Habitat Management Plan
for
Galen Wildlife Management Area
2023 - 2032


Photo: Mike Palermo

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

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SUMMARY

Galen Wildlife Management Area (WMA) is located in the Town of Galen, Wayne County, and consists of 763 acres. The WMA was purchased by New York State in 1980 as an effort to protect part of the larger marsh, locally known as Marengo Marsh. DEC management since acquisition has primarily focused on field management and access point development.

Most of the WMA is wetland (57%), primarily composed of forested wetland, with lesser amounts of shrub swamp, emergent marsh, and open water. The WMA borders approximately three miles of the Clyde River and includes approximately 151 acres of Creager Island.

Forest covers approximately 79% of the WMA, and 63% of this is forested wetland. Much of this forested wetland is floodplain forest that is seasonally inundated and influenced by water levels in the Clyde River and Erie Canal. Nearly all the forest stands here are an intermediate or mature age structure, but the present infestation of emerald ash border is expected to establish a component of young forest over the next few years.

A minor component of the WMA includes small stands of shrubland and grassland which provide valuable early-successional habitats. Agricultural lands, primarily crops, are also present and have been maintained in some fields since state acquisition.

The WMA is bisected by a portion of the abandoned Old West Shore Railroad grade, which provides valuable public access into the interior of the property.

Galen WMA is primarily managed to maintain the natural wetland habitats present and provide a variety of upland habitats scattered throughout. The WMA is situated between the villages of Clyde and Lyons and provides valuable wildlife-related recreation opportunities, such as hunting, fishing, trapping, and bird watching.

Habitat management goals for Galen WMA include:

- Maintaining the majority of forest cover in an intermediate or mature age-class to provide a diversity of forest habitats that benefit associated wildlife (69% of the WMA);
- Establishing a young forest component that benefits dependent wildlife species and regenerates a healthy future forest (10% of the WMA, 12% of total forested acres);
- Maintaining wetlands and streams to provide high-value habitat that benefits migratory and resident wildlife (11% of WMA);
- Managing agricultural lands to provide supplemental food for wildlife (6% of WMA);
- Maintaining grassland openings to provide herbaceous food and cover for associated wildlife (1% of WMA);
- Maintaining an early-successional shrubland component to provide dense upland cover and soft mast for associated wildlife (1%); and
- Maintaining access features (2% of WMA).

I. BACKGROUND AND INTRODUCTION

PURPOSE OF HABITAT MANAGEMENT PLANS

BACKGROUND

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

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

SCOPE AND INTENT

Primary purposes of this document:

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

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

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

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

Definitions are provided in Appendix A.

WMA Overview

Location

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

Total Area

763 acres

Habitat Inventory

A habitat inventory of the WMA was conducted in 2019 and will be updated every ten to fifteen years to document the existing acreage of each habitat type and to help determine the location and extent of future management actions.

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

Image 1: Location of Galen WMA

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

Habitat Type	Current Conditions (as of 2019)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Forest [a]	598	78%		526	69%
Young forest	3	1%		75	10%
Shrubland	5	1%		5	1%
Grassland	6	1%		7	1%
Agricultural land	50	6%		50	6%
Wetland (natural)	53	7%		53	7%
Wetland (impounded)	5	1%		5	1%
Roads, parking, other [b]	18	2%	3.5	17	2%
Streams / open water	25	3%	4.7	25	3%
Total Acres:	763	100%		763	

[a] Forest acreage includes all mature and intermediate age classes of natural forest, plantations, and forested wetlands. Young forest is reported separately. Definitions are provided in the Forest section of this plan.

[b] There are multiple cabin sites on the WMA that are planned to be demolished and restored to natural habitat. These total approximately 1 acre and are planned to be maintained as small grassland openings.

ECOLOGICAL RESOURCES

Wildlife Overview:

Wildlife species occurring on this WMA are primarily a mix of those associated with forested wetlands and general upland habitats. Common or notable species include:

- Small and big game (e.g., cottontail rabbit, gray squirrel, white-tailed deer, wild turkey)
- Furbearers (e.g., coyote, foxes, fisher, weasels, mink, opossum, raccoon, skunk)
- Small mammals (e.g., deer mouse, white-footed mouse, big brown bat, eastern red bat)
- Songbirds (e.g., American redstart, swamp sparrow, wood thrush, yellow warbler)
- Raptors (e.g., bald eagle, Cooper's hawk, red-tailed hawk, eastern screech owl)
- Waterfowl (e.g., Canada goose, hooded merganser, mallard, wood duck)
- Wading birds (e.g., great blue heron, green heron)
- Amphibians (e.g., American toad, wood frog, spring peeper, spotted salamander)
- Reptiles (e.g., common garter snake, northern water snake, painted turtle, snapping turtle)
- Fish (e.g., bullhead, bluegill, largemouth bass, northern pike, walleye)

Wildlife and Plant Species of Conservation Concern:

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

[1] The 2015 New York State Wildlife Action Plan is available online at https://www.dec.ny.gov/animals/7179.html.

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

Species Group	Species	Federal Status	NY Status	NY SGCN
Birds	American bittern		SC	x
	American kestrel			x
	American woodcock			x
	Bald eagle		T	x
	Black-billed cuckoo			x
	Blue-winged warbler			x
	Brown thrasher			HP
	Cerulean warbler		SC	x
	Cooper's hawk		SC	
	Horned lark		SC	HP
	Osprey		SC	
	Pied-billed grebe		T	x
	Prothonotary warbler			HP
	Red-headed woodpecker		SC	HP
	Ruffed grouse			x
	Rusty blackbird			HP
	Scarlet tanager			x
	Sharp-shinned hawk		SC	
	Vesper sparrow		SC	HP
	Wood thrush			x
Mammals	None known to occur			
Amphibians and reptiles	Eastern ribbonsnake			x
	Snapping turtle			x
	Western chorus frog			x
	Wood turtle		SC	HP
Fish	None known to occur			
Invertebrates	Lilliput (freshwater mussel)			x
	Rainbow (freshwater mussel)			HP
Plants	Big shellbark hickory		T	
	Kentucky coffee tree		E	

Significant Ecological Communities:

There are two significant natural communities located on Galen WMA as identified by the NY Natural Heritage Program. The state rank reflects the rarity within NY, ranging from S1, considered the rarest, to S5, considered stable; definitions are provided in Appendix A. The

following significant ecological communities occur on the WMA; community descriptions are from New York Natural Heritage Ecological Community Guides[2] (Figure 2):

- **Floodplain Forest** (S2S3) – a hardwood forest that occurs on mineral soils on low terraces of river floodplains and river deltas. These sites are characterized by their flood regime; low areas are annually flooded in spring and high areas are flooded irregularly.
- **Shrub Swamp** (S3S4) – an inland wetland dominated by tall shrubs that occurs along the shore of a lake or river; in a wet depression or valley not associated with lakes; or as a transition zone between marsh, fen, or bog and a swamp or upland community.

Additional information about ecological communities is available in the Galen WMA Biodiversity Inventory Final Report (1997) prepared by the NY Natural Heritage Program.

Soils and Topography:

Most of the soils on Galen WMA are of the following series:

- Wayland soils complex (37%)
- Ontario gravelly loam (14%)
- Teel silt loam (12%)
- Canandaigua silt loam (9%)
- Carlisle muck (7%)
- Hilton gravelly loam (5%)
- Palmyra gravelly loam (4%)
- Madrid gravelly fine sandy loam (3%)

Approximately 62% of the WMA contains soils that are considered somewhat poorly drained or very poorly drained, and 38% that are considered well-drained or moderately well-drained. Elevations of land range from 385 feet above sea level to 500 feet; however, most is at or below 400 feet. In general, the WMA is very flat, and the only areas with much slope are a few small hills on the east and south sides of the property (Figure 3). Even there, slopes are gentle, ranging from 3% to 8%, and only reach 15% to 30% in a small area at the southeast corner of the WMA.

Special Management Zones:

Special Management Zones (SMZs) are areas in and 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 570 acres of SMZs (75% of the WMA) are on Galen WMA, including:

- Three wetlands (LN-22, LN-29, and LN-30) regulated by Article 24 of the Environmental Conservation Law and 37 wetlands shown on the National Wetlands Inventory (NWI; Figure 3). State-regulated wetlands are protected by a buffer zone of 100 feet (regulated adjacent area).
- Approximately 4.7 miles of streams, composed of 1.7 miles of tributaries to the Clyde River and 3 miles of shoreline along the Clyde River (Figure 3). These are all classified as C and are not regulated by Article 15 of the Environmental Conservation Law; however, water quality standards will be adhered to. [3]

[2] Available online at https://guides.nynhp.org/communities/.
[3] Information about stream classification is available online at https://www.dec.ny.gov/permits/6042.html.

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.*[4] Some habitat management activities may either be prohibited or restricted in order to protect these features. Any deviations from these guidelines will be addressed in the individual stand prescriptions.

LANDSCAPE CONTEXT

The goals of this HMP have been developed with consideration of surrounding landscape features, habitat availability, and other conservation lands near Galen WMA (Figures 4 and 5).

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

- Cultivated crops (39%)
- Forest, combining deciduous, evergreen, and mixed (21%)
- Wetland, combining emergent and woody (20%)
- Pasture/hay and grassland (11%)
- Developed (7%)
- Open water (2%)
- Early-successional shrubland (<1%)

Two other conservation lands occur within 3 miles:

- Ducks Unlimited (184 acres) – fields, forested wetland, and emergent marsh. This property is proposed to be added to Galen WMA in the future.
- New York State Canal Corporation (approximately 1,000 acres) – Erie Canal and surrounding floodplain lands, primarily forested or other wetland.

Galen WMA is situated along the Clyde River, which is connected to the Erie Canal (approximately 1 mile away). This provides an aspect of water-based access and recreation connecting the WMA to a much larger resource. The WMA also includes part of and is connected to the larger Marengo Marsh, which is approximately 1,300 acres total.

Forest on the WMA is part of a concentration of relatively unfragmented forest (approximately 2,000 acres) that is uncommon in the surrounding landscape. Most of the landscape within three miles is a patchwork of agricultural fields and small woodlots; however, overall forest cover within 1 mile of the WMA is much greater. This forest concentration is largely associated with the Marengo Marsh wetlands and the floodplain along the Clyde River and Erie Canal.

Most of this forest cover is composed of a mature forest structure (poletimber or sawtimber) and less than 1% of the surrounding landscape is shrubland or young forest. Young forest habitat and several associated wildlife species have steeply declined in the northeast over recent decades due to maturing forests and a lack of natural and human-caused forest disturbances. An increase of young forest on the WMA is an important goal of this plan (see the Forest section below).

[4] Available online at https://www.dec.ny.gov/outdoor/104218.html.

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

DEC will continue active management of wildlife habitats on Galen 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.

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, typically 0-20 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 Galen 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. [5]

MANAGEMENT OBJECTIVES

- Increase young forest from 3 to 75 acres (12% of WMA forested acreage) to provide habitat for young forest-dependent species.
- Maintain most forest cover (526 acres) in an intermediate or mature age class to provide diverse forest habitats that benefit associated wildlife.
- Encourage the regeneration of desirable native tree and shrub species to replace ash-dominated stands that are declining.
- Reduce the spread and extent of non-native, invasive plants to improve forest diversity.

[5] Additional information about DEC's Young Forest Initiative and the Strategic Plan for Forest Management on WMAs is available online at https://www.dec.ny.gov/outdoor/104218.html.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

There are 601 acres of forest covering approximately 79% of Galen WMA (Figure 6). Approximately 63% of this forest cover is forested wetland (Photo 1) that is inundated at least part of the year. Table 3 provides a summary of forest types, including the most common tree species present in each.

Forest cover on the WMA is relatively contiguous, interrupted only by roads, small fields, and small wetlands. Dominant forest communities include floodplain forest, red maple hardwood swamp, and successional northern hardwoods. Floodplain forest on the WMA is part of a large occurrence (710 acres) tracked by the New York Natural Heritage Program that also includes adjacent private lands. Young forest is a very minor component of the WMA (5 acres) and originated from field abandonment.

Photo 1: Forested wetlands provide important habitat to associated wildlife, such as breeding salamanders and wood ducks.

Photo: Michael Palermo, DEC

Dominant tree species in forested wetlands on the WMA are silver maple, red maple (and their hybrid, Freeman's maple), green ash, and bitternut hickory. The shrub layer in these stands is mostly composed of spicebush and dogwood, with some American bladdernut and buttonbush. Upland forests on the WMA are dominated by white ash, shagbark hickory, black cherry, red and sugar maples, and tuliptree. Many of these upland stands contain invasive plants in their understory, and in some cases, they are dominant and degrading habitat values. Oaks (primarily bur oak and swamp white oak) are scattered throughout wetland and upland forests here and provide an important food resource. A couple mature northern hardwood stands have healthy and diverse understories, are relatively invasive-free, and should be maintained. Conifers are a minor component on the WMA, with white pine only being present in a couple stands.

Two tree species of conservation concern in New York, big shellbark hickory and Kentucky coffee tree, are present at Galen WMA. These species are often associated with floodplain forests and wetlands but can occur in upland areas. Review of mapped locations of these species, documentation of additional occurrences, and evaluation of health and regeneration are expected to take place over the length of this HMP.

Ash is a dominant or codominant species in several upland and wetland forest stands on the WMA (Photo 2). The widespread infestation of the invasive emerald ash borer (EAB) is causing extensive mortality of mature ash trees here and will significantly alter forest composition over the next few years.

This loss is expected to establish young forest where ash composes greater than 50% of a stand (approximately 75 acres). In stands where ash is less abundant, this should provide valuable canopy gaps that will allow space for complex understory structure to develop. There are biological control insects currently on the landscape that parasitize EAB; it is uncertain how effective they will be over time, but it is possible that ash regeneration after this wave of mortality may be able to persist. The abundance of woody debris that will be created will also benefit several wildlife species by increasing rotting ground cover and invertebrate food sources. In some stands there is concern that this disturbance could promote an increase of non-native, invasive plant species (e.g., common buckthorn) and control actions should be implemented to reduce their presence in the regenerating stand.

The diversity of forests on the WMA provides valuable habitat for a wide range of wildlife. The forested wetlands offer important breeding habitat for dependent species, such as spotted salamander and wood frogs. The abundance of mature red and silver maples near standing water provides plentiful cavities for wood ducks to nest (Photo 3). The large block of forest cover with minimal fragmentation on both the WMA and adjacent properties provides important habitat that certain species depend upon, such as wood thrush and scarlet tanager. Popular game species, such as white-tailed deer and wild turkey, commonly utilize upland forests and the edges near fields.

Photo 2: This poletimber stand is dominated by ash trees that are declining from emerald ash borer infestation. This disturbance is expected to regenerate valuable young forest habitat.

Photo: Michael Palermo, DEC

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

Forest Type	Acres (as of 2019)	Desired Acres	Overstory species
Natural forest (mature/intermediate)	222	188	Black cherry, red maple, sugar maple, white ash, hickory
Plantation	0	0	Currently not present on WMA
Forested wetland (mature/intermediate)	376	338	Red maple, silver maple, green ash, bitternut hickory, cottonwood
Young forest	3	37	Green and white ash, red maple, hickory
Young forest (forested wetland)	0	38	Currently not present on WMA
Total Forested Acres:	601	601	

Forest Management Target Species:
Target species for forest habitat management were designated as targets because they are species of greatest conservation need (SGCN) and/or popular game animals that have well-studied habitat requirements with established best management practices. These species were also selected because they can be considered umbrella species, meaning habitat management to maintain, enhance, or create their habitat will also benefit numerous other species that utilize similar habitats.

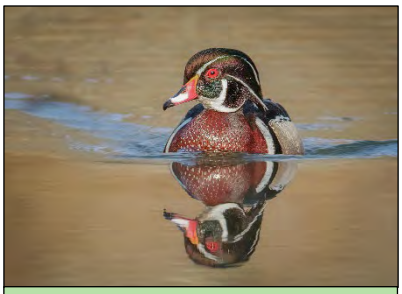

Photo 3: Forests here provide excellent wood duck habitat.

Photo: Art Kirsch

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

Habitat Type	Target Species	Beneficial Habitat Structure
Young Forest	American woodcock	*Nesting*: Stands of an acre or more with woody stem density of at least 6,000 stems per acre, on mostly dry soil.
		Foraging: Moist, rich soils with dense cover and abundant invertebrates.
		Singing ground: Open areas, such as fields or recent clearcuts near nesting and foraging habitat.
Mature forest	Wood duck	*Nesting*: snags or live trees with cavities near accessible water.
		Brood-rearing: waterbody with abundant aquatic invertebrates.
	Wood thrush	*Nesting*: hardwood forest of intermediate to old age with tall shrub and sapling layer to conceal nest.
		Foraging: thick leaf litter on open forest floor for invertebrates, and fruit-bearing trees and shrubs for migration.

MANAGEMENT HISTORY

DEC has performed no forest management here, but some stands were selectively logged prior to state acquisition.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

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

- **Management planned for 2023-2027** (Table 5, Figure 6):
  - Control invasive plants and cut vines off healthy trees in Stands A-29, A-30, A-31 and A-34 (37 acres) to prevent interference and promote forest regeneration.
  - Control colonizing invasive plants in Stands A-17 and A-18 (35 acres) to maintain healthy understories.
  - Perform crop tree release in Stand A-25 (2 acres) to improve growth of desirable trees.
- **Ongoing management throughout 2023-2032** (Figure 6):
  - Monitor for non-native, invasive vegetation and pests throughout all forest stands and as needed control mechanically, biologically, and/or with pesticide.
    - A 0.25-acre patch of knotweed along Heit Road is a priority for control.

        - Swallow-wort is widespread on the old railbed trail and effective control would require significant effort; limiting further spread is the priority.
    - Monitor regeneration of ash-dominated stands and plant native trees and shrubs as needed if natural regeneration is lacking.
    - Survey distribution and health of big shellbark hickory and Kentucky coffee tree occurrences and promote their persistence, particularly in Stand A-4 (12 acres).

Table 5. Forest management schedule for the first five-year period of this HMP (2023-2027).

Stand	Acres	Size Class	Forest Type		Treatment Type
			Current	Future	
A-4	12	Medium Sawtimber 19”-24” DBH	Floodplain Forest	Floodplain Forest	Promote shellbark hickory and Kentucky coffee tree
A-17	22	Small Sawtimber 12”-18” DBH	Northern Hardwood	Northern Hardwood	Control invasives
A-18	13	Small Sawtimber 12”-18” DBH	Northern Hardwood	Northern Hardwood	Control invasives
A-25	2	Seedling/Sapling <5” DBH	Young Forest	Successional Hardwood	Crop tree release
A-29	2	Pole Timber 6”-11” DBH	Ash-Elm	Young Forest	Control invasives, cut vines
A-30	3	Small Sawtimber 12”-18” DBH	Walnut-Oak-Ash	Young Forest	Control invasives, cut vines
A-31	19	Small Sawtimber 12”-18” DBH	Ash	Young Forest	Control invasives, cut vines
A-34	13	Small Sawtimber 12”-18” DBH	Ash-Cherry	Young Forest	Control invasives, cut vines

All young forest planned to establish on the WMA during the time frame of this HMP is due to mortality of ash-dominated stands (greater than 50% ash) infested with the emerald ash borer (75 acres). Forested wetlands dominated by ash (38 acres) generally have healthy understories and should naturally regenerate a young forest of native trees and shrubs over time; however, they should be monitored and control actions should occur if invasive plants begin to interfere. Upland forest stands dominated by ash (37 acres) currently contain a high abundance of invasive shrubs that will likely increase following ash death; therefore, specific control actions are planned to promote the establishment of a young forest composed of native trees and shrubs.

The existing three acres of young forest is expected to become an intermediate forest stand (poletimber) by 2032. Total young forest expected to establish during the timeframe of this HMP would be approximately 12% of overall forest cover. This increase should significantly benefit wildlife species dependent on this habitat.

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

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

- **Management planned for 2023-2027 (Table 5, Figure 6):**
  - **Stand A-4 (12 acres):** This is a floodplain forest dominated by ash, red and silver maples, and bitternut hickory. Occurrences of big shellbark hickory (state threatened) and Kentucky coffee tree (state endangered) are present. As the ash component declines, select shellbark and coffee tree seedlings should be protected (if deer browse is excessive) so they can reach the canopy. Mature shellbark and coffee trees should have all vines cut off and could have some competing trees girdled or felled. Some seed planting may also occur.
  - **Stand A-17 and A-18 (35 acres):** These two stands are the only examples of healthy, mature northern hardwood forest on the WMA. These stands are relatively free of invasive plants but have some colonization occurring, primarily barberry and buckthorn. Minor invasive species and vine control should occur to maintain the quality of these stands.
  - **Stand A-25 (2 acres):** This young forest stand is composed of a variety of hardwood species, including ash. A crop tree release treatment is planned to clear around select, desirable (non-ash) trees to reduce competition, improve growth, and ensure they are recruited into the future canopy.
  - **Stands A-29, A-30, A-31, A-34 (37 acres):** These stands are dominated by declining green and white ash, ranging from 50% to 85% dominance in some sections. Other species are present in lower abundance, including elm, cherry, maple, hickory, and oak. Wild grape and poison ivy are stressing many of the overstory trees. In most areas, the understory contains invasive shrubs (especially common buckthorn) that will likely increase after the ash canopy dies and interfere with the establishment of native trees and shrubs. Some desirable tree and shrub regeneration is present in sparse patches. Planned management will control these invasive shrubs to reduce competition and provide space for desirable regeneration. Vines will be cut off healthy trees and these will act as seed trees. Salvaging the ash timber is not a viable option due to their low quality, the rapidness of decline, difficult access, nearby sensitive resources, and the abundance of invasive plants. Woody debris is lacking in these stands since they are associated with old homesteads and were previously cleared or heavily logged; ash decline will provide a valuable addition of rotting wood habitat.

BEST MANAGEMENT PRACTICES

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

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

Resource	**Guidance Document** [6]
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*

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

Wildlife Considerations:

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

- *Bald eagle*. Eagles are known to nest near Galen WMA. Management on the WMA will avoid disturbing any nesting should it occur within or adjacent to a stand with proposed actions. This may include delaying nearby actions until after the breeding season.
- *Great blue heron*. Although not an imperiled species, great blue heron rookeries are of importance and sensitivity. A rookery exists within Marengo Marsh and management actions will avoid disturbing any nests on or near the WMA.
- *Indiana, northern long-eared, and tri-colored bats*. There are no known occurrences of these species here; however, surveys will occur prior to any tree cutting activities to detect presence or probable absence, or cutting will take place in winter to avoid impacts.
- *Vernal pool salamanders*. These salamanders breed in vernal pools and forested swamps and then spend most of their adult lives in the surrounding upland forest. No vernal pools or forested wetlands on the WMA are planned to be managed.

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

Forest Health Considerations:

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

Infestations of non-native insects such as emerald ash borer (EAB, Photo 4), spongy moth, and pear thrips are of present concern and bear persistent monitoring. Spongy moth (formerly gypsy moth) and pear thrips densities fluctuate and can reach outbreak levels where complete defoliation can occur. Spongy moth most commonly attacks oak and aspen while pear thrips favors sugar maple. EAB has been present on the WMA for several years and is causing significant decline and mortality of the ash component. There are no effective control measures to protect ash forests at the moment, so planned actions are instead focused on ensuring native

Photo 4: Emerald ash borer is causing severe decline of ash trees on this WMA.

Photo: David Cappaert, Bugwood.org

trees replace the lost ash, rather than invasive plants. Biological control insects targeting EAB have been released throughout New York and are becoming established in many areas; these may provide enough control to allow ash regeneration to survive to maturity and become part of the future forest.

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

Oak wilt is a fungal disease that can infect and kill oak trees. Although rare in New York, the disease has been found several times since 2016 in neighboring Ontario County. Oak wilt primarily spreads in two ways: 1) through root connections with adjacent oak trees, and 2) from *Nitidulid* beetles that spread spores to open wounds on other oak trees. Current recommendations for treating affected areas include removing infected trees and severing root connections to reduce the chance of spread. Oaks are not abundant on the WMA but are important where present; any suspicious oak decline should be investigated.

Invasive plants that are known to be in or near the forested areas of the WMA include: autumn olive, barberry, common buckthorn, common reed, creeping jenny, garlic mustard, honeysuckle, knotweed, multiflora rose, privet, swallow-wort, and tree of heaven.

Pre- and Post-treatment Considerations:

Regeneration of a forest stand requires suitable conditions to ensure that desired species will succeed. Non-native invasive vegetation is present in the understory of some stands here and have the potential to interfere with forest regeneration. Invasives are proposed to be treated in several stands where the ash-canopy is declining. Post-treatment monitoring should occur to determine if follow-up treatment is needed and to determine if natural regeneration is successful or if planting is needed.

Conifers are a very minor component on the WMA, and only includes a small amount of white pine in a couple stands. Planting patches of conifers in Stands A-29, 30, 31, and 34 should be considered once invasive control actions are complete. Species chosen should be those less favored for deer browse.

Deer herbivory is an issue in some stands on Galen WMA. The slash left behind after cut-stump treatment of invasive shrubs combined with the debris tangle that will result from dying and falling ash should provide some protection from browse for native tree and shrub establishment. Efforts to promote deer hunting on the WMA to manage the local deer herd at desired levels will continue.

MANAGEMENT EVALUATION

Stands expected to establish young forest following ash mortality will be monitored over the next decade to determine if native trees and shrubs are establishing naturally. If necessary, invasive plant control treatments may be repeated or native trees and shrubs may be planted.

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 5 acres of shrubland habitat to provide dense cover and abundant soft mast for associated wildlife.
- Promote dominance of native shrub species to enhance habitat quality.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

There are 5 acres of shrubland on Galen WMA (Figure 6). These stands originated from separate sections of a large field being abandoned and naturally succeeding to a shrub-dominated plant community. These provide an important transition area between forest and field habitat.

Native shrubs found in these stands include dogwood, hawthorn, sumac, and viburnum, which provide valuable dense cover and soft-mast for wildlife (Photo 5). Non-native invasive shrub species, such as multiflora rose, honeysuckle, and common buckthorn are established in most of these stands, in some areas are dense, and should be controlled.

Photo 5: Dogwood shrubs are abundant in shrublands on the WMA and provide late summer/fall fruits that are important for migrating songbirds.

Photo: Denise Ellsworth, Ohio State University, Bugwood.org

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 highly beneficial to pollinator species[7], and fall fruits are especially important to migrating songbirds.

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

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

habitat for similar species, both are needed to provide for the full range of disturbance-dependent wildlife species.

Shrub swamp (also known as scrub-shrub wetlands) also exists on the WMA (approximately 40 acres) and are described in the Wetland section of this plan. These shrub swamps provide valuable early-successional habitat that also benefits several wildlife species that inhabit upland shrublands and young forests.

Table 7. Target species for shrubland management on Galen WMA.

Target Species	Beneficial Habitat Structure
American woodcock	*Nesting*: Stands of an acre or more with woody stem density of at least 6,000 stems per acre, on mostly dry soil.
	Foraging: Moist, rich soils with dense overhead cover and abundant earthworms.
	Singing ground: open areas, such as fields or recent clearcuts near nesting and foraging habitat.
Eastern cottontail rabbit	*Breeding and escape cover*: Dense, young woody vegetation near food sources. Thorny shrubs, such as raspberry and blackberry, provide the best cover. Brush piles are important in winter when herbaceous cover has died back.
	Foraging: During the growing season, grasses and forbs are most important. During the winter, woody plant material is most important. Cottontail generally do not feed more than 300 feet from woody cover.

These species were selected as targets because they are either SGCN (woodcock) or popular game species (both woodcock and cottontail). Much of their habitat requirements overlap and they both use shrublands for breeding and foraging. Managing shrublands on the WMA targeting these species is expected to benefit numerous other species as well, including other SGCN, such as brown thrasher and black-billed cuckoo, and popular game species, including white-tailed deer and wild turkey.

MANAGEMENT HISTORY

No active management of shrublands has occurred on the WMA. All existing shrublands originated from field abandonment starting around 2008.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2023-2032** (Figure 6):
    - Perform maintenance actions as needed throughout all acres of shrubland.
        - Brush cutting using a rotary mower or forestry cutter should be utilized to stimulate dense shrub regrowth and to maintain an interspersion of openings and travel corridors.

- Trees that would eventually dominate and shade out shrubs may be cut; stumps should be removed or cut low to facilitate future maintenance.
- When and where feasible prescribed fire may be utilized.

- Throughout all shrubland stands, promote the dominance of native shrub species.
  - Invasive shrub control is the primary action planned for this objective since they are already dominant in several locations, especially buckthorn. Invasives will be controlled both mechanically and with herbicide.
  - Slash from invasive shrub control should be utilized to create brushpiles.
  - Native shrubs may be planted as needed.

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

Stands where invasive plants are controlled will be monitored over time to determine the effectiveness of the treatment and needs for follow-up actions.

GRASSLAND

Grasslands are open areas dominated by grasses and forbs, with less than 25% woody vegetation. Ideally, the forb component should not exceed 25% by area. Grasslands may contain shrubs and other woody vegetation, but not to the point beyond which maintenance would require significant brush cutting (i.e., not suitable for brush-hogging). Grasslands may include areas where hay is harvested by late season mowing once per year.

MANAGEMENT OBJECTIVES

- Increase grassland to 7 acres.
- Maintain all grasslands to prevent reversion to shrubland and forest.
- Encourage a diversity of grasses and forbs beneficial to target species.
- Identify and control invasive plant species to prevent their dominance in fields.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

There are 6 acres of grassland habitat on Galen WMA (Figure 6, Photo 6). This is composed of three small fields - two that are 0.5 acres each and one that is 5 acres.

Some of these fields have been planted with various grasses (i.e., warm and cool season) and forbs (e.g., legumes and wildflowers) that are beneficial to target wildlife species. For example, warm season grasses, such as switchgrass, often grow in bunches, which provide bare ground between plants that allows for wildlife movement and foraging. Many bunch grass species also retain their upright form through winter, providing valuable cover when most vegetation is

matted down by heavy snow. Cool-season grasses, such as timothy, develop rapidly in spring, providing a flush of valuable cover with high forage value.

Although these grasslands only compose 1% of the WMA, they add valuable diversity to the forested landscape. Numerous wildlife species that typically inhabit forest use these grasslands at various times of year, and for many this field habitat is an important component of their life history. For example, the abundant insects in these fields provide an important protein source for wild turkey brood rearing, and the dense cover of tall grass provides valuable hiding cover for fawns. These fields are also important sites for woodcock singing displays.

Photo 6: Fields on the WMA are adjacent to forest and benefit forest wildlife with abundant food (forage, seeds, insects) and dense herbaceous cover.

Photo: Michael Palermo, DEC

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

Table 8. Target species for grassland management on Galen WMA.

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

MANAGEMENT HISTORY

Grasslands present on the WMA were historically used for agriculture and have been managed as grass since state acquisition through planting and mowing. Restoration work to improve the quality of fields overgrown with woody plants has also occurred.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2023-2032** (Figure 6):
    - Increase grassland to 7 acres.
        - Convert several old cabin sites into small grassland openings once structures have been removed (totals approximately 1 acre).
    - Throughout all grassland stands, routinely perform maintenance actions.
        - Mow fields every 1-3 years to prevent establishment of woody vegetation.
            - Mowing fields heavily invaded by woody plants may be most effective if conducted in early spring and again before senescence in fall.
        - As needed: lime, fertilize, disk, and/or reseed grasslands.
        - Control invasive vegetation mechanically, biologically, and/or with herbicide.

BEST MANAGEMENT PRACTICES

The following sub-sections provide guidelines for grassland habitat management on all WMAs in NY. For more detailed information and recommendations see *A Plan for Conserving Grassland Birds in New York*.[8] 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 which species are present.
- Increase field size by hedgerow removal, removing trees, etc. to benefit species that require large open fields.
- Control invasive plant species (common reed, glossy buckthorn, pale and black swallowwort, Canada thistle, etc.) to improve habitat quality.
- When developing grassland planting or habitat restoration projects, consider a variety of factors including the targeted grassland bird species, pollinators, seed mix (warm versus cool season grasses, forbs, wildflower mixes, grass height and density), timing of planting, existing site conditions, and vegetation removal techniques (including herbicide and intensive disking).
- 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

[8] 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.

- Fields over 25 acres (including all contiguous fields) and fields of any size with a history of listed (federally listed and/or state E/T or SC) grassland bird species within the last 10 years:
    - Avoid mowing or conducting other management between April 23 and August 15, unless the field(s)/area(s) targeted for management are first assessed or surveyed to confirm there is no active nesting by E/T/SC grassland birds and the proposed management will provide long-term benefits to the habitat/wildlife (such as invasive species management). In some cases, if nesting locations can be avoided, such as using spot treatment for invasive species, work can be done as long as any negative impacts to the species of concern are eliminated.
- Fields under 25 acres (including all contiguous fields) with no history of listed species:
    - Fields can be managed/mowed between April 23 and August 15 if necessary to accomplish other goals and priorities that benefit other species that use the habitat. If early management is proposed, then the habitat requirements and nesting periods of other species should be considered (e.g., nesting waterfowl, American bittern, reptiles, and amphibians).
- Wintering Restrictions: Avoid mowing and other management from November 1 to March 1 within fields over 25 acres (including all contiguous fields) and fields with a history of listed wintering raptors (regardless of field size). If management to improve habitat is planned during this time, conduct pre-treatment winter raptor surveys using established protocols to confirm there is no use by listed wintering raptors (short-eared owl and northern harrier). Other activities that cause excessive disturbance such as frequent high-speed snowmobile, ATV, motorized vehicle operation, or other loud noises should be avoided from November 1 to March 1, inclusive, for the protection of wintering raptors.

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). In some cases, spot/wander mowing can be done to leave cover while targeting problem areas.
- 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 at Galen WMA is informal and data are often derived opportunistically, and will be continued.

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

- Manage 50 acres as crops to provide agricultural habitat and supplemental food for associated wildlife, such as white-tailed deer, wild turkey, and migrating waterfowl.

DESCRIPTION OF EXISTING AGRICULTURAL LANDS AND TARGET SPECIES

There are currently 50 acres of agricultural lands on Galen WMA (Figure 6). This consists of four fields that are periodically contracted for crop cultivation. These fields are all located along River Road on the northeast side of the WMA.

Crops are generally rotated each year and typically include types that are beneficial for wildlife, such as corn, hay, or soybeans. When crops are grown on the WMA, conditions of the contract require at least 10% of the crop remain standing after harvests (Photo 7). Likewise, during harvest a portion of the crop is left on-site (waste grain) due to an inefficiency in harvest machinery.

Photo 7: Crops grown on WMAs provide supplemental food for wildlife and a valuable recreation opportunity.

Photo: Michael Palermo, DEC

The presence of crops on the WMA before harvest, and the resources that remain after harvest provide high-quality food for numerous wildlife species, especially white-tailed deer, wild turkey, and migrating waterfowl. These fields may occasionally be left fallow between contracts but are planted to a cover crop that conserves soil and provides herbaceous cover and forage that is also beneficial to wildlife.

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.

Table 9. Target species for agricultural land management on Galen WMA.

Target Group	Example Species	Beneficial Habitat Structure
Migrating waterfowl	Canada and snow geese	Residual crops (e.g., corn, grain) persisting after harvest with stubble present for cover.
Upland game	White-tailed deer, and wild turkey	Crops that provide a reliable, abundant food and cover resource before harvest. After harvesting, residual food that persists through winter.

MANAGEMENT HISTORY

Agricultural activities have periodically occurred on the WMA since DEC acquisition. This has slowly declined from approximately 70 acres in the early 1980s to the current amount of 50 acres

(some fields were converted to grasslands and some field sections were allowed to revert to shrubland or young forest). The most recent contract for crop planting began in 2021.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2023-2032** (Figure 6):
    - Manage approximately 50 acres as crops to provide agricultural habitat.
        - Rebid or renew contracts as they expire. The current contract could remain active through 2025.
        - Specific fields and total acreage included in a future contract will be determined at the expiration of the existing contract. This will be influenced by habitat conditions at that time and potential additions to the WMA that may be completed by then. Some current crop fields may be restored to grassland while new fields could be rotated into agriculture.

BEST MANAGEMENT PRACTICES

Agricultural activities involve mowing, tilling, and the use of pesticides, which have potential to impact wildlife and the environment, therefore guidelines are provided within the contract to minimize impacts. For Galen WMA this includes soil conservation practices, buffers between cropland and wetlands, review of planned pesticide use, no fall plowing without a winter cover crop, and harvest date restrictions based on crop type and field size. Current DEC regulations prohibit the use of Glyphosate herbicides for agricultural purposes on state land.

MANAGEMENT EVALUATION

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

WETLANDS (NATURAL AND IMPOUNDED)

Approximately 57% of the WMA is wetland habitat (434 acres); places where the soil or substrate is periodically saturated or covered by water and the vegetative community is predominantly composed of hydrophytes. Eighty-seven percent of these wetlands (376 acres) are forested wetlands, which were discussed in the Forest section of this HMP.

The wetland acreage discussed in this Wetlands section includes emergent marsh and scrub-shrub wetlands. For the purposes of this HMP, these wetlands have been categorized as either natural or impounded (definitions below).

Natural wetland: includes areas where the soil or substrate is periodically saturated or covered by water, the vegetative community is predominantly composed of hydrophytes, and hydrologic processes are not greatly altered by human construction.
Impounded wetland: are areas similar to natural wetlands, but where water is held back by a berm, road, or other human-made structure.

MANAGEMENT OBJECTIVES

- Maintain 58 acres of non-forested wetland that benefits target species.
- Identify and control invasive plant species to maintain and enhance biodiversity.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

There are 53 acres of natural wetlands and 5 acres of impounded wetlands on Galen WMA (Figures 3 and 6). This consists of approximately 40 acres of shrub swamp and 18 acres of emergent marsh.

Approximately 13 acres of shrub swamp on the WMA occurs in multiple small patches scattered throughout forested wetland stands, and are generally dominated by buttonbush, winterberry, and northern bayberry (Photo 8). Approximately 9 acres of this is denoted by the New York Natural Heritage Program as a high-quality occurrence.

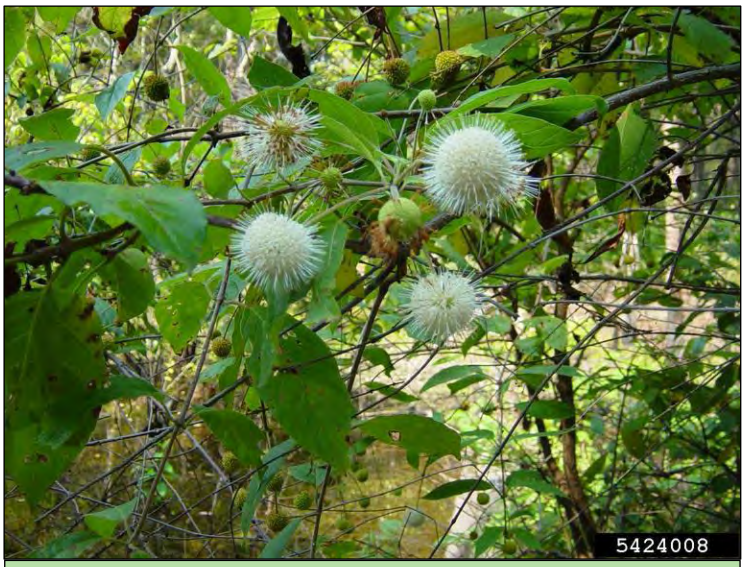

Photo 8: Buttonbush is dominant in many shrub swamps here and provides low, dense cover important to many wildlife species.

Photo: Franklin Bonner, USFS, Bugwood.org

A large concentration of shrub swamp (approximately 27 acres) is also present on the south side of the WMA, southeast of the old railroad bed. This section contains scattered wetland shrubs and stunted trees interspersed among dense emergent vegetation (e.g., cattails).

Emergent marsh on the WMA is generally composed of dense cattail (Photo 9) with some scattered woody plants or open water pockets. The only impounded wetland on the WMA contains emergent marsh, has a water control structure, and is located south of River Road and west of the old railroad.

Photo 9: On the south end of the WMA is an expanse of emergent marsh and shrub swamp covering approximately34 acres total.

Photo: Michael Palermo, DEC

Although non-forested wetlands only compose approximately 8% of the WMA, they support a wide variety of wildlife species. A heron rookery (grouping of multiple nests) occurs in mature trees in and around the large shrub swamp southeast of the old railroad. These patches of shrub

swamp are also important to multiple species of wildlife that depend upon young forest, such as American woodcock and wood turtle. Numerous insects (e.g., mosquitos, dragonflies, mayflies) are present in an around these wetlands (having aquatic larva that emerge as flying adults) and are an important food source to many wildlife species, including bats and songbirds. Wood duck and hooded mergansers leave their nest cavities and lead their young to standing water in these wetlands for rearing. An abundance of songbirds are present, such as red-winged blackbird and swamp sparrow, and limited numbers of marshbirds, such as Virginia rail and common gallinule, are occasionally present. Common frog, toad, and turtle species are present in abundance, and beaver, mink, and muskrat also occur.

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

Target Group	Species	Beneficial Habitat Structure
Wading birds	Great blue heron	Undisturbed nesting sites and pockets of open water for foraging.
Furbearers	Beaver, mink, muskrat	A diversity of wetland types that support preferred foods: beaver (woody plant material), muskrat (cattails), mink (small mammals).

MANAGEMENT HISTORY

Wetlands on the WMA have not received much direct management since state acquisition. The only impounded wetland was established from the construction of River Road and is not actively managed. Viewing structures were developed where the old railroad trail passes through the large marsh / shrub swamp area at the south end of the WMA. Some invasive plant control has occurred, primarily through the release of biocontrol insects to reduce the density of purple loosestrife.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2023-2032** (Figure 6):
    - Monitor for invasive vegetation (e.g., common reed, flowering rush, yellow iris) and as needed control biologically, mechanically, and/or with herbicide.
    - Consider additional wetland projects that will benefit wetland-dependent species as opportunities and funding arise.

BEST MANAGEMENT PRACTICES

Management activities within wetlands will take into consideration the timing of wildlife breeding seasons and when practicable these periods of time will be avoided. Wetland management will follow guidelines established in the General Permit GP-0-20-005: 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 Galen WMA is informal and data are often derived opportunistically, and will be continued.

STREAMS AND OPEN WATER

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

MANAGEMENT OBJECTIVES

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

DESCRIPTION OF EXISTING OPEN WATER HABITAT AND TARGET SPECIES

Approximately 4.7 miles of streams occur on Galen WMA (Figures 3 and 6), composed of three intermittent streams that cross through wetlands (Photo 10) and approximately 3 miles of the Clyde River that borders the WMA. Portions of the Clyde River on the WMA amount to approximately 14 acres. The WMA also includes part of a small bay just south of the river (approximately 11 acres of the bay are on the WMA).

Clyde River is slow moving, having a low gradient of elevation change along its path. This stretch of river is connected to the Erie Canal, both upstream and downstream, and water levels are influenced by those managed within the canal.

Photo 10: Intermittent streams on the WMA are small and mostly flow through forested wetlands.

Photo: Michael Palermo, DEC

These waters on the WMA contain a diverse warm-water fish community, including most common species (e.g., brown bullhead, bluegill, largemouth and smallmouth bass, northern pike, sunfish, and walleye). Fisheries management within these waters is beyond the scope of this HMP.

Bald eagles and osprey both utilize this fish resource as a food source. Similarly, both mink and river otter forage for fish in streams and rivers here.

Recent surveys for freshwater mussels have occurred in the Erie Canal and it is very likely that the Clyde River would host a similar suite of species. Species found include eastern elliptio, fat mucket, fragile papershell, giant floater, lilliput, and rainbow. Some or all of these species may be present on

the WMA and continuing to follow best management practices that protect water quality should benefit them.

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

Target Group	Example Species	Beneficial Habitat Structure
Warmwater fish	Bluegill, bullhead, bass, pike, walleye	Clean, undegraded water resources with native submerged aquatic vegetation and cover objects.
Freshwater mussels	Eastern elliptio, fat mucket, giant floater, lilliput	Unpolluted, unfragmented waterways with undisturbed substrate and low rates of sedimentation.

MANAGEMENT HISTORY

The development of the Erie Canal greatly impacted aquatic habitats present within the Clyde River. General management of the canal and associated water levels has influenced the section of the Clyde River on the WMA over time and will continue to for the foreseeable future. This management is the responsibility of the New York State Canals Corporation. There has been no management of streams on the WMA by DEC and management of other habitats near streams has followed best management practices to prevent erosion and sedimentation.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2023-2032** (Figure 6):
    - Maintain the natural condition and quality of streams and open water on the WMA.
        - All habitat management activities on the WMA will adhere to the Environmental Conservation Law and follow best management practices to reduce the transport of sediment and nutrients into waters on and near the WMA.
    - Monitor for invasive vegetation and control mechanically and/or with herbicide (e.g., water chestnut, Eurasian milfoil, European frogbit).
        - The use of biological control options should be considered and utilized if species become approved and obtainable.

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) and applicable federal rules and regulations. Guidelines for special management zones will be adhered to.

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.

HABITAT MANAGEMENT SUMMARY

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

Table 12. Summary of habitat management actions recommended for Galen WMA, 2023-2032 (Also see Figure 6).

Habitat	Management Action	Acres	Timeframe
Forest	Control invasive plants in Stands A-29, A-30, A-31, and A-34 to establish regeneration	37	2023-2027
Forest	Control invasive plants in Stands A-17 and A-18 to maintain healthy understory condition	35	2023-2027
Forest	Crop tree release Stand A-25	2	2023-2027
Forest	Promote persistence of big shellbark hickory and Kentucky coffee tree	12	2023-2032
Forest	Monitor and control invasive species in all forest stands	≤ 601	2023-2032, ongoing
Shrubland	Maintain all shrubland stands by cutting trees and brush cutting	≤ 5	2023-2032
Shrubland	Monitor and control invasive species	≤ 5	2023-2032, ongoing
Grassland	Convert 1 acre of old cabin sites to grassland	1	2023-2032
Grassland	Maintain grassland acreage with mowing	≤ 7	Annual, biennial, or triennial
Grassland	Improve grassland quality (e.g., lime, fertilize, disk, and/or reseed)	≤ 7	2023-2032, as needed
Grassland	Monitor and control invasive species	≤ 7	2023-2032, ongoing
Agricultural land	Rebid or renew contracts with local farmers	≤ 50	2023-2032, as needed
Wetland & open water	Monitor and control invasive species	≤ 83	2023-2032, ongoing
Stream	Follow BMPs for water quality		2023-2032

III. FIGURES

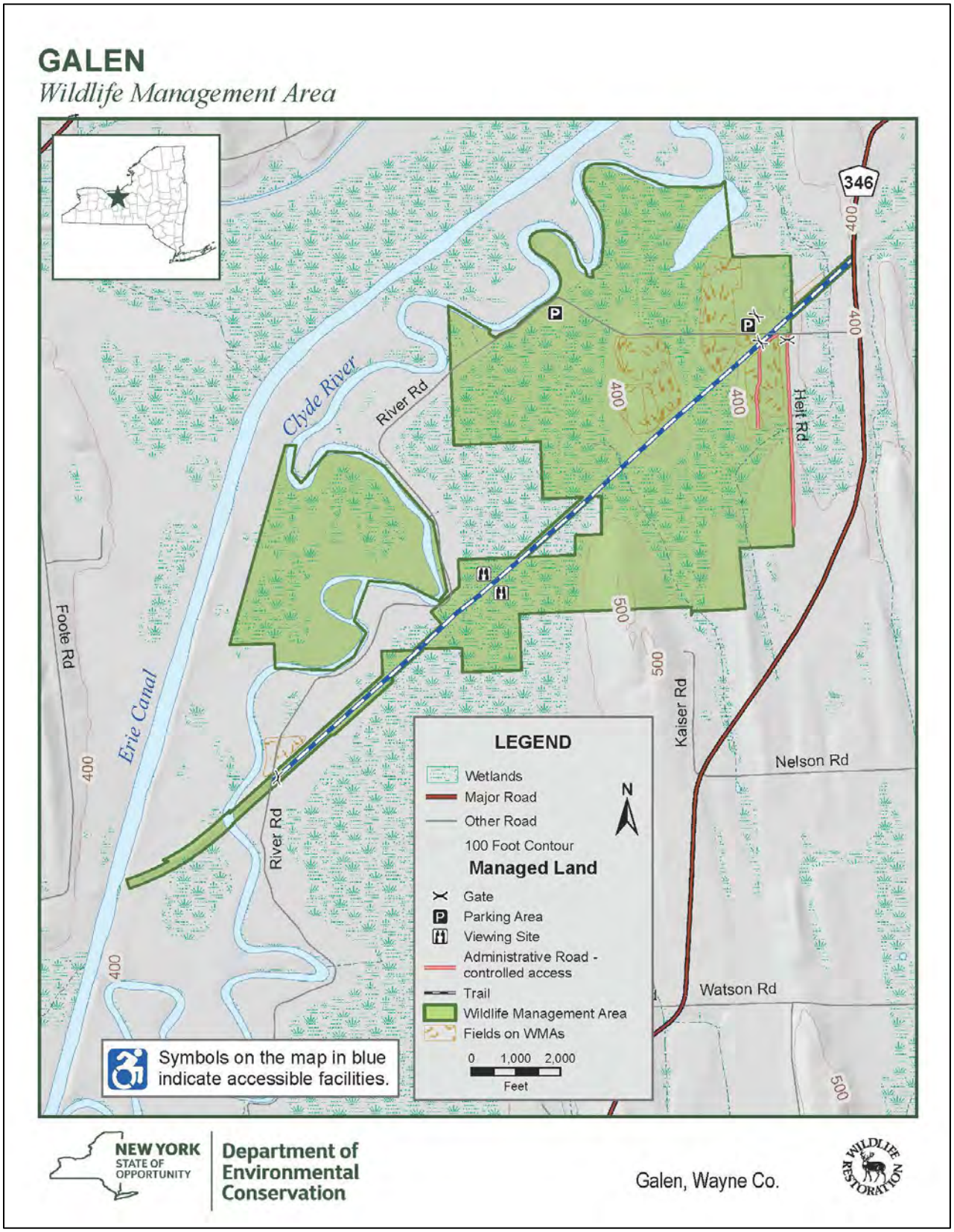

FIGURE 1. Location and access features at Galen WMA.

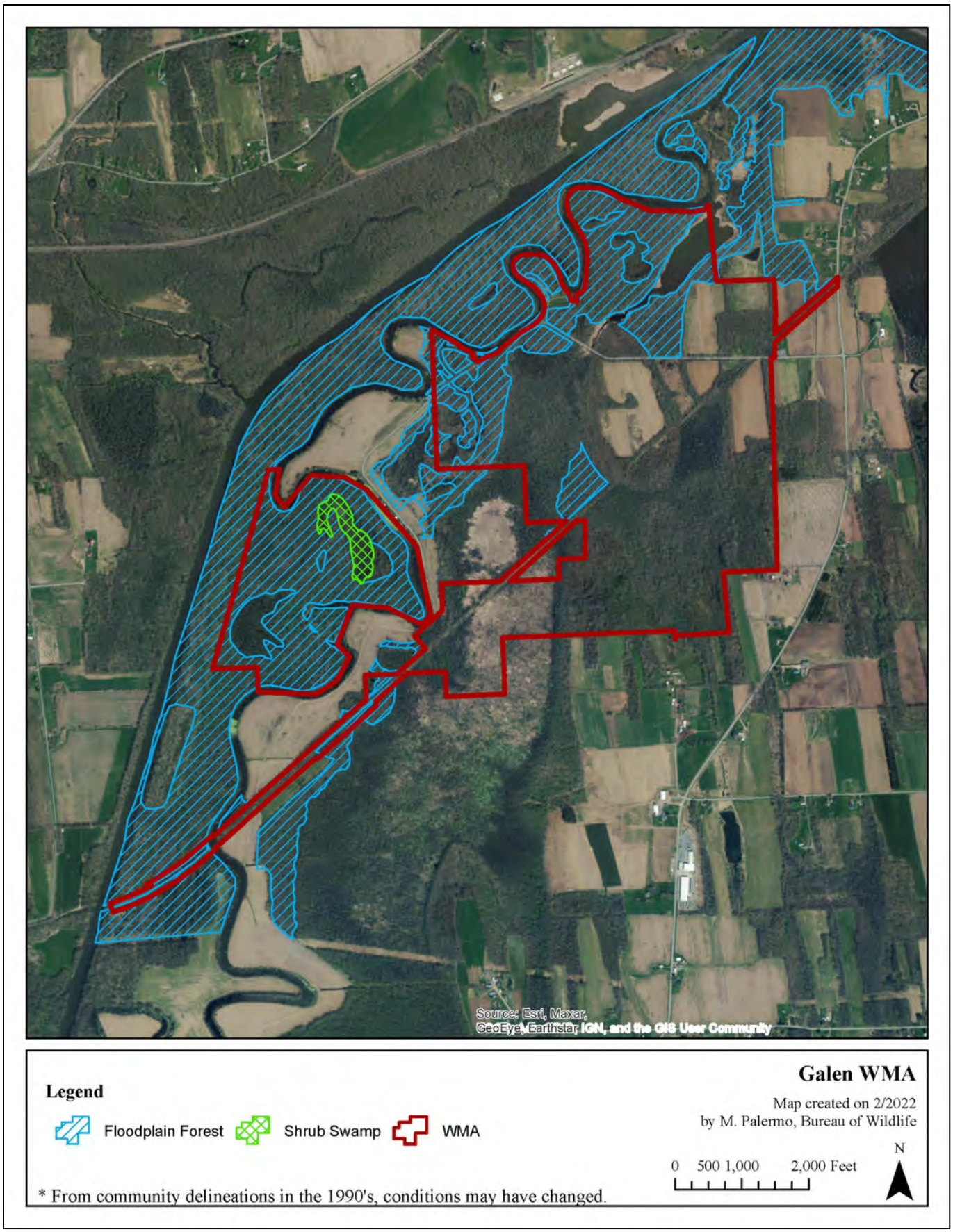

FIGURE 2. Significant ecological communities on Galen WMA. Data from the NY Natural Heritage Program.

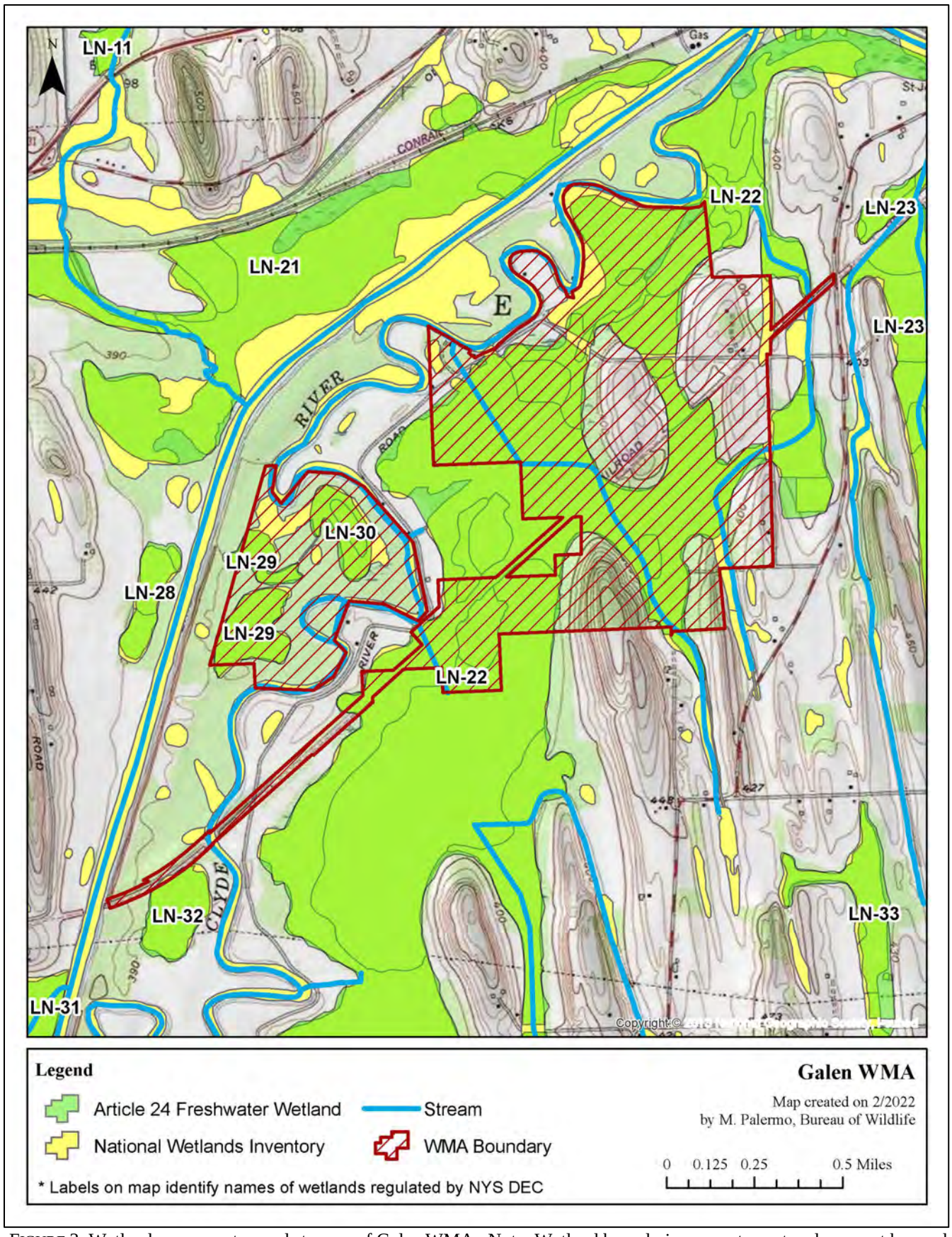

FIGURE 3. Wetlands, open water, and streams of Galen WMA. Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

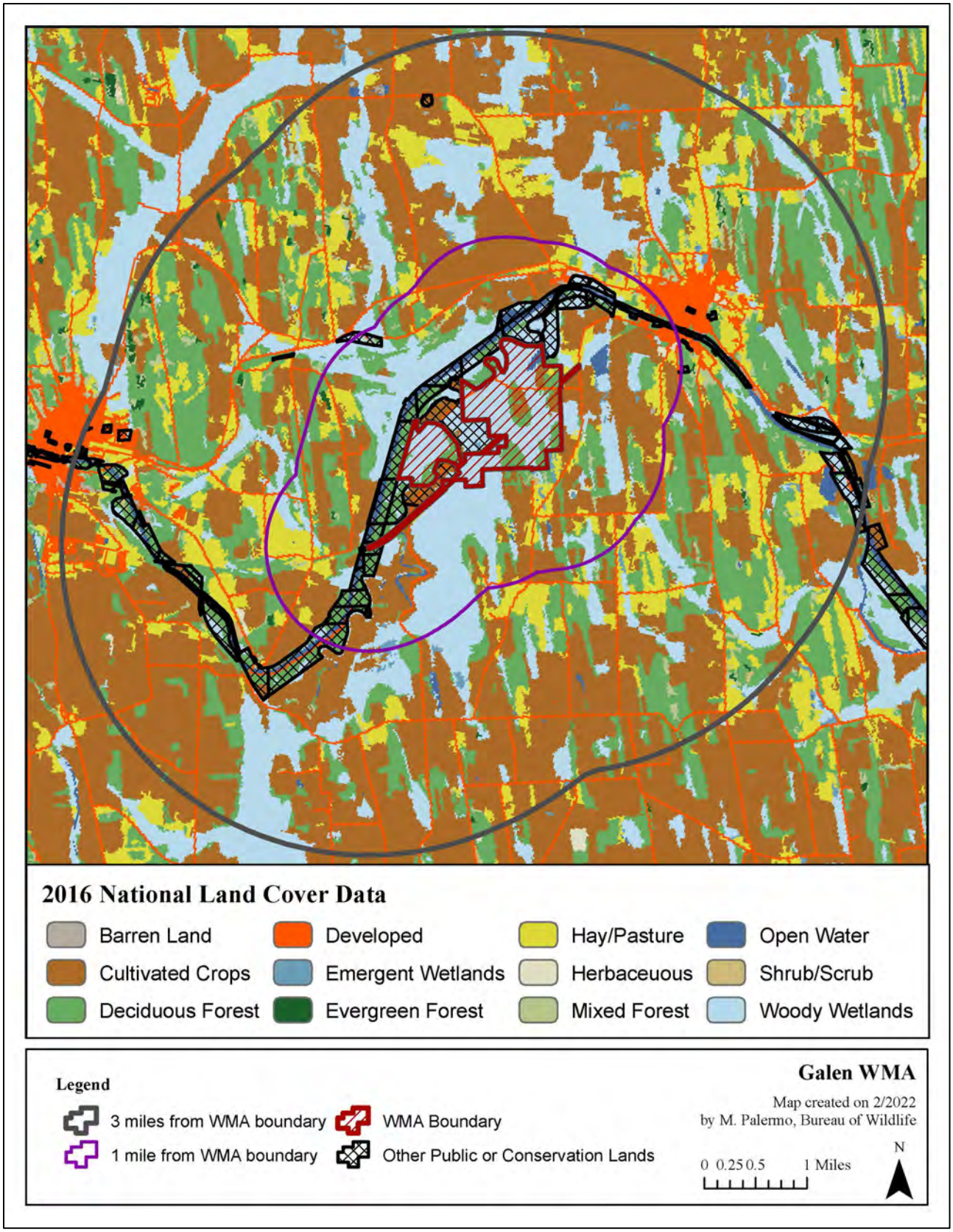

FIGURE 4. Land cover types and conservation lands in the landscape surrounding Galen WMA. Conservation lands are from the NY Protected Areas Database available online at https://www.nypad.org/. Land cover types are from the 2016 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at https://www.mrlc.gov/data/legends/national-land-cover-database-2019-nlcd2019-legend.

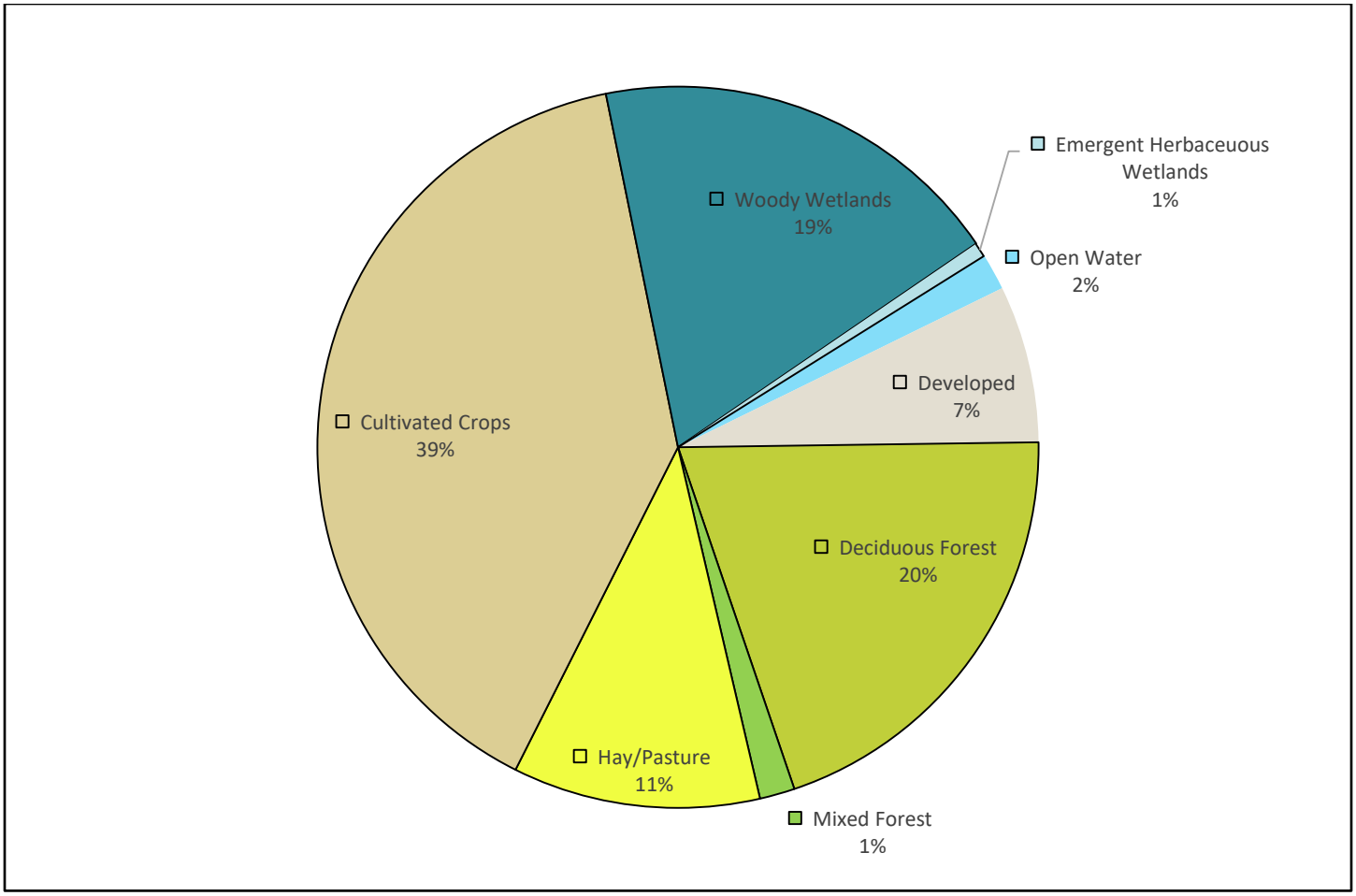

FIGURE 5. Percent cover of land cover types within three miles of Galen WMA.

Land cover types are from the 2016 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-2019-nlcd2019-legend.

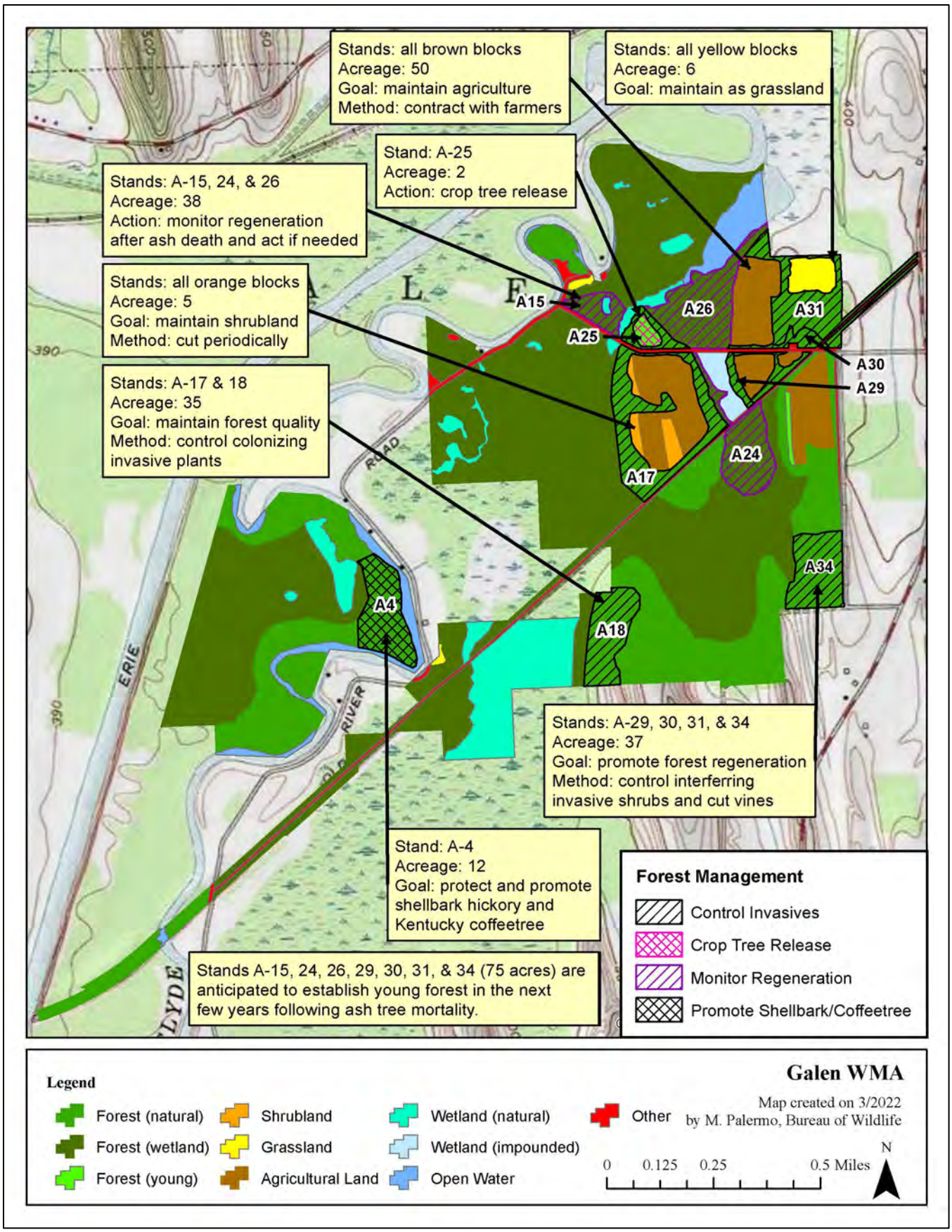

FIGURE 6. Habitat types and location(s) of proposed management on Galen WMA. Numbers indicate the stand number from habitat inventory.

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 Bird Conservation Center: A landscape of at least 25,000 acres that meets at least two of the following three criteria: (1) >7,500 acres of grassland [i.e., >25% of the landscape is currently in some form of grassland habitat], (2) a grassland "anchor" field that meets specific criteria, and/or (3) at least 1,000 acres of grasslands already managed under BMPs for grassland birds (NYSDEC Strategy for Grassland Bird Habitat Management and Conservation 2021-2026).

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. 2014. 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. 2014. 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. 2014. 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, the young forest target species at Galen WMA is American woodcock.

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. 2014. 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 are generally 0-20 years following a disturbance and composed of seedling-sapling sized trees (<5" DBH). Includes the stand initiation and beginning of stem exclusion phases of stand development. Old fields with woody encroachment and shrublands offer similar habitat structure as seedling-sapling stands for many of the target species.

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).[9] 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).[10]

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.

[9] Available online at https://www.dec.ny.gov/regulations/28693.html.
[10] Available online at https://www.dec.ny.gov/enb/enb.html.

APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS

PRESCRIPTION FOR WILDLIFE MANAGEMENT AREA TIMBER HARVEST

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

Species composition:

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

Stand inventory or analysis date:

Regeneration data:

Natural Heritage Element Occurrence layer review:

SMZ layer review:

Retention data:

Soil types and drainage:

Interfering vegetation:

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

Technical guidance/stocking guide:

Treatment purpose:

Management Objective: Even aged or Uneven Aged

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

Clearcut acreage and configuration: (if applicable)

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

Retention considerations and adjustments:

Treatment descriptions:

Name and Title of Preparer:

Central Office Lands and Forests Staff **Date**

Regional Wildlife Manager **Date**

PRESCRIPTION NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX D: AMENDMENTS

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