Habitat Management Plan
for
Oak Orchard Wildlife Management Area
2019 - 2028

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

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NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

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Oak Orchard WMA Management

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SUMMARY

Oak Orchard Wildlife Management Area (WMA) is located in Genesee and Orleans counties and comprises 2,554 acres. The WMA is part of an approximately 19,000-acre complex of state and federal land that also includes Iroquois National Wildlife Refuge (NWR) and Tonawanda WMA. Acquisition of the WMA began in 1941 and was mostly complete by 1947, with an additional 300 acres purchased between the late-1950s and mid-1970s.

The WMA is primarily composed of several marsh impoundments that are managed to provide a variety of wetland habitat conditions throughout the year. A large forested wetland surrounding Oak Orchard Creek occupies much of the western half of the property. Upland habitats compose approximately 20% of the WMA and mostly consist of large and small grassland fields, with a variety of forest and shrubland stands scattered throughout.

Large numbers of wetland-dependent birds breed here, and the site is an important migratory stopover for waterfowl and other wetland-dependent birds of the Atlantic Flyway. The WMA is part of a NYS Bird Conservation Area,[1] and the entire state-federal land complex is an Audubon Important Bird Area.[2] In addition to popular game species, such as mallard, wood duck, Canada goose, muskrat, and white-tailed deer, several threatened or special concern species and/or Species of Greatest Conservation Need (SGCN) also use the various habitats on the WMA.

Oak Orchard WMA is primarily managed to provide a diversity of wetland and grassland habitats that benefit dependent wildlife and afford multiple recreational opportunities including hunting, trapping, and bird watching.

Habitat management goals for Oak Orchard WMA include:

- Managing wetland impoundments to provide a diversity of habitats important to wetland-dependent wildlife that use the WMA for breeding and/or migratory stopover, including waterfowl, marshbirds, and furbearers (43% of WMA);
- Maintaining the habitat value of natural wetlands and the water quality of Oak Orchard Creek and its tributaries (6% of WMA);
- Maintaining the majority of forests, including the forested wetlands, in an intermediate or mature age class to provide a diversity of forest habitats that promote associated wildlife, such as wood duck and prothonotary warbler (34% of WMA);
- Establishing young forest habitat to promote American woodcock, ruffed grouse, and other young forest wildlife (2% of WMA, at least 5% of forested area);
- Maintaining and enhancing grasslands to provide breeding habitat for grassland-dependent birds and waterfowl, and year-round cover for other wildlife (11% of WMA);
- Maintaining an early-successional shrubland component to provide dense upland cover and soft mast for associated wildlife (<1% of WMA);
- Maintaining small food plots of herbaceous vegetation that benefits wildlife, especially white-tailed deer and wild turkey (<1% of WMA); and
- Maintaining all dikes, administrative roads, and parking lots (3% of WMA).

[1] Bird Conservation Area information is available online at http://www.dec.ny.gov/animals/25341.html.
[2] Information about Audubon Important Bird Areas is available at http://www.audubon.org/important-bird-areas.

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

Within the next five years, this HMP will be integrated into a comprehensive WMA Management Plan that will include management provisions for facilitating compatible wildlife-dependent recreation, access, and facility development and maintenance. This comprehensive WMA Management Plan will serve as a revision of the Oak Orchard and Tonawanda Unit Management Plan, which was written in 1994 and currently guides management on the WMA.

Definitions are provided in Appendix A.

The effects of climate change and the need to facilitate wildlife adaptation under expected future conditions will be incorporated into the habitat management planning process and will be included in any actions that are recommended in the HMPs. For example, these may include concerns about invasive species, anticipated changes in stream hydrology and storm intensity, and the desirability for maintaining connectedness on and permeability of the landscape for species range adjustments.

This plan and the habitat management it recommends will be in compliance with the State Environmental Quality Review Act (SEQRA), 6NYCRR Part 617 (see Appendix B). The recommended habitat management also requires review and authorization under the Endangered Species Act (ESA), National Environmental Policy Act (NEPA), and State Historic Preservation Act (SHPA), prior to implementation.

WMA Overview

Location

Oak Orchard WMA is located in DEC Region 8, Towns of Alabama and Oakfield in Genesee County, and Towns of Shelby and Barre in Orleans County (Figure 1 and Image 1).

Total Area

2,554 acres

Habitat Inventory

A habitat inventory of the WMA was conducted in 2017 and 2018. This is proposed to be updated every ten to fifteen years to document the existing acreage of each habitat type and to help determine the location and extent of future management actions.

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

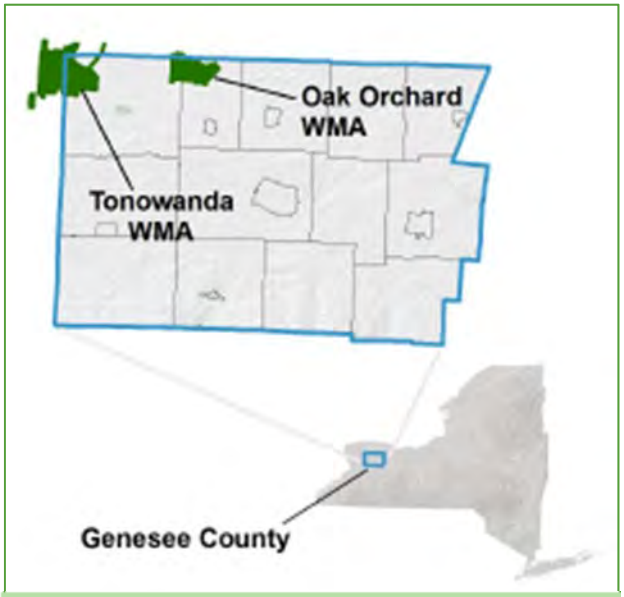

Image 1: Location of Oak Orchard WMA.

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

Habitat Type	Current Conditions (as of 2018)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Wetland (impounded)	1,096	43%		1,096	43%
Wetland (natural)	127	5%		127	5%
Streams	24	1%	10	24	1%
Forest [a]	915	36%		871	Decrease to 34%
Young forest	0	0%		50	Increase to 2%
Shrubland	11	<1%		6	<1%
Grassland	272	11%		271	11%
Agricultural land	11	<1%		11	<1%
Dikes	64	2%	10	64	2%
Roads and parking	34	1%	7	34	1%
Total Acres:	2,554	100		2,554	

[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:

Oak Orchard WMA is part of an approximately 19,000-acre complex of state and federal land that is primarily composed of wetland habitats. Uplands cover a smaller percentage of the WMA and consist of grassland fields, food plots, shrubland, and forest. Most common wildlife species associated with wetlands and adjacent uplands are present. Several rare or declining species also occur here, utilizing the large expanse of diverse habitats. Species diversity and abundance varies widely throughout the year, being largely influenced by seasonal migrations.

Species likely occurring on the WMA include:

- Waterfowl (e.g., mallard, wood duck, hooded merganser, blue-winged teal, Canada goose, gadwall, green-winged teal, pintail, ring-necked duck, scaup, tundra swan)
- Marshbirds (e.g., American and least bitterns, pied-billed grebe, Virginia rail)
- Shorebirds (e.g., American woodcock, least and semipalmated sandpipers, yellowlegs)
- Wading birds (e.g., great blue heron, black-crowned night-heron, great egrets)
- Raptors (e.g., bald eagle, northern harrier, osprey, red-tailed hawk)
- Songbirds (e.g., American robin, common grackle, gray catbird, marsh wren, purple martin, bluebird, red-winged blackbird, song sparrow, tree swallow, yellow warbler)
- Furbearers (e.g., beaver, mink, muskrat, otter)
- Upland mammals (e.g., cottontail rabbit, coyote, fox, opossum, raccoon, deer)
- Upland game birds (e.g., ring-necked pheasant, ruffed grouse, wild turkey)
- Amphibians and reptiles (e.g., bull frog, green frog, leopard frog, spring peeper, common garter snake, northern water snake, milk snake, painted turtle, snapping turtle)
- Invertebrates (e.g., bees, butterflies, moths, damselflies, dragonflies, freshwater mussels)

Wildlife and Plant Species of Conservation Concern:

There are no federally listed Endangered species and one federally listed Threatened species known to occur near the WMA. The following 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).[3] Species listed below have been documented on or within the vicinity of the WMA and may occur in suitable habitat on the WMA. Other species of conservation concern may also be present on the WMA. Data sources include: the NY Natural Heritage Program, NY Breeding Bird Atlases,[4] NY Reptile and Amphibian Atlas,[5] DEC wildlife surveys and monitoring, and eBird.[6]

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

Species Group	Species	Federal Status	NY Status	NY SGCN Status
Birds	American bittern		SC	x
	American black duck			HP
	American kestrel			x
	American woodcock			x
	Bald eagle		T	x
	Black-billed cuckoo			x
	Black-crowned night-heron			x
	Black-throated blue warbler			x
	Black tern		E	HP
	Blue-winged teal			x
	Blue-winged warbler			x
	Bobolink			HP
	Brown thrasher			HP
	Canada warbler			HP
	Cerulean warbler		SC	x
	Common nighthawk		SC	HP
	Cooper's hawk		SC	
	Eastern meadowlark			HP
	Golden-winged warbler		SC	HP
	Grasshopper sparrow		SC	HP
	Great egret			x
	Henslow's sparrow		T	HP
	Horned lark		SC	HP
	King rail		T	HP
	Least bittern		T	x
	Northern harrier		T	x
	Northern pintail			x

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

Table 2. Continued

Species Group	Species	Federal Status	NY Status	NY SGCN
	Osprey		SC	
	Pied-billed grebe		T	x
	Prothonotary warbler			HP
	Red-headed woodpecker		SC	HP
	Red-shouldered hawk		SC	x
	Ruddy duck			x
	Ruffed grouse			x
	Sandhill crane [a]			
	Scarlet tanager			x
	Sedge wren		T	HP
	Semipalmated sandpiper			HP
	Sharp-shinned hawk		SC	
	Short-eared owl		E	HP
	Upland sandpiper		T	HP
	Vesper sparrow		SC	HP
	Wood thrush			x
	Yellow-breasted chat		SC	HP
Mammals	None known to occur			
Amphibians and reptiles	Black ratsnake			x
	Blue-spotted salamander		SC	HP
	Jefferson salamander		SC	
	Smooth green snake			x
	Snapping turtle			x
	Spotted turtle		SC	HP
	Western chorus frog			x
	Wood turtle		SC	HP
Fish	Northern longear sunfish		T	HP
Invertebrates	American rubyspot			x
	Black sandshell			HP
	Deertoe			HP
	Elktoe			x
	Eastern pondmussel			x
	Pink heelsplitter			x
	Plain pocketbook			x
	Rainbow			HP
	Wabash pigtoe			HP
Plants	Houghton's goldenrod [b]	T	E	

[a] Although not a listed species or SGCN, the sandhill crane is a rare breeder in New York and has been documented nesting on the WMA.

[b] Houghton's goldenrod is not known to occur on the WMA, but is known to occur in eastern Genesee County.

Significant Ecological Communities:

There is one significant natural community located on Oak Orchard 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* [7] (Figure 2):

- **Rich hemlock-hardwood peat swamp** (S2S3) - a mixed swamp that occurs on organic soils (peat or muck) in depressions or concave slopes which receive groundwater discharge, typically in areas where the groundwater flows through calcareous gravels of glacial deposits. These swamps usually have a fairly open canopy (50 to 70% cover), scattered shrubs, and a diverse groundlayer with sedges, mosses, and forbs.

Additional information about ecological communities is available in the Oak Orchard WMA Biodiversity Inventory Final Report (1993) prepared by the NY Natural Heritage Program.

Soils and Topography:

Most of the soils on Oak Orchard WMA are of the following soil associations:

- Odessa-Lakemont (42%)
- Palms-Edwards-Carlisle (38%)
- Minoa-Lamson-Galen-Arkport (20%)

Most of these soils are characterized as sandy loam or silt loam, while the Palms-Edwards-Carlisle association is organic muck. According to the National Soil Survey, nearly half the soils on the WMA are classified as not prime farmland, while 7% are prime farmland if drained, 11% are prime farmland, and 34% are farmland of statewide importance.[8] These classifications describe the suitability of soils for farmland, not the current land use (much of the soil classified as farmland here is currently wetland or forest habitats). Approximately 88% of the WMA contains soils that are considered poorly drained, some of which occurs in fields or forest stands. Management in poorly drained areas will use best management practices to avoid erosion.

Elevations of land on the WMA ranges from approximately 620 feet above sea level to 670 feet. The majority of the WMA is flat bottomland with gradual elevation change and little to no slope. The only location on the WMA with notable slope is the northeast corner of the property, but even at this site there are only 8 to 15% slopes.

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 2,200 acres of SMZs (86% of the WMA) are on Oak Orchard WMA, including:

- One wetland (OK-1) regulated by Article 24 of the Environmental Conservation Law that covers the majority of the WMA, and 147 wetlands shown on the National Wetlands

[7] Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero. 2014. Ecological Communities of New York State, Second Edition. Available online at http://www.dec.ny.gov/animals/29384.html.
[8] National Soil Survey data is available online at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.

Inventory (NWI; Figure 3). State-regulated wetlands are protected by a buffer zone of 100 feet from the delineated wetland boundary, known as the adjacent area. There may be forestry prescriptions associated with forested wetlands and adjacent areas, and each management prescription will be reviewed individually for determination of impacts.

- Approximately 10 miles of streams, including Oak Orchard Creek and its tributaries (Figure 3). This mileage includes the distance where some of these tributaries flow into and out of wetland impoundments on the WMA. Oak Orchard Creek is classified as C and therefore not regulated by Article 15 of the Environmental Conservation Law; however, water quality standards will be adhered to. [9]

Guidelines for habitat management projects within these areas are outlined in the Division of Lands and Forests *Rules for Establishment of Special Management Zones on State Forests and Wildlife Management Areas.*[10] Some habitat management activities may either be prohibited or restricted in order to protect these features. Any deviations from these guidelines will be addressed in the individual stand prescriptions.

LANDSCAPE CONTEXT

The goals of this HMP have been developed with consideration of surrounding landscape features, the availability of habitats, and other conservation lands adjacent to Oak Orchard WMA (Figures 4 and 5). The landscape within a three-mile radius of the WMA is primarily privately-owned land including:

- Cultivated crops (37%)
- Wetland, combining emergent and woody (31%)
- Pasture/hay and grassland (17%)
- Forest, combining deciduous, evergreen, and mixed (9%)
- Developed (5%)
- Open water (1%)
- Early-successional shrubland (<1%)

Three other conservation lands are near Oak Orchard WMA (Figure 4). This includes:

- Iroquois NWR (10,828 acres) – primarily a mix of wetland habitats, with a few large grasslands and areas of upland shrubland and forest.
- John White WMA (328 acres) – expansive grassland fields with a small mature woodlot and a few small wetland areas.
- Tonawanda WMA (5,643 acres) – primarily a mix of wetland habitats, with scattered large and small grasslands, with areas of upland shrubland and forest (this WMA is more than 3 miles away).

Oak Orchard WMA is the eastern-most of a 12-mile-long, contiguous, state-federal wetlands complex that also includes Iroquois NWR and Tonawanda WMA. The complex is composed of

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

approximately 19,000 acres of high-quality marsh, swamp, grassland, and forest that provides valuable breeding and migratory habitat important to numerous wildlife species.

The wetlands complex has exceptional importance to migrating birds because the surrounding landscape is mostly agricultural, providing minimal wetland habitat, and because the complex is located near Lake Ontario (approximately 17 miles away).[11] Before and after birds cross the large expanse of Lake Ontario, they concentrate in areas of good habitat to rest, eat, and wait for appropriate conditions to continue traveling. The abundant and diverse habitats on the complex attract high numbers of migrating birds from numerous species and are especially important to migrating waterfowl. It is an important goal to maintain the high value of migratory stopover habitat on the WMA.

The WMA is within the Western New York Grassland Focus Area.[12] Grassland focus areas are regions of the state that support key, residual populations of grassland birds and within them habitat work to benefit grassland bird populations is encouraged on both private and public land. A portion of the WMA is also within a proposed Grassland Bird Concentration Center (Figure 6), which also includes parts of Tonawanda WMA, John White WMA, Iroquois NWR, and portions of the surrounding landscape. The goal of grassland bird concentration centers across the state is to increase the amount of grassland habitat (particularly the amount of grassland managed using best management practices for grassland birds) within more focused areas that have existing populations of rare species and existing anchor fields already managed using best management practices.

Oak Orchard WMA is also within the Iroquois forest matrix block. Forest matrix blocks are large, unfragmented examples of the dominant forest communities throughout the state. The management of forest stands at Oak Orchard WMA is important to promote the persistence of these forest communities. More information regarding forest matrix blocks can be found within the *Strategic Plan for State Forest Management*.[13]

Forest composes only 9% of the landscape surrounding the WMA. The majority of this is forested wetland found on or adjacent to the greater wetlands complex, with small fragmented woodlots also scattered throughout the surrounding agricultural lands. These forests are predominantly of a mature age-class and provide limited benefits to species requiring a young forest component. Young forest habitat and several associated wildlife species have steeply declined in the northeast over recent decades due to maturing forests caused by a lack of natural and human-caused forest disturbances. Upland young forest and shrubland does occur on Iroquois NWR and conservation planning on the NWR intends to maintain this component (as of the writing of this HMP, approximately 95 acres of this habitat is adjacent to the WMA).[14] The establishment and maintenance of young forests on the WMA will add to the distribution of this habitat on the landscape and ensure that it is present in perpetuity.

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[11] France, K. E. 2012. Lake Ontario Migratory Bird Stopover Project. Prepared by The Nature Conservancy in partnership with Audubon NY and NY Natural Heritage Program.
[12] Morgan, M. and M. Burger. 2008. A Plan for Conserving Grassland Birds in New York. Audubon New York, Ithaca, NY. Available online at http://ny.audubon.org/conservation/grassland-bird-conservation-program.
[13] The Strategic Plan for State Forest Management is available online at http://www.dec.ny.gov/lands/64567.html.
[14] The comprehensive conservation plan for Iroquois National Wildlife Refuge is available online at https://www.fws.gov/refuge/Iroquois/what_we_do/finalccp.html

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

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

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

WETLANDS (NATURAL AND IMPOUNDED)

Wetland acreage includes ponds, emergent marsh, and scrub-shrub wetlands, and is categorized as natural or impounded. Forested wetlands compose an additional 753 acres of wetland (approximately 29% of the WMA) and are addressed in the Forest section of this HMP.

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 have not been 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

- Maintain 127 acres of natural emergent and scrub-shrub wetlands.
- Manage 1,096 acres of impounded wetlands to provide diverse habitats that benefit wetland-dependent wildlife. Considering habitats on the greater wetlands complex, strive to provide a variety of habitat conditions within impoundments to meet the needs of target species at different times of year.
- Maintain integrity of impoundment dikes and water control structures.
- Identify and control invasive plant species.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

Approximately 75% of Oak Orchard WMA is wetland which is composed of several wetland types, including emergent marsh (22%), open water (10%), scrub-shrub (17%), and forested wetland (26%). Of the non-forested wetlands, there are approximately 127 acres of natural wetlands and 1,096 acres of impounded wetlands managed on the WMA (Figures 1, 3, and 7).

The majority of the WMA consists of a series of diked wetland impoundments (Photo 1). Oak Orchard Creek is a primary water source for the various wetland impoundments and paddies, but water also enters the WMA through multiple drainages and runoff from adjacent upland areas.

Water levels in these impoundments are controlled and manipulated by a series of control boxes and ditches, with water generally moving east to west. Water levels are managed on the WMA to influence habitat conditions throughout the year, primarily the composition of vegetation and the amount of open water.

Photo 1: Earthen dikes divide wetland impoundments on the WMA and water control structures are used to manipulate water levels.

Photo: Bill Wolanske, DEC

Several small ponds, potholes, and ditches have also been constructed or excavated on the WMA to provide additional habitat diversity. Ditching and pothole excavation has also been done within individual marsh impoundments to improve drainage and interspersion of open water in areas of dense emergent vegetation.

The WMA also contains extensive natural floodplain wetlands found along Oak Orchard Creek, which flows east to west through the southern half of the WMA. These natural wetlands are predominantly forested, but several areas of emergent marsh and scrub-shrub also occur, generally along the creek channel. Water levels in these floodplain wetlands naturally fluctuate throughout the year, with early spring having the highest water levels and late summer having the lowest.

Non-native invasive plant species (e.g., purple loosestrife, Phragmites, and frogbit) are present in several wetlands on the WMA, and in some areas are negatively affecting habitat values for native wildlife. Phragmites is especially challenging as it outcompetes native vegetation and grows in dense stands. Efforts to control aquatic invasive plants is challenging, often requiring multiple treatments. Past control efforts have shown temporary effectiveness and need to be repeated and expanded. Extensive Phragmites control has recently occurred along dikes and within certain impoundments, including Campbell Marsh and Guthries Paddy, and these efforts to control Phragmites and reestablish native vegetation will continue. *Galerucella* spp. beetles, a biological control for purple loosestrife, have been distributed multiple times on the WMA, but purple loosestrife still persists in several of the marshes. Other plant species, such as water lily and reed canarygrass, have also become significant issues in individual marshes and targeted management to address these issues will continue.

It is the concentration, quantity, quality, and outstanding diversity of wetland habitats provided by the impoundments and natural floodplain that make this WMA and the greater wetland complex so valuable and important to wildlife. Thousands of migrating birds stopover or stay to breed each year, and there are numerous species of wetland-dependent mammals, amphibians, reptiles, and invertebrates occurring here. Many of these species have differing habitat

requirements; therefore, maintaining a diversity of wetland conditions is needed to provide quality habitat used by target species for breeding, migrating, and in some cases overwintering.

Active management by DEC, such as the manipulation of water levels or excavation of potholes, has ensured that a diversity of important wetland conditions exist throughout the year on the WMA. See Table 3 below for descriptions of wetland habitats on the WMA.

Table 3. Summary of predominant wetland habitat types on Oak Orchard WMA, the wildlife species benefited most, and management techniques that maintain or establish these habitats.

Habitat Type	Description	Wildlife Benefit	Management Technique
Early Successional Marsh	A wetland dominated by early successional, disturbance-dependent annual plants (e.g., smartweed, bidens, and wild millet) that develop during periods of low water and exposed soils (e.g., droughts). When water levels rise again, (typically from late summer/early fall rains) the seeds from these plants become available to migrating waterfowl.	Provides a valuable source of carbohydrate rich food for fall migrating waterfowl. During the following spring migration, residual annual vegetation provides excellent invertebrate habitat and therefore a source of protein important to migrating hen ducks, as well as carbohydrates in the form of seeds.	This habitat is typically established by drawing down wetland impoundment water levels in spring and reflooding in fall, mimicking a natural drought. The association between these plants and exposed moist soils has led to this technique often being referred to as "*moist-soil management*" and these plants as "*moist-soil vegetation*." Moist soil areas will typically be created on the WMA in different/rotating impoundments every year, but certain marshes will be drawn down more frequently and managed to provide moist soils.
Emergent Marsh	A wetland dominated by perennial herbaceous vegetation (e.g., cattail, bur-reed, and bulrush) and may contain saturated soils or be inundated under variable water depths. This habitat is highly diverse, being influenced by vegetative composition, a gradient of water depths, and degrees of open water interspersion. A ratio of approximately 50:50 vegetation to water is referred to as "*hemi-marsh*."	Various species of waterfowl and marshbirds use emergent marsh. Deeper water depths benefit black tern, pied-billed grebe, and least bittern, while shallower water benefits American bittern, sora, and Virginia rails. This habitat is also important to muskrat (Photo 2), which create openings in dense cattails and construct lodges and feeding platforms that can be used as nesting substrate by birds and basking sites for turtles. Hemi-marsh provides the widest range of habitat conditions and thus is a goal over time in many marshes.	This is typically maintained or established by drawing down water levels when an impoundment has developed a large open water component (usually every 3 to 6 years). The drawdown will establish annual plants the first year, but will also allow perennial plants to germinate and recolonize the open areas of the marsh. Vegetation can become quite dense the couple years following a drawdown, but over time higher water levels and muskrat activity start to create openings and the marsh transitions toward a hemi-marsh condition. Other tools that are used to manage habitat in emergent marsh impoundments are mowing, disking, herbicide, biological control of invasive species, and controlled burns.

Table 3. Continued

Habitat Type	Description	Wildlife Benefit	Management Technique
Secluded Open Water Areas	These areas are typically small openings (less than 1 acre) of open water interspersed throughout emergent vegetation.	The secluded nature of these areas provides important habitat for waterfowl pairing, breeding, and brood rearing.	This habitat is provided by impoundments in the hemi-marsh stage and where potholes and/or ditching have been excavated in dense cattail areas.
Large Open Water Areas	These are expansive open water areas, typically 10 acres or more in size.	These provide important roost habitat for migrating waterfowl (especially spring migrating geese), and foraging areas for bald eagle and osprey.	These areas are generally located in deeper parts of an impoundment when water levels are held high.
Mud Flats	Unvegetated, saturated soil that was previously inundated but became exposed due to receding waters.	Mud flats provide important foraging habitat for shorebirds during migration.	These are established in impoundments by drawing down impoundment water levels. Often turn into Early Successional Marsh if dry during 1st half of growing season.
Wet Shrub Thickets	A wetland dominated by shrubs such as alder, buttonbush, and winterberry, and may also contain an abundance of stunted tree growth. At different seasons these wetlands may be inundated under several inches or feet of water, or may be fairly dry.	Scrub-shrub wetlands are important to a wide-variety of wildlife, including those that are also associated with young forests, such as American woodcock. Numerous songbirds use this habitat, including alder and willow flycatchers. These shrub wetlands also provide valuable food and cover for wood ducks and other waterfowl.	These wetlands typically occur at the edges of an impoundment or at areas of high ground within an impoundment. Water level management to achieve other habitat goals generally allow this habitat to persist in these locations. Prolonged inundation can limit tree establishment and promote continued wetland shrub dominance.

Target species for wetland management on Oak Orchard WMA are:

- Migrating waterfowl (e.g., Canada goose, tundra swan, mallard, blue and green-winged teals, black duck, northern pintail, American wigeon, & gadwall)
- Breeding waterfowl (e.g., mallard, hooded merganser, wood duck, & blue-winged teal)
- Marshbirds (American & least bitterns, black tern, pied-billed grebe, sora, & Virginia rail)
- Furbearers (e.g., muskrat, otter, & beaver)
- Northern harrier, osprey, and bald eagle
- American woodcock and wood turtle

MANAGEMENT HISTORY

The expansive wetlands that include Oak Orchard WMA were created by a natural barrier across Oak Orchard Creek. This barrier is an outcropping of dolomitic limestone located at Shelby

Center that resisted the cutting action of the creek, resulting in restricted flows and the creation of a huge wetland upstream. This extensive wetland system along Oak Orchard Creek, as well as the nearby wetland along Tonawanda Creek, are locally referred to as "the Alabama Swamp."

The expense of completely draining the area is the factor that has preserved the swamp land to this day, despite several attempts. The first attempt was in 1829 when an association of landowners enlarged the outlet of Oak Orchard Creek. In the late 1860s, nearly 5,000 acres of the swamp were drained. In 1893 much of Oak Orchard Creek was improved for use as a feeder canal of the Erie Canal. In 1912, the construction of large canals and lateral canals improved drainage of the region into the creek.

Photo 2: Muskrat create openings in dense cattail areas and construct lodges and feeding platforms that can be used as nesting substrate by various marsh birds and basking sites for turtles.

Photo: Art Kirsch

Further drainage operations continued in the early 1900s by the Western New York Farms Company, which acquired extensive partially developed mucklands and adjoining uplands. Drainage operations included the dredging and straightening of Oak Orchard Creek, primarily the stretch north of Elba, but extending onto what is now the WMA, to just west of Albion Road. Dredged soil was deposited principally along the north side of the new channel, resulting in a dike which served to impound additional flood waters along the old channel (this area on the WMA is now referred to as Oxbow Marsh).

This drainage system was successful in reducing flood waters on the muckland, allowing profitable muck crop production. However, much of the area was now dry for most of the year, allowing several serious muck fires to occur, many of which burned through the muck down to the clay subsoil, greatly reducing the soils agricultural value. Besides fires, the drier surface of the muck was subject to compaction, wind erosion, and subsidence due to oxidation and decay of organic material, resulting in a gradual lowering of the soil surface. By the late 1930s, periodic flooding was again a problem, and muck farming became less profitable, especially in the area west of Route 98, so the Western New York Farms Company decided to dispose of their property.

Following the dredging of Oak Orchard Creek, the rapid dumping of flood waters from drained mucklands increased flooding west of Albion Road, which improved habitat conditions for waterfowl and furbearers. This led to the private acquisition of approximately 1,500 acres of periodically flooded lands in 1927 by an individual named Martin Schmitt for the establishment of a muskrat farm (about 1,000 acres between Albion and Knowlesville Roads and 500 acres west of Knowlesville Road). A system of dikes was installed to establish various muskrat ponds, including what is now referred to as Windmill Marsh.

In 1941, following the death of Martin Schmitt, New York State purchased approximately 1,000 acres of his estate to establish a wildlife management area. Adjacent lands were subsequently purchased from several other owners, including Martin Schmitt's son and the Western New York Farms Company, and acquisition was mostly complete by 1947.

Photo 3: The light green in this photo is a flush of moist soil annual plant growth following a water level draw down. When this is reflooded in the fall, the annual plant seeds will provide food for migrating waterfowl.

Photo: Bill Wolanske, DEC

In 1948, once Oak Orchard WMA was established, the State began development work in the form of low-level diking to catch and hold spring flood waters. Various diking projects have been completed since then, although the majority of work was done between 1948 and 1958. More recently, other projects such as the development of Campbell Marsh and the raising of the dike between Guthries Paddy and Supply Pond have been completed.

Active management of impounded marshes to manipulate habitats has been an ongoing process since their construction (Photo 3). This includes lowering and raising water levels, disking and mowing marsh bottoms, and excavation of potholes and ditches. Control of invasive vegetation has also been an ongoing process and has included the application of herbicide to control species such as Phragmites, and the release of *Galerucella spp.* beetles to control purple loosestrife.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2019-2028** (Figure 7):
    - Maintain integrity of existing marsh impoundments in accordance with Dam Safety Inspection and Management Plans (currently being developed).
        - Mow dikes annually to prevent establishment of woody vegetation.
        - Inspect dikes and spillways annually and repair as needed, including the filling and compacting of animal burrows. All dikes on the WMA will require some repair/reshaping during these 10 years, but no significant repair or reconstruction is currently planned.
        - Inspect water control structures; repair and replace as needed.
    - Manage marsh impoundments to provide a variety of habitat conditions to meet the needs of target species at different times of year.
        - To achieve these diverse conditions, water levels will be managed. This includes periodic drawdowns and reflooding to balance interspersion of emergent vegetation and open water over time in each marsh.

        - Plans for specific marshes are provided below in Table 4. An individual marsh may contain multiple habitat conditions and may require a combination of management approaches to maintain or enhance habitat values over time.
        - In marshes with a planned moist soil management component, drawdown water levels in spring/early summer and reflood in fall to grow annual plants that provide a rich source of food for migrating waterfowl. This may occur annually or less frequently and should consider habitat conditions available throughout other marshes. Reflooding is dependent on water availability in late summer/fall.
        - In marshes with a planned hemi-marsh component, drawdown water levels approximately every 3 to 6 years to maintain the desired emergent vegetation to open water ratio. In years with a drawdown, these marshes will provide moist-soil annual plant growth.
        - As needed, water levels may be increased to drown overabundant cattails or other undesirable vegetation.
        - As needed, mow or disk drawn-down marsh substrate to stimulate desired plant growth or control undesirable growth (use of equipment is dependent upon how dry a marsh becomes while drawn down, which is often influenced by weather and will vary by year).
        - As needed, excavate ditches and/or potholes in marshes to increase open water interspersion in dense emergent vegetation, and in some cases to improve drainage.
    - Monitor for invasive vegetation and as needed control mechanically, biologically, with water level manipulation, and/or with herbicide (e.g., Phragmites, narrowleaf cattail, purple loosestrife).
    - Consider additional wetland projects that will benefit wetland-dependent species as opportunities and funding arise.

Table 4. Summary of habitat management actions planned for wetland impoundments on Oak Orchard WMA, 2019-2028. Impoundment locations are shown on Figure 1.

Marsh Name	Acres	Planned Management
South Marsh	60	Openings may be created in dense cattails using mechanical or chemical means. Phragmites needs to be controlled.
North Marsh	90	Drawdowns approximately every 2 to 3 years to provide moist soil annuals for fall waterfowl migration and mud flats for spring shorebird habitat. Maintain valuable scrub-shrub in east end of marsh.
Woods Paddy	20	Maintain scrub-shrub/forested wetland habitat.
West Paddy	25	Maintain scrub-shrub/forested wetland areas. In emergent marsh areas, control cattails through mowing and disking to create open water and areas for moist soil annuals in drawdown years.

Table 4. Continued

Marsh Name	Acres	Planned Management
Belson Paddy	20	Manage north section for sedge meadow vegetation (control of reed canary grass may be necessary). Manage south section for a diversity of vegetation, including drawdowns to produce moist soil annuals (in some years) and/or disk and plant sections to waterfowl food plants, such as Japanese millet.
Guthries Paddy	65	Manage for a variety of emergent marsh habitats including dense emergent areas, hemi-marsh, open water, and moist soil annuals (in some years) through water level management. Control Phragmites, especially in northern section.
Supply Pond	50	Continue to use as a source of water to restore other marshes. Maintain scrub-shrub/forested wetland habitats.
Campbell Marsh	150	Continue chemical control of Phragmites followed by restoration of native vegetation at control sites through drawdowns and planting. Maintain forested component of marsh and leave standing dead timber in place (until they naturally fall), to promote continued osprey nesting and habitat for wood duck and possibly prothonotary warbler.
Windmill Marsh	300	Control water lily - may involve excavation of a channel to improve draw down capabilities to allow a winter drawdown. After initial control, the marsh will continue to be managed to provide a large open water area in the center, and extensive areas of emergent hemi-marsh and scrub-shrub.
Goose Pond	110	Manage for a variety of emergent marsh habitats, including dense emergent areas, hemi-marsh, open water, and moist soil annuals (in some years) through water level management. Some mechanical or chemical control may be used to create openings in dense cattail areas in the southwest portion of the marsh. Control Phragmites below overlook and possibly plant native sedge meadow species. Drawdowns and reflooding may be difficult in this marsh depending on availability of water.
Oxbow Marsh	140	Manage primarily as hemi-marsh with drawdowns as needed and scrub-shrub in the northeast section of the marsh.

BEST MANAGEMENT PRACTICES

Management activities within wetlands will take into consideration the timing of wildlife breeding 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 any necessary additional permits, such as additional Article 24 permits and pesticide permits.

MANAGEMENT EVALUATION

Current monitoring of wetland habitat use at Oak Orchard WMA includes surveys to document marshbird presence and impacts of management, bald eagle and osprey numbers and nest

success, use and success of waterfowl nesting structures, black tern numbers (especially every three years during statewide survey), muskrat winter house numbers, waterfowl hunter take on opening weekend of duck season, and trapper effort and take. These surveys should continue; however, the establishment of periodic surveys for additional species 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 acreage calculations, some streams may be lumped within surrounding habitat stands (e.g., an intermittent stream that flows through a forest stand is included in that forest stand's acreage calculation).

MANAGEMENT OBJECTIVES

- Maintain the quality of waters found on the WMA.

DESCRIPTION OF EXISTING STREAM HABITAT AND TARGET SPECIES

Approximately 10 miles of streams occur on Oak Orchard WMA (Figures 3 and 7). This includes approximately 3 miles of Oak Orchard Creek and 7 miles of its tributaries. Stream length calculations include distances where streams flow through wetlands.

Oak Orchard Creek flows east to west and is slow moving, having a low gradient of elevation change along its path (Photo 4). During periods of high water, the creek has a wide floodplain (Photo 5). During normal flow levels, Oak Orchard Creek composes approximately 24 acres of the WMA.

Photo 4: Oak Orchard Creek flows east to west through the WMA and during normal water levels is between 30 and 70 feet wide.

Photo: Mike Palermo, DEC

Two tributaries with year-round flow enter Oak Orchard Creek within the WMA: the Oakfield Ditch (which enters Oak Orchard Creek from the east at Albion Road), and Brinningstool Creek (which flows north through the forested wetland and enters Oak Orchard Creek at the west end of the WMA). In addition, two intermittent drainages enter the WMA from the north, one

discharging into Supply Pond and the other into Windmill Marsh.

The quality of water within streams on the WMA are heavily influenced by upstream agricultural runoff. This runoff often contains excessive sediment and nutrients that reduce the quality of these streams. The stretch of Oak Orchard Creek on and upstream from the WMA is considered an impaired waterbody because biological sampling has shown significant impacts to aquatic life. The primary pollutants in the creek are phosphorus and sediment that enter the creek from the large area of cultivated mucklands upstream. Improving the quality of water within Oak Orchard Creek is beyond the scope of this HMP; however, management on the WMA can avoid causing additional impacts.

Photo 5: Each spring, the water level of Oak Orchard Creek is high and floods the nearby forested wetland.

Photo: John Mahoney, DEC

The most recent fish surveys of Oak Orchard Creek on the WMA were done from 2013 to 2015, and found several common warm water species, as well as northern longear sunfish, a threatened species present from past stocking efforts (last stocked in 2015). There have been no fish surveys of the ponds and marshes on the WMA, but it is likely that bluegill, brown bullhead, common carp, green sunfish, largemouth bass, northern pike, and pumpkinseed occur there.

A survey of freshwater mussels occurred in Oak Orchard Creek downstream from the WMA in 2011 and found 16 species, 8 of which are SGCN, including 4 high priority species (i.e., black sandshell, deertoe, rainbow, and Wabash pigtoe). Some or all of these species may be present on the WMA and maintaining the quality of waters here should benefit them.

Numerous wildlife species inhabit the diverse wetland habitats associated with Oak Orchard Creek and several of these species feed upon the various fish and invertebrates that live in the creek. Maintaining the quality of the creek will benefit the aquatic ecosystem, the aquatic organisms it supports, and the wetland and upland wildlife that feed upon them.

Target species for stream management on Oak Orchard WMA are:

- Warm water fish species
- Freshwater mussels

MANAGEMENT HISTORY

Historically, much activity occurred to drain the Alabama swamps, including ditching of wetlands and dredging of Oak Orchard Creek. The stretch of Oak Orchard Creek that borders the eastern side of the WMA flows through a linear channel dredged in the early 1900s, whereas the western portion of the creek that is on the WMA still retains its natural meandering stream channel. Several of the smaller streams on the WMA flow into ditches and wetland impoundments constructed by DEC, most of which were completed by the late 1950s. Portions of these small streams are sometimes inundated, depending on impoundment management and associated water levels.

Most of the wetland impoundments on the WMA drain into Oak Orchard Creek, but during periods of high water, creek waters also enter several of the impoundments through control boxes and ditches. DEC has not altered the stream channel of Oak Orchard Creek on the WMA.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2019-2028** (Figure 7):
    - Maintain the quality of waters found 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).

MANAGEMENT EVALUATION

Surveys for fish and wildlife in streams on the WMA are not routine. Future survey of fish and wildlife occurring within streams on the WMA are not currently planned.

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 Oak Orchard 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. [15]

MANAGEMENT OBJECTIVES

- Increase young forest from 0 to 50 acres (5% of WMA forested acreage) to improve stand quality and provide habitat for young forest-dependent species.
- Maintain 871 acres (95% of WMA forested acreage) in an intermediate or mature age class to provide a diversity of forest habitats that benefit associated wildlife.
- Monitor infestation of emerald ash borer and subsequent regeneration of forested wetlands. As needed, treat stands to ensure desirable tree and shrub composition.
- Encourage regeneration of native hardwoods and conifers (e.g., aspen, maples, oak, cedar, and hemlock) to increase availability of mast and cover for wildlife.
- Control non-native invasive vegetation to maintain forest biodiversity.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

There are 915 acres of forest (approximately 36%) on Oak Orchard WMA (Figure 7). Table 5 provides a summary of the forested areas, including the most common tree species present in each.

The majority of forest on the WMA occurs south of Oak Orchard Creek and is part of an extensive forested wetland/floodplain forest. Several other forest stands occur throughout the WMA and are mostly fragmented, interspersed among fields and wetlands. Approximately 82% of forest cover on the WMA is forested wetland and is flooded at least part of the year (Photo 6).

Photo 6: The majority of forest cover on the WMA is forested wetland that is seasonally inundated. Several stands contain a well-developed network of above ground roots and hummocks.

Photo: Michael Palermo, DEC

Dominant forest communities include silver maple-ash swamp, successional northern hardwoods, beech-maple mesic forest, and rich hemlock-hardwood peat swamp. Climax northern hardwood forest is very scarce and is limited to a few isolated woodlots on the uplands and a few islands located south of Oak Orchard Creek. Conifers are a minor component of forests

[15] 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.

here, with natural hemlock and cedar occurring near the southern boundary, and a few pine and spruce plantations scattered throughout the WMA (Photo 7).

Photo 7: Some conifer plantations on the WMA are in poor health and provide marginal wildlife habitat. Removal of these conifers is planned to regenerate a natural young forest of improved habitat.

Photo: Michael Palermo, DEC

The mature forest habitat consists of seasonally flooded swamps, small wooded islands in managed marshes, and scattered stands of upland forest, and provides valuable habitat for a wide range of wildlife. The forested wetlands offer breeding habitat for species such as spotted salamander and wood duck. Forests at the edge of managed marshes provide roosting trees for herons and kingfishers. A pair of bald eagles have nested here since 2001, mostly in a small clump of white pine within Windmill Marsh, but more recently in a dead tree within Campbell Marsh (in 2017 they returned to Windmill Marsh). Prothonotary warblers are known to nest in the flooded forests near Oak Orchard Creek.

The majority of the landscape surrounding the WMA is agriculture or wetland, with significant forest cover generally limited to the wetland complex and its immediate surroundings. This concentration of forest in an open landscape provides critical stopover habitat for numerous migratory songbirds.

Photo 8: This stand is an island surrounded by forested wetland, containing large oaks and hemlock, which provide important hard mast and thermal cover for wildlife.

Photo: Michael Palermo, DEC

Many of the upland forest stands on the WMA are poor quality with abundant invasive species in the understory. Correcting these negative attributes provides a good opportunity to create young forest habitat while simultaneously improving stand quality.

Numerous wildlife species depend upon young forests, including several species that are experiencing steep population declines. Planned management

would convert 5% of WMA forested acreage to young forest. Establishing more than 5% would be challenging because of difficult access into wetland stands, the high habitat value of several existing stands (Photo 8), and current occupancy by imperiled species. Approximately 500 acres of scrub-shrub wetland exists on the WMA and approximately 95 acres of young forest/shrubland occurs adjacent to the WMA on Iroquois NWR. The planned creation of young forest here combined with these other early-successional habitats should benefit several associated species.

Table 5. Summary of the acreage and dominant overstory species for each forest type present on Oak Orchard WMA.

Forest Type	Acres (as of 2018)	Desired Acres	Overstory species
Natural forest (mature/intermediate)	130	100	Aspen, black cherry, cottonwood, hemlock, maples, white ash
Plantation (mature/intermediate)	32	18	Red, Scotch, and white pine, Norway spruce, larch
Forested wetland (mature/intermediate)	753	753	Silver maple, red maple, green ash, hemlock, swamp white oak
Young forest	0	50	Currently not present on WMA
Young forest (forested wetland)	0	0	Currently not present on WMA
Total Forested Acres:	915	921 [a]	

[a] Change in total forest acres is due to the planned conversion of forest to grassland (3 acres) and planned reversion of grassland and shrubland to young forest (9 acres).

Young Forest Target Species:

Target species for young forest habitat management at Oak Orchard WMA are American woodcock and ruffed grouse. Both of these are SGCN and popular game species.

These species rely on areas of young forest adjacent to mature forest for breeding, foraging, and cover and will benefit from management that creates the following habitat conditions:

- American woodcock:
  - Singing/Peenting Ground – Open areas from 1 to >100 acres.
  - Foraging areas – Moist, rich soils with dense overhead cover of young trees.
  - Nesting – Young, open, second growth woodlands.
  - Brood rearing – Similar to nesting, also including bare ground and dense cover.
  - Roosting – Open fields (minimum of 5 acres) or reverting farm fields.[16]
- Ruffed grouse:
  - Drumming sites – Downed logs surrounded by high stem density cover (Photo 9).
  - Foraging areas – Open areas with dense overhead cover of young forest.
  - Nesting – Young, open forest stands or second growth woodlands.
  - Brood rearing – Herbaceous ground cover with a high midstory stem density.[17, 18]

[16] US Department of Agriculture, Natural Resources Conservation Service. 2010. American Woodcock: Habitat Best Management Practices for the Northeast by Scot J. Williamson. Wildlife Insight. Washington, DC.
[17] Dessecker, D. R., G. W. Norman, and S. J. Williamson. 2006. Ruffed Grouse Conservation Plan. 94 pp.
[18] Jones, B. C. et al. Habitat Management for Pennsylvania Ruffed Grouse, Pennsylvania Game Commission. 10 pp.

Management actions to create young forest will also benefit several other SGCN known to occur on or near the WMA, including blue-winged warbler, brown thrasher, Canada warbler, black ratsnake, and wood turtle. SGCN dependent upon young forest habitat have been experiencing significant declines for decades and habitat loss is a primary cause (e.g., brown thrasher has declined 41% since 1966).[19]

More common wildlife species, such as white-tailed deer and wild turkey, are expected to benefit as well from the abundant food and cover found in young forests. This should provide enhanced hunting opportunities on the WMA, having reliable sites to pursue associated game.

Photo 9: Ruffed grouse require the dense cover of young forest for drumming and courtship.

Photo: Art Kirsch

A variety of pollinator species, such as bees and butterflies, are also expected to 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.[20]

It is important to note that young forest habitat is beneficial to many species typically associated with mature forest. The abundant and diverse food (e.g., berries, catkins, insects) present in young forests attract juvenile interior nesting bird species, such as black-throated blue warbler, during critical growth periods as well as juveniles and adults preparing for energy intensive migrations.

Mature Forest Target Species:

Target species for mature forest habitat management on Oak Orchard WMA are bald eagle, wood duck, and cerulean and prothonotary warblers. Bald eagle is a state threatened species, wood duck is a popular game species, and both warblers are SGCN. An abundance of high-quality habitat for these species currently exists on the WMA.

A pair of bald eagles have nested on Oak Orchard WMA since 2001. From 2001 to 2013, the nest was located in a small clump of white pine within Windmill Marsh. Then, from 2014 to 2016, they nested in a dead tree within Campbell Marsh. When this nest tree fell after a wind storm during January 2017, the eagles rebuilt in another tree in Campbell Marsh, but when that tree also came down they moved back to the white pines within Windmill Marsh.

Wood ducks (Photo 10) are plentiful on the WMA and are popular among hunters and bird watchers alike because of their attractive plumage. These ducks nest in the abundant tree cavities and maintained nest boxes found in or near flooded forests on the WMA. After nesting, the brood

[19] USGS Breeding Bird Survey data. This can be viewed at https://www.mbr-pwrc.usgs.gov/bbs/bbs.html.
[20] The NYS Pollinator Protection Plan can be viewed at http://www.dec.ny.gov/animals/279.html.

will make its way to water to forage for seeds and arthropods within forested wetlands, shrub swamps, or emergent marshes.

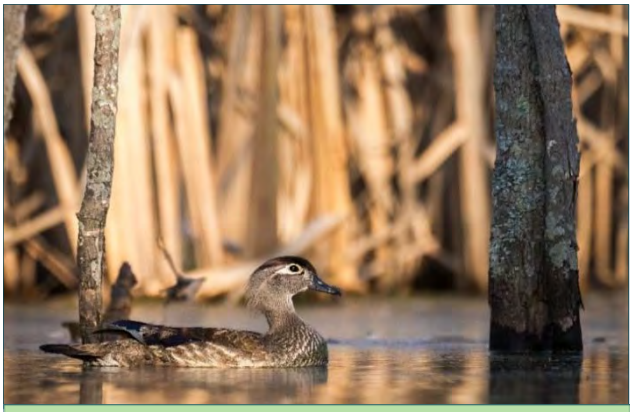


Photo 10: Wood duck nest in tree cavities in forested wetlands and in upland forest near water.

Photo: Art Kirsch

Cerulean and prothonotary warblers nest in the mature forested wetlands along Oak Orchard Creek. The prothonotary warbler is a high priority SGCN with a very limited/localized distribution in New York. This wetlands complex is one of the few breeding sites in the state, and work is underway at Oak Orchard and Tonawanda WMAs to improve habitat, nesting opportunities, and nesting success. Conservation actions will include placement of nest boxes, and where possible, management for certain habitat conditions that may be more conducive to successful nesting (e.g., certain water depths, presence of snags of appropriate size, reduction in habitat fragmentation).

The objective to maintain the majority of existing forest on the WMA in an intermediate and mature age-class, especially in stands occupied by target species, will ensure their continued presence and success. Numerous other SGCN utilize these same habitats throughout the year and will benefit from management favoring these species, including: red-headed woodpecker, rusty blackbird, scarlet tanager, wood thrush, blue-spotted salamander, and western chorus frog. Mature stands maintained near wetland impoundments will also benefit roosting waterbirds, such as black-crowned night heron and great egret.

MANAGEMENT HISTORY

Since State acquisition of the WMA (mostly completed by 1947), forest management has been minimal. From 1958 to 1972, a tree nursery existed on the property and provided seedlings that were then planted on the WMA. Several forest stands have been converted to marsh with the construction of wetland impoundments (some trees were harvested first, others were left to drown and become snags). Small-scale firewood harvests occasionally occurred within both upland and wetland forest stands; however, no timber harvests have occurred on the WMA since the early 2000s.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

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

- **Management planned for 2019-2028** (Figure 7):
    - Monitor for invasive vegetation throughout all forest stands and as needed control mechanically, biologically, and/or with herbicide (e.g., autumn olive, buckthorn, honeysuckle, multiflora rose, and oriental bittersweet).
        - Control of mile-a-minute vine in Stand C03 and swallow-wort in Stands A06 and B08 are priorities. Future conversion of Stand C03 from forest to grassland may be necessary if other control efforts are not successful.

- **Management planned for 2024-2028** (Table 6, Figure 7):
    - Patch cut harvest in Stand A05 (6 acres)
    - Seed tree harvest in Stand C10 (4 acres)
    - Clearcut harvest in Stands A01, A03, A06, C06, C08 (31 acres)
    - Clearcut and convert to grassland Stands A18 and C01 (3 acres)

Even though 3 acres of forest are planned to be converted to grassland, the total forest acreage on the WMA will increase by 6 acres because 4 acres of grassland and 5 acres of shrubland are planned to revert to young forest (see Shrubland and Grassland sections for details). Table 6 provides additional information regarding stands planned to receive a timber cutting treatment. These cuts are all planned for the second five-years of this HMP to avoid timing conflicts with other regional forestry priorities and to provide time for HMPs to be completed for nearby WMAs. Combining forestry projects on this WMA with nearby WMAs may be the most efficient and economical approach to accomplish these actions.

Table 6. Forest management scheduled for the second five-years of this HMP (2024-2028).

Stand	Acres	Size Class	Forest Type		Treatment Type
			Current	Future	
A01	10	Pole Timber 6”-11” DBH	Plantation - Scotch Pine / Norway Spruce	Young Forest	Clearcut
A03	5	Small Saw Timber 12”-17” DBH	Northern Hardwood	Young Forest	Clearcut
A05	6	Pole Timber 6”-11” DBH	Pioneer Hardwoods	Young Forest / Pioneer Hardwoods	Patch Cuts
A06	5	Small Saw Timber 12”-17” DBH	Pioneer Hardwoods	Young Forest	Clearcut
A18	2	Pole Timber 6”-11” DBH	Pioneer Hardwoods	Grassland	Convert to grassland
C01	1	Pole Timber 6”-11” DBH	Pioneer Hardwoods	Grassland	Convert to grassland
C06	7	Pole Timber 6”-11” DBH	Pioneer Hardwoods	Young Forest	Clearcut
C08	4	Small Saw Timber 12”-17” DBH	Pioneer Hardwoods	Young Forest	Clearcut
C10	4	Pole Timber 6”-11” DBH	Plantation - Larch / Natural Hardwoods	Young Forest	Seed Tree

Stand locations and planned management actions are also summarized in Figure 7. 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 will include the following:

- **Stand A01:** This stand is a mixed conifer plantation with mostly Scotch pine and Norway spruce and some larch. These conifers currently provide marginal habitat and there is

minimal desireable understory. A clearcut with prior invasive shrub control will provide conditions favorable for establishment and regeneration of native hardwoods. Some aspen is present throughout the stand and this harvest should stimulate abundant root and stump sprouting.

- **Stand A03:** This stand consists of two forested strips seperated by a small field and is primarily sawtimber cottonwood and aspen, with a lesser component of black cherry. Very little desireable regeneration is present and the understory is dominated by honeysuckle, with buckthorn also present. A clearcut with prior invasive control should provide the conditions necessary to regenerate desirable tree species, especially aspen. Select black cherry and other mast trees will be retained as a seed source.
- **Stand A05:** This stand contains mostly aspen, red maple, and ash with some Scotch and red pine. The understory contains patches of dogwood and honeysuckle, with some aspen regeneration. Approximately 6 acres of patch cuts (approximately ½ acre each) will occur throughout this stand targeting aspen regeneration. Trees will be harvested in winter to ecourage aspen root and stump sprouting. Invasives should be controlled throughout the entire stand. This stand is currently occupied by some species associated with young forests, including blue-winged warbler and woodcock, and this treatment will prolong this stand's habitat suitability for young forest wildlife.
- **Stand A06:** This stand contains a mix of aspen and black cherry with scattered planted conifers. A fair amount of aspen regeneration exists in spots but is heavily browsed by deer. Thick patches of honeysuckle and autumn olive are present and will require control. The exact areas of harvesting will be located during sale layout to avoid impacting vernal pools within the stand's interior. A clearcut with prior invasive control will release existing hardwood regeneration and stimulate abundant aspen resprouting.
- **Stand A18:** This stand is composed of pole sized hardwoods, is mostly surrounded by grassland, and is adjacent to a pond. Converting this stand to grass will increase acreage of the surrounding grassland habitat patch, which should benefit grassland-dependent bird species, and should improve mallard nesting habitat near the pond. Actions will include a clearcut, bulldozing and planting to desirable herbaceous species.
- **Stand C01:** This is a small hedge of pole sized pioneer hardwoods along Albion Road that separates two grasslands. This stand will be clearcut, bulldozed, and planted to desirable herbaceous species to provide habitat connectivity between the grasslands.
- **Stand C06:** This stand currently consists of overstory cottonwood and aspen, in low density, with some sumac and dogwood in the understory. A high abundance of invasive shrubs and vines are hindering overstory trees and choking out native vegetation. A clearcut harvest in winter will stimulate aspen root and stump sprouting. Control of invasive shrubs will be required.
- **Stand C08:** This stand is composed of sawtimber ash, cottonwood, aspen, black locust, and Norway spruce. Clearcutting this stand will establish a corridor of young forest near fields and wetland, providing especially valuable woodcock habitat. The understory is dense and includes native and non-native vines, brambles, and shrubs. A clearcut with prior invasive plant control will provide conditions favorable for establishment and regeneration of native hardwoods. Some aspen is present throughout the stand and this harvest should stimulate abundant root and stump sprouting.
- **Stand C10:** This stand is a failing mixed conifer plantation of larch and red pine, with some pioneer hardwoods also present (red maple, ash, black cherry, and aspen). A seed

tree harvest will convert this stand from plantation to natural hardwoods and should promote black cherry regeneration, which will provide abundant future soft mast for wildlife. Invasives will need to be controlled in order to successfully regenerate the stand to early-successional hardwoods.

BEST MANAGEMENT PRACTICES

Forest management on all WMAs follows Best Management Practices to protect soil and water resources, promote quality wildlife habitat, and establish healthy forests (Table 7).

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

Resource	**Guidance Document** [21]
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 species known to be present on or near Oak Orchard WMA that warrant special consideration include:

- *Bald eagle*. Eagles are known to nest on Oak Orchard WMA. Forest management here will avoid disturbing any nesting should it occur within or adjacent to a stand with proposed timber harvest actions. This may include delaying nearby harvest actions until after the breeding season and/or the establishment of a forested buffer around the nest.
- *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 on the WMA. However, surveys will occur in suitable habitat prior to timber harvest activities to detect presence or probable absence, or harvests will take place in winter to avoid potential impacts.
- *Blue-spotted and Jefferson salamanders*. These salamanders breed in vernal pools and forested wetlands and then spend most of their adult lives in the surrounding uplands. In stands planned for timber harvest, vernal pools should receive at least a 100-foot buffer where 75% of canopy cover is retained and soil/leaf litter disturbance is minimized.
- *Cerulean and prothonotary warblers*. Forest stands on the WMA where these species nest are well-documented and timber harvests are not planned in these areas. A point-count survey to detect presence may be utilized prior to a timber harvest to avoid negative impacts to these species.

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 the forest stand to be harvested.

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

Forest Health Considerations:

Forest pests and invasive vegetation are an ongoing problem for habitat management. When pests 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 (Photo 11). This decrease in habitat values means less wildlife may be able to utilize the area. All efforts to manage habitats on Oak Orchard WMA must consider these forest pests and invasive species and ensure that measures are taken to control their presence or prevent their establishment.

Infestations of introduced insects such as emerald ash borer (EAB), gypsy moth, hemlock wooly adelgid (HWA), pear thrips, and pine shoot beetle are of present concern and bear persistent monitoring. Gypsy moth and pear thrips densities fluctuate and occasionally can reach outbreak levels where complete defoliation of host trees can occur. Gypsy moth most commonly attacks oak and aspen species while pear thrips favors sugar maple. HWA has not yet been confirmed on the WMA; however, it is present nearby. Hemlock is a minor component of forests on the WMA, and although management actions to prevent or control HWA infestation are currently limited, they may be implemented should effective methods be developed.

Photo 11: Non-native invasive plant species, such as this mile-a-minute vine, have the potential to dominate an area, suppressing desirable native plants.

Photo: Gary Koplun, DEC

EAB was recently detected on the WMA and is expected to cause extensive mortality of ash trees within the next decade, which will significantly alter forest composition, especially in the forested wetlands. However, these changes may benefit some species; recent studies have shown increases in abundance for some woodpecker and nuthatch species after EAB infestation, and an increase in snags and nest cavities may benefit wood duck, hooded merganser, and prothonotary warbler. Similarly, as ash snags decay and fall over, numerous species will utilize the increase in downed coarse woody debris for cover, foraging, and in the case of the ruffed grouse, for drumming. Likewise, cerulean warbler has been shown to respond positively to a reduction in forest stocking levels. Monitoring forest regeneration and controlling invasive vegetation in these stands will be important.

Native insects, 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.

Invasive plants that are known to be on or near the forested areas of the WMA include: autumn olive, buckthorn, garlic mustard, honeysuckle, knotweed, mile-a-minute vine, multiflora rose,

oriental bittersweet, Phragmites, and swallow-wort. Management of invasive vegetation may include mechanical, chemical, or biological methods. Mile-a-minute is an especially concerning species due to its prolific, smothering growth form and its current scarcity in western New York. It was detected on the WMA and neighboring private property in 2017 (approximately 2 acres on the WMA). Efforts to monitor for and eradicate this species here are a high priority.

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 and shrubs (e.g., hawthorn and beech) are present in the understory of many stands here and left untreated could 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. Pre-treatment herbicide application will be necessary in some of the forest stands planned to be managed. Reapplication will be prudent in most cases to ensure successful forest regeneration.

Conifers are a minor component of forests on the WMA; however, retaining this component provides valuable habitat diversity. Stands A01 and C10 are conifer plantations planned to be harvested and naturally regenerated because they contain degraded habitat. Promoting the regeneration of naturally occurring conifers (e.g., cedar, hemlock, and white pine) 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 is expected to be an issue at Oak Orchard WMA. If it is determined that herbivory is intense enough to prevent regeneration of desired tree species, fencing 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.[22] 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. YFI wildlife target species selected for Oak Orchard

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

WMA, which may be assessed to determine response to management, include American woodcock and ruffed grouse.

Monitoring of these species may include woodcock singing-ground surveys and ruffed grouse drumming surveys to determine habitat use and abundance in response to forest management. The establishment of periodic bird point counts and amphibian and reptile surveys in all forest types would 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

- Maintain approximately 6 acres as shrubland habitat to provide dense cover, abundant soft mast, and an interspersion of grass and wildflowers that benefit associated wildlife.
- Control invasive vegetation and promote dominance of native shrub species.
- Allow 5 acres of shrubland to revert to young forest.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

There are 11 acres of shrubland on Oak Orchard WMA (Figure 7, Photo 12). This is composed of four small stands that range from 1.5 acres to 4 acres. These shrublands originated from fields not being maintained and naturally succeeding to a shrub-dominated plant community.

These stands vary from sparse shrubs and grasses to dense shrub thickets with scattered trees. Native shrubs found in these areas include species of dogwood, hawthorn, sumac, and viburnum, which provide valuable dense cover and soft-mast for wildlife. Non-native invasive shrub species, such as autumn olive, buckthorn, honeysuckle, and multiflora rose are established in most of these stands, as well, and in some areas are dominant.

Photo 12: Shrublands on the WMA contain dense shrub growth which provides valuable cover and soft-mast for wildlife.

Photo: Bill Wolanske, DEC

Shrublands provide valuable habitat for several wildlife species because they provide dense cover and contain abundant food (e.g., twig browse, insects, berries). The prolific flowers produced by these 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 trees 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.

Extensive scrub-shrub wetland (approximately 500 acres) exists on the WMA and is described in the previous Wetland section. These shrub swamps provide valuable early-successional habitat that also benefits several wildlife species that inhabit upland shrublands and young forests.

Target species for shrubland management on Oak Orchard WMA are:

- American woodcock
- Brown thrasher
- Cottontail rabbit
- Wild turkey

These species were selected as targets because they are either SGCN (woodcock and brown thrasher) or popular game species (woodcock, cottontail, and wild turkey). Each of these species utilize shrublands for breeding and foraging, and much of their habitat requirements overlap. A difference among these habitat requirements is the woodcock's need for herbaceous openings within or adjacent to a shrubland for singing and courtship. Managing shrublands on the WMA targeting these species is expected to promote several other SGCN, including black-billed cuckoo, blue-winged warbler, ruffed grouse, smooth green snake, and wood turtle. White-tailed deer and various pollinator species are also expected to benefit.

MANAGEMENT HISTORY

Since acquisition, a management priority for Oak Orchard WMA has been to provide breeding habitat for waterfowl and has included the maintenance of grasslands. In an effort to increase shrubland habitat on the WMA for other wildlife, some smaller grasslands away from wetlands were left unmowed to allow them to succeed to shrubs. Some of these shrublands have been periodically maintained in a rotation using a brush hog or other forestry equipment.

Past DEC management of the WMA also included the planting of wildlife food and cover shrubs. These were planted along woodland edges to enhance the transition zone between habitat types. Once considered benign and beneficial, non-native species were sometimes included in these plantings and this was likely a significant source of invasive shrub species that have become established here. More recently only native shrubs have been planted on the WMA.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2019-2028** (Figure 7):
    - Throughout all shrubland stands, 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 will be utilized to create and maintain an interspersion of openings and travel corridors.
        - When and where practicable prescribed fire may be utilized.
    - Throughout all shrubland stands, promote the dominance of native shrub species.
        - Control of invasive vegetation will be accomplished through mechanical removal, prescribed fire and/or herbicide application.
        - Habitat type conversion to grassland may be necessary to effectively control invasives. Either the converted stand or another area of grassland would then be planted or allowed to revert to a native shrubland to maintain acreage of each habitat type.
    - Allow shrubland Stands A02 (4 acres) and A19 (1 acre) revert to young forest.
        - Stand A02 contains an ash and aspen component mixed with abundant invasive shrubs. Controlling these invasives and protecting existing tree regeneration from deer browse is planned to allow this stand to revert.

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

Current monitoring of shrubland habitat use at Oak Orchard WMA is informal and data are often derived opportunistically, and will be continued. However, the establishment of periodic bird point counts would be beneficial to better understand species diversity and habitat use.

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 encourage favorable herbaceous species and prevent reversion to shrubland and forest.
- Convert 3 acres of forest to grass to increase field size and improve habitat connectivity.
- Allow 4 acres of grassland to revert to young forest.
- Temporarily (2 to 5 years) convert approximately 30 acres of grasslands to crops as a means to restore grassland quality.
- Implement best management practices that benefit grassland-dependent birds.
- Identify and control invasive plant species to prevent their dominance in fields.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

There are 272 acres of grassland habitat on Oak Orchard WMA (Figure 7, Photo 13). This is composed of several small fields (1 to 25 acres) adjacent to wetlands and forest stands throughout the WMA, and a few large fields (25+ acres) on the east side of the property (largest area of contiguous grassland is approximately 53 acres).

Photo 13: The herbaceous vegetation of grasslands provides valuable food and cover to several species, including pollinators, white-tailed deer, pheasant, and wild turkey.

Photo: Michael Palermo, DEC

The entire WMA is within the Western New York 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 of grassland with low perimeter-to-area ratios in an open landscape. A portion of the WMA is also within a proposed Grassland Bird Concentration Center (Figure 6). The largest grasslands on the WMA (Photo 14) occur within the proposed conservation center and habitat management in these stands should utilize best management practices for grassland birds and attempt to enhance and increase the size of available habitat patches.

Several fields on the WMA have been planted with various grasses (i.e., warm and cool season) and forbs (e.g., legumes and wildflowers) to improve habitat values for 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 14: Large grasslands (> 25 acres) are a rare habitat on the landscape and provide important habitat to several bird species that are dependent upon them throughout the year.

Photo: John Mahoney, DEC

The diversity of grasslands on the WMA provides a range of habitats beneficial to several wildlife species. Grasslands adjacent to wetlands provide important nesting habitat for waterfowl such as mallard, and songbirds like sedge wren. Large grassland patches provide important habitat for grassland dependent birds that are area sensitive, meaning they require extensive habitat to be successful, such as grasshopper sparrow, upland sandpiper, and northern harrier. Grasslands adjacent to forest provide habitat for upland animals, such as deer (fawning) and turkey (brood-rearing). Pollinators, such as bees and butterflies, and various other insects, also thrive in all types of grassland and provide an important high-protein food for grouse chicks, turkey poults, and songbirds.

In an effort to promote hunting opportunities, the ring-necked pheasant has been stocked in grasslands on the WMA annually since the early 1980s. Pheasant, and several other wildlife species, benefit from the abundant seeds and herbaceous cover that often persists in grasslands throughout the winter.

Target species for grassland management on Oak Orchard WMA are:

- Breeding waterfowl (e.g., mallard and blue-winged teal)
- Grassland birds (e.g., bobolink, eastern meadowlark, northern harrier, and sedge wren)
- Wintering raptors (e.g., northern harrier, rough-legged hawk, and short-eared owl)
- Pheasant, white-tailed deer, and wild turkey
- Bees, butterflies, and other pollinators.

MANAGEMENT HISTORY

Historically, the fields at Oak Orchard WMA were used for agriculture. Under DEC management, these fields have been maintained as open habitat through routine mowing, agricultural practices, removal of hedgerows, and reseeding to provide herbaceous plants favored by target wildlife. Over the years a variety of warm-season (e.g., switchgrass, big blue stem, little blue stem, and Indian grass) and cool season grasses (e.g., timothy, orchard grass, redtop, Virginia wildrye and Canada wildrye) have been planted.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2019-2028** (Figure 7):
    - Throughout all grassland stands, routinely perform maintenance actions.
        - Mow fields every 1-3 years to prevent establishment of woody vegetation.
            - Mowing of 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.
        - Control invasive vegetation mechanically and/or with herbicide.
        - As needed: lime, fertilize, disk, and reseed grasslands. Promote native herbaceous species where practical.
    - Temporarily (2 to 5 years) convert 30 acres of grassland (Fields O35, O36, O42, O43, O44, and O46) to crops as a means to restore grassland quality.
        - Over a few years, the repeated tilling associated with cultivated crops disrupts root systems and depletes the seed bank of woody vegetation and other undesirable plants. This provides a clean slate for seeding desired herbaceous plants to establish a grassland of improved habitat value.

        - As needed, additional fields may be temporarily converted to agricultural lands to facilitate grassland restoration.
    - Expand grassland habitat patch size by converting approximately 3 acres of forest (Stands A18 and C01) to grassland.
        - These forest stands are hedgerows that separate existing grassland fields. Removing C01 will improve the visual connectivity of fields on the east and west side of Albion Road, and removing A18 will increase the size of the field between Albion Road and Windmill Marsh. Stand A18 is also adjacent to a pond and converting the stand to grass should improve mallard breeding habitat.
    - Allow 4 acres of grassland (Fields O2 and O50) to revert to young forest.
        - Field O2 (2 acres) is surrounded by forest Stand A03, which is planned to be clearcut. After the cut, aspen in Stand A03 are expected to prolifically sprout from roots throughout Field O2.
        - Field O50 (2 acres) is bordered by Windmill Marsh to the west and is mostly separated from the larger adjacent grassland by a hedgerow. Some woody vegetation is currently established in this field and is mostly composed of desirable species and should establish a good-quality young forest. The loss of grassland habitat will not significantly reduce the habitat patch size of the adjacent grassland because of the existing hedgerow.

BEST MANAGEMENT PRACTICES

The following sub-sections provide guidelines for grassland habitat management on all WMAs. For more detailed information and recommendations see *A Plan for Conserving Grassland Birds in New York*.[23] In particular, refer to the plan for species-specific habitat requirements and detailed recommendations regarding grassland management and restoration techniques.

General Management Recommendations

- Target management for grassland bird species known to be in the vicinity, and consider the needs of both breeding and wintering grassland bird species.
- Consider the surrounding landscape when making management decisions.
- Conduct baseline grassland bird surveys on newly acquired fields or fields targeted for management changes to determine species present.
- Increase field size by hedgerow removal, removing trees, etc. to benefit species that require large fields.
- Conduct invasive species control (glossy buckthorn, pale and black swallowwort, Canada thistle, Phragmites, purple loosestrife etc.) to improve habitat quality.
- Consider a variety of factors, such as the targeted grassland bird species, pollinators, seed mix (warm versus cool season grasses, forbs, wildflower mixes, grass height and density), timing of planting, existing conditions, and vegetation removal techniques (including herbicide and intensive disking) in developing grassland planting or restoration projects.

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

- Utilize mowing, haying, burning, and grazing for maintaining grassland habitat, after evaluating the appropriateness of these methods relative to site conditions and management objectives. In particular, burning cool season grasses is not advisable in most situations in New York.

Timing of Management

- Fields over 25 acres (including all contiguous fields) or fields with a history of listed (federally listed and/or state E/T or SC) grassland bird species within the last 10 years, including fields of any size AND contiguous fields. Can also include nearby fields if deemed necessary:
    - Mowing or other management should be avoided between April 23 and August 15 unless at least one of the following criteria are met and the fields are assessed or surveyed to confirm there is no active nesting by E/T/SC grassland birds:
        - Management is to be done for long term benefits to the habitat/wildlife (such as invasive species management).
        - Nesting locations can be avoided, such as using spot treatment for invasive species, reducing any negative impact to the species of concern.
- Fields under 25 acres (including all contiguous fields) with no history of listed species:
    - Field can be managed/mowed within the period April 23 and August 15 if necessary to:
        - Control the growth of invasive vegetation in fields where grassland habitat value is degraded.
        - Ensure that suitable grass cover will be present to provide important winter habitat for grassland birds and ring-necked pheasants.
    - If early management is proposed, then the habitat requirements and nesting periods of other species should be considered (e.g., nesting waterfowl, American bittern, reptiles and amphibians).

Additional Mowing Guidelines

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

MANAGEMENT EVALUATION

Current monitoring of grassland habitat use on the WMA consists of surveys to document grassland birds during the breeding season, which includes an assessment of vegetation characteristics to determine wildlife response to management actions. In the past, breeding waterfowl surveys have occurred, but findings are likely outdated and more recent surveys would be beneficial. Monitoring of invasive vegetation control efforts will be necessary to ensure success and prevent future spread.

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.

MANAGEMENT OBJECTIVES

- Maintain approximately 11 acres of food plot habitat to provide supplemental food for wildlife species such as deer and turkey, and provide varied hunting opportunities.
- Temporarily (2 to 5 years) convert approximately 30 acres of existing grasslands to crops as a means to restore grassland quality.

DESCRIPTION OF EXISTING AGRICULTURAL LANDS AND TARGET SPECIES

There are currently 11 acres of agricultural lands on Oak Orchard WMA (Figure 7, Photo 15). This consists of three fields that are planted to wildlife food plots to benefit deer, turkey, waterfowl and other game and non-game species.

These food plots are planted annually to a mix of herbaceous vegetation favored by wildlife, which may vary from year to year. Species typically planted include alfalfa, buckwheat, clover, corn, millet, orchard grass, perennial ryegrass, soy beans, and sunflowers. These fields should continue to be maintained as needed with similar mixes.

Agricultural activities (i.e., crop planting) can be an effective tool to facilitate grassland restoration. Over a few years, the repeated tilling associated with cultivated crops disrupts root systems and depletes the seed bank of woody vegetation and other undesirable plants. This provides a clean slate for seeding desired herbaceous plants to establish a grassland of improved habitat value.

The presence of food plots, and any agricultural crops that may be planted to restore grasslands, have important habitat value including high-quality forage for deer, waterfowl, pheasants, and turkey, as well as for grassland bird species that prefer a higher amount of bare soil, such as horned lark and vesper sparrow.

Hunters also value being able to hunt agricultural land habitat types on public land. This is particularly true regarding field hunting for geese, as nearly all public land waterfowl hunting is limited to marshes or open water.

Photo 15: This food plot is planted with corn, millet, and soy beans and provides valuable forage for many wildlife species.

Photo: Michael Palermo, DEC

Target species for agricultural land management on Oak Orchard WMA are:

- White-tailed deer
- Wild turkey
- Waterfowl

MANAGEMENT HISTORY

The food plots just east of Knowlesville Road were planted in cooperation with the National Wild Turkey Federation and local farmers/landowners. The food plot north of Podunk Road was planted and is maintained by DEC staff. Agricultural activities, including food plots and crops, have periodically occurred on the WMA ever since DEC acquisition. Cooperative agricultural agreements for growing crops used to be used on the WMA, but there have not been any active agreements for growing crops in several years. The most recent cooperative agreement was for harvesting hay, and that agreement expired in 2007.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2019-2028** (Figure 7):
    - Maintain approximately 11 acres as wildlife food plots.
        - As needed, replant Fields O10, O63, and O64 with herbaceous plant mixes favored by target wildlife species.
    - Temporarily (2 to 5 years) convert 30 acres of grassland (Fields O35, O36, O42, O43, O44, and O46) to crops as a means to restore grassland quality.
        - Control woody plant growth through repeated tilling and crop planting, with the eventual reseeding of desired vegetation.
        - Planting of crops may be done by DEC Division of Operations or by a private individual/group through a contract, cooperative agreement, or voluntary stewardship agreement.
        - Rotate agriculture throughout grasslands across the WMA as needed to promote long-term quality of grasslands.

BEST MANAGEMENT PRACTICES

Agricultural activities involve mowing, tilling, and pesticide use, which have potential to impact wildlife and the environment, therefore guidelines are provided within cooperative agreements to minimize impacts. For Oak Orchard WMA this will include: soil conservation practices, buffers between cropland and water bodies, review of planned pesticide use, no fall plowing without a winter cover crop; and no harvest of hay, alfalfa, or other grasses prior to August 1 (possibly earlier if fields are less than 25 acres or later if rare/listed species are detected).

MANAGEMENT EVALUATION

Annual agricultural activities, such as timing of mowing and crops planted, will be tracked. Fields should be monitored for control of invasives to prevent spread to adjacent areas, or in preparation for rotating agricultural fields to grassland.

HABITAT MANAGEMENT SUMMARY

In summary, Table 8 lists the habitat management actions planned for Oak Orchard WMA over the next ten years. Any substantive changes will be appended to this HMP annually or as needed (Appendix D).

Table 8. Summary of habitat management actions recommended for Oak Orchard WMA, 2019-2028 (also see Figure 7).

Habitat	Management Action	Acres	Timeframe
Wetlands	Manipulate wetland habitat conditions within managed marshes (e.g., drawdowns, flooding, mowing, tilling, excavation of potholes)	≤ 1,096	2019-2028, as needed
Wetlands	Maintain impounded wetland dikes and control structures (e.g., inspect, mow, disk, repair and replace as needed)	41,395 ft	Annually
Wetlands / Streams	Monitor and control invasive species	≤ 1,247	2019-2028, ongoing
Forest	Patch cut harvest in Stand A05 (approximately ½ acre patches)	6	2024-2028
Forest	Clearcut harvest of Stands A01, A03, A06, C06, and C08	31	2024-2028
Forest	Seed tree harvest of Stand C10	4	2024-2028
Forest	Clearcut and convert to grassland Stands A18 and C01	3	2024-2028
Forest	Monitor and control invasive species	≤ 921	2019-2028, ongoing
Shrubland	Maintain shrubland acreage by cutting trees, brush cutting and/or prescribed fire	≤ 6	2019-2028, as needed
Shrubland	Promote dominance of native shrubs by controlling invasive shrub species	≤ 6	2019-2028, ongoing
Shrubland	Allow Stands A02 and A19 to revert to young forest	5	2019-2028
Grassland	Maintain grassland acreage with mowing and potentially prescribed fire	≤ 271	Annual, biennial, or triennial

Table 8. Continued

Habitat	Management Action	Acres	Timeframe
Grassland	Allow Fields O2 and O50 to revert to young forest	4	2019-2028
Grassland	Improve grassland quality (e.g., lime, fertilize, disk, and/or reseed)	≤ 271	2019-2028, as needed
Grassland	Monitor and control invasive species	≤ 271	2019-2028, ongoing
Grassland	Temporarily convert Fields O35, O36, O42, O43, O44, and O46 from grassland to crops to restore grassland quality	≤ 30	2019-2028
Agricultural Lands	Replant food plots to maintain habitat value	≤ 11	2019-2028, as needed

III. FIGURES

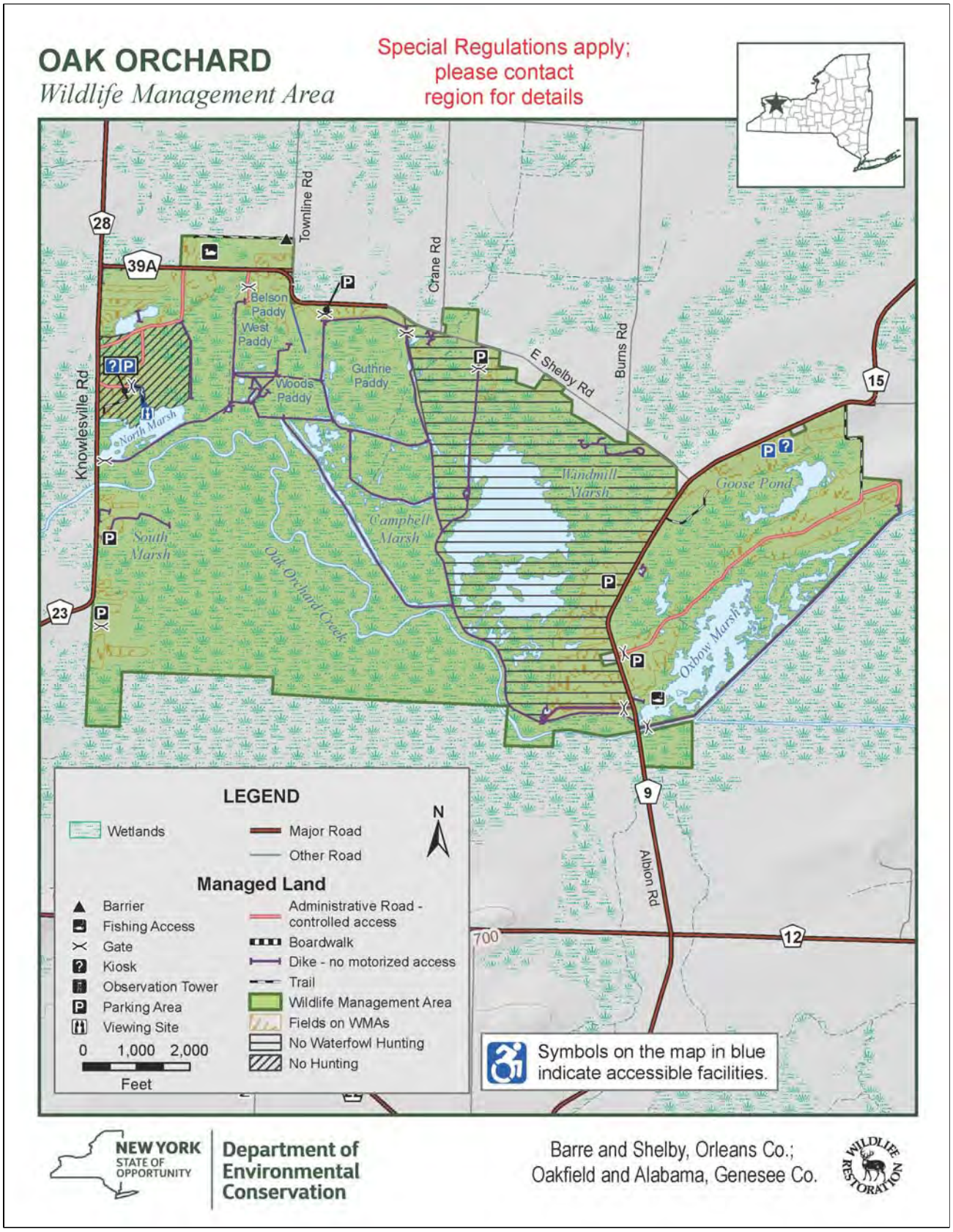


FIGURE 1. Location and access features at Oak Orchard WMA.

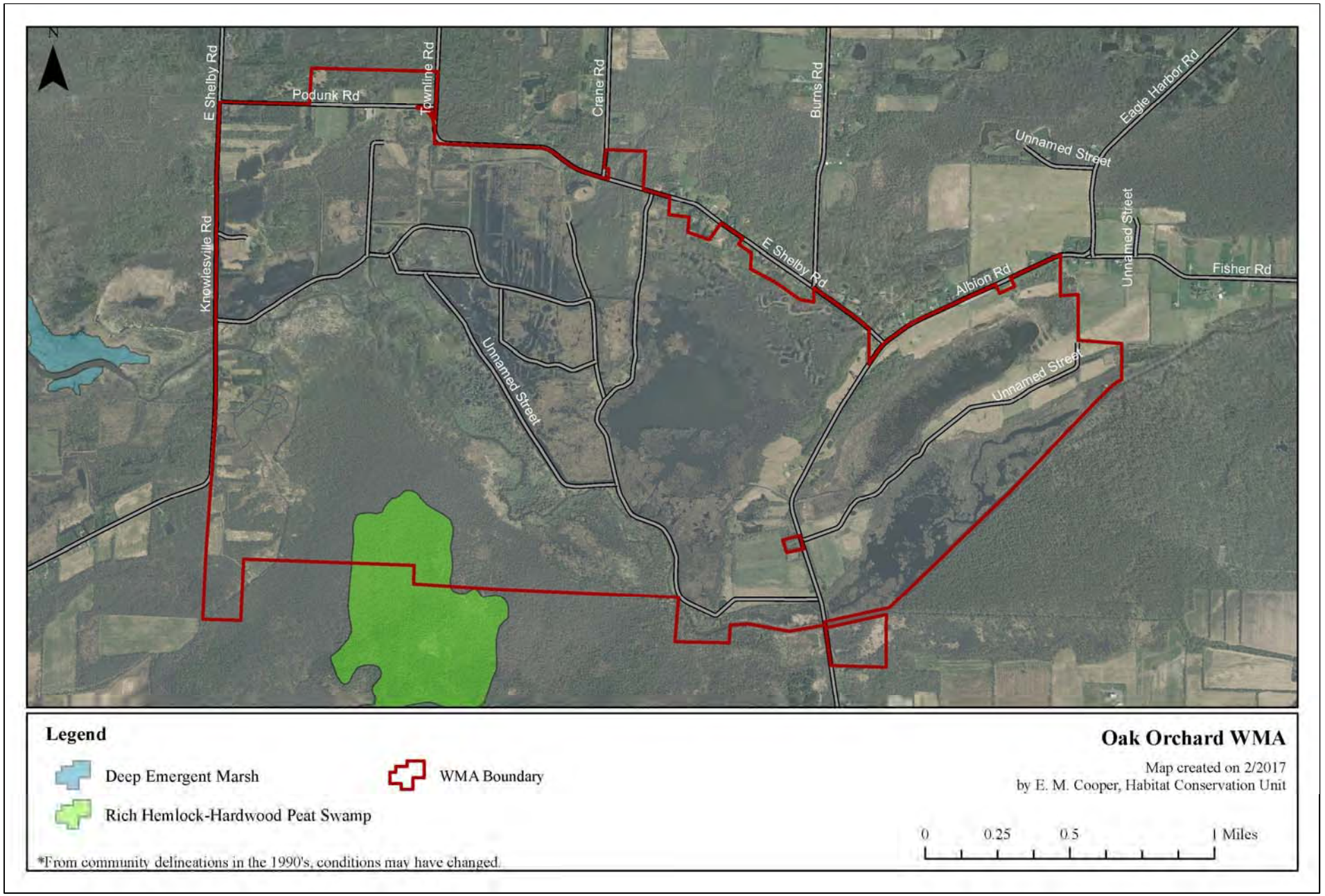


FIGURE 2. Significant ecological communities on Oak Orchard WMA. Data from the NY Natural Heritage Program.

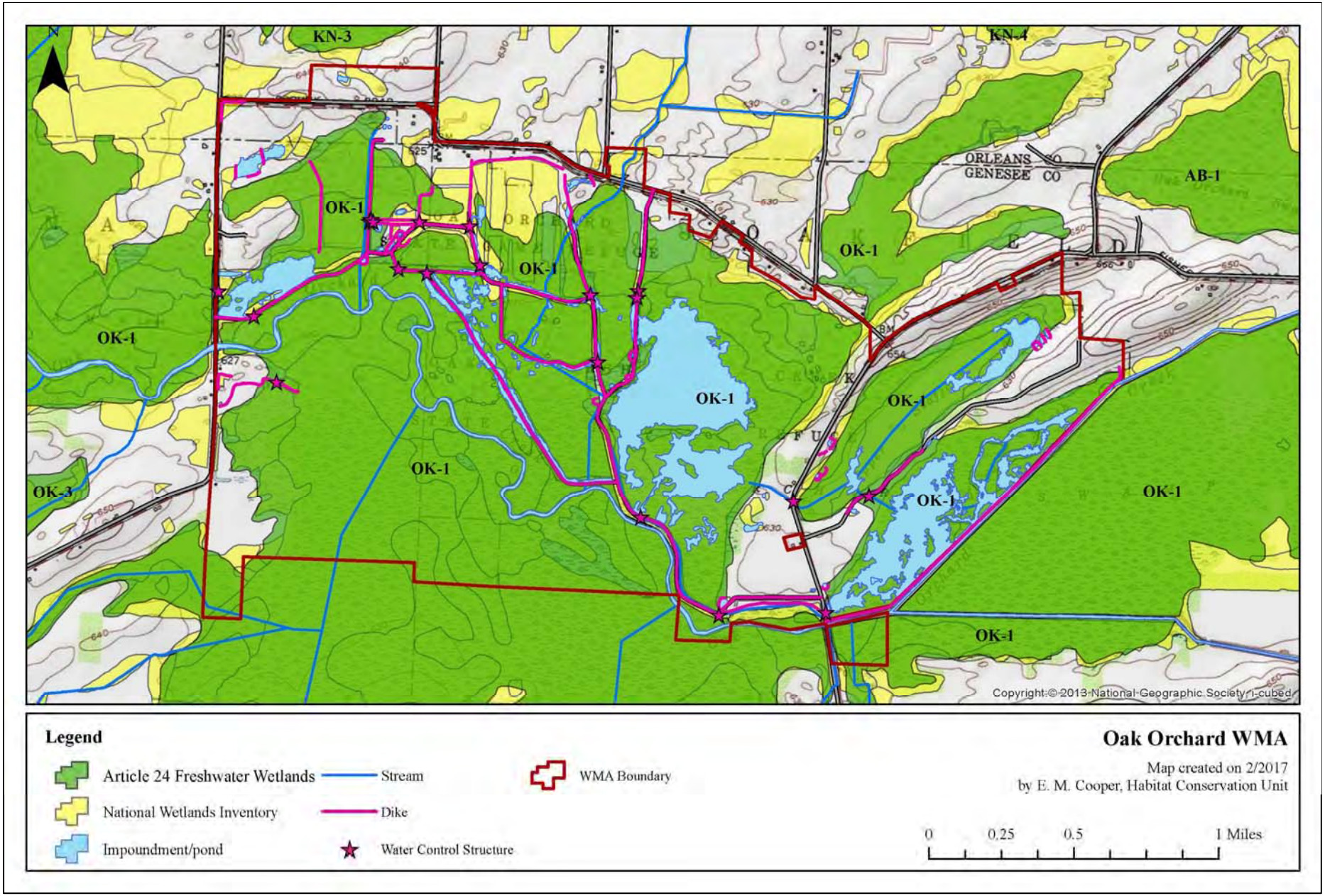


FIGURE 3. Wetlands, open water, and streams of Oak Orchard WMA. Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

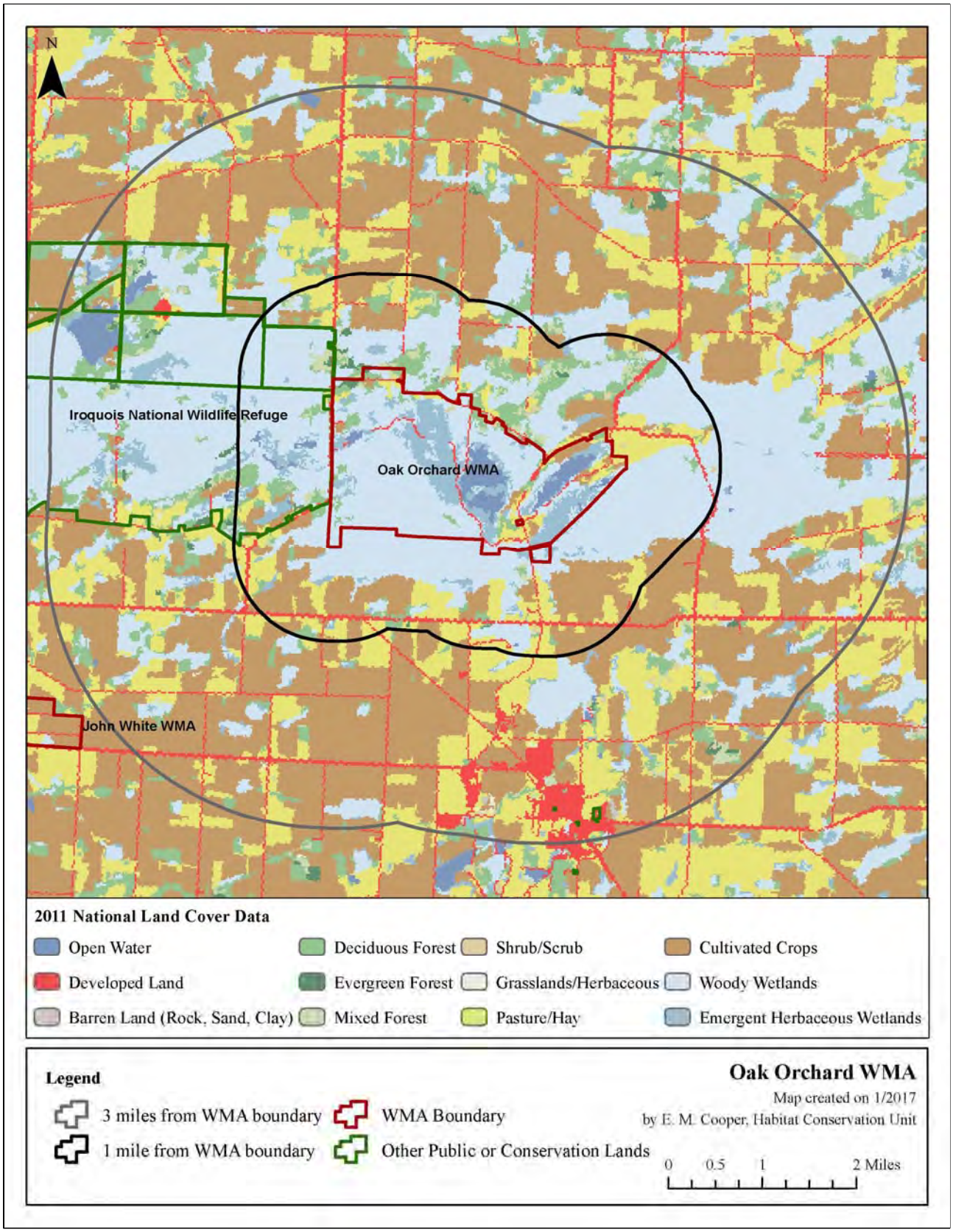


FIGURE 4. Land cover types and conservation lands in the landscape surrounding Oak Orchard WMA. Conservation lands are from the NY Protected Areas Database available online at http://www.nypad.org/. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used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

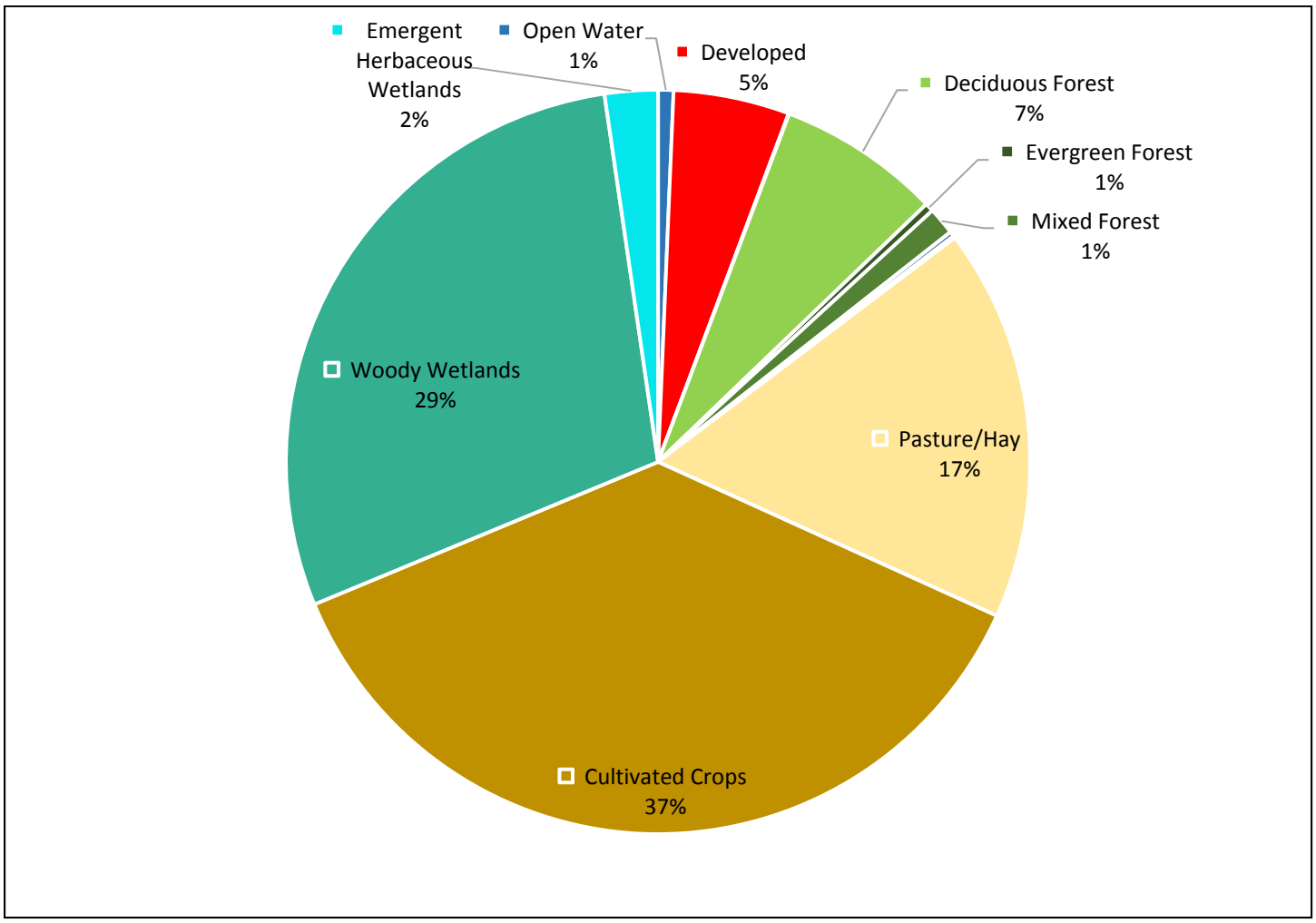
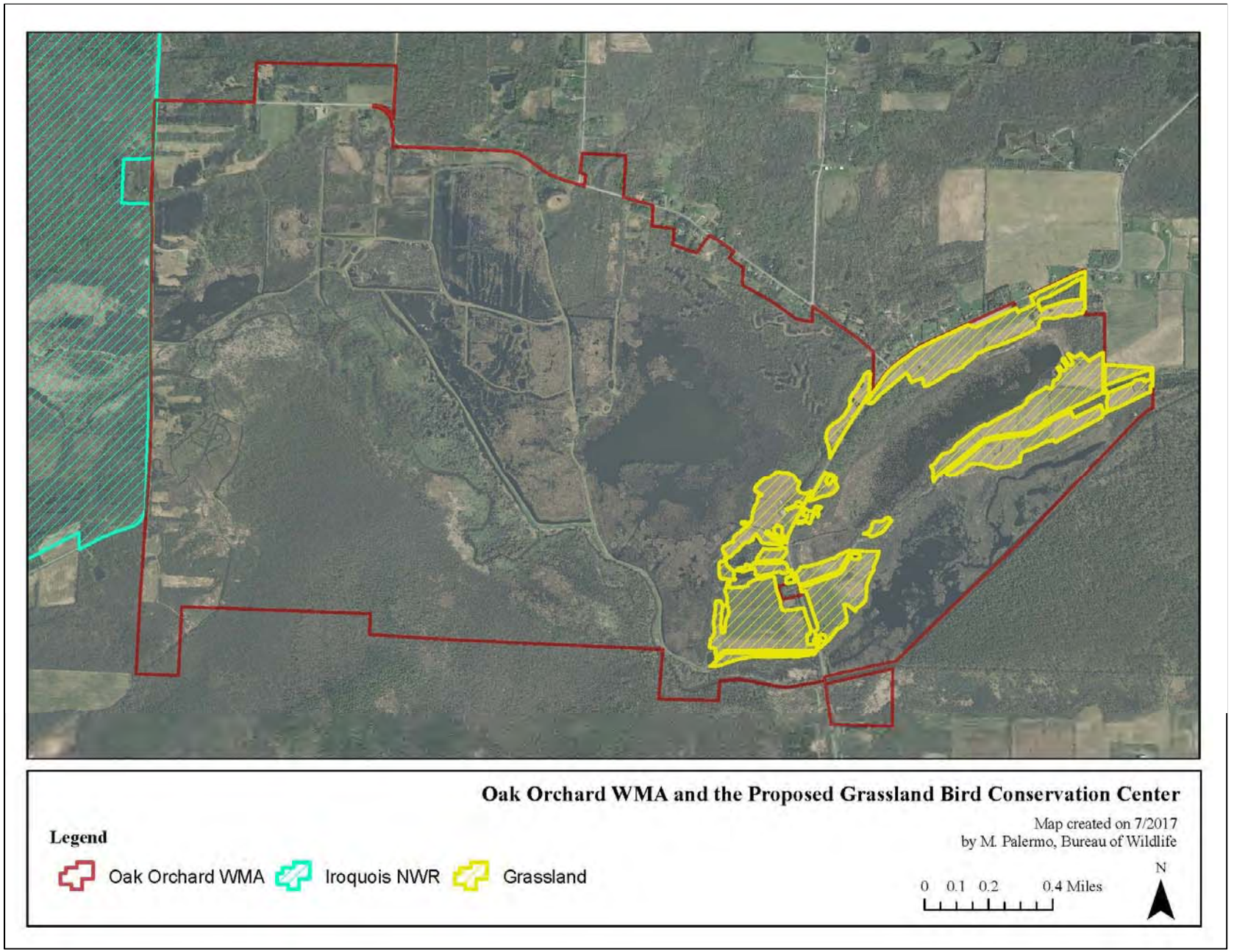


FIGURE 5. Percent cover of land cover types within three miles of Oak Orchard WMA.

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.



IGURE 6. Location of grasslands at Oak Orchard WMA that are likely to be included in the proposed Grassland Bird Conservation Center.

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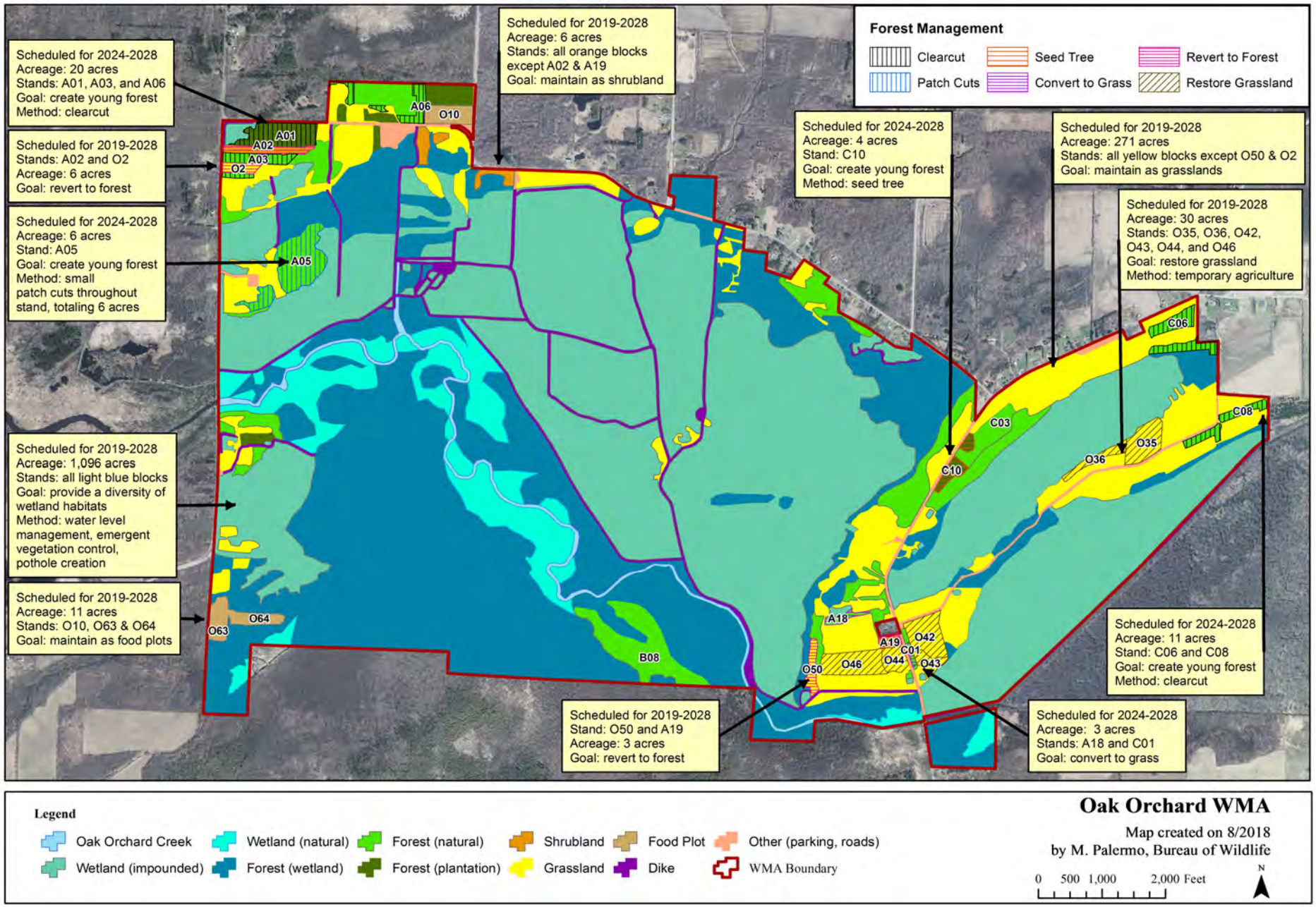

FIGURE 7. Habitat types and location(s) of proposed management on Oak Orchard WMA. Numbers indicate the stand number from habitat inventory.

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 Oak Orchard WMA include: American woodcock 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).[24] 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).[25]

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.

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

APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS

PRESCRIPTION FOR WILDLIFE MANAGEMENT AREA TIMBER HARVEST

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

Species composition:

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

Stand inventory or analysis date:

Regeneration data:

Natural Heritage Element Occurrence layer review:

SMZ layer review:

Retention data:

Soil types and drainage:

Interfering vegetation:

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

Technical guidance/stocking guide:

Treatment purpose:

Management Objective: Even aged or Uneven Aged

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

Clearcut acreage and configuration: (if applicable)

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

Retention considerations and adjustments:

Treatment descriptions:

Name and Title of Preparer:

Central Office Lands and Forests Staff **Date**

Regional Wildlife Manager **Date**

PRESCRIPTION NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX D: AMENDMENTS

Any substantive changes to the habitat management described in this plan will be amended to the plan annually or as needed. Such changes may include: land acquisition, unforeseen natural disturbance, or any other change that alters the need for or the scope, method, or timing of management.