Habitat Management Plan
for
Tioughnioga Wildlife Management Area
2017 – 2026

Division of Fish and Wildlife
Bureau of Wildlife

1285 Fisher Ave, Cortland, NY 13045

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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SUMMARY

Tioughnioga Wildlife Management Area (WMA) was acquired by the State in 1937, at which point the property was roughly half forested and half pasture or cropland. Originally, the property was managed to maintain good habitat for game species, especially ruffed grouse, white-tailed deer, and cottontail rabbit through reforestation efforts to provide both cover and food sources. The WMA has reforested naturally over the past 80 years and is still well known as a good destination for hunters, in part due to its extensive apple orchards. The WMA is currently managed to be a diverse mix of early successional habitats, some mature forests, and scattered small wetlands and ponds to create healthy, diverse habitat for the more early successional habitat species. Considering that the surrounding landscape is mostly forest or agricultural lands, by providing a large percentage of grassland, young forest, and shrubland, while maintaining healthy mature forests, Tioughnioga can provide managed habitats for the species attracted to the surrounding area.

Habitat management goals for Tioughnioga WMA include:

- Maintain intermediate and mature forested acreage at approximately 64% of the WMA (2,408 acres) to continue to provide habitat diversity for forest species.
- Manage approximately 9% of the WMA as young forest (12% of the total forested area) within the next 10 years to improve American woodcock, ruffed grouse, and wild turkey habitat.
- Increase grassland habitat to 13% of the WMA to benefit grassland-dependent species such as bobolink and eastern meadowlark.
- Increase shrubland habitat to 8% to provide habitat for shrubland obligate species.
- Maintain the remaining 6% of the WMA as wetlands, open water, and roads.
- Provide habitat for a variety of wildlife species and permit wildlife-dependent recreational uses compatible with wildlife.

I. BACKGROUND AND INTRODUCTION

PURPOSE OF HABITAT MANAGEMENT PLANS

BACKGROUND

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

year time period, after which the plans and progress on implementation will be assessed and HMPs will be modified as needed.

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

SCOPE AND INTENT

Primary purposes of this document:

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

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

The Tioughnioga UMP was scheduled to be updated starting in 2016. At this point there are no plans to retain Tioughnioga WMA in the UMP as part of the update.

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

Tioughnioga WMA is located in DEC Region 7, Towns of Cazenovia, Georgetown and Nelson, Madison County (Figure 1).

TOTAL AREA

3,744 acres

HABITAT INVENTORY

A habitat inventory of the WMA was completed in 2016 and is proposed to be updated every 10 to 15 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 Tioughnioga WMA.

Habitat Type	Current Conditions			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Forest [a]	3,305	88%		2,408	Decrease to 64%
Young forest	81	2%		345	Increase to 9%
Shrubland	13	<1%		305	Increase to 8%
Grassland	148	4%		489	Increase to 13%
Agricultural lands	0	0		0	No change
Wetlands (natural) [b]	103	3%		103	No change
Wetlands (impounded)[b]		0		0	No change
Open water	25	<1%		25	No change
Other (quarry, parking lot, utility line)	11	<1%		11	No change
Roads	58	2%	9.4	58	No change
Rivers and streams			4.1		
Total Acres:	3,744	100%		3,744	

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

ECOLOGICAL RESOURCES

Wildlife Overview:

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

- White-tailed deer, beaver, fox, coyote

- Ruffed grouse, wild turkey, American woodcock
- Snapping turtle, wood turtle, smooth greensnake
- Barred owl, sharp-shinned hawk, grasshopper sparrow, Eastern meadowlark

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 2).[1] SGCN listed below include species that have been documented on or within the vicinity of the WMA that are likely to occur in suitable habitat on the WMA. Other SGCN may also be present on the WMA. Data sources include: the NY Natural Heritage Program, NY Breeding Bird Atlases,[2] NY Reptile and Amphibian Atlas,[3] DEC wildlife surveys and monitoring and eBird.[4]

Table 2. Species of conservation concern that may be present on Tioughnioga 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 [5]	American black duck			HP
	American kestrel			x
	American woodcock			x
	Bay-breasted warbler			HP
	Black-billed cuckoo			x
	Black-throated blue warbler			x
	Blue-winged warbler			x
	Bobolink			HP
	Brown thrasher			HP
	Canada warbler			HP
	Common nighthawk		SC	HP
	Cooper's hawk		SC	
	Eastern meadowlark			HP
	Golden-winged warbler		SC	HP
	Grasshopper sparrow		SC	HP
	Henslow's sparrow		T	HP
	Horned lark		SC	HP
	Louisiana waterthrush			x
	Northern goshawk		SC	x
	Northern harrier		T	x
	Prairie warbler			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.
[5] Several listed bird species only use this WMA as migratory habitat and are considered as such in management plans.

Table 2. Continued

Species Group	Species	Federal Status	NY Status	NY SGCN
	Red-headed woodpecker		SC	HP
	Ruffed grouse			x
	Scarlet tanager			x
	Sharp-shinned hawk		SC	
	Vesper sparrow		SC	HP
	Wood thrush			x
Mammals	Eastern red bat			x
	Hoary bat			x
	Little brown bat (myotis)			HP
	Northern long-eared bat (myotis)	T	T	HP
	Silver-haired bat			x
	Small-footed bat		SC	x
Amphibians and reptiles	Eastern ratsnake			x
	Eastern snapping turtle			x
	Smooth greensnake			x
	Wood turtle		SC	HP
Fish	Brook trout			x
Invertebrates	None known			
Plants	None known			

Significant Ecological Communities:

There is one rare and significant natural community located on Tioughnioga WMA as identified by the NY Natural Heritage Program (Figure 2). 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 community description is from *Ecological Communities of New York State, Second Edition.*[6]

- **Rich Sloping Fen** (S2) Small, gently sloping, minerotrophic wetland, with shallow peat deposits, that occurs in a shallow depression on a slope composed of calcareous glacial deposits.

Additional information about significant ecological communities is available in the Tioughnioga WMA Biodiversity Inventory Final Report (1998) prepared by the NY Natural Heritage Program.

[6] 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.

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 Tioughnioga WMA include:

- There are no wetlands regulated by Article 24 of the Environmental Conservation Law located on Tioughnioga WMA. There are 48 wetlands shown on the National Wetlands Inventory (NWI; Figure 3). There may be forestry prescriptions associated with forested wetlands and each management prescription will be reviewed individually for determination of impacts.
- 15 streams (a watercourse entirely within the WMA) or segments of streams (a steam that meanders in and out of the WMA). The highest stream classification is B(T).[7]

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.*[8] 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 Tioughnioga WMA (Figures 4 and 5). The landscape within a three mile radius of the WMA is primarily privately-owned land including:

- Forest (52%)
- Agriculture (32% combining cultivated crops and hay)
- Early successional (6% combining grasslands and shrublands)
- Wetlands (5% combining open water, emergent and woody wetlands)
- Developed areas (5%)

Since the surrounding area is predominately forest, much of which is likely mature, managing for younger forest will provide greater habitat diversity on the landscape level. By managing the WMA's forest for increased young forest, we can provide critical habitat to a host of species that require young forest. With most of the immediate, non-forested area also in agricultural crops, providing open space and grassland habitat that is not routinely managed throughout the breeding season shall benefit those species disturbed by typical agricultural practices.

There are several other public or conservation lands within the surrounding landscape including Nelson Swamp Unique Area (831 acres), Dugway County Forest (195 acres), Tuscarora Nature Park (82 acres) and four State Forests: Stoney Pond (1,469 acres), DeRuyter (972 acres), Morrow Mountain (1,290 acres) and Three Springs State Forests (797 acres). Nelson Swamp Unique Area is primarily managed for preservation of the current habitats as well as the

[7] Information about stream classification is available online at http://www.dec.ny.gov/permits/6042.html.
[8] Available online at http://www.dec.ny.gov/outdoor/104218.html.

development of mature forest on abandoned agricultural lands. Tuscarora Nature Park is primarily managed for public recreation. Dugway County Forest, which is surrounded on three sides by Tioughnioga WMA, was acquired and reforested under a Madison County Law that requires such lands "be forever devoted to watershed protection, timber production and for recreation and kindred purposes."

State Forests may have occasional areas of young forest type habitat, 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 in a sustainable manner to provide quality wildlife habitat and populations by promoting ecosystem health, enhancing landscape biodiversity, 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, which is not often the case on State Forests, but is a targeted goal on Tioughnioga WMA. As part of DFW's Young Forest Initiative (YFI) on WMAs, future habitat management for Tioughnioga WMA will enhance young forest habitat across the landscape.[9] In addition, this plan provides for the creation of more non-forested areas, such as grasslands and shrublands, distributed throughout the WMA. The increase of these two habitat types will enhance overall species diversity. Further details on management of each habitat type can be found in the next section of this plan.

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

DEC will continue active management of wildlife habitats on Tioughnioga WMA to provide the following benefits:

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

FOREST

Forested acreage includes the following forest types:

Natural forest: naturally forested acres, including hardwoods and softwoods. Includes any upland forested acreage that is not young forest, i.e., pole stands, other intermediate forest age

[9] Information about the Young Forest Initiative is available at http://www.dec.ny.gov/outdoor/104218.html.

classes, mature forest, and old growth forest.
Plantation: planted forested acres, generally planted in rows dominated by one or two species.
Forested wetland: wetland acres where forest or shrub vegetation accounts for greater than 50% of hydrophytic vegetative cover and the soil or substrate is periodically saturated or covered with water.
Young forest: young or regenerating forested acres, which are typically aged 0-10 years since a disturbance or regeneration cut, depending upon the site conditions. May include both natural forest and plantations.
Young forest (forested wetland): young, regenerating forested wetland acres.

Forest management on Tioughnioga WMA incorporates an approach to create and/or maintain the diversity of forest age classes that are required to support a diversity of wildlife. In 2015, DEC launched the YFI to increase the amount of young forest on WMAs to benefit wildlife that require this transitional, disturbance-dependent habitat.

MANAGEMENT OBJECTIVES

- Maintain intermediate and mature forested acreage at approximately 64% of the WMA (2,408 acres) to continue to provide habitat diversity for forest species.
- Convert approximately 341 acres of existing forest into grassland habitats within the next ten years as part of the long-term goal (beyond 2026) of 15% of the WMA being converted to grassland.
- Convert approximately 263 acres of forest into shrubland within the next ten years as part of the long-term goal (beyond 2026) of reaching 10% of the WMA as shrubland.
- Increase young forest cover from 81 acres (2% of total forested area) to 345 acres (12% of total forested area, 9% of the WMA) over the next 10 years to improve habitat for young forest-dependent wildlife.

The long-term management direction for Tioughnioga is to substantially increase the early successional habitats on the property. This requires converting forest to other habitat types (grassland and shrubland) and diversifying forest age classes. As part of a Grassland Bird Focus Area,[10] the management plan will significantly increase the acreage of managed grasslands by linking together existing small fields, creating new grasslands adjacent to neighboring property grasslands, and improve the quality and longevity of these areas to provide habitat for grassland-obligate species known to occur in the surrounding area. The heavy agricultural presence in the surrounding landscape encourages species of open areas to be attracted to the area, but when those areas are managed for agricultural production, they provide limited, bona fide habitat benefits to many species. By encouraging these species to use the WMA, they can be afforded habitats that are managed with their specific needs in mind and therefore be successful in their life cycle. This is also the reasoning behind an aggressive young forest and shrubland goal in the long term. Already a more successional WMA than others in the region, building off this existing habitat will provide increased opportunity for a host of wildlife that flourish in young forest and shrubland habitat mosaics. Combine this with retained and healthy mature forest stands, distributed through the property, many species of songbird, upland game bird, large and

[10] Additional information about DEC's Grassland Bird Focus Areas and the Landowner Incentive Program (LIP) is available online at http://www.dec.ny.gov/pubs/32891.html.

small mammals, reptiles and amphibians will all be able to utilize the WMA and surrounding landscape to a greater extent.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

As shown in Table 1, 90% of the total area of Tioughnioga WMA is forested (3,386 acres). Of this habitat type, approximately 74% is natural forest, 23% is plantation, and 3% is composed of forested wetland and young forest (Table 3). Compared to the surrounding landscape, Tioughnioga WMA has more forest habitat but less early successional or wetland habitat (Figures 6-9). Of particular note, approximately one-third of the surrounding landscape is agriculture, which is taken into consideration in the management objectives in the Grassland section of this plan.

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

Forest Type	Acres (as of 2016)	Desired Acres	Overstory species
Natural forest (mature/intermediate)	2,497	1,877	Red maple, hard maple, white ash
Plantation	789	512	Red pine, white pine, Norway spruce
Forested wetland	19	19	Eastern hemlock, red maple, yellow birch
Young forest	81	345	
Young forest (forested wetland)	0	0	
Total Forested Acres:	3,386	2,753	

There are 3,386 acres of forest on Tioughnioga WMA, and that area is divided into many separate and distinct forest stands, with a significant portion of those being less than five acres. Management over the next ten years may involve many individual stands, but it is important to note that many stands are small, not the entirety of each stand will be treated in the next ten years, and many treatments will affect stands on multiple locations on the WMA. This approach will create habitat diversity on a greater area of the WMA and ensure mature areas are maintained for species that rely on those habitats.

The soils on Tioughnioga WMA are of the Volusia-Mardin-Lordstown series. These soils are moderately deep and vary from somewhat poorly- to well-drained. Due to the depth and structure provided, forests are in good health, diverse, and regenerate readily to both typical northern hardwoods and softwood species.[11]

Target species for young forest include American woodcock, ruffed grouse and wild turkey. These species rely on a mixture of mature and young forest habitats and by providing such

[11] 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.

variety through forest management, DEC can create a landscape that meets the following requirements:

- 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) or blueberry fields and reverting farm fields.[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]
- 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.[15]

MANAGEMENT HISTORY

Forest management on Tioughnioga began shortly after DECs acquisition of the property. Much of the open space was planted to trees, predominantly softwoods, to increase cover and provide wildlife food sources. Timber harvesting has been a continued part of the forest management since the 1950s and the WMA was included in a ten-year Unit Management Plan beginning in 2007, which has provided for continued forest management. Numerous commercial timber harvests, as well as wildlife habitat and public access projects, have been conducted in the past decade to increase the quality of habitat on the WMA and encourage wildlife-dependent recreation (Figures 6-9).

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

In Tables 4 and 5, more acreage is identified than is needed to reach the ten-year goal for young forest habitat. Stands are identified as a whole, but only portions of some stands may be treated at a time (in the next ten years) to increase habitat diversity and provide options and flexibility to tailor management actions on a case-by-case basis. As a result, the total number of acres listed in

[12] US Department of Agriculture, Natural Resources Conservation Service. 2010. American Woodcock: Habitat Best Management Practices for the Northeast by Scot J. Williamson. Wildlife Insight. Washington, DC.
[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] US Department of Agriculture, Natural Resources Conservation Service. 1999. Wild Turkey. Wildlife Habitat Management Institute. 12 pp.

Tables 4 and 5 may not equal the number of acres listed in Table 1, however Table 1 is an accurate representation of what we plan to achieve from 2017-2026.

The following management is proposed in order to reach the goal of 345 acres of young forest, 305 acres of shrubland (189 acres of which will be created through apple tree release), and 489 acres of grassland within ten years. In addition, 118 acres are also identified for uneven aged treatments. Achieving this proposed level of management is subject to: changing timber markets, concerns over rare, threatened or endangered species, cultural/historical features on the property, wet ground conditions, or changes in level of staff and funding support.

Woodland stream at Tioughnioga WMA.

Photo: Adam Perry, NYSDEC

- **Management planned for 2017-2021** (Table 4, Figures 6-9):
    - Conduct a clearcut and seed tree treatment on stand F42 to create young forest totaling approximately 35 acres.
    - Conduct a clearcut treatment on the following stands to create young forest: C38, C60, D80, E7 and E78 totaling approximately 33 acres.
    - Conduct a clearcut treatment on the following stands to create shrubland: B22, B23, B75 and F47 totaling approximately 27 acres.
    - Conduct a clearcut treatment on the following stands to create grassland: C49, C50, C51, C52, C53, C54, C55, C56, C61, C64, C65, C66 and F46 totaling approximately 71 acres.
    - Conduct a patch clearcut treatment on the following stands to create young forest: C29, C57, C63, D41, D53 and F34.1 totaling approximately 40 acres.
    - Conduct a patch clearcut treatment on the following stands to create grassland: F26 and F31 totaling approximately 69 acres.
    - Conduct a seed tree treatment on the following stands to create young forest: C10, C12 and C14 totaling approximately 24 acres.
    - Conduct a seed tree treatment on the following stands to create shrubland: A17, F32 and F49 totaling approximately 47 acres.
    - Conduct a thinning treatment on the following stands to maintain mature forest: A14, A20, A25, A33, A34 and C36 totaling approximately 52 acres.
    - Conduct an apple tree release treatment on the following stands to create shrubland: A1, A12, A29, A32, B30, C59, C73, D37, D56, D64, D73.2, D93, D95, D97, D111, D121, E1, E6.2, E43, E45, E46, E48 and E51 totaling approximately 150 acres.
    - Conduct multiple treatments on the following stands between 2016-2026 to create 42 acres of grassland, 37 acres of shrubland and maintain 30 acres of mature forest: C4, E6.1, E35, E38, E42, E66, F18 and F19 totaling approximately 109 acres.

- **Management planned for 2022-2026** (Table 5, Figures 6-9):
    - Conduct a clearcut treatment on the following stands to create young forest: B71, B73, C3, C17, C28, C35, D44, D46, D50, D61, D62 and D96 totaling approximately 103 acres.
    - Conduct a clearcut treatment on the following stands to create grassland: D1, D3, D98, D99, D101, D103, D126, E22, E23, E24, E26, E27, E28, E29, E30, E32, E34, E39, E40, E56, E68, E69, E70 and E71 totaling approximately 159 acres.
    - Conduct a clearcut treatment on the following stands to create shrubland: E3, E52, E53, E59, E60 and E61 totaling approximately 30 acres.
    - Conduct a clearcut treatment in stand E58 to create young forest (5 acres) and shrubland (3 acres).
    - Conduct a patch clearcut treatments on the following stands to create young forest: D41 and D53 totaling approximately 12 acres.
    - Conduct a seed tree treatment to create young forest in the following stands: D6, D11, E5, E54 and E62 totaling approximately 26 acres.
    - Conduct an apple tree release treatment in stand E4 to create 2 acres of shrubland.
    - Conduct a thinning treatment on the following stands to maintain mature forest: D12, D36, D38, D115, D116 and E36 totaling approximately 36 acres.
    - Conduct multiple treatments on the following stands between 2017-2026 to create 42 acres of grassland, 37 acres of shrubland and maintain 30 acres of mature forest: C4, E6.1, E35, E38, E42, E66, F18 and F19 totaling approximately 109 acres.

Table 4. Forest management schedule for the first five-year period of this HMP (2017-2021).

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
A1	14	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
A12	2	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Non Forest: Shrubland	Even Aged	Apple Tree Release
A14	11	Small Sawtimber 12”-18” DBH	Natural Forest: Eastern Hemlock-Northern Hardwood	Natural Forest: Eastern Hemlock-Northern Hardwood	Uneven Aged	Thinning
A17	9	Pole Timber 6”-11” DBH	Natural Forest: Eastern Hemlock-Northern Hardwood	Non Forest: Shrubland	Even Aged	Seed Tree
A20	10	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning
A25	2	Small Sawtimber 12”-18” DBH	Natural Forest: Eastern Hemlock-Northern Hardwood	Natural Forest: Eastern Hemlock-Northern Hardwood	Uneven Aged	Thinning

Table 4. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
A29	12	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
A32	3	Small Sawtimber 12”-18” DBH	Plantation: European Larch	Non Forest: Shrubland	Even Aged	Apple Tree Release
A33	9	Small Sawtimber 12”-18” DBH	Natural Forest: Eastern Hemlock-Northern Hardwood	Natural Forest: Eastern Hemlock-Northern Hardwood	Uneven Aged	Thinning
A34	18	Small Sawtimber 12”-18” DBH	Natural Forest: Oak-Northern Hardwood	Natural Forest: Oak-Northern Hardwood	Uneven Aged	Thinning
B22	9	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
B23	6	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
B30	2	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
B75	6	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
C4	10	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood	Even Aged	Apple Tree Release
C10	10	Small Sawtimber 12”-18” DBH	Plantation: Bucket Mix	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
C12	3	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
C14	17	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
C29	15	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Plantation: Norway Spruce and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut
C36	7	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-Norway Spruce	Natural Forest: Northern Hardwood-Norway Spruce	Uneven Aged	Thinning
C38	3	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C49	6	Seedling/Sapling 0”-5” DBH	Natural Forest: Seedling/Sapling	Non Forest: Grassland	Even Aged	Clearcut

Table 4. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
C50	10	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Non Forest: Grassland	Even Aged	Clearcut
C51	6	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
C52	2	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Non Forest: Grassland	Even Aged	Clearcut
C53	1	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
C54	2	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
C55	2	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Non Forest: Grassland	Even Aged	Clearcut
C56	6	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Non Forest: Grassland	Even Aged	Clearcut
C57	28	Small Sawtimber 12”-18” DBH	Natural Forest: Oak-Northern Hardwood	Natural Forest: Oak-Northern Hardwood and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut
C59	5	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
C60	7	Small Sawtimber 12”-18” DBH	Plantation: Bucket Mix	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C61	2	Pole Timber 6”-11” DBH	Plantation: White Spruce	Non Forest: Grassland	Even Aged	Clearcut
C63	5	Pole Timber 6”-11” DBH	Plantation: Norway Spruce	Plantation: Norway Spruce and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut
C64	13	Small Sawtimber 12”-18” DBH	Plantation: Bucket Mix	Non Forest: Grassland	Even Aged	Clearcut
C65	5	Small Sawtimber 12”-18” DBH	Plantation: Norway Spruce	Non Forest: Grassland	Even Aged	Clearcut
C66	2	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
C73	18	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D37	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release

Table 4. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
D41	16	Pole Timber 6”-11” DBH	Plantation: Jack Pine	Natural Forest: Seedling/Sapling and Plantation: Jack Pine	Even Aged	Patch Clearcut
D53	7	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling and Natural Forest: Pioneer Hardwood	Even Aged	Patch Clearcut
D56	3	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D64	5	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D73.2	18	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D80	14	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D93	9	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D95	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D97	9	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D111	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
D121	10	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
E1	1	Small Sawtimber 12”-18” DBH	Natural Forest: Other	Non Forest: Shrubland	Even Aged	Apple Tree Release
E6.1	45	Small Sawtimber 12”-18” DBH	Natural Forest: Oak-Northern Hardwood	Natural Forest: Oak-Northern Hardwood	Even Aged	Apple Tree Release
E6.2	3	Pole Timber 6”-11” DBH	Plantation: Pine-Natural Species	Non Forest: Shrubland	Even Aged	Apple Tree Release
E7	6	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
E35	2	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Even Aged	Apple Tree Release

Table 4. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
E38	3	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Northern Hardwood-White Pine	Even Aged	Apple Tree Release
E42	2	Pole Timber 6”-11” DBH	Natural Forest: Jack Pine-Natural Species	Natural Forest: Jack Pine-Natural Species	Even Aged	Apple Tree Release
E43	9	Small Sawtimber 12”-18” DBH	Natural Forest: Oak-Pine	Non Forest: Shrubland	Even Aged	Apple Tree Release
E45	13	Small Sawtimber 12”-18” DBH	Plantation: White Pine	Non Forest: Shrubland	Even Aged	Apple Tree Release
E46	2	Pole Timber 6”-11” DBH	Natural Forest: Oak-Northern Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
E48	6	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
E51	10	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
E66	25	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood	Even Aged	Apple Tree Release
E78	4	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
F18	24	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Even Aged	Apple Tree Release
F19	18	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Even Aged	Apple Tree Release
F26	126	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Non Forest: Grassland	Even Aged	Patch Clearcut
F31	33	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood and Non Forest: Grassland	Even Aged	Patch Clearcut
F32	17	Pole Timber 6”-11” DBH	Natural Forest: Other	Non Forest: Shrubland	Even Aged	Seed Tree
F34.1	35	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood and Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut

Table 4. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
F42	36	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut and Seed Tree
F46	14	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
F47	6	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
F49	21	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Seed Tree

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

Table 5. Forest management schedule for the second five-year period of this HMP (2022-2026).

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
B71	35	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
B73	24	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C3	2	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C4	10	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
C17	6	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C28	2	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
C35	3	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D1	12	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Non Forest: Grassland	Even Aged	Clearcut
D3	10	Small Sawtimber 12”-18” DBH	Plantation: Black Locust	Non Forest: Grassland	Even Aged	Clearcut
D6	10	Small Sawtimber 12”-18” DBH	Natural Forest: Other	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
D11	5	Small Sawtimber 12”-18” DBH	Plantation: White Cedar	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree

Table 5. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
D12	3	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood	Uneven Aged	Thinning
D36	7	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning
D38	4	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning
D41	16	Pole Timber 6”-11” DBH	Plantation: Jack Pine	Natural Forest: Seedling/Sapling	Even Aged	Patch Clearcut
D44	7	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D46	6	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D50	4	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D53	7	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D61	6	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D62	7	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D96	6	Pole Timber 6”-11” DBH	Plantation: Red Pine	Natural Forest: Seedling/Sapling	Even Aged	Clearcut
D98	11	Pole Timber 6”-11” DBH	Plantation: Scotch Pine-Spruce	Non Forest: Grassland	Even Aged	Clearcut
D99	3	Pole Timber 6”-11” DBH	Plantation: Red Pine	Non Forest: Grassland	Even Aged	Clearcut
D101	2	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Non Forest: Grassland	Even Aged	Clearcut
D103	5	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
D115	17	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Northern Hardwood	Uneven Aged	Thinning
D116	3	Small Sawtimber 12”-18” DBH	Natural Forest: Eastern Hemlock-Northern Hardwood	Natural Forest: Eastern Hemlock-Northern Hardwood	Uneven Aged	Thinning
D126	3	Small Sawtimber 12”-18” DBH	Plantation: White Cedar	Non Forest: Grassland	Even Aged	Clearcut
E3	6	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Non Forest: Shrubland	Even Aged	Clearcut

Table 5. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
E4	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
E5	1	Small Sawtimber 12”-18” DBH	Natural Forest: Oak-Northern Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
E6.1	45	Small Sawtimber 12”-18” DBH	Natural Forest: Oak-Northern Hardwood	Natural Forest: Oak-Northern Hardwood and Non Forest: Grassland	Even Aged and Uneven Aged	Thinning and Clearcut
E22	2	Pole Timber 6”-11” DBH	Natural Forest: Other	Non Forest: Grassland	Even Aged	Clearcut
E23	6	Pole Timber 6”-11” DBH	Plantation: Red Pine-Spruce	Non Forest: Grassland	Even Aged	Clearcut
E24	10	Pole Timber 6”-11” DBH	Plantation: Red Pine	Non Forest: Grassland	Even Aged	Clearcut
E26	7	Pole Timber 6”-11” DBH	Natural Forest: Eastern Hemlock-Northern Hardwood	Non Forest: Grassland	Even Aged	Clearcut
E27	9	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-White Pine	Non Forest: Grassland	Even Aged	Clearcut
E28	5	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-White Pine	Non Forest: Grassland	Even Aged	Clearcut
E29	7	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Non Forest: Grassland	Even Aged	Clearcut
E30	7	Pole Timber 6”-11” DBH	Natural Forest: Other	Non Forest: Grassland	Even Aged	Clearcut
E32	7	Small Sawtimber 12”-18” DBH	Natural Forest: Other	Non Forest: Grassland	Even Aged	Clearcut
E34	9	Seedling/Sapling 0”-5” DBH	Natural Forest: Seedling/Sapling	Non Forest: Grassland	Even Aged	Clearcut
E35	2	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Non Forest: Grassland	Even Aged	Clearcut
E36	2	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Pioneer Hardwood	Uneven Aged	Thinning
E38	3	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-White Pine	Non Forest: Grassland	Even Aged	Clearcut
E39	7	Small Sawtimber 12”-18” DBH	Plantation: Red Pine	Non Forest: Grassland	Even Aged	Clearcut

Table 5. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
E40	3	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
E42	2	Pole Timber 6”-11” DBH	Natural Forest: Jack Pine-Natural Species	Non Forest: Grassland	Even Aged	Clearcut
E52	5	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
E53	4	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
E54	10	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
E56	3	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
E58	8	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Natural Forest: Seedling/Sapling and Non Forest: Shrubland	Even Aged	Clearcut
E59	4	Pole Timber 6”-11” DBH	Plantation: Miscellaneous Hardwoods	Non Forest: Shrubland	Even Aged	Clearcut
E60	3	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
E61	5	Small Sawtimber 12”-18” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland	Even Aged	Clearcut
E62	7	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood-White Pine	Natural Forest: Seedling/Sapling	Even Aged	Seed Tree
E66	25	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Shrubland and Non Forest: Grassland	Even Aged	Apple Tree Release and Clearcut
E68	14	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood-Spruce-Fir	Non Forest: Grassland	Even Aged	Clearcut
E69	11	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut
E70	3	Pole Timber 6”-11” DBH	Natural Forest: Pioneer Hardwood	Non Forest: Grassland	Even Aged	Clearcut

Table 5. *Continued*

Stand[a]	Acres[b]	Size Class[c]	Forest Type		Management Direction	Treatment Type[d]
			Current	Future		
E71	4	Pole Timber 6”-11” DBH	Natural Forest: Northern Hardwood	Non Forest: Grassland	Even Aged	Clearcut
F18	24	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release
F19	18	Small Sawtimber 12”-18” DBH	Natural Forest: Northern Hardwood	Non Forest: Shrubland	Even Aged	Apple Tree Release

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

Stand locations and planned management actions are also summarized in Figures 6-9. Specific forest stand descriptions and detailed management prescriptions will be prepared for each proposed forest management area prior to implementation (see template, Appendix C). Briefly, habitat management for each of these stands will include the following:

Management planned for 2017-2021 (Figures 6-9):

- **Stand F42:** This is a mix of hard maple, black cherry and American beech that will have a combination of clear cut and seed tree cut treatments to create young forest (35 acres).
- **Stand C38:** This is a Norway spruce plantation that will be clearcut to create young forest (3 acres).
- **Stand C60:** This is a hardwood plantation with a mixture of aspen, white ash and some white pine that will be clearcut to encourage the regeneration of aspen (7 acres).
- **Stands D80, E7 and E78:** These are pioneer hardwood stands with a mixture of mostly aspen and white ash that will be clearcut to encourage the regeneration of aspen (23 acres).
- **Stands B22, B23, B75 and F47:** These are pioneer hardwood stands that will be clearcut and converted to shrubland (27 acres).
- **Stand C49:** This is a seedling/sapling stand that will be clearcut and converted into grassland (6 acres).
- **Stands C50, C55 and C65:** These are Norway spruce plantations that will be clearcut and converted into grassland (17 acres).
- **Stands C51, C53, C54, C66 and F46:** These are pioneer hardwood stands that will be clearcut and converted into grassland (25 acres).
- **Stand C52:** This is a red pine plantation that will be clearcut converted into grassland (2 acres).
- **Stand C56:** This is a mix of white ash, hard maple and basswood that will be clearcut and converted into grassland (6 acres).

- **Stand C61:** This is a white spruce plantation that will be clearcut and converted into grassland (2 acres).
- **Stand C64:** This is a hardwood plantation mix of white ash, black cherry and red oak that will be clearcut and converted into grassland (13 acres).
- **Stands C29 and C63:** These are Norway spruce plantations that will be patch clearcut to create young forest (11 acres).
- **Stand C57:** This is a mix of red oak, black cherry and white ash that will have a patch clearcut done to encourage the regeneration of aspen (4 acres).
- **Stand D41:** This is a jack pine plantation that is being patch clearcut to encourage the regeneration of aspen (5 acres).
- **Stands D53 and F34.1:** These are pioneer hardwood stands with a mixture of white ash, aspen and red maple that will be patch clearcut to encourage the regeneration of aspen (20 acres).
- **Stands F26 and F31:** These are a mix of hard maple, white ash and black cherry that will be clearcut and converted into grassland (69 acres).
- **Stand C10, C12 and C14:** Stands are a mix of Norway spruce, white ash and hard maple where the majority of the trees will be removed, leaving a few of the best quality trees scattered throughout the stands to provide a seed source for the next generation of trees (23 acres).
- **Stand A17:** Stand is a mix of white ash, Norway spruce and eastern hemlock where the majority of the trees will be removed and the stand converted to shrubland (9 acres).
- **Stand F32:** Stand is a mix of red and hard maple and white ash where the majority of the trees will be removed and the stand converted to shrubland (17 acres).
- **Stand F49:** Stand is a pioneer hardwood stand with red maple, white ash and pin cherry where the majority of the trees will be removed and the stand converted to shrubland (21 acres).
- **Stands A14, A25 and A33:** These are a mix of eastern hemlock, white ash and hard maple where the thinning will focus on removing most of the hardwood trees creating openings in the canopy to encourage the regeneration of eastern hemlock (19 acres).
- **Stand A20:** Stand is a mix of hard maple, American beech and black cherry that will be thinned to remove the low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (10 acres).
- **Stand A34:** Stand is mostly red oak with a little bit of elm and boxelder maple mixed in that will be thinned to remove the low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (18 acres).
- **Stand C36:** Stand is a mix of red maple, Norway spruce and red oak that will be thinned and focus on removing the Norway spruce and low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (5 acres).
- **Stands A1, A12, A29, A32, B30, C59, C73, D37, D56, D64, D73.2, D93, D95, D97, D111, D121, E1, E6.2, E43, E45, E46, E48 and E51:** These are old apple orchards where the apple trees are becoming overtopped by other trees and brush. The apple trees will be released by cutting the brush and trees immediately adjacent to each apple tree to

provide them with more sunlight so they can continue to produce apples for wildlife forage (150 acres).

- **Stand C4, E6.1, E35, E38, E42, E66, F18 and F19:** Stand are a mix of white ash, apple and hard maple that are growing in old apple orchards where the apple trees are becoming overtopped by other trees and brush. The treatment will release the apple trees by cutting the brush and trees immediately adjacent to each apple tree to provide them with more sunlight so they can continue to produce apples for wildlife forage (109 acres).

Management planned for 2022-2026 (Figures 6-9):

- **Stands B71, B73, C3, C17, C28, C35, D44, D46, D50, D61, D62 and D96:** These are red pine plantations that will be clearcut to create young forest (103 acres).
- **Stands D1, D101, E32 and E71:** These are a mix of hard maple, white ash and black cherry that are being clearcut and converted into grassland (14 acres).
- **Stands D99, E24, E29 and E39:** These are red pine plantations that will be clearcut and converted into grassland (27 acres).
- **Stand D3:** This is a black locust plantation that will be clearcut and converted into grassland (10 acres).
- **Stands D98 and E23:** These are plantations that are a mix of Scotch pine, red maple and red pine that will be clearcut and converted into grassland (17 acres).
- **Stands D103, E40, E56, E69 and E70:** These are a mix of white ash, white pine and aspen that will be clearcut and converted to grassland (25 acres).
- **Stand D126:** This is a white cedar plantation that will be clearcut and converted to grassland (3 acres).
- **Stand E22:** This is a mix of apple, thornapple and white ash that will be clearcut and converted to grassland, while also retaining the apple trees so they can continue to produce apples for wildlife forage (2 acres).
- **Stands E26, E27 and E28:** These are a mix of white pine, black cherry and aspen that will be clearcut and converted into grassland (21 acres).
- **Stand E30:** This is a mix of black locust, white pine and black cherry that will be clearcut and converted into grassland (7 acres).
- **Stand E34:** This is a seedling/sapling stand that will be clearcut and converted into grassland (9 acres).
- **Stand E68:** This is a mix of Norway spruce, white ash and white pine that will be clearcut and converted into grassland (14 acres).
- **Stand E3:** This is a red pine plantation that will be clearcut and converted into shrubland (6 acres).
- **Stands E52, E53, E60 and E61:** These are a mix of white ash, black cherry and hard maple that will be clearcut and converted into shrubland (17 acres).
- **Stand E59:** This is a hardwood plantation of mostly white ash. Some white pine and black cherry have naturally seeded in as well. This stand will be clearcut and converted to shrubland (4 acres).
- **Stand E58:** This is a mix of black cherry, aspen and hard maple. The entire stand will be clearcut and part of it left to encourage the regeneration of aspen (5 acres) with the rest of the stand being converted to shrubland (3 acres).

- **Stand D41:** This is a jack pine plantation that is being patch clearcut to encourage the regeneration of aspen (11 acres).
- **Stands D53:** This is a pioneer hardwood stands with a mixture of white ash, aspen and red maple that will be patch clearcut to encourage the regeneration of aspen (1 acre).
- **Stand D6:** This is a mix of white ash, black cherry and black locust where the majority of the trees will be removed, leaving a few of the best quality trees scattered throughout the stands to provide a seed source for the next generation of trees (3 acres).
- **Stand D11:** This is a white cedar plantation where the majority of the trees will be removed, leaving a few of the best quality trees scattered throughout the stands to provide a seed source for the next generation of trees (5 acres).
- **Stands E5, E54 and E62:** These are a mix of white ash, white pine and red maple where the majority of the trees will be removed, leaving a few of the best quality trees scattered throughout the stands to provide a seed source for the next generation of trees (18 acres).
- **Stand E4:** This is an old apple orchard where the apple trees are becoming overtopped by other trees and brush. The apple trees will be released by cutting the brush and trees immediately adjacent to each apple tree to provide them with more sunlight so they can continue to produce apples for wildlife forage (2 acres).
- **Stands D12 and D116:** These are a mix of eastern hemlock, black cherry and hard maple where the thinning will focus on removing most of the hardwood trees creating openings in the canopy to encourage the regeneration of eastern hemlock (6 acres).
- **Stands D36, D38 and D115:** These are a mix of white ash, hard maple and American beech that will be thinned to remove the low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (28 acres).
- **Stand E36:** This is a mix of aspen, black cherry and white pine that will be thinned to remove the low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (2 acres).
- **Stand C4, F18 and F19:** These are old apple orchards where the apple trees are becoming overtopped by other trees and brush. The apple trees will be released by cutting the brush and trees immediately adjacent to each apple tree to provide them with more sunlight so they can continue to produce apples for wildlife forage (32 acres).
- **Stand E6.1:** This is a mix of red oak, white pine and black cherry. The portion of the stand that will have an apple tree release conducted in the first five years of this plan, plus an additional ten acres will be clearcut and converted into grassland (15 acres total). The apple trees that will be released will be retained as part of the new grassland. The remainder of the stand will be thinned to remove the low quality trees in order to give the higher quality trees more room to grow. Snags will be retained where possible for the benefit of wildlife (30 acres).
- **Stands E35, E38 and E42:** These are old apple orchards where the apple trees will be released in the first five years of this plan. These stands will be clearcut and converted into grassland. The apple trees previously released will be retained as part of the new grassland (7 acres).
- **Stand E66:** This is an old apple orchard where the apple trees will be released in the first five years of this plan. An additional apple tree release will be conducted to convert the old apple orchard into shrubland (5 acres). The remainder of the stand will be clearcut and converted into grassland (20 acres).

BEST MANAGEMENT PRACTICES

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

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

Resource	**Guidance Document** [16]
Soils	*Rutting Guidelines for Timber Harvesting on Wildlife Management Areas*
Water quality	*NYS Forestry Best Management Practices for Water Quality*
Wildlife	*Retention Guidance on Wildlife Management Areas*
Plantations	*Plantation Management Guidance on Wildlife Management Areas*

Wildlife Considerations:

There are no confirmed occurrences of federal or state listed endangered or threatened species on the WMA. Within the vicinity of the WMA, Henslow's sparrow, grasshopper sparrow, and northern harrier have been confirmed in the past, but habitat suitable for such species is limited on the WMA to one existing area already managed as grasslands. As grassland-dependent species, they would only benefit from timber management that resulted in an increase in grassland habitat available on the WMA. The plan includes a substantial increase in grassland acreage over the next 10 years and beyond to benefit these species. Whenever possible, timber management actions shall avoid peak nesting season (April-July) to minimize any negative impacts to songbird and woodland raptor species. Winter timber harvest is the best scenario in most cases, but given some locations and management goals, summer or fall timber management may be used to achieve desired goals when winter work is not an option. Surveys for forest-dwelling bats, specifically northern long-eared bats, will be used to determine presence or absence in treatment areas. If bats are determined to be on the site, cutting of brush and trees greater than three inch diameter at breast height (DBH) would be limited to October 1-March 31 to avoid potential negative impacts.

Forest Health Considerations:

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

The most pressing forest health concern to address in the near future are large patches of natural forest that are experiencing a significant mortality of mature trees. Stands F26, F31, F42 and F46, totaling approximately 209 acres, are in the worst condition. The exact cause of the mortality is unknown but signs of Armillaria root rot have been found. Armillaria is a type of fungus that occurs naturally in the forest and lives on the roots and lower stems of conifers and broad-leaved trees. Armillaria can infest and kill trees that have been weakened by some other factor such as infestation by insect pests, other plant diseases, being damaged by storms or

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

drought but it can also infest and kill otherwise healthy trees.[17] The mortality appears to have been ongoing for some years now and has resulted in an understory of mostly undesirable regeneration (briars, striped maple and American beech). These stands will be some of the first to be treated to create young forest and grassland habitat due to the rapidly declining condition of these stands.

Pre- and Post-treatment Considerations:

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

MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife responses have been achieved by the management outlined above, pre- and post-management assessments will be conducted in accordance with guidelines in the *Young Forest Initiative Monitoring Plan, 2016-2025*.[18] 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, and again 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 Tioughnioga WMA, which may be assessed to determine response to management, include:

- Ruffed grouse
- American woodcock
- Wild turkey

In addition to the target YFI species, benefits of future management actions can be assessed with routine breeding bird point counts and, specifically, grassland bird surveys. As breeding bird surveys progress, species of interest that are detected will be considered in forest management to ensure a continued use or increased use of the WMA by those species. Tioughnioga WMA is part of a grassland focus area (GFA). A GFA is where the DEC believes that the creation of larger (>25 acres), contiguous grasslands would be of most benefit to at-risk grassland birds.[19] This management plan is intended to improve existing grassland areas and create more

[17] Armillaria Root Disease https://www.na.fs.fed.us/spfo/pubs/fidls/armillaria/armillaria.htm
[18] The Young Forest Initiative Monitoring Plan is available at http://www.dec.ny.gov/outdoor/104218.html.
[19] More information can be found online at http://www.dec.ny.gov/pubs/32891.html

appropriate grassland habitat for those species, as will be discussed in more detail in the Grassland section below. Acoustic bat surveys may be used to determine any presence of at-risk bats and then management actions can be tailored to mitigate any potential disturbance to those species.

SHRUBLAND

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

MANAGEMENT OBJECTIVES

- Increase the amount of shrubland habitat on the property from 13 acres (<1% of the WMA) to 305 acres (8% of the WMA) through a combination of timber management and shrub plantings to benefit upland game birds and breeding songbirds.
- In the long term (beyond 2026), increase the amount of shrubland habitat on the property to approximately 374 acres (10% of the WMA).
- Protect longevity of apple orchards with routine apple releases to prevent apple trees from being shaded out by competing shrubs and trees.
- Monitor for invasive species and treat as necessary with mechanical or, when appropriate, chemical means.
- Establish native, food-producing shrubland species in buffer areas around wetlands and new and existing fields.
- Create a "soft-edge effect" around select new and existing fields.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

Currently, there are approximately 13 acres of shrubland on Tioughnioga WMA split between stands D950 and E950. These shrublands originated from grasslands and old agricultural fields not being maintained and either naturally succeeded into a shrub-dominated community or the shrubs were planted.[20] These stands are mostly dense shrub thickets with clumps of trees.

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

[20] The Tioughnioga UMP can be found online at http://www.dec.ny.gov/lands/22563.html

MANAGEMENT HISTORY

Timber management prescriptions have been used in the past to release existing shrub species by thinning the overstory and allowing species such as wild apple, dogwoods and viburnums to continue to grow and expand in their acreages. Management plans have continued with this policy of maintaining those species whenever possible to provide food-producing woody species for wildlife, but any significant acreages of non-wetland shrubs have been replaced with forest species.

Freshly-cut stand on Tioughnioga WMA.

Photo: Region 7 Wildlife, NYSDEC

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2017-2021** (Figures 6-9):
  - Conduct a shrub maintenance treatment on stand D950 to maintain shrubland totaling approximately 12 acres.
  - Conduct a clearcut treatment on the following stands to create shrubland: B22, B23, B75 and F47 totaling approximately 27 acres.
  - Conduct a seed tree treatment on the following stands to create shrubland: A17, F32 and F49 totaling approximately 47 acres.
  - Conduct an apple tree release treatment on the following stands to create shrubland: A1, A12, A29, A32, B30, C59, C73, D37, D56, D64, D73.2, D93, D95, D97, D111, D121, E1, E6.2, E43, E45, E46, E48 and E51 totaling approximately 150 acres.
  - Conduct multiple treatments on the following stands between 2017-2026 to create 20 acres of grassland and 37 acres of shrubland: C4, E66, F18 and F19 totaling approximately 57 acres.
  - Monitor for invasive species.
  - Evaluate the need for supplemental shrub planting.
- **Management planned for 2022-2026** (Figures 6-9):
  - Conduct a clearcut treatment on the following stands to create shrubland: E3, E52, E53, E59, E60 and E61 totaling approximately 30 acres.
  - Conduct a clearcut treatment in stand E58 to create young forest (5 acres) and shrubland (3 acres).
  - Conduct an apple tree release treatment in stand E4 to create 2 acres of shrubland.
  - Conduct multiple treatments on the following stands between 2017-2026 to create 20 acres of grassland and 37 acres of shrubland: C4, E66, F18 and F19 totaling approximately 57 acres.
  - Monitor for invasive species.
  - Evaluate the need for supplemental shrub planting.
  - Evaluate the need to reset shrublands with brush mower or forestry mower to maintain proper species and structure.

BEST MANAGEMENT PRACTICES

Before any cutting of trees or brush with greater than three inch DBH, between the months of April 1st and September 30th, pre-treatment acoustic surveys for forest dwelling bats, specifically northern long-eared bats, will be conducted. If it is determined there are sensitive bat species present on a site, management will be restricted to October 1st –March 31st to prevent negative impacts.

MANAGEMENT EVALUATION

Created shrublands can be assessed through routine inspection to prevent colonization by mature forest species. Evaluation will be based on success of newly established shrub species and the wildlife response to those areas. Surveys for American woodcock, ruffed grouse, wild turkey and breeding songbirds will be used to monitor continued use and response to shrublands, and other habitats, on the WMA.

GRASSLAND

Grasslands are open, grassy areas with a minimal amount of shrub and tree cover (<35%) that are maintained, or could be maintained, without significant brush cutting. 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. This section also includes forest openings and small, old fields that are not managed as grassland habitats but more to provide open space and forest edge to encourage wildlife diversity.

MANAGEMENT OBJECTIVES

- Maintain and improve the existing 148 acres of grassland habitat through rotational mowing, prescribed fire (pending creation and approval of a separate prescribed fire plan), and other grassland improvement projects.
- Monitor for invasive plant species.
- Convert currently forested areas to achieve the 10-year goal of 341 acres of new grassland.
- Work toward a long-term goal (beyond 2026) of converting 15% of the WMA to grassland.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

Tioughnioga currently includes 148 acres of grassland habitat. Most of the areas are very small (<5 ac.) and widely distributed. The northeast corner of the property has a series of contiguous fields (stand C940) totaling 47 acres that are known to support grassland bird species currently. Management of the smaller, more scattered grassland areas has targeted improving habitat for white-tailed deer, wild turkey, American woodcock and edge-friendly songbird species.

Species that benefit from grassland best management practices include:

- Wild turkey
- Bobolink, eastern meadowlark, northern harrier, Henslow's sparrow, grasshopper sparrow

- White-tailed deer, cottontail rabbit

MANAGEMENT HISTORY

Grassland areas have been maintained with routine mowing on a two-year rotation. Stand C940 was farmed until this property was acquired by the State in 2004. After acquisition, the fields were used for crop production through agricultural agreement until 2013 when management was reduced to routine, annual mowing. In 2016, 24 acres of stand C940 were re-seeded to a warm season grass mix to create a more desirable grassland structure.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2017-2021** (Figures 6-9):
    - Conduct a clearcut treatment on the following stands to create grassland: C49, C50, C51, C52, C53, C54, C55, C56, C61, C64, C65, C66 and F46 totaling approximately 71 acres.
    - Conduct a patch clearcut treatment on the following stands to create grassland: F26 and F31 totaling approximately 69 acres.
    - Conduct multiple treatments on the following stands between 2017-2026 to create 42 acres of grassland, 5 acres of shrubland and maintain 30 acres of mature forest: E6.1, E35, E38, E42, E66, totaling approximately 77 acres.
    - Continue rotational mowing on existing fields and expand to new fields as they are created.
    - Remove tree stumps, grade and seed newly established fields as they are completed.
- **Management planned for 2022-2026** (Figures 6-9):
    - Conduct a clearcut treatment on the following stands to create grassland: D1, D3, D98, D99, D101, D103, D126, E22, E23, E24, E26, E27, E28, E29, E30, E32, E34, E39, E40, E56, E68, E69, E70 and E71 totaling approximately 159 acres.
    - Conduct multiple treatments on the following stands between 2017-2026 to create 42 acres of grassland, 5 acres of shrubland and maintain 30 acres of mature forest: E6.1, E35, E38, E42, E66, totaling approximately 77 acres.
    - Continue rotational mowing on existing fields and expand to new fields as they are created.
    - Remove tree stumps, grade and seed newly established fields as they are completed.

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,*[21] which establishes grassland bird focus areas, one of which includes Tioughnioga WMA. In particular, refer to the plan for species-specific habitat requirements and detailed recommendations regarding grassland management and restoration techniques.

[21] 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.

General Management Recommendations

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

Timing of Management

- Fields over 25 acres (including all contiguous fields) or fields with a history of listed (federally listed and/or state E/T or SC) grassland bird species within the last 10 years, including fields of any size AND contiguous fields. Can also include nearby fields if deemed necessary:
    - Mowing or other management should be avoided between April 23 and August 15 unless at least one of the following criteria are met and the fields are assessed or surveyed to confirm there is no active nesting by E/T/SC grassland birds:
        - Management is to be done for long term benefits to the habitat/wildlife (such as invasive species management).
        - The fields are assessed or surveyed and there is no active nesting by E/T/SC grassland birds.
        - Nesting locations can be avoided, such as using spot treatment for invasive species, reducing any negative impact to the species of concern.
- 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.

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

MANAGEMENT EVALUATION

No grassland bird monitoring has occurred to date but will be considered on the newly restored areas to evaluate effectiveness and determine if additional grassland acreages would be beneficial in that area.

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 Tioughnioga WMA at this time. As future grassland restoration projects are undertaken, agricultural agreements may be used to help restore or improve grassland areas to a more wildlife productive state and a more sustainable structure for long-term management for grassland obligate species.

WETLANDS (NATURAL AND IMPOUNDED)

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

MANAGEMENT OBJECTIVES

- Maintain the current acreage and quality of wetlands (103 acres).
- Maintain existing wetland infrastructure (e.g., dikes and water control structures).
- Maintain the quality of existing vernal pools and construct new vernal pools as opportunities arise.
- Monitor and treat for invasive aquatic vegetation as needed.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

Most of the wetlands are a mixture of herbaceous plants, shrubs and widely scattered trees and are located directly adjacent to open water (ponds). Ongoing beaver activity has made a significant contribution to the current amount of wetland habitat on Tioughnioga WMA.

Currently, 103 acres are managed as natural wetlands on Tioughnioga WMA. There are no NYS regulated wetlands, however there are 48 wetlands mapped by the NWI. NWI wetlands typically overlap with New York State regulated wetlands. Wetlands classified as freshwater ponds, lacustrine and riverine are considered open water habitat types in this plan and are further discussed in that section.

There are multiple small wetlands located on Tioughnioga WMA (Figure 3). Most were created as either vernal pools or potholes via timber sale trade-off work to benefit species such as:

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

Vernal pools created in 2010.

Photo: Adam Perry, NYSDEC

MANAGEMENT HISTORY

Recent management has focused on maintaining existing habitats through routine mowing of dikes and monitoring for invasive plants. In 2010, a series of four pools were created by a logging contractor as part of a timber sale contract and the berms were seeded in the summer of 2011. The Upper Susquehanna Coalition (USC) began a series of new vernal pools in 2015 and evaluated four locations for herbicide application to treat common reed.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2017-2021** (Figures 6-9):
  - Maintain the current acreage and quality of wetlands (103 acres).
  - Construct new vernal pools as opportunities arise and maintain existing pools.
  - Address existing common reed locations with herbicide treatments.
  - Monitor and control invasive plants as needed.
- **Management planned for 2022-2026** (Figures 6-9):
  - Continue monitoring and maintenance of vernal pools.
  - Construct additional and expanded vernal pools if needed.
  - Monitor and control invasive plants as needed.

BEST MANAGEMENT PRACTICES

- Protect pools 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) and 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 sound.

OPEN WATER (WATERBODIES AND WATERCOURSES)

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

MANAGEMENT OBJECTIVES

- Maintain existing pond infrastructure (e.g., dikes, water control structures).
- Maintain the current acreage and quality of open water (25 acres).
- Monitor and control invasive plants as needed.
- Conduct periodic drawdowns to encourage emergent vegetation growth.

DESCRIPTION OF EXISTING OPEN WATER HABITAT AND TARGET SPECIES

There are 15 streams or parts of streams located on Tioughnioga WMA. In addition, there are multiple areas (stands) of open water consisting of both manmade and natural ponds, totaling 25 acres. These areas are managed to provide habitat and associated emergent vegetation for species such as:

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

MANAGEMENT HISTORY

Most of the ponds on Tioughnioga WMA are manmade.[23] Stands A910, A920, C910, E911 and E912 were constructed back in 1952-53. In 1990-91, stands D910 and F910 were constructed and maintenance work was done on stands A910, A920, C910 and E912.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2017-2026** (Figures 6-9):
    - Survey ponds to evaluate existing fish species.
    - Maintain the current acreage and quality of ponds (25 acres).

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

[23] Tioughnioga Wildlife Management Area Source Book, NYS DEC Cortland Sub-Office, 1285 Fisher Ave, Cortland, NY

- Continue routine mowing of dikes, periodic operation of water control structures, and as needed, repair pond infrastructure (e.g., dikes, water control structures).
- Conduct occasional drawdowns to encourage vegetation growth.

BEST MANAGEMENT PRACTICES

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

MANAGEMENT EVALUATION

Water bodies on Tioughnioga are not regularly surveyed. Fisheries surveys are planned for 2017 to determine if any significant species are present that may require an adjustment to the treatment schedule.

HABITAT MANAGEMENT SUMMARY

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

Table 7. Summary of habitat management actions recommended for Tioughnioga WMA, 2017-2026. (Also see Figures 3 and 6-9.)

Habitat	Management Action	Acres	Timeframe
Forest	Clearcut and seed tree stand F42	35	2017-2021
Forest	Clearcut stands C38, C60, D80, E7 and E78	33	2017-2021
Forest	Patch clearcut stands C29, C57, C63, D41, D53 and F34.1	40	2017-2021
Forest	Seed tree stands C10, C12 and C14	24	2017-2021
Forest	Thin stands A14, A20, A25, A33, A34 and C36	52	2017-2021
Shrubland	Shrub maintenance stand D950	12	2017-2021
Shrubland	Clearcut stands B22, B23, B75 and F47	27	2017-2021
Shrubland	Seed tree stands A17, F32 and F49	47	2017-2021
Shrubland	Apple tree release stands A1, A12, A29, A32, B30, C59, C73, D37, D56, D64, D73.2, D93, D95, D97, D111, D121, E1, E6.2, E43, E45, E46, E48 and E51	150	2017-2021

Table 7. *Continued*

Habitat	Management Action	Acres	Timeframe
Grassland	Clearcut stands C49, C50, C51, C52, C53, C54, C55, C56, C61, C64, C65, C66 and F46	71	2017-2021
Grassland	Patch clearcut stands F26 and F31	69	2017-2021
Forest	Clearcut stands B71, B73, C3, C17, C28, C35, D44, D46, D50, D61, D62 and D96	103	2022-2026
Forest	Patch clearcut stands D41 and D53	12	2022-2026
Forest	Seed tree stands D6, D11, E5, E54 and E62	26	2022-2026
Forest	Thin stands D12, D36, D38, D115, D116 and E36	36	2022-2026
Forest/ Shrubland	Clearcut stand E58	8	2022-2026
Shrubland	Clearcut stands E3, E52, E53, E59, E60 and E61	30	2022-2026
Shrubland	Apple tree release stand E4	2	2022-2026
Shrubland	Reset shrublands with brush mower or forestry mower to maintain proper species and structure		2022-2026 As needed
Grassland	Clearcut stands D1, D3, D98, D99, D101, D103, D126, E22, E23, E24, E26, E27, E28, E29, E30, E32, E34, E39, E40, E56, E68, E69, E70 and E71	159	2022-2026
Shrubland	Evaluate the need for supplemental shrub planting		2017-2026 As needed
Grassland	Rotationally mow a portion of the grasslands each year, monitor and treat invasive species, and apply soil amendments/seed as needed	Will vary as new grassland is created	2017-2026
Wetland	Construct vernal pools		2017-2026
Wetland/ Open Water	Routinely mow dikes, periodically operate water control structures, and as needed, repair wetland infrastructure (e.g., dikes, water control structures)		2017-2026 as needed
Forest/ Shrubland/ Grassland	Multiple treatments stands C4, E6.1, E35, E38, E42, E66, F18 and F19	109	2017-2026

III. FIGURES

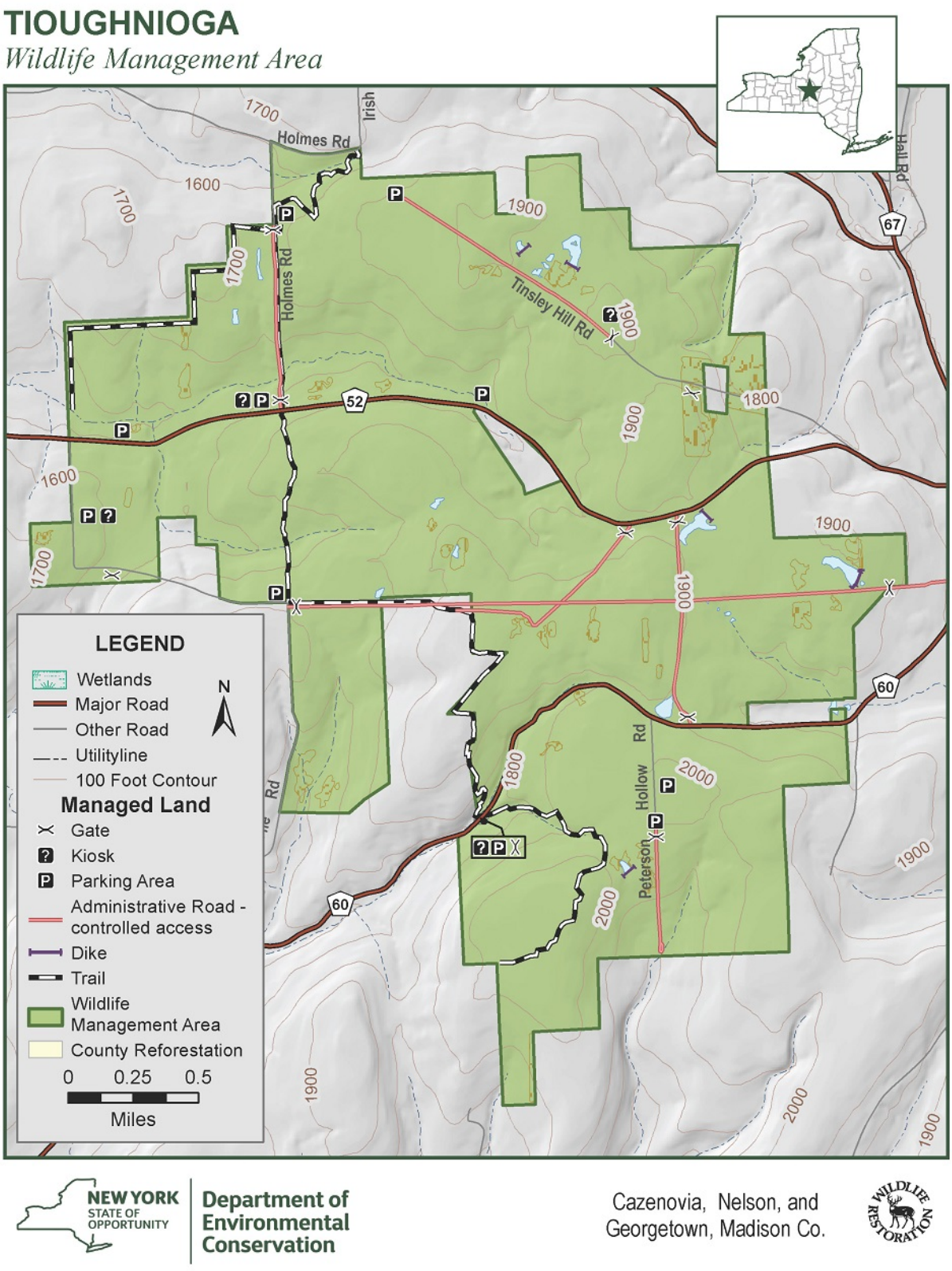

FIGURE 1. Location and access features at Tioughnioga WMA.

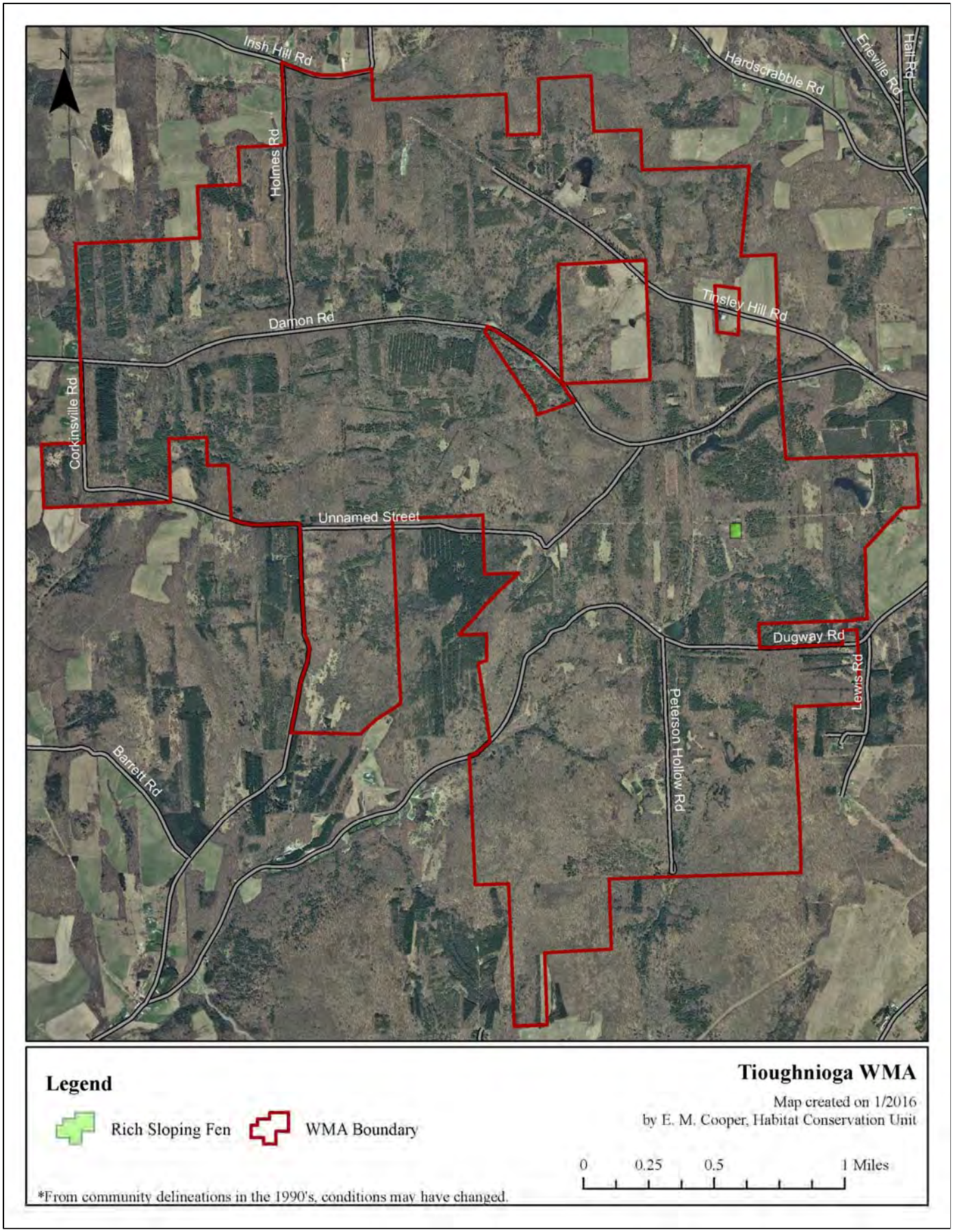

FIGURE 2. Significant ecological communities on Tioughnioga WMA. Data from the NY Natural Heritage Program.

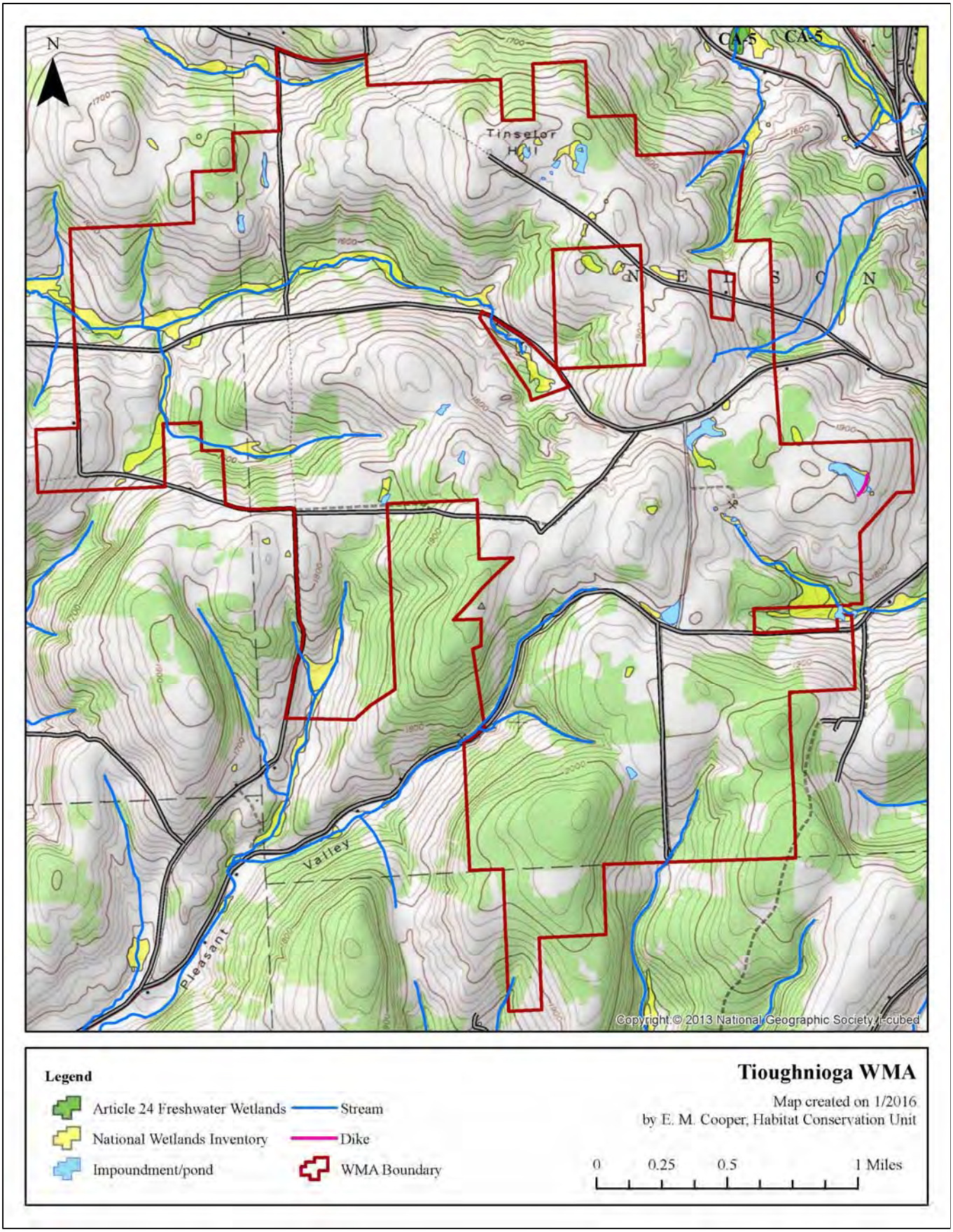

FIGURE 3. Wetlands, open water, and streams of Tioughnioga WMA. Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

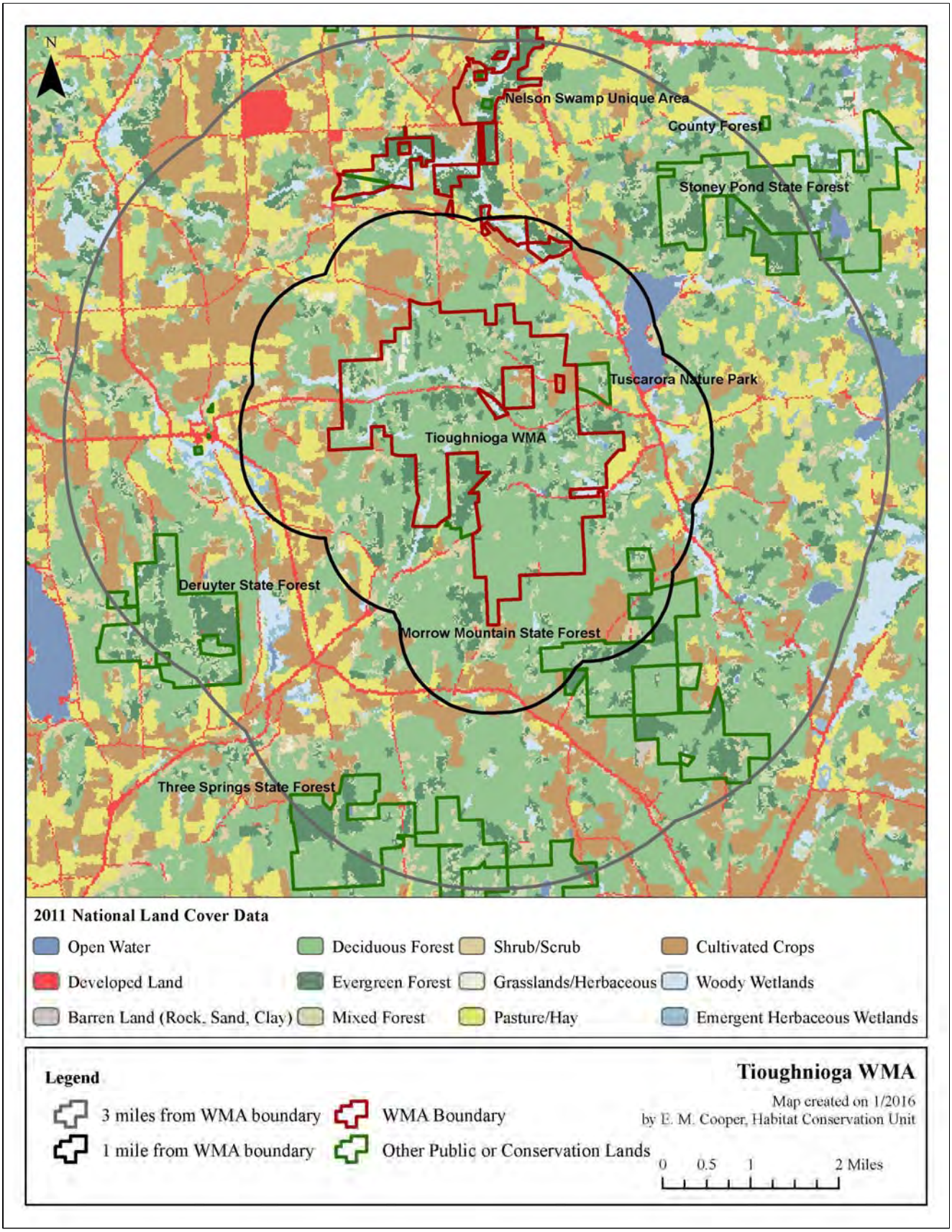

FIGURE 4. Land cover types and conservation lands in the landscape surrounding Tioughnioga WMA. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used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

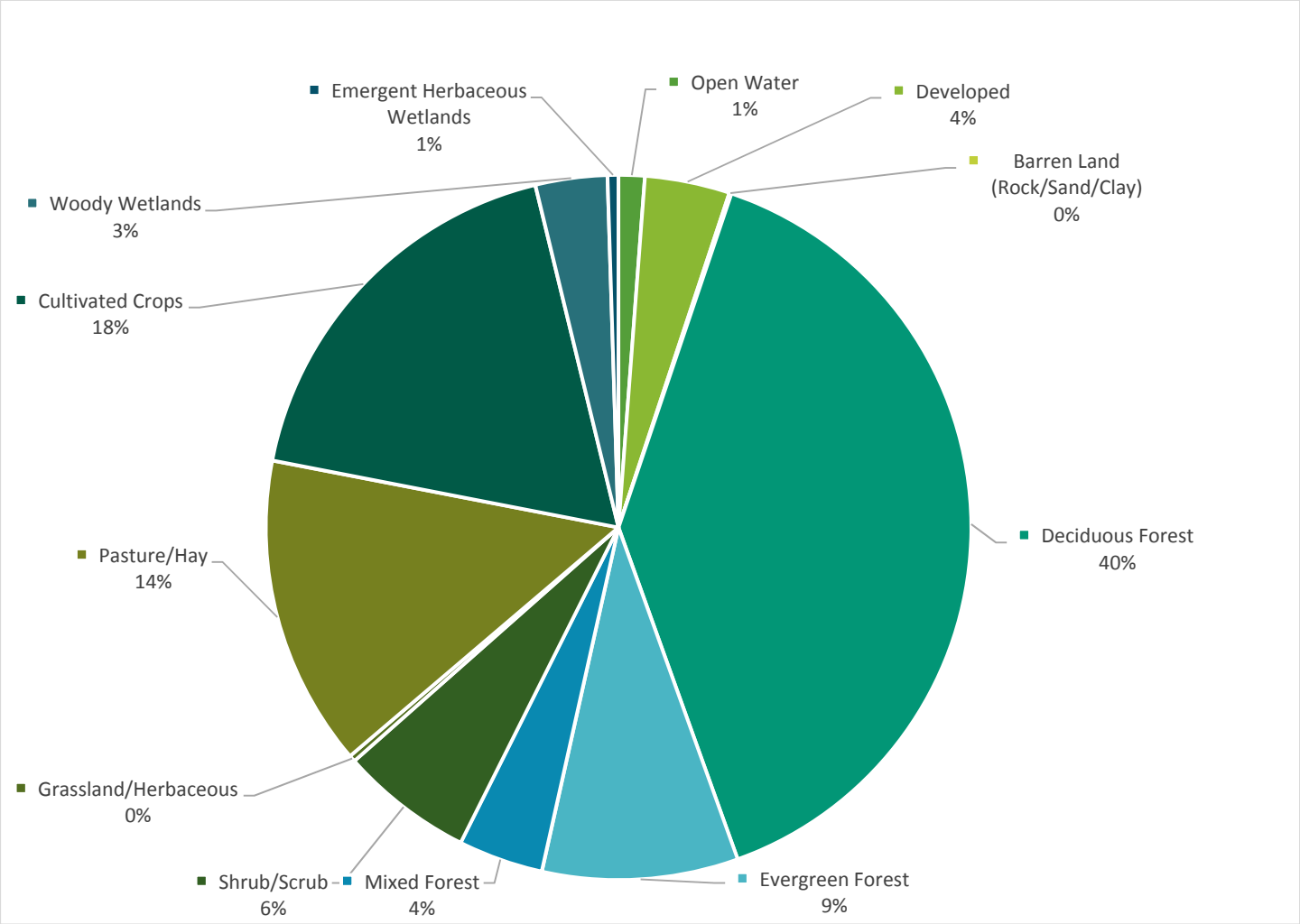

FIGURE 5. Percent cover of land cover types within three miles of Tioughnioga WMA.

Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at http://www.mrlc.gov/nlcd2011.php.

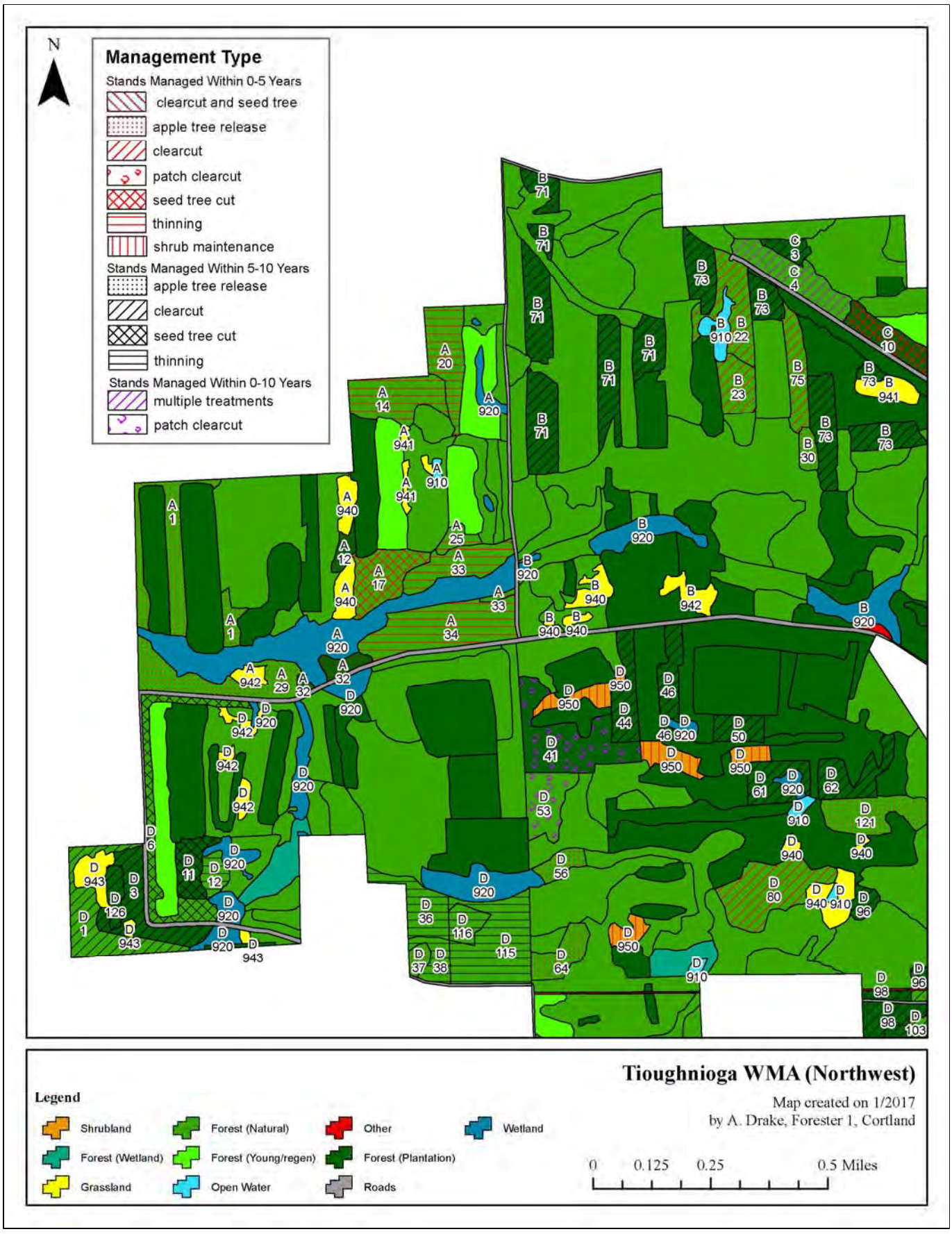

FIGURE 6. Habitat types and locations of proposed management on Tioughnioga WMA (Map 1). Numbers indicate the stand number from habitat inventory.

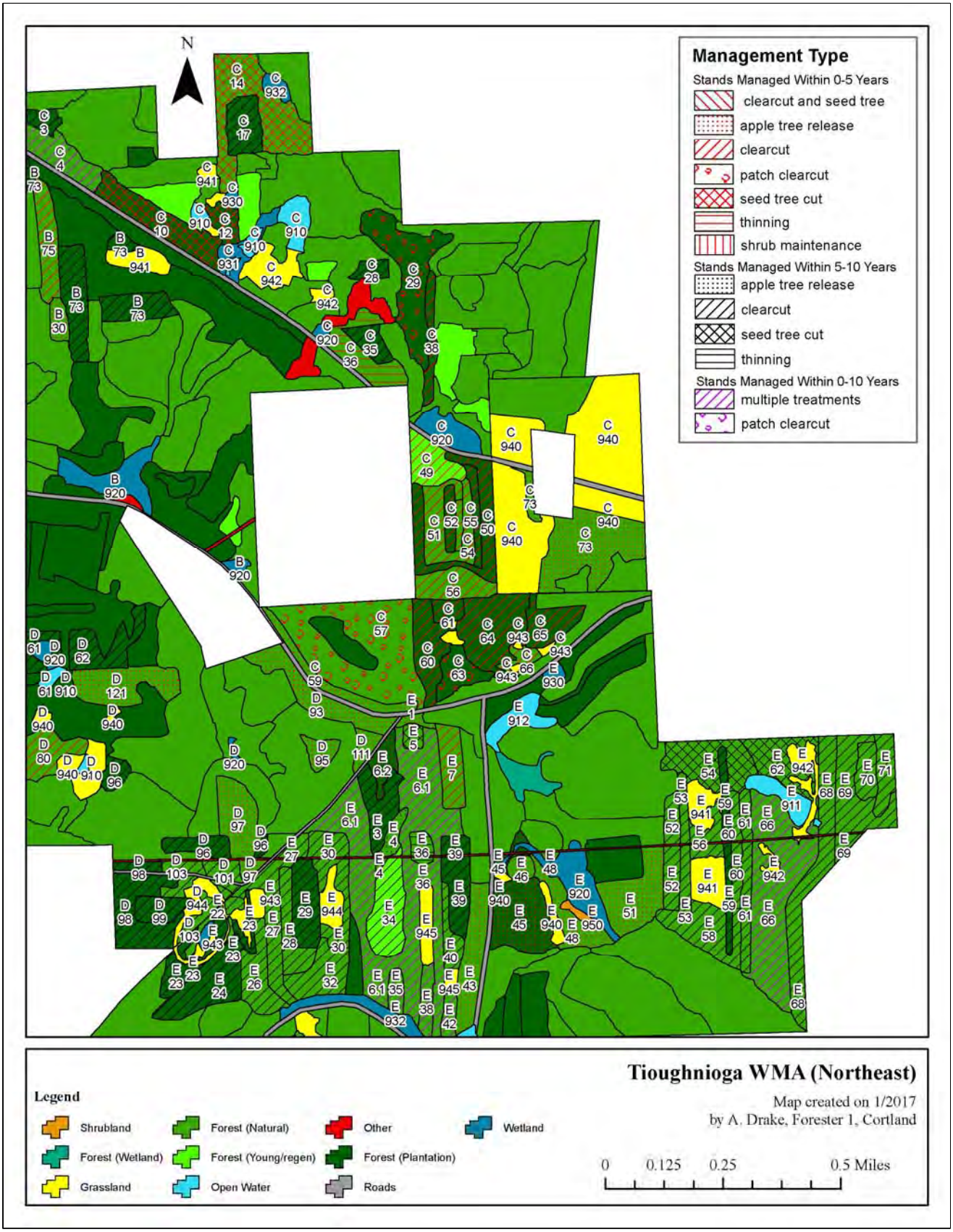

FIGURE 7. Habitat types and locations of proposed management on Tioughnioga WMA (Map 2). Numbers indicate the stand number from habitat inventory.

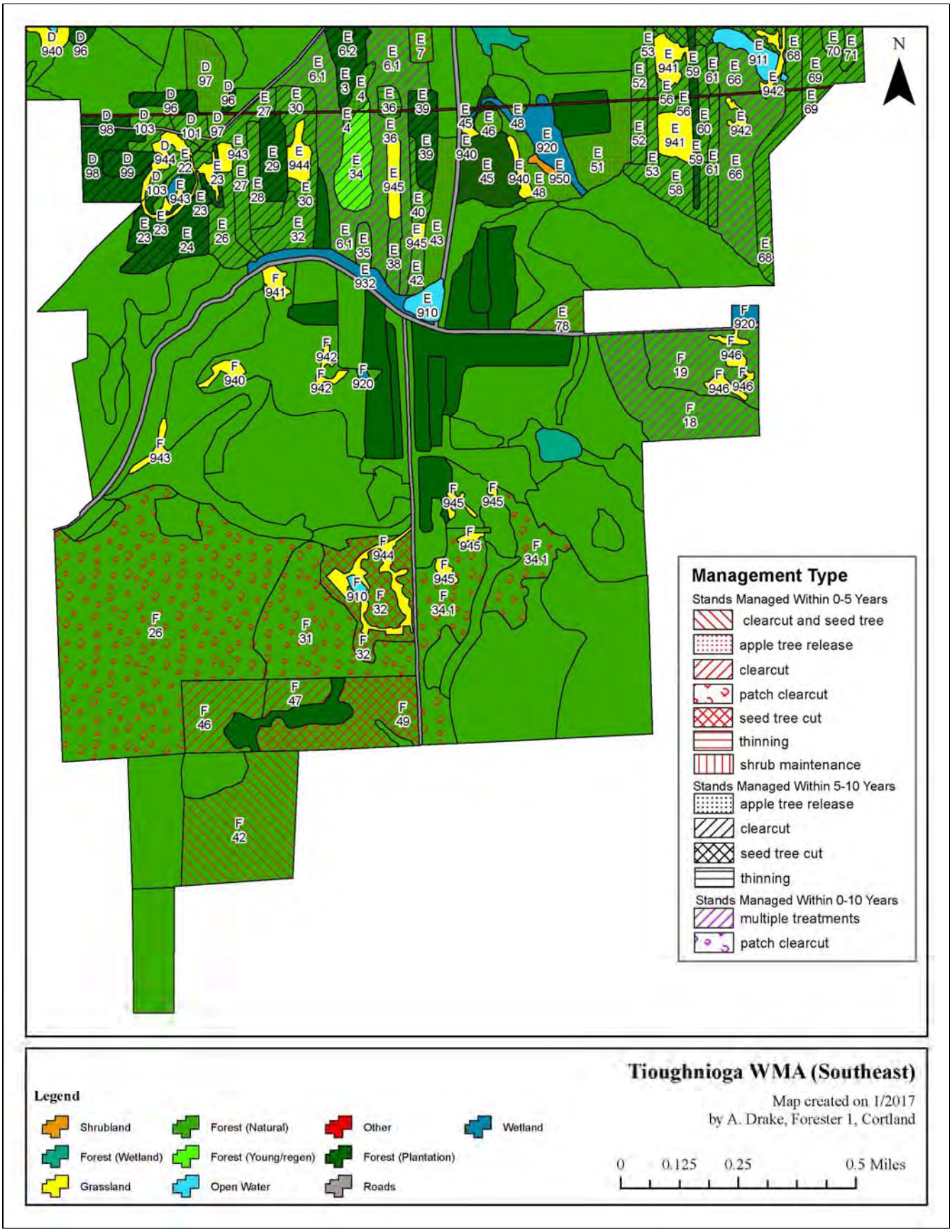

FIGURE 8. Habitat types and locations of proposed management on Tioughnioga WMA (Map 3). Numbers indicate the stand number from habitat inventory.

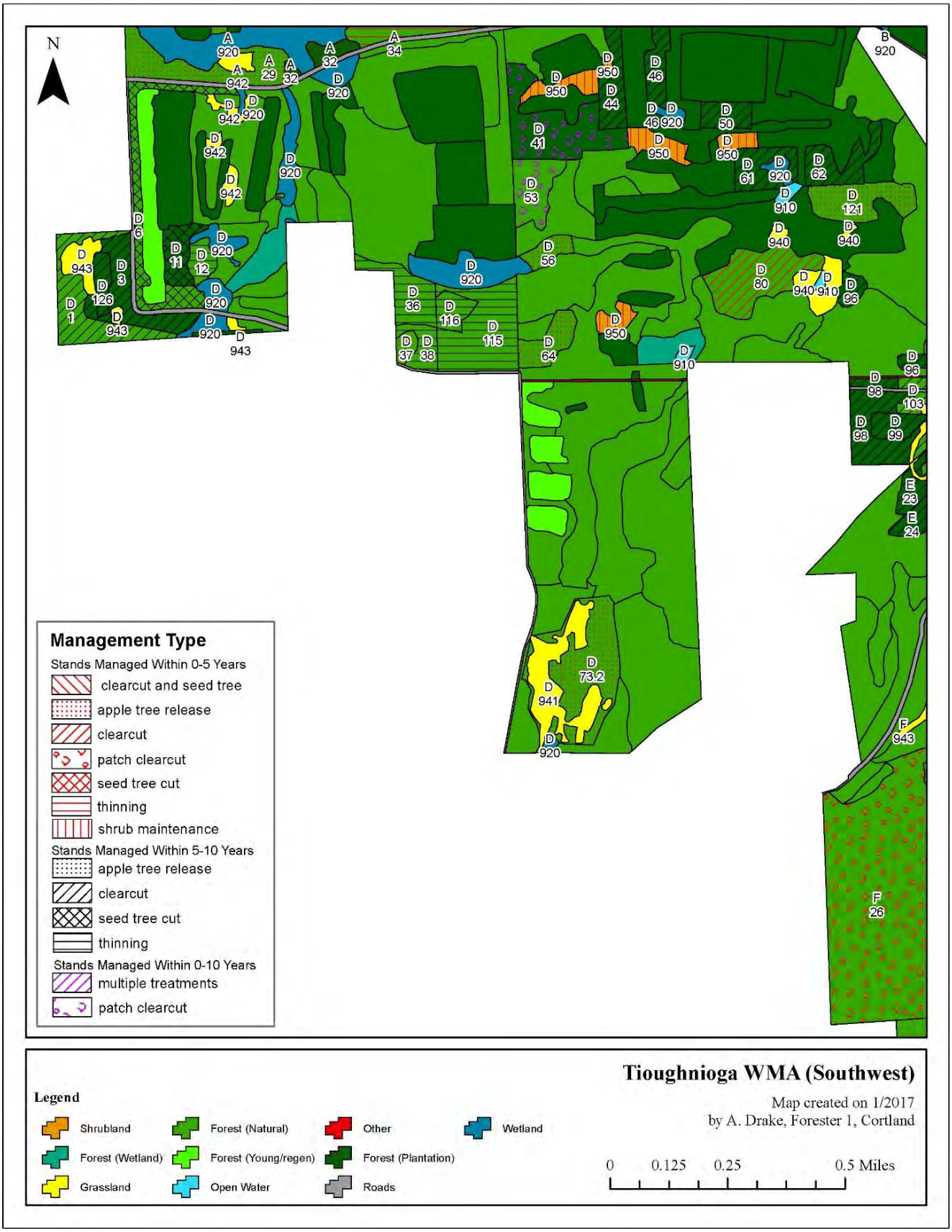

FIGURE 9. Habitat types and locations of proposed management on Tioughnioga WMA (Map 4). Numbers indicate the stand number from habitat inventory.

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)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

State Rank of Significant Ecological Communities:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 = Apparently secure in New York State.
S5 = Demonstrably secure in New York State.
SH = Historically known from New York State, but not seen in the past 15 years.
SX = Apparently extirpated from New York State.
SE = Exotic, not native to New York State.
SR = State report only, no verified specimens known from New York State.
SU = Status unknown.
(Edinger et al. 2002. Ecological Communities of New York State, Appendix A)

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

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

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

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

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

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

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

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

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

Wildlife Management Area: Lands that were acquired by DEC primarily for the production and use of wildlife, including hunting and trapping. These areas provide and protect wildlife habitats that are particularly significant in

their capacity to harbor rare, threatened or endangered species, host unusual concentrations of one or more wildlife species, provide an important resting and feeding area for migratory birds, provide important nesting or breeding area for one or more species of wildlife, or provide significant value for wildlife or human enjoyment of wildlife. (Public Use of Lands Managed by the Bureau of Wildlife)

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

APPENDIX B. STATEMENT OF CONFORMITY WITH SEQRA

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

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

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

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

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

APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS

PRESCRIPTION FOR WILDLIFE MANAGEMENT AREA TIMBER HARVEST

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

Species composition:

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

Stand inventory or analysis date:

Regeneration data:

Natural Heritage Element Occurrence layer review:

SMZ layer review:

Retention data:

Soil types and drainage:

Interfering vegetation:

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

Technical guidance/stocking guide:

Treatment purpose:

Management Objective: Even aged or Uneven Aged

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

Clearcut acreage and configuration: (if applicable)

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

Retention considerations and adjustments:

Treatment descriptions:

Name and Title of Preparer:

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.

FY 17-18 (4/1/17 - 3/31/18)