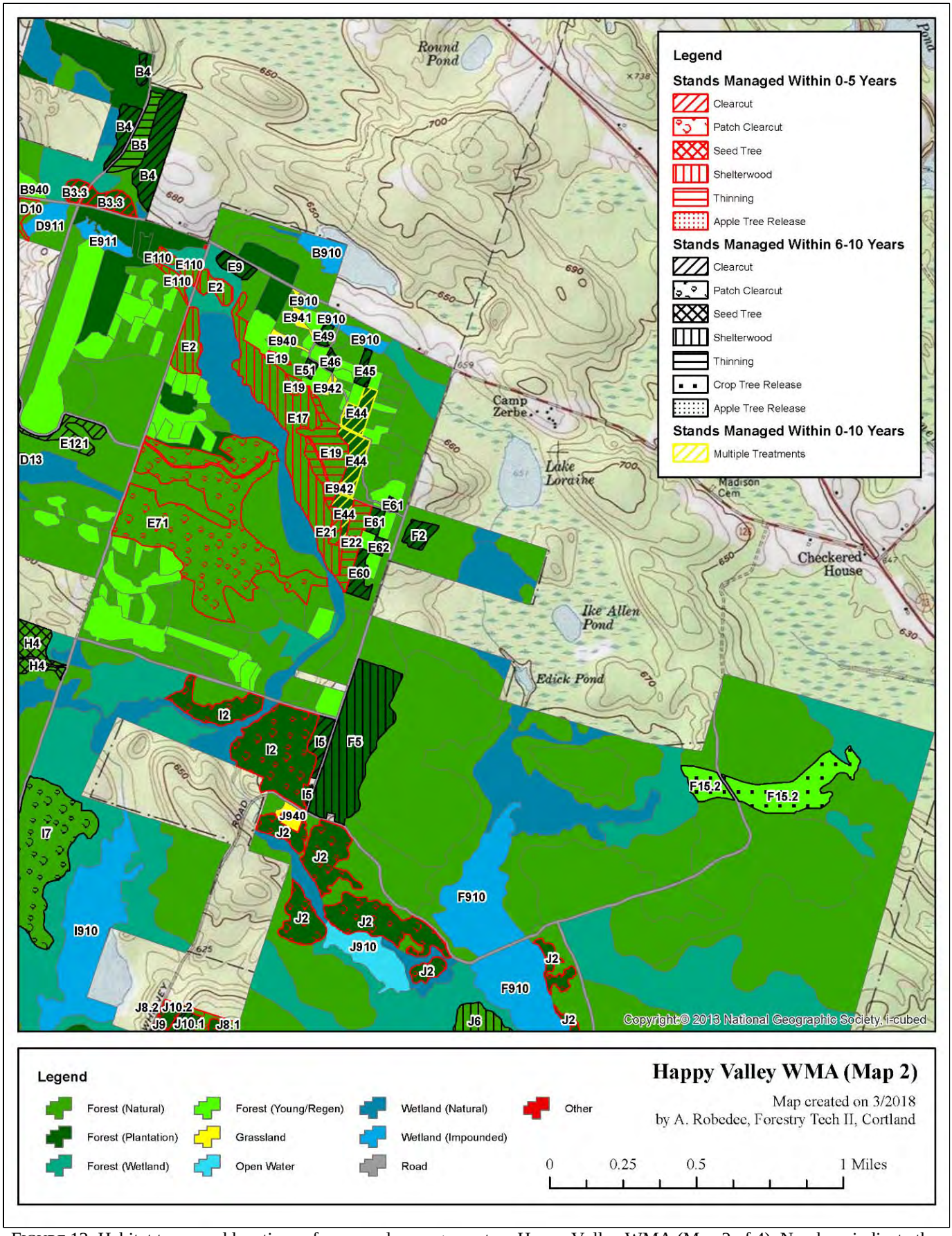

FIGURE 12. Habitat types and locations of proposed management on Happy Valley WMA (Map 2 of 4). Numbers indicate the stand number from habitat inventory.

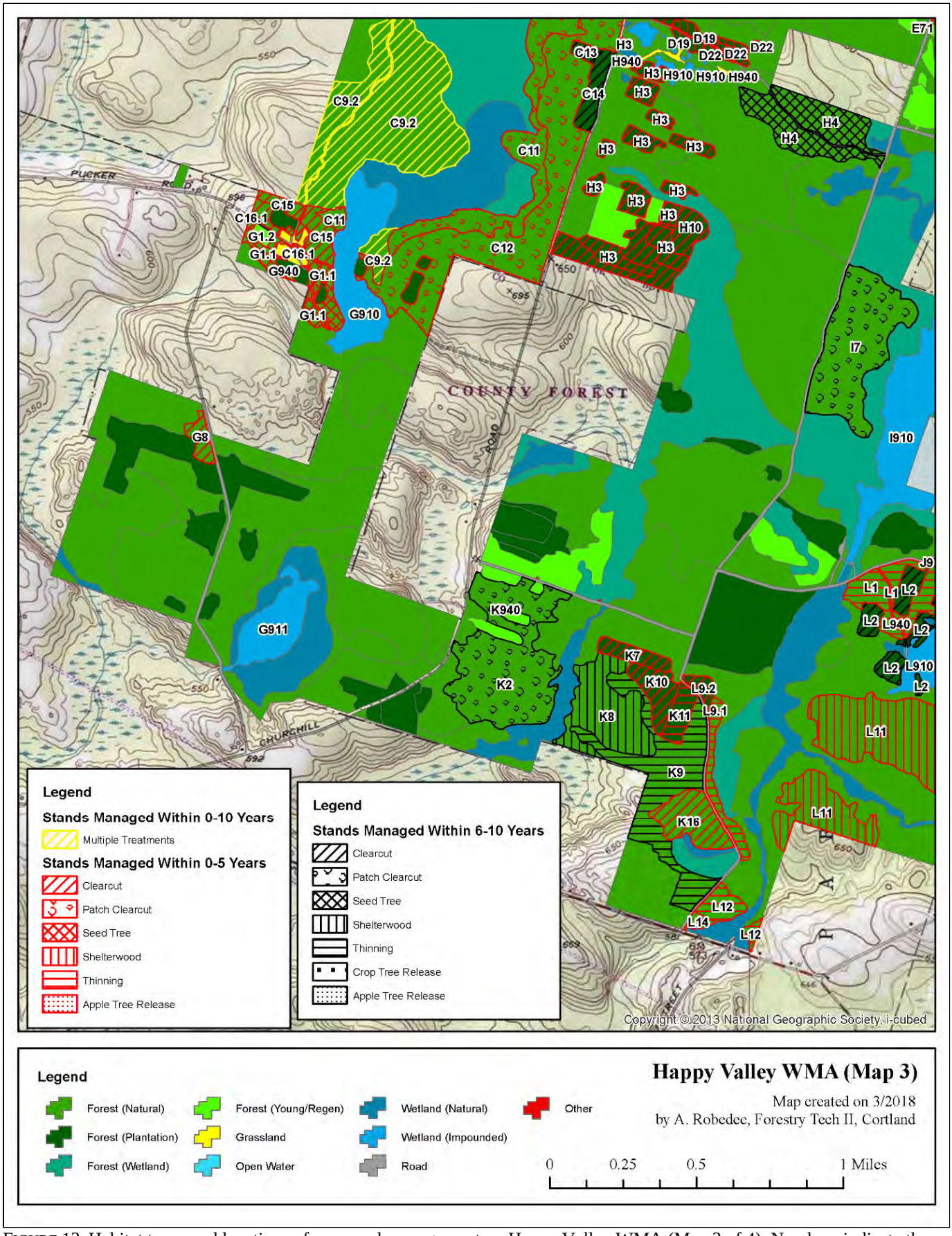

FIGURE 13. Habitat types and locations of proposed management on Happy Valley WMA (Map 3 of 4). Numbers indicate the stand number from habitat inventory.

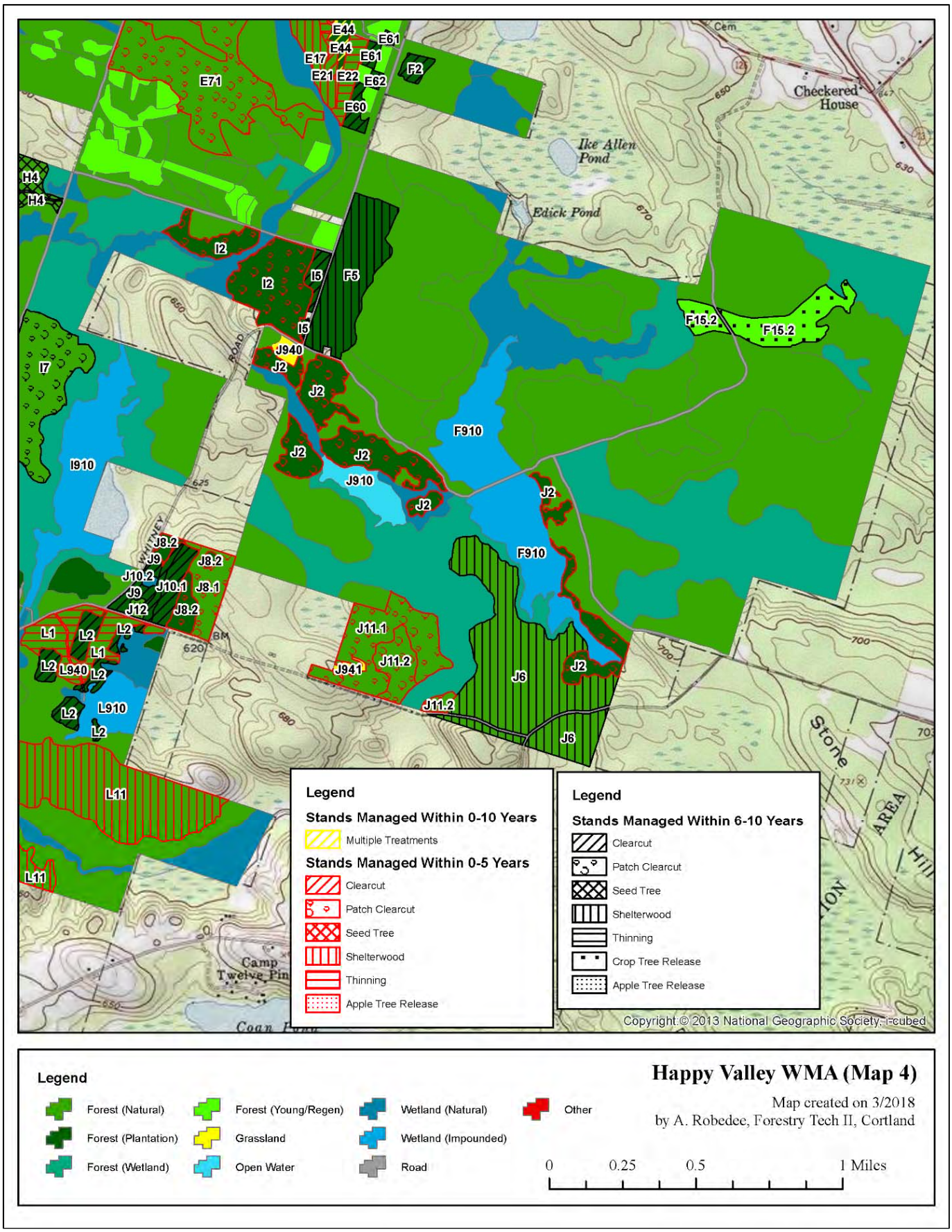

FIGURE 14. Habitat types and locations of proposed management on Happy Valley WMA (Map 4 of 4). Numbers indicate the stand number from habitat inventory.

IV. APPENDICES

APPENDIX A: DEFINITIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

State Rank of Significant Ecological Communities:

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX B. COMPLIANCE WITH STATE ENVIRONMENTAL QUALITY REVIEW

This plan identifies habitat management activities to be conducted on the Wildlife Management Area. These activities were analyzed in the 1979 *Programmatic Environmental Impact Statement on Habitat Management Activities of the Department of Environmental Conservation; Division of Fish and Wildlife* (PEIS), as updated and amended in 2017 by the *Supplemental Final Environmental Impact Statement* (SFEIS).[23] Any activity that exceeds the thresholds of, or was not analyzed in the 1979 PEIS as amended in 2017, will require individual, site-specific environmental review. Environmental assessment forms prepared as a result of this review will be posted on the Environmental Notice Bulletin (ENB).[24]

The activities recommended in this plan:

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

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

APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS

PRESCRIPTION FOR WILDLIFE MANAGEMENT AREA TIMBER HARVEST

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

Species composition:

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

Stand inventory or analysis date:

Regeneration data:

Natural Heritage Element Occurrence layer review:

SMZ layer review:

Retention data:

Soil types and drainage:

Interfering vegetation:

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

Technical guidance/stocking guide:

Treatment purpose:

Management Objective: Even aged or Uneven Aged

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

Clearcut acreage and configuration: (if applicable)

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

Retention considerations and adjustments:

Treatment descriptions:

Name and Title of Preparer:

Central Office Lands and Forests Staff **Date**

Regional Wildlife Manager **Date**

PRESCRIPTION NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX D: AMENDMENTS

Any substantive changes to the habitat management described in this plan will be amended to the plan annually or as needed. Such changes may include: land acquisition, unforeseen natural disturbance, or any other change that alters the need for or the scope, method, or timing of management.
No text was edited within the body of the previously approved HMP, and the following revisions supersedes language from within the HMP. Any references to page numbers, tables, figures or maps indicate where the changes would have been inserted, had they been included in the HMP when it was initially approved.

Revisions

Revisions made on 12/22/2022:

Stands E12, H19 and K6 were not listed for treatment when the HMP was originally approved in 2018. Since then, field inspections showed those stands had apple trees present that are in need of tending in order to try and retain their presence on the WMA.

The changes listed above are referenced in the bulleted list below:

- Page 18: Under *Management planned for 2023-2027* add the following line
    - **Stands E12, H19 and K6**: Stand E12 is a pioneer hardwood stand with a mix of Red maple, black cherry and eastern hemlock. Stand H19 is a northern hardwood stand with a mix of red and sugar maple and white ash. Stand K6 is a northern hardwood stand with a mix of white pine, red maple and black cherry. These stands contain apple trees that will be released by removing trees and brush adjacent to each apple tree to provide them with more sunlight. This will encourage apple production to provide forage for wildlife (9.3 acres).

- Page 23: The stands are being added to *Table 7. Forest management schedule for the second five-year period of this HMP (2023-2027)*.

Table 7. Forest management schedule for the second five-year period of this HMP (2023-2027).

Stand	Acres	Size Class	Forest Type		Management Direction	Treatment Type
			Current	Future		
E-12	7.1	Poletimber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood and Non-Forest: Shrubland	Even Aged	Apple Tree Release (1.7 acres)

Table 7. Continued						
H-19	43.3	Small Sawtimber 12”-17” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Non-Forest: Shrubland	Even Aged	Apple Tree Release (2.3 acres)
K-6	26	Small Sawtimber 12”-17” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Non-Forest: Shrubland	Even Aged	Apple Tree Release (5.3 acres)