Habitat Management Plan
for
Erwin Wildlife Management Area
2020 - 2029


Photo: Mike Palermo

Division of Fish and Wildlife
Bureau of Wildlife
6274 East Avon-Lima Road, Avon, New York 14414

June 12, 2020

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Prepared by:

Michael Palermo, Biologist 1 (Wildlife)
Emily Bonk, Forester 1
John Mahoney, Forestry Technician 1
Forest Management Program

Scott Smith, Biologist 1 (Wildlife)
Kelly Raab, Fish & Wildlife Technician 2
Erwin WMA Managers

Heidi Kennedy, Biologist 1 (Wildlife)
Land Management & Habitat Conservation Team

Reviewed and approved by:

M. Wasilco — 7/2/2020

Michael Wasilco, Regional Wildlife Manager
Bureau of Wildlife — Date

James F Farquhar III — 7/6/2020

James F. Farquhar III, Chief
Bureau of Wildlife — Date

Tony Wilkinson — 7/6/20

Tony Wilkinson, Director
Division of Fish and Wildlife — Date

Financial support for development of this Habitat Management Plan was provided by the Federal Aid in Wildlife and Sport Fish Restoration Program and non-federal funds administered by the New York State Department of Environmental Conservation including Habitat & Access Stamp funds.

TABLE OF CONTENTS

LIST OF FIGURES

SUMMARY

Erwin Wildlife Management Area (WMA) is located in the Town of Erwin, Steuben County, and consists of 2,507 acres. The WMA was purchased by New York State in 1928 and is one of the oldest WMAs in the state. The property was extensively logged and portions were burned over prior to State acquisition. DEC management has included administrative road construction, boundary line clearing, pond and field creation, and extensive timber harvesting to improve forest health and wildlife habitat.

Most of the WMA is forested (94%), primarily composed of Allegheny oak forest on the hilltop and ridges, and hemlock-northern hardwood forest on northern slopes and in gullies. Approximately 11% of the forest is young forest regenerating from timber harvests, providing important habitat that is lacking from the surrounding landscape. These young forest stands are excellent examples of successful silviculture and were established to regenerate oak stands that were declining and in poor health.

Grassland and wetland are minor components of the WMA but add valuable habitat diversity. The grasslands occur in a few small openings and in linear strips along administrative roads and the property boundary. The wetlands consist of small potholes and impoundments, ranging from a quarter-acre to 13 acres, the larger of which contain a moderate fishery of common warmwater species.

This plan elaborates upon habitat objectives described in both the Erwin Unit Management Plan (UMP) and the Great Divide UMP.[1] Erwin WMA is primarily managed to provide and enhance wildlife habitats, especially a diversity of forested habitats. The WMA is near both Corning and Elmira and provides valuable wildlife-related recreation opportunities, such as hunting, trapping, and bird watching.

Habitat management goals for Erwin WMA include:

- Maintaining the majority of forest cover in an intermediate or mature age-class to provide a diversity of forest habitats that benefit associated wildlife (81% of the WMA);
- Managing a young forest component that provides early-successional habitat while regenerating forest stands (12% of the WMA, 13% of total forested acres);
- Maintaining grassland openings and strips to provide food and cover for associated wildlife, including eastern cottontail, white-tailed deer, and wild turkey (4% of WMA);
- Maintaining wetland impoundments and the quality of streams to provide aquatic habitat and water sources for upland wildlife (1% of WMA);
- Establishing an early-successional shrubland component to provide continuous dense upland cover and soft mast for associated wildlife (1%); and
- Maintaining access features (1% of WMA).

[1] Information of DEC Unit Management Plans is available online at http://www.dec.ny.gov/lands/4979.html.

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.

The Erwin UMP was approved in October 2008 and addressed management needs and activities for a 10-year period. The Erwin Unit was combined with the Great Divide Unit in 2019; therefore, Erwin WMA will be addressed in the revised Great Divide UMP which is currently being drafted (as of the writing of this HMP). The Great Divide UMP will address habitat

objectives and actions, as well as management provisions for facilitating compatible wildlife-dependent recreation, access, and facility development and maintenance.

The effects of climate change and the need to facilitate habitat adaptability and resilience under projected future conditions will be incorporated into the habitat management planning process and will be considered in any actions that are recommended in HMPs. Changing conditions that may affect habitat composition include warmer temperatures, milder winters, longer growing seasons, increased pressure from invasive species, more frequent intense storms, and moisture stress. It is also important to consider landscape level effects to maintain the connectedness of habitats to allow range adjustments of both plant and animal species.

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. Definitions are provided in Appendix A.

WMA Overview

Location

Erwin WMA is located in DEC Region 8, Town of Erwin in Steuben County (Image 1).

Total Area

2,507 acres

Habitat Inventory

A habitat inventory of the WMA was conducted in 2015 and will be updated every ten to fifteen years to document the existing acreage of each habitat type and to help determine the location and extent of future management actions.

Table 1 summarizes the current acreage by habitat type and the desired acreage after management. Desired conditions were determined with consideration of habitat requirements of targeted wildlife, current conditions on the WMA, and conditions in the surrounding landscape (see Landscape Context section below).

Image 1: Location of Erwin WMA

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

Habitat Type	Current Conditions (as of 2015)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Forest [a]	2076	83%		2028	81%
Young forest	265	11%		303	12%
Shrubland	0	0%		10	1%
Grassland	99	4%		99	4%
Agricultural land	0	0%		0	0%
Wetland (natural)	0	0%		0	0%
Wetland (impounded)	34	1%		34	1%
Roads and parking	33	1%		33	1%
Rivers and streams			3.7		
Total Acres:	2,507	100%		2,507	

[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.

ECOLOGICAL RESOURCES

Wildlife Overview:

Erwin WMA is primarily forested and wildlife species occurring here are generally those associated with oak and northern hardwood forests. The diversity of forest age classes present (i.e., young, intermediate, and mature) provides various habitat conditions important to a range of wildlife that depend upon forest. Several rare or at-risk species are present, and popular small and big game species are quite abundant.

Common or notable species occurring on the WMA include:

- Small and big game (e.g., black bear, cottontail rabbit, gray squirrel, ruffed grouse, white-tailed deer, wild turkey)
- Furbearers (e.g., bobcat, coyote, gray and red foxes, fisher, long and short-tailed weasels, mink, opossum, raccoon, skunk)
- Small mammals (e.g., deer mouse, white-footed mouse, big brown bat, eastern red bat)
- Songbirds (e.g., black-billed cuckoo, black-throated blue warbler, blue-winged warbler, brown thrasher, eastern towhee, ovenbird, red-eyed vireo, scarlet tanager, wood thrush)
- Raptors (e.g., broad-winged hawk, Cooper's hawk, red-tailed hawk, barred owl, eastern screech owl)
- Waterfowl (e.g., mallard, wood duck)
- Amphibians (e.g., American toad, leopard frog, wood frog, spring peeper, spotted salamander, red-backed salamander, eastern red-spotted newt)
- Reptiles (e.g., common garter snake, northern water snake, eastern milk snake, painted turtle, snapping turtle)
- Fish (e.g., black crappie, bluegill, largemouth bass, pumpkinseed)

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).[2] Species listed below have been documented on or within the vicinity of the WMA and are likely to occur in suitable habitat on the WMA. Other species of conservation concern may also be present. Data sources include: the NY Natural Heritage Program, NY Breeding Bird Atlases,[3] NY Reptile and Amphibian Atlas,[4] DEC wildlife surveys and monitoring, and eBird.[5]

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

Species Group	Species	Federal Status	NY Status	NY SGCN
Birds	American kestrel			x
	American woodcock			x
	Bald eagle		T	x
	Black-billed cuckoo			x
	Black-throated blue warbler			x
	Blue-winged warbler			x
	Brown thrasher			HP
	Canada warbler			HP
	Cerulean warbler		SC	x
	Cooper's hawk		SC	
	Northern goshawk		SC	x
	Prairie warbler			x
	Red-shouldered hawk		SC	x
	Ruffed grouse			x
	Scarlet tanager			x
	Sharp-shinned hawk		SC	
	Wood thrush			x
Mammals	Eastern red bat			x
	Northern long-eared bat (Northern myotis)	T	T	HP
Amphibians and reptiles	Four-toed salamander			HP
	Eastern long-tailed salamander		SC	HP
	Northern black racer			x
	Snapping turtle			x
	Smooth green snake			x
	Wood turtle		SC	HP
Fish	None known to occur			

[2] 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.
[3] Available online at http://www.dec.ny.gov/animals/7312.html.
[4] Available online at http://www.dec.ny.gov/animals/7140.html.
[5] Available online at http://ebird.org/content/ebird/about/. © Audubon and Cornell Lab of Ornithology.

Table 2. Continued

Species Group	Species	Federal Status	NY Status	NY SGCN
Invertebrates	None known to occur			
Plants	Sweet coltsfoot		E	
	Wild hydrangea		T	

Significant Ecological Communities:

There is one significant natural community located on Erwin WMA as identified by the NY Natural Heritage Program. The state rank reflects the rarity within NY, ranging from S1, considered the rarest, to S5, considered stable; definitions are provided in Appendix A. The following significant ecological community occurs on the WMA; community description is from *Ecological Communities of New York State, Second Edition* [6] (Figure 2):

- **Alleghany oak forest** (S2) - a hardwood forest that occurs on well-drained sites, from 1,300 to 2,300 feet above sea level. This is a narrowly defined community distinguished by a more diverse flora, especially in the tree canopy and ground layer, compared to other mid to high elevation oak communities. This is distinguished from a chestnut oak forest by codominance of four to five oak species, in contrast to dominance of chestnut oak or codominance of chestnut oak and red maple typical of chestnut oak forests.

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

Soils and Topography:

Most of the soils on Erwin WMA are of the following silt loam soil associations:

- Willowemoc-Vly-Onteora-Lewbeach (58%)
- Volusia-Mardin-Lordstown (42%)

According to the National Soil Survey, approximately 60% of the soils on the WMA are classified as prime farmland (9%) or farmland of statewide importance (51%).[7] These classifications describe the suitability of soils for farmland, not the current land use or cover (there are currently no agricultural lands on the WMA). Approximately 81% of the WMA contains soils that are considered well-drained or moderately well-drained. Most of the poorly drained soils here occur in low areas draining the hilltop and management actions in these areas will use best management practices to avoid erosion.

Elevations of land on the WMA ranges from 1,100 feet above sea level to 1,780 feet. Approximately half the WMA is hilltop with flat to gentle slopes, and the other half is hillside and gullies with slopes ranging from moderate to very steep. Management actions on steep slopes will generally be avoided.

[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. Available online at https://www.dec.ny.gov/animals/29384.html.
[7] National Soil Survey data is available online at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

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. Approximately 258 acres of SMZs (10% of the WMA) are on Erwin WMA, including:

- One wetland (CB-10) regulated by Article 24 of the Environmental Conservation Law and eighteen wetlands shown on the National Wetlands Inventory (NWI; Figure 3). State-regulated wetlands are protected by a buffer zone of 100 feet (regulated adjacent area).
- Approximately 3.7 miles of streams, composed of intermittent tributaries to the Cohocton and Tioga Rivers (Figure 3). Most of these are unnamed, except for Weaver Hollow Brook. These streams are classified as C and are not regulated by Article 15 of the Environmental Conservation Law; however, water quality standards will be adhered to. [8]

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.*[9] 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, habitat availability, and other conservation lands near Erwin WMA (Figures 4 and 5).

The landscape within 3 miles is primarily composed of these cover types:

- Forest, combining deciduous, evergreen, and mixed (62%)
- Pasture/hay and grassland (12%)
- Cultivated crops (10%)
- Developed (10%)
- Early-successional shrubland (2%)
- Wetland, combining emergent and woody (2%)
- Open water (2%)

Three other conservation lands occur within 3 miles, covering 3% of the surrounding landscape:

- Erwin Mountain State Forest (502 acres) - contiguous to the WMA's southern boundary, primarily forested with multiple age classes.
- Erwin Hollow State Forest (529 acres) - primarily forested with multiple age classes, bisected by a large creek. Some patches of young forest.
- McCarthy Hill State Forest (799 acres) - partially within 3-mile radius of WMA, predominantly hemlock forest, contains a 60 acre stand of young forest.

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

Erwin WMA is situated on a hilltop, with the Cohocton River to the north, the Tioga River to the south, and the confluence of these rivers to the east. In these river valleys land cover is mostly agricultural, except east of the WMA where the land has been extensively developed as the City of Corning and neighboring villages have grown. High-density residential development occurs directly adjacent to the WMA's southeastern boundary and may expand in the future. Aside from an expansive area of agriculture to the west of the WMA, the surrounding hilltop and hillside terrain is predominantly forested.

Erwin WMA is within a nexus of linkage zones spanning across southern Steuben County that connect several forest matrix blocks. Forest matrix blocks are large, unfragmented examples of the dominant forest communities throughout the state. Linkage zones describe corridors between a pair of forest blocks that maintain connectivity for the populations of plants and animals of these forests. More information regarding forest matrix blocks can be found within the *Strategic Plan for State Forest Management*. [10]

Approximately 62% of the landscape surrounding the WMA is forested and most of these forests are of similar age (50 to 90 years) and composed of a mature forest structure (poletimber or sawtimber). Only 2% of the surrounding landscape is shrubland or young forest. Young forest habitat and several associated wildlife species have steeply declined in the northeast over recent decades due to maturing forests and a lack of natural and human-caused forest disturbances. However, on the WMA, young forest is well represented from recent timber harvests and provides valuable habitat diversity to the greater forested landscape. It is an important goal to perpetuate this young forest component on the WMA.

Erwin WMA is within the Southern Tier Grassland Focus Area. These focus areas are regions of the state that support key, residual populations of grassland birds. Grassland dependent bird species typically require large patches (25+ acres) of grassland with low perimeter-to-area ratios in an open landscape, and this focus area was established considering the large pasture/hay fields present in the region. The small fields on the WMA do not provide suitable habitat for grassland bird nesting and establishing this habitat on the WMA is not feasible.

II. Management Strategies by Habitat Type

DEC will continue active management of wildlife habitats on Erwin 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.

[10] The Strategic Plan for State Forest Management is available online at http://www.dec.ny.gov/lands/64567.html.

FOREST

Forested acreage includes the following forest types:

Natural forest: naturally forested acres, including hardwoods and softwoods. Includes any upland forested acreage that is not young forest, i.e., pole stands, other intermediate forest age classes, mature forest, and old growth forest.
Plantation: planted forested acres, generally planted in rows dominated by one or two species.
Forested wetland: wetland acres where forest vegetation accounts for greater than 50% of hydrophytic vegetative cover and the soil or substrate is periodically saturated or inundated.
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 Erwin WMA incorporates an approach to create and/or maintain the diversity of forest age classes that are required to support a diversity of wildlife. In 2015, DEC launched the Young Forest Initiative (YFI) to increase the amount of young forest on WMAs to benefit wildlife that require this transitional, disturbance-dependent habitat. [11]

MANAGEMENT OBJECTIVES

- Increase young forest from 265 to 303 acres (13% of WMA forested acreage) by regenerating mature forest stands using even-aged silviculture.
- Maintain most forest cover (2,028 acres) in an intermediate or mature age class to provide diverse forest habitats that benefit associated wildlife.
- Promote persistence of the oak forest type that covers most of the WMA, and the hemlock-northern hardwood forest type present on north-facing slopes and in gullies.
- Introduce prescribed fire to oak and transition hardwood stands to restore and maintain a fire-adapted forest community.
- Control non-native invasive vegetation to maintain forest biodiversity.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

There are 2,341 acres of forest covering approximately 94% of Erwin WMA (Figure 6). Table 3 provides a summary of forest types, including the most common tree species present in each.

Forest cover on the WMA is mostly contiguous, interrupted only by administrative roads and small fields, and is well connected to large parcels (>100 acres) of adjacent private forest lands. This large expanse of forest on and adjacent to the WMA provides interior forest conditions important to several wildlife species.

Approximately 70% of the forest here is an oak forest type (Photo 1), some of which is classified as an Allegheny oak forest (an ecological community with an S2 state rank). Most of these oak stands are very uniform in age and structure and are composed of northern red oak, black oak,

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

white oak, scarlet oak, and chestnut oak, with some stands also containing a component of hemlock and/or white pine. Many of these stands show signs of decline (due to age, pest outbreaks, and drought) and should be regenerated to ensure the oak forest type persists over time.

Photo 1: Oak forest covers 70% of the WMA and provides important food and cover that numerous species depend upon.

Photo: Michael Palermo, DEC

Since most oaks are intermediate in shade tolerance, seedlings generally do not establish within a stand without a disturbance that provides adequate sunlight on the forest floor. In the absence of such a disturbance (e.g., timber harvest, prescribed burn), an oak forest can transition to the dominance of shade-tolerant tree species (e.g., maple, basswood, beech) as individual mature oaks die. Implementing suitable silviculture and incorporating prescribed fire to promote the regeneration and recruitment of oak is an important goal here.

Hemlock-northern hardwood forest composes approximately 15% of WMA forest cover and is primarily present on north facing slopes and within gullies. In most of these stands, hemlock is generally codominant with one or more other species, including white pine, red and sugar maples, and/or various oaks but in a few stands, hemlock is heavily dominant. Hemlocks provide valuable thermal cover for wildlife throughout the year, including warmer winter and cooler summer temperatures (Photo 2). The hemlock woolly adelgid (HWA) could cause widespread decline and mortality of hemlocks on the WMA within the next decade, which would greatly disrupt these hemlock-related habitat conditions. Monitoring infestation extent and implementing control options as available will be important.

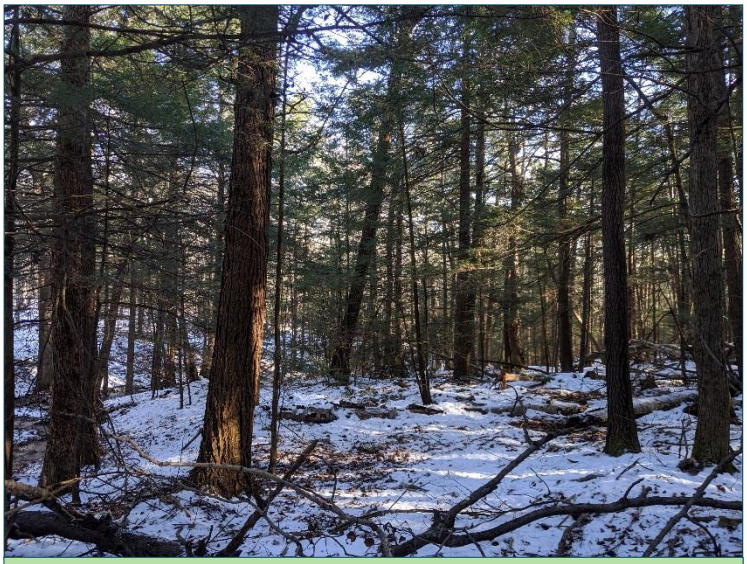

Photo 2: Hemlock provides valuable shade in early spring before hardwoods leaf out, which keeps conditions cool and moist.

Photo: Michael Palermo, DEC

Approximately 3% of forest cover here is composed of pioneer (e.g., aspen and white birch) and black locust stands. These stands are mostly poletimber and provide

diverse foods preferred by some wildlife species (e.g., aspen flower buds are an important winter food for grouse). Actions to ensure these forest types persist should occur, especially aspen stands.

Just over 11% of forest cover is young forest composed of dense tree saplings (Photo 3) and is primarily located within five stands, ranging in size from 28 to 93 acres. These stands were established following timber harvests completed in 2011 and contain an abundance of oak, aspen, and birch saplings, with very little competing invasive vegetation. The dense cover and abundant food (e.g., twig browse, flowers, berries, insects) provided by these stands is important to numerous at-risk wildlife species with declining populations. These stands should be monitored as they develop and be retreated as needed to ensure oaks are recruited into the overstory.

Photo 3: The high stem density of young forest provides important cover for breeding and escape from predators.

Photo: Michael Palermo, DEC

Approximately 18 acres of forested wetland are present and occur in a few flat areas where saturated soils and shallow pools naturally formed.

The understory in mature forest stands on the WMA is diverse and variable. In some stands it is quite sparse, such as in hemlock and young poletimber stands. In several of the sawtimber oak stands it is well developed and creates the high vertical diversity important to many wildlife species. The most common understory shrub and small tree species here are eastern teaberry, hillside and lowbush blueberries, black huckleberry, mountain laurel, pinxter flower, serviceberry, and witch hazel.

Table 3. Summary of the acreage and dominant overstory species for each forest type.

Forest Type	**Acres (as of 2015)**	**Desired Acres**	**Overstory species**
Natural forest (mature/intermediate)	2057	2009	Various oaks, red and sugar maples, hemlock, white pine
Plantation	1	1	Norway spruce
Forested wetland (mature/intermediate)	18	18	Red maple, red oak, hemlock
Young forest	265	303	Aspen, birch, oak, maple
Young forest (forested wetland)	0	0	Currently not present on WMA
Total Forested Acres:	2,341	2,331 [a]	

[a] This decrease in total forested acres is due to the planned conversion of 10 acres of forest to shrubland.

Forest Management Target Species:
To address the diverse needs of various wildlife, the target species for forest habitat management on Erwin WMA are categorized by the dominant forest types present and are shown in Table 4. These species were designated as targets because they are species of greatest conservation need (SGCN) and/or popular game animals that have well-studied habitat requirements with established best management practices. These species were also selected because they can be considered umbrella species, meaning habitat management to maintain, enhance, or create their habitat will also benefit numerous other species that utilize similar habitats.

Table 4. Target species for forest management on Erwin WMA and their habitat needs.

Habitat Type	Target Species	Beneficial Habitat Structure
Young forest	Canada warbler	*Nesting*: young, even-aged stands with exposed song perches (retained mature trees) above a dense understory and complex floor.
		Foraging: dense cover of leafy shrubs and young trees that support abundant insects.
	Ruffed grouse	*Drumming*: downed trees surrounded by small diameter woody cover with high stem density.
		Nesting: young, open forest stands or second growth woodlots.
		Brood-rearing: herbaceous ground cover with a high midstory woody stem density.
Mature forest	Wild turkey	*Foraging*: mast producing trees (e.g., oak and hickory) provide important forage during the fall and winter.
		Nesting: varied, includes woody debris cover and overturned tree root wads in mature forest, to dense areas in young forest.
		Brood-rearing: small herbaceous openings near forest.
	Wood thrush	*Nesting*: hardwood forest of intermediate to old age with tall shrub and sapling layer to conceal nest.
		Foraging: thick leaf litter on open forest floor for invertebrates, and fruit-bearing trees and shrubs for migration.

Efforts to increase and maintain young forest on the WMA is expected to benefit many additional wildlife species, including at-risk species and popular game animals, such as eastern cottontail and white-tailed deer. It is important to note that young forest also benefits many wildlife species generally associated with mature forest. The abundant and diverse food (e.g., berries, catkins, insects) present in young forests attract juvenile interior nesting songbird species, such as black-throated blue warbler, during critical growth periods as well as juveniles and adults preparing for energy intensive migrations.

A variety of pollinator species, such as bees and butterflies, will also benefit from the abundance of flowering plants in young forests. Pollination is critical to the reproduction of wild and

cultivated plants and providing habitat to sustain these pollinator populations is important both ecologically and economically.[12]

An important goal on this WMA is to regenerate declining oak stands, which not only will create young forest, but will also ensure that healthy, vigorous oak stands are present here in the future. Oaks are some of the most beneficial and important tree species for wildlife in New York because they provide an abundance of food resources. Prolific acorn crops are an important food during the fall and winter, but it is the large diversity and high numbers of insects that oaks are host to that provide the most benefit for wildlife. Many species, especially songbirds, depend upon these abundant insect populations during the spring and summer to successfully reproduce.

Over time, managing at least 10% of the forest acreage on the WMA as young forest, through the rotation of even-aged management, will ensure a diversity of forest age classes and structure in perpetuity, which will benefit both young and mature forest target species.

MANAGEMENT HISTORY

Prior to European settlement, the majority of what is now Erwin WMA was forested, but by the late 1800s most of the level terrain was cleared for agriculture, while the rest was heavily logged. In the early 1900s, most of the cleared land had been abandoned and was reverting back to forest, and wildfires had burned over some areas. American chestnut was once a dominant component of the forest here, as is evidenced by persisting root sprouts on the WMA today, but all large chestnuts on the property succumbed to chestnut blight in the early 1900s. This history of repeated disturbance favored the establishment of oaks in regenerating forests, leading to the current oak dominated forest type. State acquisition of the property began in 1928 and was completed by early 1931.

Photo 4: This image shows the dense young forest established just a few years following a seed tree harvest.

Photo: Emily Bonk, DEC

Minimal forest management occurred until the mid-1960s when a road system was developed, and multiple small openings were cut. In the mid-1970s, approximately 100 acres of timber stand improvement cuts occurred, and in the mid-1980s, several stands received even-aged regeneration harvests. Recent, notable forest management includes several large oak stands that received shelterwood treatments beginning in the early 2000s and completed by 2011. Also completed around 2011 were two large seed tree harvests (Photo 4) and a clearcut. These harvests established the existing 265 acres of

[12] The NYS Pollinator Protection Plan can be viewed at http://www.dec.ny.gov/animals/279.html.

young forest on the WMA and were primarily implemented to regenerate oak stands that were declining following consecutive gypsy moth outbreaks and drought.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

The following management is proposed during the timeframe of this plan:

- **Management planned for 2020-2024** (Table 5, Figure 6):
  - Shelterwood harvest of Stands A-5, A-10 (partial), A-30, and A-31 (145 acres).
  - Clearcut in Stands A-39 and C-4 (9 acres).
  - Seed tree harvest of Stands A-11 and C-5 (53 acres).
  - Overstory removal of Stands A-10 (partial) and B-2 (52 acres).
  - Thinning of Stands A-8 and C-6 (75 acres).
  - Crop tree release in Stand A-23 (20 acres).
  - Convert 10 acres of forest to shrubland in Stands A-23 and A-30.
- **Management planned for 2025-2029** (Table 6, Figure 6):
  - Shelterwood harvest of Stands A-19 and A-24 (150 acres).
  - Clearcut of Stands A-12 and A-28 (14 acres).
  - Seed tree harvest of Stand A-36 (30 acres).
- **Ongoing management throughout 2020-2029** (Figure 6):
  - Monitor for non-native, invasive vegetation and pests throughout all forest stands and as needed control mechanically, biologically, and/or with pesticide.
    - Controlling the dense growth of autumn olive and honeysuckle at several locations along forest edges is a priority.
    - Pursue the release of biological control agents for HWA on the WMA and the application of insecticide on select hemlocks.
  - Incorporate periodic prescribed fire to restore fire-adapted forest community.
    - Exact stands, acreage, and methods for burning will be identified in the WMA prescribed fire management plan (currently being developed).
    - Burning of oak and transition hardwood stands is a priority. Young forest may also be burned to promote oak recruitment to the overstory.

Table 5. Forest management schedule for the first five-year period of this HMP (2020-2024).

Stand	Acres	Size Class	Forest Type		Treatment Type
			Current	Future	
A-5	15	Medium Sawtimber 19”-24” DBH	Oak	Young Forest	Second cut of Shelterwood
A-8	30	Poletimber 6”-11” DBH	Hemlock	Hemlock	Thinning
A-10	50	Small Sawtimber 12”-18” DBH	Oak	Young Forest	Overstory removal (20 ac) Shelterwood (30 ac)
A-11	47	Medium Sawtimber 19”-24” DBH	Oak	Young Forest	Seed tree

Table 5. Continued

Stand	Acres	Size Class	Forest Type		Treatment Type
			Current	Future	
A-23	25	Seedling/Sapling <5" DBH	Young Forest	Oak	Crop tree release (20 ac)
				Shrubland	Convert to shrubland (5 ac)
A-30	25	Small Sawtimber 12"-18" DBH	Oak	Oak	Shelterwood (20 ac)
				Shrubland	Convert to shrubland (5 ac)
A-31	80	Medium Sawtimber 19"-24" DBH	Oak	Young Forest	Shelterwood
A-39	4	Poletimber 6"-11" DBH	Pioneer: Aspen/Locust	Young Forest	Clearcut
B-2	32	Poletimber 6"-11" DBH	Northern Hardwood - Hemlock	Young Forest	Overstory removal
C-4	5	Poletimber 6"-11" DBH	Other: Aspen/Oak	Young Forest	Patch clearcut
C-5	6	Small Sawtimber 12"-18" DBH	Other: Oak/Pine	Young Forest	Seed tree
C-6	45	Poletimber 6"-11" DBH	Oak	Oak	Thinning

Table 6. Forest management schedule for the second five-year period of this HMP (2025-2029).

Stand	Acres	Size Class	Forest Type		Treatment Type
			Current	Future	
A-12	8	Poletimber 6"-11" DBH	Aspen	Young Forest	Clearcut
A-19	100	Small Sawtimber 12"-18" DBH	Oak	Oak	Shelterwood
A-24	50	Small Sawtimber 12"-18" DBH	Oak	Oak	Shelterwood
A-28	6	Small Sawtimber 12"-18" DBH	Other: Maple/Aspen/Pine	Young Forest	Clearcut with reserves
A-36	30	Small Sawtimber 12"-18" DBH	Oak	Young Forest	Seed tree

All current young forest stands are expected to age to intermediate forest by 2029. The young forest acreage planned to be established during the timeframe of this HMP (303 acres) includes the clearcut, seed tree, overstory removal, and shelterwood harvests scheduled for 2020-2024,

and the clearcut and seed tree harvests scheduled for 2025-2029. Shelterwood harvests include two to three cutting phases over several years and those planned for 2025-2029 are not expected to be fully complete (young forest establishment) until after the timeframe of this HMP. Approximately 10 acres of forest are planned to be converted to shrubland within Stands A-23 and A-30; exact locations will be determined during timber sale layout.

Stand locations and planned management actions are summarized in Figure 6. Specific forest stand descriptions and detailed management prescriptions will be prepared for each proposed forest management area prior to implementation (see template, Appendix C).

Briefly, habitat management for each of these stands will include the following:

- **Management planned for 2020-2024 (Table 5, Figure 6):**
    - **Stand A-5 (15 acres):** This stand was previously harvested in 2003 to begin establishing regeneration. The second cut for this stand is long overdue as the regeneration is fairly advanced (>4.5' tall) with red maple dominant in spots. A second cut should occur to release any desirable regeneration and remove more overstory to encourage more oak regeneration/release.
    - **Stand A-8 (30 acres):** This is a less steep section of a hemlock dominated stand. A thinning is planned to remove poor health or heavily HWA infested trees to provide better nutrient availability and growing conditions for residual hemlock. This action should occur between early August and late February to reduce the risk of spreading HWA. Soil disturbance should be avoided around residual hemlocks, due to shallow rooting and susceptibility to root damage and decline.
    - **Stand A-10 (50 acres):** This is a large stand (192 acres) of mixed oak sawtimber. In 2014, 20 acres were cut to remove dead and dying oak which resulted in a flush of oak seedling regeneration. An overstory removal here would release this regeneration. Throughout another 30 acres, a shelterwood harvest would begin to establish desirable regeneration to eventually rotate into young forest.
    - **Stand A-11 (47 acres):** This is a mature sawtimber stand of mixed oak. Previous gypsy moth related tree mortality has allowed decent oak regeneration to establish. There does not appear to be much undesirable/interfering regeneration; therefore, a seed tree harvest would release any areas with desirable regeneration as well as establish it in other areas.
    - **Stand A-23 (25 acres):** This is a young forest stand (2011 timber harvest) primarily composed of birch, oak, and maple. Approximately 20 acres will receive a crop tree release treatment to reduce competition around young oaks. Approximately 5 acres that contain an abundance of beneficial shrubs will be converted to shrubland.
    - **Stand A-30 (25 acres):** This is a mixed oak sawtimber stand with a diverse understory composed of beneficial wildlife shrubs and small trees (e.g., teaberry, blueberry, huckleberry, serviceberry). Approximately 20 acres will receive a shelterwood treatment to regenerate oak and 5 acres will be converted to shrubland. Control of invasive shrubs (primarily autumn olive) is needed.
    - **Stand A-31 (80 acres):** This is a mixed oak sawtimber stand with a red maple component. A shelterwood harvest is planned to establish desirable regeneration. Control of undesirable regeneration may be necessary, including mountain laurel

and beech. This stand, in conjunction with surrounding stands A-10 and A-11, will create a very sizeable area of young forest once regenerated.

- **Stand A-39 (4 acres):** This is a poletimber stand composed of aspen, birch, and black locust. The entire understory is heavily dominated by honeysuckle and should be treated with herbicide prior to tree cutting. This clearcut should occur in winter to promote prolific aspen suckering.
- **Stand B-2 (32 acres):** This stand is currently a poletimber stand mixed with northern hardwoods, hemlock and oak trees in the overstory. A previous harvest in 2012 was successful in establishing desirable regeneration. The final overstory removal should occur to complete the stand rotation. Select treatment of undesirable regeneration may be necessary.
- **Stand C-4 (5 acres):** This is a poletimber stand with a variety of oaks, aspen, hemlock and maple. Approximately 5 acres of patch cuts in the southern half of the stand will target areas with good aspen to encourage root sprouting and leave good quality oaks and maples. This action is expected to occur in conjunction with a harvest in adjacent stands C-5 and C-6.
- **Stand C-5 (6 acres):** This stand is located in between stands C-4 and C-6 and consists of mixed oak and pine sawtimber. Inventory shows decent white pine and oak regeneration. A seed tree harvest will regenerate the stand to young forest.
- **Stand C-6 (45 acres):** This is a mixed oak poletimber stand. A thinning of this stand will remove undesirable/poor quality trees and provide better growing conditions for residual trees.

- **Management planned for 2025-2029 (Table 6, Figure 6):**
  - **Stand A-12 (8 acres):** This clearcut treatment targets 8 acres of aspen within a larger mixed hardwood stand. Each patch cut should be approximately 2 to 3 acres and cutting should occur in winter to promote prolific aspen suckering.
  - **Stand A-19 (100 acres):** This is a large stand (238 acres) of mixed oak sawtimber with a small component of white pine. A shelterwood harvest in the northern portion of the stand will begin to establish desirable regeneration with an emphasis on encouraging white pine.
  - **Stand A-24 (50 acres):** This is a large stand (157 acres) of mixed oak sawtimber with a component of red maple and areas of decent regeneration. A shelterwood harvest will help to establish desirable regeneration in most of the harvest area and release areas with existing desirable regeneration. Control of existing undesirable regeneration may be necessary (beech).
  - **Stand A-28 (6 acres):** This is a mixed hardwood stand composed mostly of maple and aspen with a component of softwood (hemlock and white pine). The understory is dominated by invasive species (multiflora rose, barberry, and honeysuckle). A clearcut with reserves and treatment of the understory will create a young forest stand and encourage aspen suckering.
  - **Stand A-36 (30 acres):** In 2011, dead oak was harvested from a portion of this stand which allowed for a flush of desirable oak regeneration. A follow-up seed tree harvest would release desirable regeneration.

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 7).

Table 7. Best Management Practices for forest management on WMAs.

Resource	**Guidance Document** [13]
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:

Sensitive wildlife that may occur on or near the WMA that warrant special consideration include:

- *Forest raptors*. Pre-timber harvest surveys will be conducted and if nesting is documented, harvest activities nearby may be adjusted to occur outside the breeding season and nest buffers may be established.
- *Indiana, northern long-eared, and tri-colored bats*. There are no known occurrences of these species; however, surveys will occur prior to cutting activities to detect presence or probable absence, or cutting will take place in winter to avoid potential impacts.
- *Vernal pool salamanders*. These salamanders breed in vernal pools and then spend most of their adult lives in the surrounding upland forest. In stands planned for timber harvest, vernal pools should receive a 100-foot buffer where 75% of canopy cover is retained and soil/leaf litter disturbance is minimized. Forested wetlands on the WMA contain the best habitat for these species and are not planned for cutting.

Due to the sensitivity of endangered, threatened, and special concern species, and SGCN, special management guidelines may be implemented if additional species become known to occur in or within close proximity to a forest stand to be harvested.

Forest Health Considerations:

Forest pests, diseases, and invasive vegetation are an ongoing problem for habitat management. When pests or diseases attack forests in high numbers and cause decline and mortality, habitat values can shift to the detriment of many resident wildlife species. Likewise, as invasive plants invade an area, outcompeting and dominating native vegetation, a lower diversity plant community is created. This decrease in habitat values means less wildlife may be able to utilize the area. All efforts to manage habitats on the WMA must consider these forest pests, diseases, and invasive species and ensure that measures are taken to control their presence or prevent their establishment. One way to protect against future forest health issues is to promote species diversity, so when a pest or disease outbreak occurs, it only impacts part of a forest.

Infestations of non-native insects such as emerald ash borer (EAB), gypsy moth (Photo 5), hemlock woolly adelgid (HWA, Photo 6), pear thrips, and pine shoot beetle are of present concern and bear persistent monitoring. Gypsy moth and pear thrips densities fluctuate and can reach

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

outbreak levels where complete defoliation can occur. Gypsy moth most commonly attacks oak and aspen while pear thrips favors sugar maple. Both EAB and HWA are present on the WMA. EAB infests ash and HWA infests hemlock, and both cause mortality of host trees within a few years. Stands dominated by hemlock exist on the WMA and although management actions to prevent or control HWA are currently limited, existing control options should be pursued and utilized where practical (e.g., biological control, insecticide).

Photo 5: Gypsy moth outbreaks can cause tree decline if outbreaks repeat or are followed by other stressors (e.g., drought, disease).

Photo: Karla Salp, Washington State Dept. of Agriculture, Bugwood.org

Native insect species such as eastern tent caterpillar and fall cankerworms are cyclic in population and may impact vegetation through defoliation at some time in the future. Both species feed on a wide-range of tree species including: ash, basswood, beech, black cherry, maples, and oaks.

Oak wilt is a fungal disease that can infect and kill oak trees. Although rare in New York, the disease was found in Ontario County in 2016, 2018, and 2019, and is also present in western Pennsylvania. Oak wilt primarily spreads in two ways: 1) through root connections with adjacent oak trees, and 2) from *Nitidulid* beetles that spread spores to open wounds on other oak trees. Current recommendations for treating affected areas include removing infected trees and severing root connections to reduce the chance of spread. Monitoring of oak trees and seasonal timber harvest restrictions may be needed if oak wilt begins to spread throughout the region.

Photo 6: Hemlock is abundant on the WMA and is at-risk of decline and mortality because of the hemlock woolly adelgid.

Photo: Elizabeth Willhite, USDA Forest Service, Bugwood.org

Invasive plants that are known to be in or near the forested areas of the WMA include: autumn olive, common buckthorn, garlic mustard, honeysuckle, and multiflora rose.

Pre- and Post-treatment Considerations:

Regeneration of a forest stand requires suitable conditions to ensure that desired species will succeed. Non-native invasive vegetation and undesirable native trees/shrubs (e.g., beech, mountain laurel, striped maple) are present in the understory of many stands here and have the

potential to interfere with forest regeneration. Although these native species have many beneficial qualities, they are considered undesirable when they have the potential to interfere with forest regeneration. If invasives and other undesirable species become significantly abundant, pre-treatment herbicide application may be necessary.

Conifers are a significant component of the WMA, being dominant or codominant in approximately 20% of the forest. This component includes both conifer and mixed conifer/hardwood stands, primarily consisting of hemlock and white pine. Hemlock in the region is at risk of decline and mortality from HWA and the future condition and extent of hemlock is uncertain. White pine is present as an overstory species in several stands and also is regenerating under some hardwood stands. Efforts to maintain this conifer component should occur and may include actions to control HWA and to recruit young white pine into the overstory. Promoting the regeneration of naturally occurring conifers should be encouraged throughout the WMA, and in cases where these species are not present, conifers (including non-native species) may be planted.

Deer herbivory has not negatively impacted forest regeneration following recent timber harvests at Erwin WMA; however, this is likely due to the large size of past harvests overwhelming deer with abundant browse. If future regeneration surveys determine that herbivory is preventing regeneration of desired tree species, fencing in of treatment areas or installation of tree shelters may be necessary. Efforts to promote deer hunting on the WMA to manage the local deer herd at desired levels will continue.

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 herbicidal control of undesirable species, removal of additional trees to increase available sunlight, scarification of 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 regeneration will be addressed in detail in the silvicultural prescriptions.

MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife response(s) have been achieved by the management outlined above, pre- and post-management assessments will be conducted in accord with guidelines established in the Young Forest Initiative Monitoring Plan[14]. The Monitoring Plan provides statewide standards for evaluating vegetation and target wildlife responses to forest management to determine if the outcome is as prescribed. Regeneration assessments will be conducted within one year of harvest completion, three and five years after the harvest, or until the forester determines adequate natural or artificial (i.e., planting) regeneration has been securely established.

Surveys to determine target species habitat use and abundance in response to management will also occur, including ruffed grouse drumming and turkey gobbling surveys. The establishment

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

of periodic bird point counts and amphibian and reptile surveys in all forest types would also be beneficial to better understand species diversity and use.

SHRUBLAND

Shrublands are early successional upland 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% cover of trees.

MANAGEMENT OBJECTIVES

- Establish 10 acres of shrubland on the WMA to provide dense cover and abundant soft mast for associated wildlife.
- Maintain shrub dominance to prevent reversion to forest.
- Control invasive vegetation and promote dominance of native shrub species.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

There is currently no shrubland habitat on Erwin WMA (Figure 6); however, its creation would provide beneficial habitat diversity. Some forest stands here currently contain an abundance of beneficial shrubs and provide an opportunity to establish shrubland for continuous future maintenance.

Existing forest shrubs include blueberry, huckleberry, mountain laurel, pinxter flower, teaberry, and witch-hazel. Most of these species tolerate both shade and sun and should respond positively to the increased light conditions if the stand were converted to shrubland.

Photo 7: The abundant flowers and subsequent fruit in shrublands provide important food to numerous wildlife species.

Photo: Ansel Oommen, Bugwood.org

Shrublands provide valuable habitat for numerous wildlife species because they provide dense cover and abundant food (e.g., twig browse, insects, berries). The prolific flowers (Photo 7) produced by shrubs are also highly beneficial to pollinator species.

Similar to young forests, a suite of species is reliant upon this disturbance-dependent, early-successional habitat and many of these species utilize both young forest and shrublands. The primary difference between these habitats is that young forests are mostly composed of tree species whereas shrublands are mostly composed of shrubs, which can often persist longer as a habitat type due to the exclusion of tree growth in shrub

thickets. Although young forests and shrublands provide habitat for similar species, both are needed to provide for the full range of disturbance-dependent wildlife species.

Table 8. Target species for shrubland management on Erwin WMA.

Target Species	Beneficial Habitat Structure
Eastern cottontail	*Breeding and escape cover*: Dense, young woody vegetation near food sources. Brush piles are important in winter when herbaceous cover has died back.
	Foraging: During the growing season, grasses and forbs are most important. During the winter, woody plant material is most important. Food should be within 300 feet of cover.

Eastern cottontail was selected because it is a popular game species with well-understood habitat conditions and management techniques. Creating shrubland on the WMA that benefits cottontail is expected to benefit many other species, including SGCN (e.g., brown thrasher, ruffed grouse, and smooth green snake) and popular game (e.g., white-tailed deer and wild turkey).

MANAGEMENT HISTORY

There is currently no shrubland on the WMA and no history of it being managed in the past.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2024** (Figure 6):
    - Establish 10 acres of shrubland within Stands A-23 and A-30 (5 acres per stand).
        - This should occur in sections of each stand where there is an existing shrub layer of beneficial species (e.g., blueberry, huckleberry).
        - Additional beneficial shrub species may be planted to supplement diversity (e.g., dogwoods, hazelnuts, viburnums).
- **Management planned for 2025-2029**:
    - Perform maintenance actions as needed.
        - Selectively cut young trees that would eventually dominate. Small stands of trees may be left as islands of second growth.
        - Stumps should be removed or cut low to facilitate future maintenance.
        - Brush cutting using a rotary mower or forestry cutter can be utilized to create and maintain an interspersion of openings and travel corridors.
        - When and where practicable prescribed fire may be utilized.
    - Control non-native invasive vegetation through mechanical removal, prescribed fire and/or herbicide application.

BEST MANAGEMENT PRACTICES

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

MANAGEMENT EVALUATION

Monitoring of future shrubland will be included in efforts related to young forest management.

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. Grasslands may include areas where hay is harvested by late season mowing once per year.

MANAGEMENT OBJECTIVES

- Maintain grasslands to prevent reversion to shrubland and forest.
- Encourage a diversity of grasses and forbs beneficial to target species.
- Identify and control invasive plant species to prevent their dominance in fields.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

There are currently 99 acres of grassland habitat on Erwin WMA (Figure 6). This is composed of several small fields (approximately ¼ acre to 4 acres each) and multiple narrow stretches of field situated along administrative roads and the property boundary line (Photo 8). The boundary line clearing surrounds most of the WMA and is generally about 40 feet wide.

Several of these fields have been planted with various grasses (i.e., warm and cool season) and forbs (e.g., legumes and wildflowers) that are beneficial to target wildlife species. For example, warm season grasses, such as switchgrass, often grow in bunches, which provide bare ground between plants that allows for wildlife movement and foraging. Many bunch grass species also retain their upright form through winter, providing valuable cover when most vegetation is matted down by heavy snow. Cool-season grasses, such as timothy, develop rapidly in spring, providing a flush of valuable cover with high forage value.

Photo 8: Fields on the WMA are surrounded by forest and benefit forest wildlife with abundant food (forage, seeds, insects) and dense herbaceous cover.

Photo: Michael Palermo, DEC

Although these grasslands only compose 4% of the WMA, they add valuable habitat diversity to the mostly forested landscape. Numerous wildlife species that typically inhabit forest use these grasslands at various times of year, and for many this field habitat is an important component of their life history. For example, the abundant insects in these fields provide

an important protein source for wild turkey brood rearing, and the dense cover provided by tall grass during the spring provides valuable hiding cover for fawns.

Various wildlife species commonly associated with field habitats are also present in these grasslands, including cottontail rabbit, eastern bluebird, song sparrow, and tree swallow. Numerous pollinator species, such as bees and butterflies, also rely upon these fields that provide a diversity of host plants and flower blooms throughout the spring and summer (Photo 9).

Photo 9: Asters provide important late-season food for pollinators, especially migrating monarchs, and provide valuable food and cover for winter songbirds.

Photo: Michael Palermo, DEC

Some fields here contain an abundance of woody growth (e.g., autumn olive, honeysuckle), which are typically suppressed by routine mowing, but not completely controlled. Other fields contain an abundance of ferns or Canada thistle, which can eventually outcompete the more beneficial grasses and forbs. Restoration and replanting of some fields may be necessary to prevent reversion to shrubland or forest and to maintain long-term habitat values for target wildlife. Several fields on the WMA are currently in need of soil amendments (e.g., lime) to improve soil quality and productivity.

Table 9. Target species for grassland management on Erwin WMA.

Target Group	Example Species	Beneficial Habitat Structure
Upland game	Eastern cottontail, white-tailed deer, and wild turkey	A diversity of grasses and forbs that provide variable food and cover throughout the year. Fields that support abundant insect populations are important protein sources for turkey poults.
Pollinators	Bees, butterflies, and moths	Abundant and diverse native wildflowers that bloom consistently throughout spring, summer, and fall. Alternating annual mowing regimes.

MANAGEMENT HISTORY

Fields were a minor component here when the State acquired the property and those present at that time have since reverted to forest. The fields currently present on the WMA were all converted from forest after acquisition.

The boundary line clearing was first established in the early 1950s and was subsequently widened in various places during the 1960s and again in the 1970s. In the mid-1960s, several

small clearcuts (approximately 1/4 acre each) occurred throughout the forest, most of which were allowed to regenerate to forest; however, five have been maintained as small fields to present day. In the mid-1970s, strips of forest along several administrative roads were clearcut and converted to grass, establishing a network of linear fields. Four natural gas well pads were established on the WMA (one each year in 1988, 1996, 2002, and 2004) and have since been plugged, abandoned, and the sites rehabilitated and planted as fields.

DEC management has intended to maintain and enhance the habitat value of these fields since their establishment. To achieve this goal, routine mowing has occurred, and in some cases, fields have been replanted with various grass and forb seed mixes preferred by wildlife. Several patches of milkweed have been promoted to benefit monarchs.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figure 6):
    - Throughout all grassland stands, routinely perform maintenance actions.
        - Mow fields every 1-3 years to prevent establishment of woody vegetation.
            - Mowing fields heavily invaded by woody plants may be most effective if conducted in early spring and again before senescence.
        - When resources are available, utilize prescribed fire where appropriate.
            - Controlled burning of fields would favor native warm-season grasses and control undesirable invasive vegetation.
        - As needed: lime, fertilize, disk, and/or reseed grasslands.
    - Throughout all grassland stands, control invasive vegetation.
        - Depending on the species, invasive vegetation can be controlled mechanically, biologically, and/or with herbicide.

BEST MANAGEMENT PRACTICES

The following sub-sections provide guidelines for grassland habitat management on all WMAs in NY. Due to the small, fragmented nature of grasslands on this WMA, and the related lack of suitable grassland-dependent bird habitat, best management practices followed here are primarily intended to enhance habitat values for forest wildlife using grasslands.

General Management Recommendations

- Consider the surrounding landscape when making management decisions.
- Conduct invasive species control (e.g., buckthorn, honeysuckle, swallow-wort, Canada thistle, Phragmites, etc.) to improve habitat quality.
- Consider a variety of factors, such as the targeted wildlife 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, disking, burning, and grazing for maintaining grassland habitat, after evaluating the appropriateness of these methods relative to site conditions and management objectives. In particular, burning cool season grasses is not advisable in most situations in New York.

Timing of Management

- Fields under 25 acres (including all contiguous fields) with no history of listed species:
    - Mowing and other management actions should avoid April 23 through August 15.
    - Fields can be managed/mowed between April 23 and August 15 if necessary, to:
        - Control the growth of woody or invasive vegetation in fields where grassland habitat value is degraded.
        - Ensure that suitable grass cover will be present to provide important winter habitat for wildlife.
    - If early management is proposed, then the habitat requirements of other species should be considered.

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 can be accomplished in a wandering style. Strip mowing should be limited.
- 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

Surveys for wildlife in fields on the WMA are not routine and data are often derived opportunistically and will continue.

AGRICULTURAL LAND

Agricultural lands on WMAs include any acreage on which crops are grown, primarily areas that are under cooperative agreements or farming contracts, but also including wildlife food plots.

DESCRIPTION OF EXISTING AGRICULTURAL LANDS AND TARGET SPECIES

There is no acreage on Erwin WMA that is managed as agricultural land and no plan to develop such habitat during the timeframe of this plan.

WETLANDS (NATURAL AND IMPOUNDED)

Wetland acreage includes ponds, emergent marsh, and scrub-shrub wetlands, and is categorized as natural or impounded. Forested wetlands, including vernal pools, are addressed in the Forest section of this plan.

Natural wetland: includes areas where the soil or substrate is periodically saturated or covered by water, the vegetative community is predominantly composed of hydrophytes, and hydrologic processes are not greatly altered by human construction.

Impounded wetland: are areas similar to natural wetlands, but where water is held back by a berm, road, or other human-made structure.

MANAGEMENT OBJECTIVES

- Manage approximately 34 acres of impounded wetlands to provide diverse habitats that benefit fish and wildlife.
- Maintain integrity of impoundment dikes and water control structures.
- Identify and control invasive plant species to maintain and enhance biodiversity.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

There are 34 acres of impounded wetlands and no natural, non-forested wetlands on Erwin WMA (Figures 3 and 6). Impounded wetlands here consist of two large ponds (10 and 13 acres) and several small ponds (<1 acre to 3 acres).

Erwin Pond (also known as Kuehnle Pond) is the most well-known water resource on the WMA, providing a moderate fishery of largemouth bass, sunfish, and bullhead (Photo 10). This 10-acre pond is predominantly open water, with emergent vegetation around the water's edge.

Photo 10: Erwin Pond is 10 acres of fish and waterfowl habitat that provides a moderate fishing and hunting resource.

Photo: Michael Palermo, DEC

The other large impounded wetland on the WMA (known as Beaver Pond) is located just northwest of Erwin Pond and comprises 13 acres. This pond also contains fish and is mostly open water with several standing dead trees, and a section of emergent vegetation at the north end.

The smaller wetland impoundments on the WMA are more shaded than the large ponds, they contain a mix of open water and emergent vegetation, and often a component of downed wood and snags (Photo 11). These wetlands do not contain fish and provide important breeding sites for frogs, salamanders, and newts.

All of these wetlands provide a reliable water resource for upland wildlife, especially during dry months of the year when water may be limited elsewhere on the property. Numerous insects (e.g., mosquitos, dragonflies, mayflies) are present in an around these wetlands (having aquatic larva that emerge as flying adults) and are an important food source to many wildlife species, including bats and songbirds. Limited numbers of waterfowl utilize these wetlands, primarily breeding wood duck and hooded merganser, which nest in nearby tree cavities and then lead their brood to open water. Common frog, toad, and turtle species are also present in abundance, and beaver and muskrat occur in small numbers.

Table 10. Target species for wetland management on Erwin WMA.

Target Group	Example Species	Beneficial Habitat Structure
Warmwater fish	Largemouth bass, sunfish, and bullhead	Large ponds with open water, submerged cover, and a maximum depth of at least 6 feet.
Waterfowl	Wood duck	Trees or snags with cavities near water bodies.
Amphibians	Frogs, toads, salamanders, and newts	Shallow water bodies lacking fish provide the best conditions for successful reproduction.

MANAGEMENT HISTORY

All of the wetland impoundments on the WMA were constructed after State acquisition of the property. Erwin Pond was constructed in 1961, while most other ponds were constructed during the 1970s, typically in conjunction with various logging activity.

Minimal management has occurred within these impounded wetlands other than maintaining the impounding structures. Various stocking efforts (trout species) occurred in Erwin Pond until 1980 when all stocking was discontinued because a lack of success (not cold enough) and an increasing population of largemouth bass.

Photo 11: Small wetland impoundments on the WMA provide valuable sites for woodland salamander breeding.

Photo: Sarah Smith

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figure 6):
  - Maintain integrity of existing wetland impoundments in accordance with Dam Safety Inspection and Management Plans (currently being developed).
    - Burn or mow dams annually to prevent establishment of woody vegetation.
    - Inspect dams and spillways annually and repair as needed, including the filling and compacting of animal burrows.
  - Monitor for invasive vegetation (e.g., Phragmites, knotweed, & purple loosestrife) and as needed control mechanically, biologically, and/or with herbicide.
  - Consider additional wetland projects that will benefit wetland-dependent species as opportunities and funding arise.

BEST MANAGEMENT PRACTICES

Management activities within wetlands will take into consideration the timing of wildlife breeding and hibernating seasons and when practicable these periods of time will be avoided. Wetland management will follow guidelines established in the General Permit GP-0-16-003: Habitat Management by NYSDEC and will obtain any necessary additional permits.

MANAGEMENT EVALUATION

Monitoring of wetland habitat use at Erwin WMA is informal and data are often derived opportunistically and will be continued. However, the establishment of periodic surveys for amphibian, reptile, fish, and bird presence would be beneficial to better understand species diversity and use.

STREAMS

Streams are defined as any watercourse on the WMA, including both year-round and intermittent flows. This includes the aquatic habitat associated with the stream channel but does not include the wetland habitat that may occur within the floodplain or riparian zone of a watercourse. For management purposes and habitat acreage calculations, some streams are lumped within surrounding habitat stands (e.g., an intermittent stream that flows through a forest stand is included in that stand's acreage calculation).

MANAGEMENT OBJECTIVES

- Maintain the natural condition and quality of streams on the WMA.

DESCRIPTION OF EXISTING OPEN WATER HABITAT AND TARGET SPECIES

Approximately 3.7 miles of streams occur on Erwin WMA (Figures 3 and 6). These streams are intermittent (only flowing part of the year) and are located within gullies situated on the north, east, and south sides of the property. Weaver Hollow Brook (Photo 12) is the only named stream on the WMA, which begins at Beaver Pond and flows southeast through Erwin Pond and ultimately into the Tioga River.

Maximum stream flows occur in spring and after heavy precipitation events. Substrate for these streams is primarily cobble, shale, and/or bedrock. The smallest of these streams will dry up by late summer, but some of the larger streams often contain pools and moisture even through dry periods. These streams provide valuable water for terrestrial

Photo 12: Weaver Hollow Brook is shaded by hemlock trees and contains a bedrock substrate with minor riffles and falls.

Photo: Michael Palermo, DEC

wildlife that inhabit the surrounding upland forest.

A hemlock canopy covers many of the streams here and provides important spring shade that keeps waters cool. This cool water provides valuable habitat for numerous species of aquatic invertebrates and amphibians. This habitat is particularly valuable to the long-tailed salamander, a high priority SGCN in New York, which may occur on the WMA. These streams are also tributaries to the Cohocton and Tioga Rivers, which greatly benefit from the cold-water input.

Table 11. Target species for stream management on Erwin WMA.

Target Group	Example Species	Beneficial Habitat Structure
Aquatic invertebrates	Mayflies, caddisflies, stoneflies	Rocky streams with clean, unpolluted water with minimal siltation.
Stream salamanders	Dusky, spring, and long-tailed salamanders	Rocky streams with clean, unpolluted water with minimal siltation.

MANAGEMENT HISTORY

There has been no DEC management of streams on the WMA. DEC management has used best management practices to prevent erosion and sedimentation of these streams during other activities.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figure 6):
    - Maintain the natural condition and quality of streams on the WMA.
        - All habitat management activities on the WMA will adhere to the Environmental Conservation Law and follow best management practices.

BEST MANAGEMENT PRACTICES

All management activities on the WMA will comply with the New York State Freshwater Wetlands Act (ECL Article 24) and Water Resources Law (ECL Article 15, Title 5). Guidelines for special management zones will be adhered to.

MANAGEMENT EVALUATION

Surveys for wildlife using streams on the WMA are not routine. Periodic surveys of stream salamanders would be beneficial to determine diversity and distribution.

HABITAT MANAGEMENT SUMMARY

In summary, Table 12 lists the habitat management actions planned for Erwin WMA over the next ten years. Any substantive changes will be appended to this HMP annually or as needed (Appendix D).

Table 12. Summary of habitat management actions recommended for Erwin WMA, 2020-2029 (Also see Figure 6).

Habitat	Management Action	Acres	Timeframe
Forest	Shelterwood harvest in Stands A-5, A-10 (partial), A-30, and A-31	145	2020-2024
Forest	Clearcut in Stands A-39 and C-4	9	2020-2024
Forest	Seed tree harvest in Stands A-11 and C-5	53	2020-2024
Forest	Overstory removal in Stands A-10 (partial) and B-2	52	2020-2024
Forest	Thinning in Stands A-8 and C-6	75	2020-2024
Forest	Crop tree release in Stand A-23	20	2020-2024
Forest	Convert a portion of Stands A-23 and A-30 to shrubland	10	2020-2024
Forest	Shelterwood harvest in Stands A-19 and A-24	150	2025-2029
Forest	Clearcut in Stands A-12 and A-28	14	2025-2029
Forest	Seed tree harvest in Stand A-36	30	2025-2029
Forest	Monitor and control invasive species	≤ 2,331	2020-2029, ongoing
Forest	Incorporate periodic prescribed fire to restore fire-adapted forest communities	≤ 2,331	2020-2029, as needed
Shrubland	Create two patches of shrubland by removing trees from a portion of Stands A-23 and A-30	≤ 10	2020-2024

Table 12. Continued

Habitat	Management Action	Acres	Timeframe
Shrubland	Maintain all shrubland stands by cutting trees, brush cutting, and/or prescribed fire	≤ 10	2025-2029, as needed
Shrubland	Monitor and control invasive species	≤ 10	2025-2029, as needed
Grassland	Maintain grassland acreage with mowing and potentially prescribed fire	≤ 99	Annual, biennial, or triennial
Grassland	Improve grassland quality (e.g., lime, fertilize, disk, and/or reseed)	≤ 99	2020-2029, as needed
Grassland	Monitor and control invasive species	≤ 99	2020-2029, ongoing
Wetland	Maintain impounded wetland dikes and control structures (e.g., inspect, mow, burn, and repair)	1,000 ft	Annually
Wetland	Monitor and control invasive species	≤ 34	2020-2029, ongoing
Stream	Follow BMPs for water quality		2020-2029, as needed

III. FIGURES

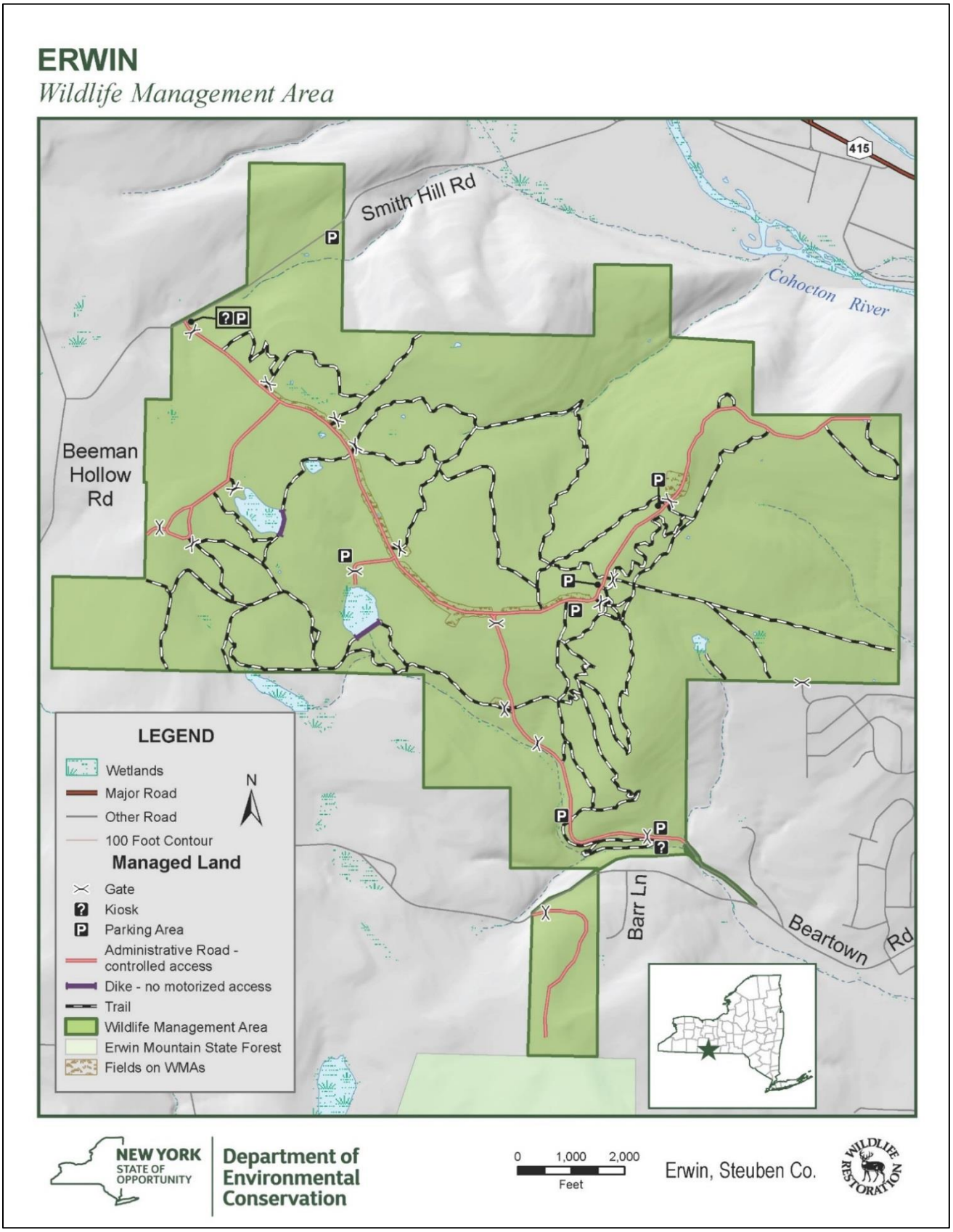

FIGURE 1. Location and access features at Erwin WMA.

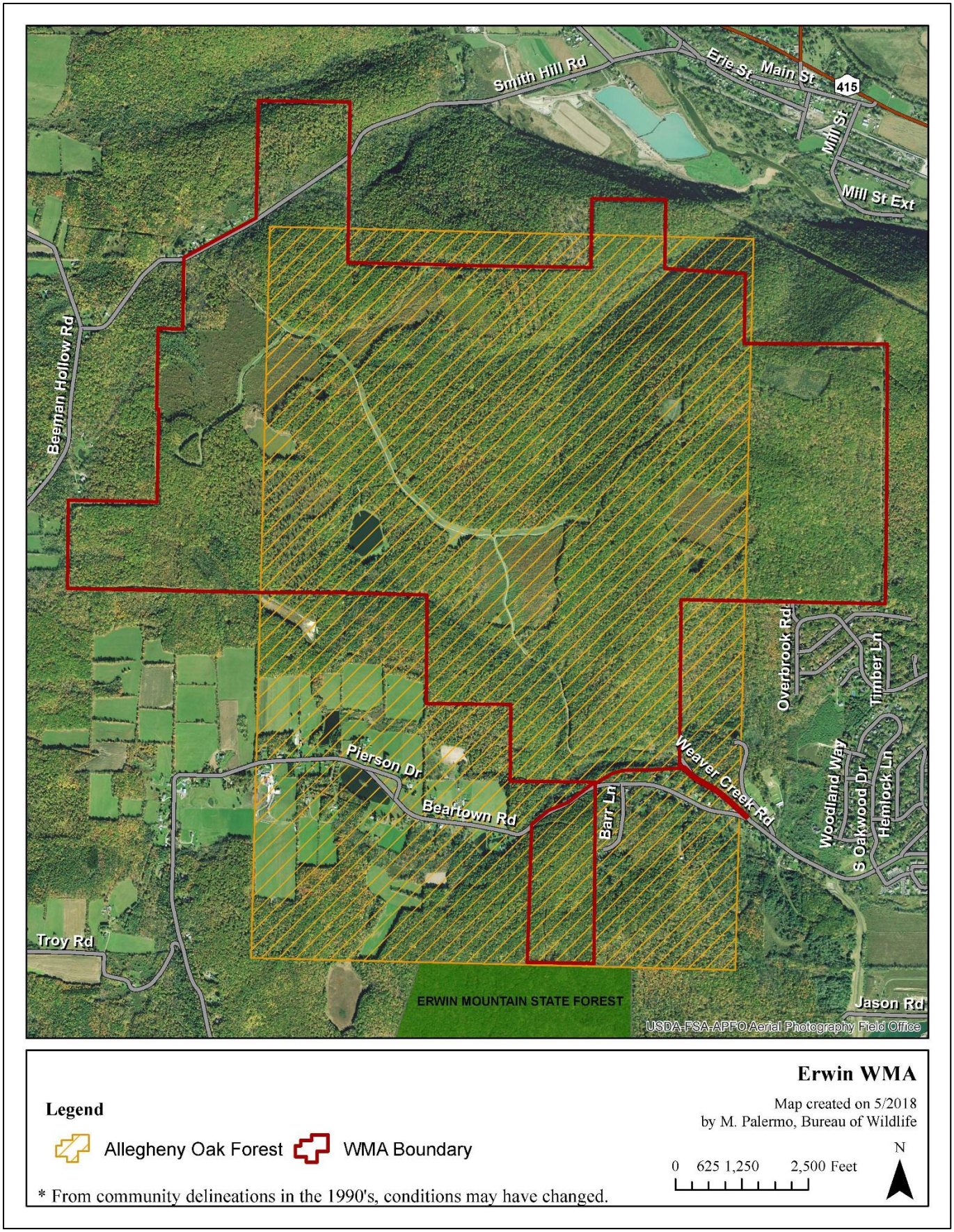

FIGURE 2. Significant ecological communities on Erwin WMA. Data from the NY Natural Heritage Program.

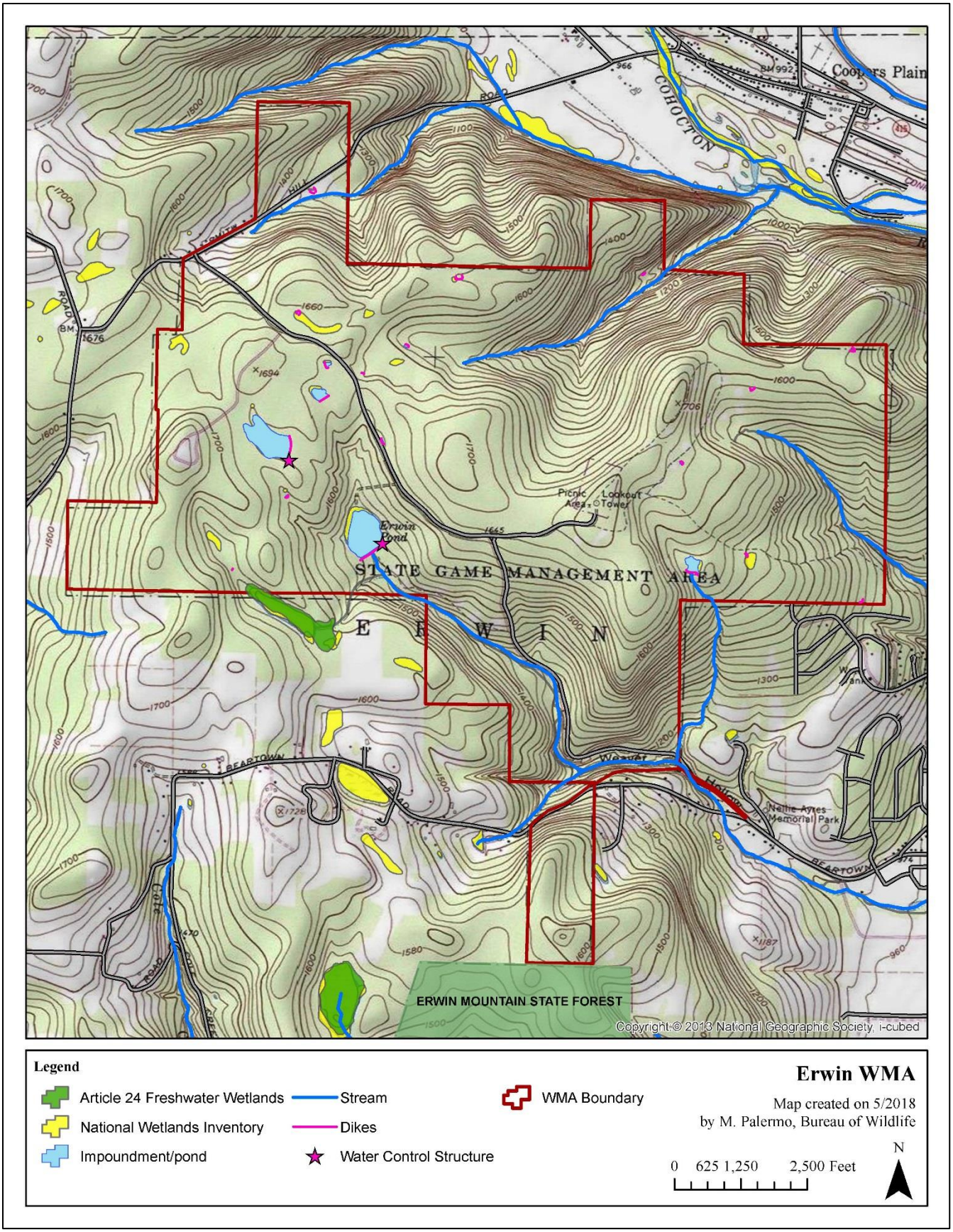

FIGURE 3. Wetlands, open water, and streams of Erwin WMA. Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

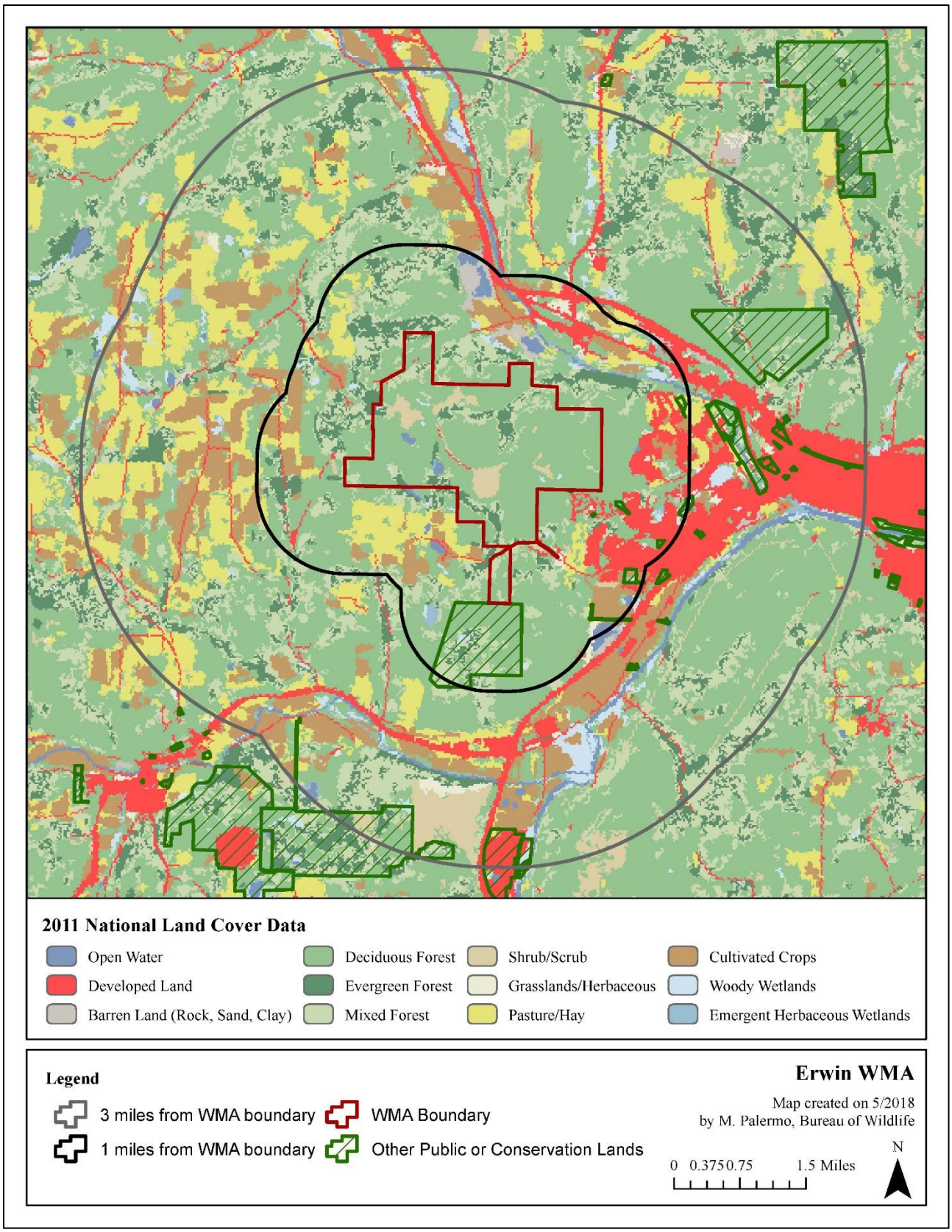

FIGURE 4. Land cover types and conservation lands in the landscape surrounding Erwin WMA. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in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

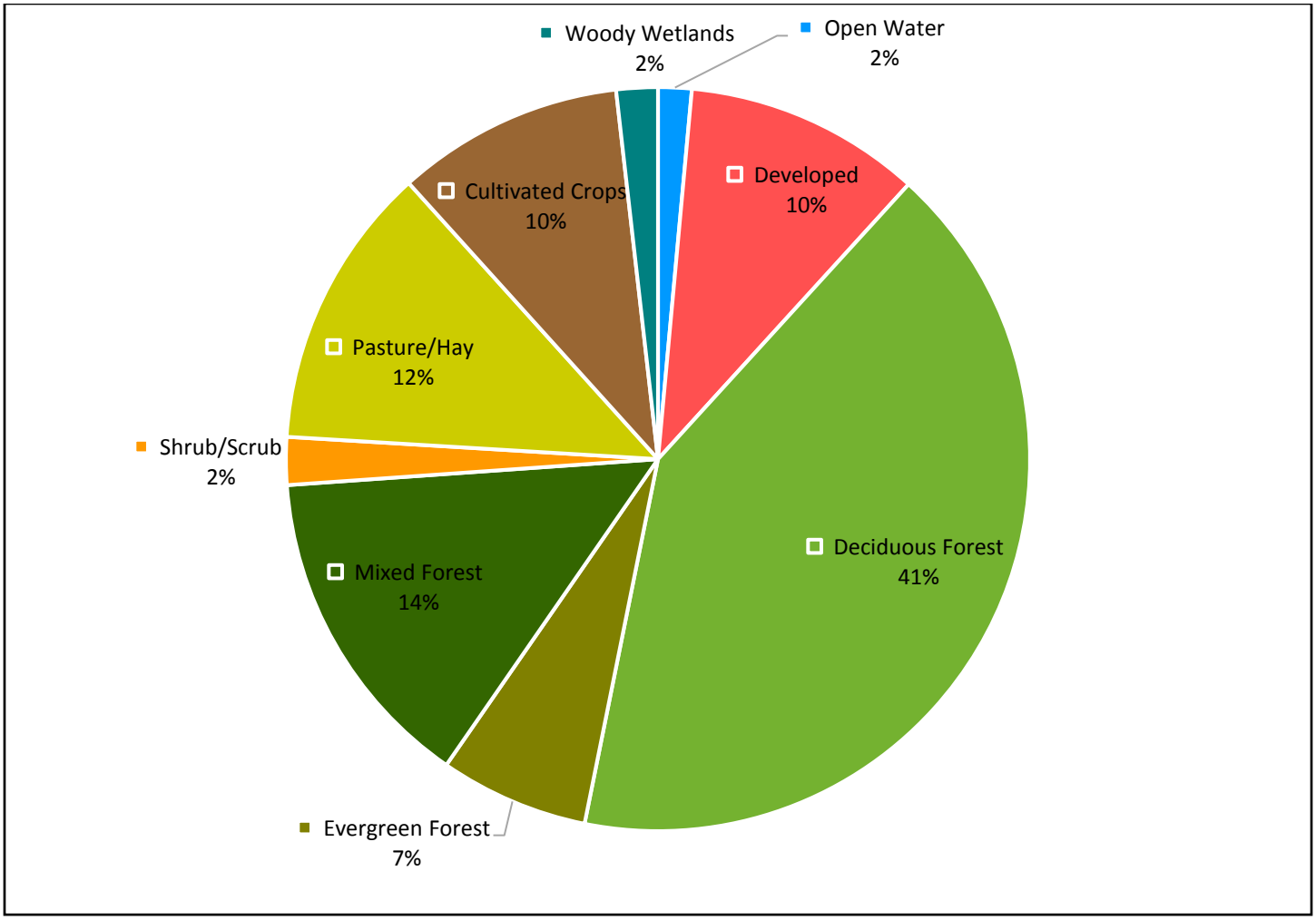

FIGURE 5. Percent cover of land cover types within three miles of Erwin WMA.

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 https://www.mrlc.gov/data/legends/national-land-cover-database-2011-nlcd2011-legend.

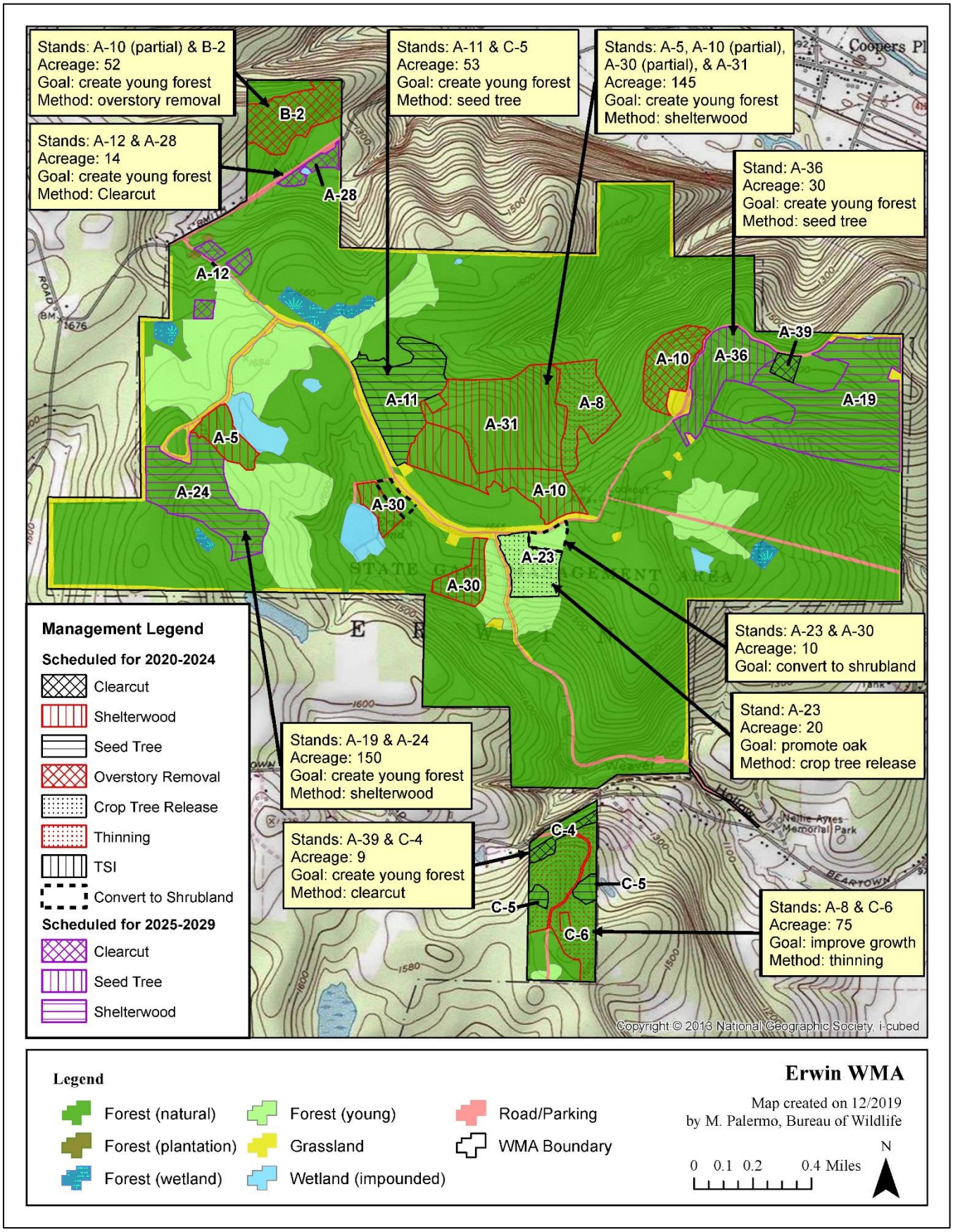

FIGURE 6. Habitat types and location(s) of proposed management on Erwin WMA. Numbers indicate the stand number from habitat inventory.

IV. APPENDICES

APPENDIX A: DEFINITIONS

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

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

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

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

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

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

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

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

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

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

Grassland Habitat Patch: A continuous area of grassland that is not divided by significant barriers (e.g., tall hedgerows, major highways, buildings). Several grassland bird species are sensitive to the size and shape of available habitat and prefer larger fields with low perimeter-to-area ratios. Increasing grassland habitat patch size is a management action that can benefit grassland bird species. (Adapted from A Plan for Conserving Grassland Birds in New York, Audubon NY)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

State Rank of Significant Ecological Communities:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

S4 = Apparently secure in New York State.
S5 = Demonstrably secure in New York State.
SH = Historically known from New York State, but not seen in the past 15 years.
SX = Apparently extirpated from New York State.
SE = Exotic, not native to New York State.
SR = State report only, no verified specimens known from New York State.
SU = Status unknown.
(Edinger et al. 2002. Ecological Communities of New York State, Appendix A)

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

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

Target Species: A suite of high priority wildlife species of conservation interest that are being targeted to benefit from management of a particular habitat type. For example, young forest target species at Erwin WMA include: Canada warbler and ruffed grouse.

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

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

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

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

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

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

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

APPENDIX B: COMPLIANCE WITH STATE ENVIRONMENTAL QUALITY REVIEW

This plan identifies habitat management activities to be conducted on the Wildlife Management Area. These activities were analyzed in the 1979 *Programmatic Environmental Impact Statement on Habitat Management Activities of the Department of Environmental Conservation; Division of Fish and Wildlife* (PEIS), as updated and amended in 2017 by the *Supplemental Final Environmental Impact Statement* (SFEIS).[15] Any activity that exceeds the thresholds of, or was not analyzed in the 1979 PEIS as amended in 2017, will require individual, site-specific environmental review. Environmental assessment forms prepared as a result of this review will be posted on the Environmental Notice Bulletin (ENB).[16]

The activities recommended in this plan:

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

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

APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS

PRESCRIPTION FOR WILDLIFE MANAGEMENT AREA TIMBER HARVEST

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

Species composition:

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

Stand inventory or analysis date:

Regeneration data:

Natural Heritage Element Occurrence layer review:

SMZ layer review:

Retention data:

Soil types and drainage:

Interfering vegetation:

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

Technical guidance/stocking guide:

Treatment purpose:

Management Objective: Even aged or Uneven Aged

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

Clearcut acreage and configuration: (if applicable)

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

Retention considerations and adjustments:

Treatment descriptions:

Name and Title of Preparer:

Central Office Lands and Forests Staff **Date**

Regional Wildlife Manager **Date**

PRESCRIPTION NOTES

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

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

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

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

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

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

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

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

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

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

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

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

Treatment description: The intended treatment should be clearly described. The amount of information necessary to accomplish this will vary greatly. For instance, in a row thinning of a poletimber 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.