

**Habitat Management Plan
for
Northern Montezuma Wildlife Management Area
2020 - 2029**



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

December 30, 2019



Prepared by:

Jim Eckler, Biologist 1 (Wildlife)
Frank Morlock, Fish & Wildlife Technician 2
Northern Montezuma WMA Management

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

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

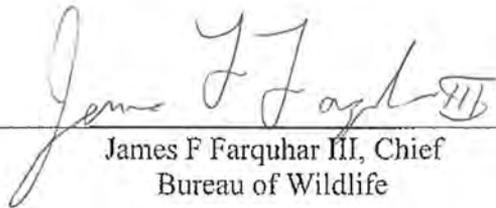
Reviewed and approved by:



Michael Wasilco, Regional Wildlife Manager
Bureau of Wildlife

1/31/2020

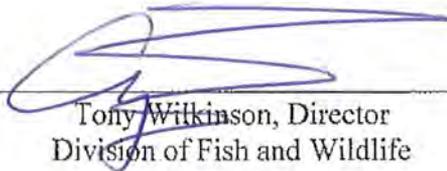
Date



James F Farquhar III, Chief
Bureau of Wildlife

2/14/2020

Date



Tony Wilkinson, Director
Division of Fish and Wildlife

2/18/20

Date



Financial support for development of this Habitat Management Plan was provided by the Federal Aid in Wildlife and Sport Fish Restoration Program and non-federal funds administered by the New York State Department of Environmental Conservation including Habitat & Access Stamp fund: 1 | Page

TABLE OF CONTENTS

<i>SUMMARY</i>	4
<i>I. BACKGROUND AND INTRODUCTION</i>	5
PURPOSE OF HABITAT MANAGEMENT PLANS	5
WMA OVERVIEW	6
LANDSCAPE CONTEXT	13
<i>II. MANAGEMENT STRATEGIES BY HABITAT TYPE</i>	15
WETLANDS (NATURAL AND IMPOUNDED)	16
RIVERS AND STREAMS	29
FOREST	32
SHRUBLAND.....	47
GRASSLAND.....	50
AGRICULTURAL LAND	55
<i>III. FIGURES</i>	61
<i>IV. APPENDICES</i>	82
APPENDIX A: DEFINITIONS	82
APPENDIX B: COMPLIANCE WITH STATE ENVIRONMENTAL QUALITY REVIEW	86
APPENDIX C: FOREST MANAGEMENT PRESCRIPTIONS	87
APPENDIX D: AMENDMENTS.....	90

LIST OF FIGURES

FIGURE 1. MAP INDEX FOR FIGURES 2 THROUGH 10.....	61
FIGURE 2. LOCATION AND ACCESS FEATURES OF THE WMA (MAP 1).	62
FIGURE 3. LOCATION AND ACCESS FEATURES OF THE WMA (MAP 2).	63
FIGURE 4. LOCATION AND ACCESS FEATURES OF THE WMA (MAP 3).	64
FIGURE 5. SIGNIFICANT ECOLOGICAL COMMUNITIES ON THE WMA (MAP 1).	65
FIGURE 6. SIGNIFICANT ECOLOGICAL COMMUNITIES ON THE WMA (MAP 2).	66
FIGURE 7. SIGNIFICANT ECOLOGICAL COMMUNITIES ON THE WMA (MAP 3).	67
FIGURE 8. WETLANDS, OPEN WATER, AND STREAMS OF THE WMA (MAP 1).	68
FIGURE 9. WETLANDS, OPEN WATER, AND STREAMS OF THE WMA (MAP 2).	69
FIGURE 10. WETLANDS, OPEN WATER, AND STREAMS OF THE WMA (MAP 3).	70
FIGURE 11. LAND COVER AND CONSERVATION LANDS IN THE SURROUNDING LANDSCAPE.	71
FIGURE 12. PERCENT OF LAND COVER TYPES WITHIN THREE MILES OF THE WMA.....	72
FIGURE 13. MAP INDEX FOR FIGURES 14 THROUGH 21.....	73
FIGURE 14. HABITAT TYPES AND LOCATION(S) OF PROPOSED MANAGEMENT (MAP 1).....	74
FIGURE 15. HABITAT TYPES AND LOCATION(S) OF PROPOSED MANAGEMENT (MAP 2).....	75
FIGURE 16. HABITAT TYPES AND LOCATIONS OF PROPOSED MANAGEMENT (MAP 3).	76
FIGURE 17. HABITAT TYPES AND LOCATIONS OF PROPOSED MANAGEMENT (MAP 4).	77
FIGURE 18. HABITAT TYPES AND LOCATIONS OF PROPOSED MANAGEMENT (MAP 5).	78
FIGURE 19. HABITAT TYPES AND LOCATIONS OF PROPOSED MANAGEMENT (MAP 6).	79
FIGURE 20. HABITAT TYPES AND LOCATION(S) OF PROPOSED MANAGEMENT (MAP 7).....	80
FIGURE 21. HABITAT TYPES AND LOCATIONS OF PROPOSED MANAGEMENT (MAP 8).	81

SUMMARY

Northern Montezuma Wildlife Management Area (WMA) is located in Cayuga, Seneca, and Wayne counties and comprises approximately 8,090 acres. The WMA is part of the Montezuma Wetlands Complex (MWC), an area of approximately 50,000 acres targeted by a coalition of partners striving to restore and manage thousands of acres of wetlands and associated uplands.

The MWC is known as a priority focus area under the North American Waterfowl Management Plan (NAWMP) for its value as a migratory bird staging area within the Atlantic Flyway.¹ The MWC is also designated as a globally significant Important Bird Area and the WMA is a state designated Bird Conservation Area.^{2,3} The MWC is a regional priority for continued acquisition under the New York State Open Space Conservation Plan.⁴ The WMA's approved acquisition area spans approximately 5 miles in all directions from the center of Howland Island.

State acquisition began with the purchase of Howland Island in 1932, followed by the Cayuga Lake unit in the 1960s, part of Crusoe Lake wetlands in 1986, and then several other parcels from 1991 to 2014. The majority of the WMA is centered on and around Howland Island, with several smaller parcels nearby.

Habitats on the WMA include extensive, high-quality emergent wetlands, wet meadows, bottomland floodplain forest, upland northern hardwoods and successional forest, agricultural lands, and grasslands. Waterfowl, white-tailed deer, and wild turkey are plentiful, and the Montezuma wetlands are known for abundant furbearers, especially beaver and muskrat. Several at-risk or declining species (e.g., black tern, least bittern, cerulean and prothonotary warblers, and short-eared owl) use the diverse habitats for nesting, migratory stopover, and/or wintering.

Several projects to restore and enhance habitats on the WMA have occurred since DEC management began. This has primarily focused on wetland habitats and included extensive dike construction, pothole excavation, and invasive plant control. Active annual management of wetland water levels and vegetation has been integral to maintaining a diversity of important wetland habitats present on the WMA throughout the year. Uplands comprise just over half the WMA. Most fields have been maintained as open habitat, with some fields actively planted to grass and forb mixes favored by grassland wildlife. Small scale timber harvests have also been used periodically to improve forest health and diversify habitat structure.

Overall, Northern Montezuma WMA is primarily managed to provide long-term protection, restoration, and enhancement of wetland habitats, especially those important to migrating birds. Management also provides a variety of habitats important to popular game species and species listed as endangered, threatened, or special concern, as well as valuable public access and recreational opportunities, such as hunting, trapping, and bird watching.

¹ Information about the North American Waterfowl Management Plan is available online at <https://www.fws.gov/birds/management/bird-management-plans/north-american-waterfowl-management-plan.php>.

² Information about Important Bird Areas is available online at <http://www.audubon.org/important-bird-areas>.

³ Information about Bird Conservation Areas is available online at <http://www.dec.ny.gov/animals/25341.html>.

⁴ Available online at <https://www.dec.ny.gov/lands/98720.html>.

Habitat management goals for Northern Montezuma WMA include:

- Managing wetland impoundments to provide diverse habitats important to wetland-dependent wildlife for breeding and/or migratory stopover (17% of WMA);
- Maintaining and enhancing the habitat values of natural wetlands and the water quality of rivers and streams (21% of WMA);
- Maintaining most forest cover, including forested wetlands, in an intermediate or mature age-class that provides valuable, diverse habitats for target species (42% of WMA);
- Creating young forest habitat to promote associated at-risk wildlife species and regenerate healthy future forests (3% of WMA);
- Maintaining and restoring grasslands to provide breeding habitat, forage, and cover for associated wildlife (7% of WMA);
- Managing agricultural lands as transitional habitat (leading to wetland or grassland restoration) and to provide supplemental food for wildlife (7% of WMA);
- Maintaining a shrubland component that provides dense upland cover and soft mast for associated wildlife (1% of WMA); and
- Maintaining all associated infrastructure (dikes, administrative roads, water-control structures, and parking lots) to facilitate management and provide access (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 conservation and has been an important component of wildlife management in New York for decades. Beginning in 2015, the 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 period, after which the plans and progress on implementation will be reviewed and HMPs will be modified as needed. Some action items in HMPs are contingent upon available funding, partner involvement, and/or seasonal conditions and could deviate from the time frame laid out in the plan.

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

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

This plan and the habitat management it recommends will comply with the State Environmental Quality Review Act (SEQRA) Title 6NYCRR Part 617 regulations (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.

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

WMA OVERVIEW

LOCATION

Northern Montezuma WMA is located in DEC Regions 7 and 8, within the towns of Conquest, Mentz, Montezuma, and Victory in Cayuga County; the town of Seneca Falls in Seneca County; and the towns of Butler and Savannah in Wayne County (Figures 1 through 4 and Image 1).

TOTAL AREA

8,090 acres. Approximately 5,690 acres of the WMA are contiguous and found on and around Howland Island, while the remaining 2,400 acres are spread out nearby (Figure 1). The most southern parcel (approximately 225 acres) is located along the northwest shore of Cayuga Lake.

HABITAT INVENTORY

A habitat inventory was completed in 2012 for Howland Island and in 2018 for the rest of the WMA. This inventory 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). Target species are described in each habitat section of this plan.

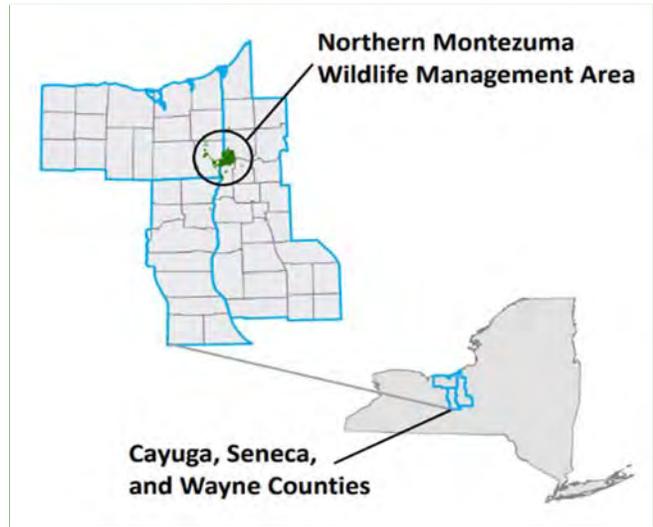


Image 1: Location of Northern Montezuma WMA.

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

Habitat Type ^a	Current Conditions (as of 2018)			Desired Conditions	
	Acres	Percent of WMA	Miles	Acres	Percent of WMA
Wetland (impounded)	1,290	16%		1,343	17%
Wetland (natural)	1,614	20%		1,624	20%
River and stream	112	1%	19	112	1%
Forest ^b	3,588	44%		3,416	42%
Young forest	16	<1%		208	3%
Shrubland	36	1%		33	1%
Grassland	458	6%		595	7%
Agricultural land	807	10%		582	7%
Dike	79	1%	15	87	1%
Roads, buildings, parking	90	1%	25	90	1%
Total Acres:	8,090 ^c	100		8,090	

^a Descriptions of habitat types are provided within the corresponding sections of this plan.

^b 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.

^c Approximately 354 acres and 137 acres of this total are owned by The Nature Conservancy and the New York State Canal Corporation, respectively, but are managed by DEC (transfer of ownership to DEC is being pursued).

MONTEZUMA WETLANDS COMPLEX

Northern Montezuma WMA is part of the Montezuma Wetlands Complex (MWC), which covers approximately 50,000 acres of state, federal, and private lands, where management is supported and coordinated by a coalition of partners. Restoration of the MWC is among the largest and most ambitious wetland restoration and enhancement efforts in North America. This HMP considers conservation plans related to the lands and wildlife species of the MWC, including:

- Environmental Impact Statement for the Northern Montezuma Wetlands Project (1991)
- Management Plan, Montezuma Wetlands Complex (2000)
- Bird Conservation Plan for the Lower Great Lakes/St. Lawrence Plain Bird Conservation Region (BCR 13, 2007)
- Montezuma National Wildlife Refuge Comprehensive Conservation Plan (2013)
- New York State Wildlife Action Plan (2015)
- Partners in Flight Landbird Conservation Plan (2016)
- Forest Management for New York Birds: A Forester's Guide (2017)

ECOLOGICAL RESOURCES

Wildlife Overview:

Northern Montezuma WMA contains a diversity of wetland and upland habitats and is part of the larger MWC. The MWC hosts one of the largest migratory concentrations of waterfowl in the northeast United States and is a significant stopover and foraging location for shorebirds in upstate New York (Photo 1). The entire MWC is a globally significant Important Bird Area (as designated by Bird Life International and administered by Audubon NY). The WMA is also designated as a New York State Bird Conservation Area because of the high value for a diversity of wetland-dependent species, large concentrations of migrating species, and the presence of several declining and at-risk species.

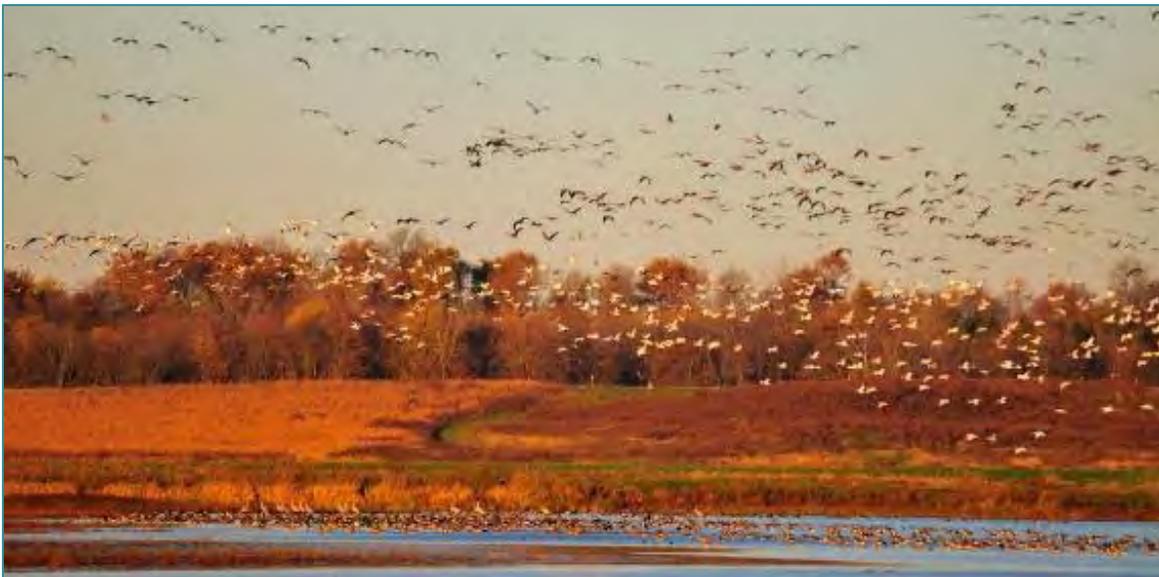


Photo 1: The MWC is one of the most important migratory stopover sites for waterfowl in the Northeast.

Photo: Doug Racine

The diverse habitat conditions here also sustain numerous non-avian species, including a wide variety of mammals, amphibians, reptiles, and invertebrates. The abundant floodplain and upland forests, grasslands, early-successional shrublands, and agricultural fields interspersed among wetlands provide a unique arrangement of habitats that have high value for wildlife. Several rare or imperiled species utilize these diverse habitats and popular small and big game species are quite abundant.

Species diversity and abundance here varies widely throughout the year, being largely influenced by seasonal migrations and water conditions. Common or notable species occurring here include:

- Waterfowl (e.g., American black duck, American wigeon, Canada goose, gadwall, green-winged teal, hooded merganser, mallard, northern pintail, ring-necked duck, wood duck)
- Marshbirds (e.g., American and least bitterns, pied-billed grebe, black tern, common gallinule, sora, Virginia rail)
- Shorebirds (e.g., greater and lesser yellowlegs, least and semipalmated sandpipers, American golden plover, dunlin)
- Wading birds (e.g., green and great blue herons, black-crowned night-heron, great egrets)
- Raptors (e.g., bald eagle, northern harrier, osprey, red-tailed hawk, short-eared owl)
- Songbirds (e.g., cerulean and prothonotary warblers, gray catbird, marsh wren, purple martin, red-winged blackbird, scarlet tanager, song and swamp sparrows, wood thrush)
- Amphibians (e.g., American toad, leopard frog, wood frog, spring peeper, blue-spotted salamander, red-backed salamander, eastern red-spotted newt)
- Reptiles (e.g., common garter snake, northern water snake, eastern milk snake, painted turtle, snapping turtle, musk turtle)
- Small mammals (e.g., meadow vole, white-footed mouse, eastern red bat, big brown bat)
- Furbearers (e.g., beaver, coyote, mink, muskrat, otter, long and short-tailed weasels)
- Big game (white-tailed deer, black bear)
- Small game (e.g., eastern cottontail, gray squirrel)
- Upland game birds (e.g., ring-necked pheasant, ruffed grouse, wild turkey)
- Native pollinators (e.g., digger bees, mason bees, carpenter bees, butterflies, moths)
- Dragonflies and damselflies (e.g., green darner, eastern pondhawk, fragile forktail)
- Freshwater mussels (e.g., eastern elliptio, eastern lampmussel, green floater, fat mucket)

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).⁵ SGCN listed below include species that have been documented on or within the vicinity of the WMA that are likely to occur in suitable habitat on the WMA. Other SGCN may also be present on the WMA. Data sources include: the NY Natural Heritage Program, NY Breeding Bird Atlases,⁶ NY Reptile and Amphibian Atlas,⁷ DEC wildlife surveys and informal observations, and eBird.⁸

⁵ The 2015 New York State Wildlife Action Plan identifies 366 Species of Greatest Conservation Need (SGCN) including 167 High Priority SGCN. Available online at <http://www.dec.ny.gov/animals/7179.html>.

⁶ Available online at <http://www.dec.ny.gov/animals/7312.html>.

⁷ Available online at <http://www.dec.ny.gov/animals/7140.html>.

⁸ Available online at <http://ebird.org/content/ebird/about/>. © Audubon and Cornell Lab of Ornithology.

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

Species Group	Species	Federal Status	NY Status	NY SGCN Status
Birds	American bittern		SC	x
	American black duck			HP
	American kestrel			x
	American woodcock			x
	Bald eagle		T	x
	Black-billed cuckoo			x
	Black-crowned night-heron			x
	Black-throated blue warbler			x
	Black tern		E	HP
	Blue-winged teal			x
	Blue-winged warbler			x
	Bobolink			HP
	Brown thrasher			HP
	Canada warbler			HP
	Cattle egret			HP
	Cerulean warbler			SC
	Common tern			T
	Cooper's hawk			SC
	Eastern meadowlark			HP
	Golden-winged warbler			SC
	Grasshopper sparrow			SC
	Great egret			x
	Horned lark			SC
	King rail			T
	Least bittern			T
	Northern harrier			T
	Northern goshawk			SC
	Northern pintail			x
	Osprey			SC
	Peregrine falcon			E
	Pied-billed grebe			T
	Prothonotary warbler			HP
	Red-headed woodpecker			SC
	Red-shouldered hawk			SC
	Ruddy duck			x
	Ruffed grouse			x
	Rusty blackbird			HP
	Sandhill crane *			
	Scarlet tanager			x
	Sedge wren			T
Semipalmated sandpiper			HP	
Sharp-shinned hawk			SC	

Table 2. Continued

Species Group	Species	Federal Status	NY Status	NY SGCN
	Short-eared owl		E	HP
	Trumpeter swan *			
	Upland sandpiper		T	HP
	Vesper sparrow		SC	HP
	Wood thrush			x
Mammals	Eastern red bat			x
	Hoary bat			x
	Indiana myotis	E	E	HP
	Little brown myotis			HP
	Northern long-eared bat (Northern myotis)	T	T	HP
	Silver-haired bat			x
	Small-footed myotis		SC	x
	Tri-colored bat (Eastern pipistrelle)			HP
Amphibians and reptiles	Blue-spotted salamander		SC	HP
	Common mudpuppy			x
	Eastern musk turtle			HP
	Jefferson salamander		SC	
	Snapping turtle			x
	Spotted turtle		SC	HP
	Western chorus frog			x
	Wood turtle		SC	HP
Fish	Lake sturgeon		T	x
Invertebrates	Elktoe			x
	Green floater		T	HP
	Lilliput			x
	Pink heelsplitter			x
	Rainbow			HP
	Wabash pigtoe			HP
Plants	Kentucky coffee tree		E	
	Marsh valerian		E	
	Pink wintergreen		T	
	Salt-meadow grass		E	
	Seaside bulrush		T	
	Seaside crowfoot		E	
	Shellbark hickory		T	
	Woodland Agrimony		T	

*Although not a listed species or SGCN, both sandhill crane and trumpeter swan are rare breeders in New York and have been documented nesting on the WMA and elsewhere in the MWC.

Significant Ecological Communities:

There are two rare and significant natural communities located on the WMA as identified by the NY Natural Heritage Program. The state rank reflects the rarity within NY, ranging from S1, considered the rarest, to S5, considered stable; definitions are provided in Appendix A. The following significant ecological communities occur on the WMA; community descriptions are from *Ecological Communities of New York State, Second Edition*⁹ (Figures 5, 6, and 7):

- **Floodplain Forest (S2S3)** - typically 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. Some sites may be quite dry by late summer whereas other sites may be flooded again in late summer or early autumn (these floods are caused by heavy precipitation associated with tropical storms). This is a broadly defined community; floodplain forests are quite variable and may be very diverse.
- **Inland Salt Marsh (S1)** - a wetland that occurs on saline mudflats associated with inland salt springs. The mucky substrate is permanently saturated and seasonally flooded. Vegetation is sparse, with less than 50% cover. Species diversity is low.

Additional information about ecological communities is available in the NY Natural Heritage Program's WMA Biodiversity Inventory Reports. At the time these reports were produced, sections of what is now Northern Montezuma WMA were independently managed as separate WMAs; therefore, multiple reports cover this WMA, including those for Barge Canal Lands (1996), Cayuga Lake WMA (1996), Crusoe Lake WMA (1997), and Howland Island WMA (1995).

Topography and Soils:

Most of the soils on Northern Montezuma WMA are of the following soil associations:

- Palms-Edwards-Carlisle (69%)
- Ontario-Lima-Lansing-Honeoye-Conesus (20%)
- Niagara-Canandaigua (10%)
- Schoharie-Odessa (1%)

The Palms-Edwards-Carlisle association is the muck soil characteristic of the MWC. These mucks are found within the lowland basins, which are generally wetland, and in some instances agricultural land. The other soil associations here generally constitute drumlin formations and other upland areas. According to the National Soil Survey, 62% of the soils on the WMA are classified as not prime farmland, while 5% are prime farmland if drained, 14% are prime farmland, and 19% are farmland of statewide importance.¹⁰ These classifications describe the suitability of soils for farming, not the current land use or cover. Approximately 75% of the WMA contains soils that are considered poorly drained, some of which occurs in fields or forest stands. Management in poorly drained areas will use best management practices to avoid erosion.

⁹ Edinger, G. J., D. J. Evans, S. Gebauer, T. G. Howard, D. M. Hunt, and A. M. Olivero. 2014. *Ecological Communities of New York State, Second Edition*. Available online at <https://www.dec.ny.gov/animals/29384.html>.

¹⁰ National Soil Survey data is available online at <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>.

Elevations of land on the WMA ranges from approximately 375 feet above sea level along the Seneca River to 545 feet on top of Eagle Hill (located on Howland Island). In general, most of the WMA is flat bottomlands, while part of Howland Island is composed of glacial drumlin formations. These drumlins are characterized as elongated hills of gentle to moderate slope, having a north-south orientation, and generally rise approximately 50 to 100 feet above the surrounding lowlands.

Special Management Zones:

Special Management Zones (SMZs) are areas adjacent to wetlands, perennial and intermittent streams, vernal pool depressions, spring seeps, ponds and lakes, recreational trails, and other land features requiring special consideration due to their ecological significant and sensitivity to negative impact. Approximately 4,422 acres of SMZs (55% of the WMA) are on Northern Montezuma WMA, these include:

- Fourteen wetlands regulated by Article 24 of the Environmental Conservation Law and 177 wetlands shown on the National Wetlands Inventory (NWI; Figures 8, 9, and 10). State-regulated wetlands are protected by a buffer zone (regulated adjacent area) of 100 feet from the delineated wetland boundary.
- Approximately 19 miles of Class C streams (Figures 8, 9, and 10).¹¹

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*.¹² Some habitat management activities may either be prohibited or restricted in order to protect these features. Any deviations from these guidelines require appropriate justification.

LANDSCAPE CONTEXT

The goals of this HMP have been developed with consideration of surrounding landscape features, the availability of habitats, and other conservation lands adjacent to Northern Montezuma WMA (Figures 11 and 12).

The landscape within a three-mile buffer of the WMA is primarily the following cover types:

- Cultivated crops (25%)
- Pasture/hay, grassland, and orchards (24%)
- Emergent herbaceous wetlands (4%)
- Woody wetlands (17%)
- Forest, including deciduous, evergreen, and mixed (17%)
- Developed (6%)
- Open water (4%)
- Early-successional shrubland (3%)

¹¹ Information about stream classification is available online at <http://www.dec.ny.gov/permits/6042.html>.

¹² Available online at <http://www.dec.ny.gov/outdoor/104218.html>.

Six other conservation lands are within three-miles of the WMA (Figure 11). This includes:

- Montezuma National Wildlife Refuge (9,809 acres) - emergent and forested wetlands
- Savannah Dhu (3,929 acres) - private wildlife preserve with ponds, marshes, forest, and developed facilities. This property is currently for sale (as of the writing of this HMP) and it is within the acquisition area for Montezuma National Wildlife Refuge.
- New York State Canal Corporation (2,128 acres) - canal, floodplain wetlands, fields
- Vanderbilt Marsh Club (808 acres) - private wildlife preserve with emergent and forested wetlands, and fields
- The Nature Conservancy, Carncross Preserve (106 acres) - emergent & forested wetlands, inland salt marsh and pond.
- Cayuga Lake State Park (139 acres) - lake shore, forest, developed recreation facilities

DEC is permitted to manage some of the lands owned by the New York State Canal Corporation within the MWC (approximately 1,200 acres) under a Revocable Permit (#62-11-275) and related amendments; however, only 137 acres of this is considered part of the WMA in this HMP (near Cayuga Lake, Figures 4 and 21). Management of the remaining Canal Corporation parcels that are included in the permit will be planned as the Access and Public Use Plan for Northern Montezuma WMA is developed (scheduled to begin in 2021). DEC also has authority under a cooperative management agreement (established in 2005) to manage some of the lands owned by The Nature Conservancy (TNC, 354 acres, Figures 2, 3, 14, and 16) within the MWC. Ownership of these TNC parcels is expected to be transferred to DEC in the near future; therefore, they are considered part of the WMA in this HMP.

The WMA is located north of Cayuga Lake in the Finger Lakes region of New York and is within the larger MWC, an area of state, federal, and private land targeted by a coalition of partners striving to restore and manage thousands of acres of wetlands and associated uplands. The WMA and Montezuma National Wildlife Refuge (NWR) compose most of the conserved lands within the MWC, and additional land acquisition by DEC and the federal government is expected. A small portion of the WMA is located on the shore of Cayuga Lake, while most of the WMA is located north of the NWR, approximately 5 to 15 miles north of the lake (Figure 1)

The MWC is situated along a major waterfowl and waterbird migration route within the Atlantic Flyway and receives spring and fall migrations that number in the millions of birds. The MWC was designated a focus area by the North American Waterfowl Management Plan (NAWMP), which is an international strategy between the United States, Canada, and Mexico to restore waterfowl populations through habitat protection, restoration, and enhancement. The NAWMP in the Atlantic Flyway is implemented by the Atlantic Coast Joint Venture (ACJV), a partnership of several state and federal agencies, and non-profit conservation organizations. This partnership provides a focus on conservation efforts for all birds. The ACJV divided the flyway into regions and the MWC is located within Bird Conservation Region 13 (BCR 13) – the Lower Great Lakes/St. Lawrence Plain. DEC management of the WMA intends to further the goals and objectives established for BCR 13.¹³

¹³ Information about BCR 13 is available online at <http://acjv.org/planning/bird-conservation-regions/bcr-13/>.

Most of the WMA is within the Finger Lakes Region Grassland Focus Area.¹⁴ Grassland Focus Areas are identified within New York State as areas of special importance to grassland-dependent birds. In many regions of NY, grasslands are becoming fragmented and are disappearing due to changing land-use patterns, natural vegetative succession, and development, causing associated declines in several bird species that require extensive, high-quality grassland habitat. A few large grasslands occur on the WMA and it is an important goal to maintain and enhance their value for grassland birds.

Forests compose 34% of the landscape surrounding the WMA (including woody wetlands and upland forest) and the entire MWC is a Priority Forest Area identified by Audubon New York.¹⁵ These priority areas are contiguous tracts of forest that support rich and abundant populations of priority forest bird species. Currently, the majority of MWC forests are of a mature age-class and provide exceptional habitat for several mature-forest wildlife species of concern. Some forests on the WMA are particularly valuable because they provide large, contiguous blocks of forest cover, since much of the forests in the surrounding landscape are fragmented. Several at-risk species associated with mature forests (e.g., cerulean warbler and wood thrush) require heavily forested landscapes for nesting.

A much smaller amount of young forest habitat currently exists in the landscape surrounding the WMA. In recent decades, young forest habitat and several associated wildlife species (e.g., American woodcock and golden-winged warbler) have steeply declined in the northeast due to maturing forests.¹⁶ An important goal of this plan is to establish a greater component of young forest on the WMA, while retaining mature forest stands of high habitat value.

II. MANAGEMENT STRATEGIES BY HABITAT TYPE

DEC will continue active management of wildlife habitats on Northern Montezuma 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.

¹⁴ Morgan, M. and M. Burger. 2008. A Plan for Conserving Grassland Birds in New York. Available online at <http://ny.audubon.org/conservation/grassland-bird-conservation-program>.

¹⁵ Information about Priority Forest Areas is available online at <http://ny.audubon.org/conservation/healthy-forests>.

¹⁶ Information about young forests is available online at <https://youngforest.org/>.

WETLANDS (NATURAL AND IMPOUNDED)

Approximately 59% of the WMA is wetland habitat (4,803 acres); places where the soil or substrate is periodically saturated or covered by water and the vegetative community is predominantly composed of hydrophytes. Forty percent of these wetlands (1,899 acres) are forested wetlands, which are discussed in the Forest section of this HMP.

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

Natural wetland: includes areas where hydrologic processes have not been greatly altered by human construction and DEC staff do not have the ability to manage water levels. In the case of riparian wetlands along the Seneca River/Barge Canal, although their hydrology has been historically altered, these are considered natural because DEC staff cannot control water levels.

Impounded wetland: includes areas where water is held back by a berm, dike, levy, road, or other human-made structure. In many cases, water levels in these wetlands can be controlled (raised or lowered) by DEC staff.

MANAGEMENT OBJECTIVES

- Maintain 1,614 acres of natural emergent, scrub-shrub, and open water wetlands.
- Manage 1,290 acres of impounded wetlands to provide diverse habitats that benefit multiple species of wetland-dependent wildlife. Considering wetland habitats throughout the MWC, strive to provide a variety of habitat conditions within impoundments to meet the needs of target species at all times of the year.
- Restore or enhance approximately 383 acres of poor-quality wetlands and agricultural fields to improve wetland conditions for wildlife.
- Maintain structural integrity of impoundment dikes and water control structures.
- Monitor for and control invasive vegetation.

DESCRIPTION OF EXISTING WETLAND HABITAT AND TARGET SPECIES

There are 1,614 acres of natural wetlands and 1,290 acres of impounded wetlands managed on Northern Montezuma WMA (Figures 14 through 21). Wetlands occur on all units of the WMA.

There are 44 impounded wetlands managed on the WMA (Photo 2). Impounded wetlands are designed to provide the ability to adjust water levels by a series of control structures and ditches. In these wetlands, DEC staff raise and lower water levels to simulate fluctuating water levels found in natural wetland systems, which produce food and cover for marsh wildlife. Many of these impoundments are inter-connected to facilitate water movement. For example, Storage Pond on Howland Island is designed to store water to be released into the many connected wetlands downstream. Many other impoundments require rainfall to refill, and in some cases, water is pumped from one site to another.

In the absence of fluctuating water levels and periodic disturbances (e.g., flood, scour), a marsh will naturally undergo ecological succession over time. In many cases, this means the plant community will continue to become more complex, shifting from bare soil to annual plants to

emergent perennials to woody shrubs. Conversely, in areas of a marsh where water levels remain high over time, these deeper areas would progressively contain less and less emergent vegetation and become more lake-like. By actively managing wetland water levels, DEC staff are able to influence the habitat conditions present in a marsh to ensure that an arrangement of the most valuable habitats for target species are present at important times of the year.

Annual plants (e.g., smartweed, beggar-ticks, millet) are encouraged to grow within marshes by lowering water levels and exposing soils in the spring (a process commonly described as moist-soil management). Annual plants are abundant seed producers – seeds that are essential food for waterfowl and other marshbirds. Water depths are gradually increased to make food available to waterbirds in time for fall migration.

Not all of the marsh impoundments are managed specifically for production of annual plants each year. Others are managed with shallow water (1-2 feet) for emergent plant cover (e.g., cattail, bur-reed, bulrush) and open water areas in about a 50:50 mix, a habitat referred to as hemi-marsh (Photo 3). Hemi-marshes are productive for furbearing mammals and secretive marshbirds including rare bitterns and grebes, and provide food and cover for migrating and brood-rearing waterfowl.

Some impoundments are managed to produce mudflats during the spring and late summer when shorebird migrations peak. Occasionally an impounded marsh may be held deliberately deeper (3-4 feet) to facilitate water storage, to provide a loafing or roosting area for waterfowl, or to thin out vegetation that has grown too dense.



Photo 2: This aerial photo of Mulligan Marsh clearly shows how a dike surrounds the wetland and impounds water.
Photo: Frank Morlock, DEC



Photo 3: This photo shows the mowing pattern of cattails in Guy's Marsh that will provide hemi-marsh habitat once reflooded.
Photo: Frank Morlock, DEC

The WMA also contains extensive floodplain wetlands found along the Seneca River, Crusoe Creek, and several other streams. Throughout the year water levels will vary depending upon stream flows and flood events and can range widely from minimally saturated soils to expansive open water. Several of these natural wetlands are dominated by dense emergent vegetation, typically cattail or reed canarygrass, and have been enhanced through the excavation of level-ditching and potholes (Photo 4). These ditches and potholes establish an interspersion of open water throughout the dense emergent vegetation, providing added habitat diversity.



Photo 4: Several potholes were excavated in the dense cattail marsh between the Seneca River and Morgan Road Unit 1.

Photo: Frank Morlock, DEC

Non-native, invasive plants (e.g., common reed, purple loosestrife, reed canarygrass, and narrow-leaved and hybrid cattails) are present here and in some cases are negatively affecting habitat values by outcompeting native plants and forming dense stands (Photo 5). Some areas that presumably were high-quality fens (a rare wetland type in NY) a century ago, have been severely degraded by reed canarygrass. Efforts to control these invasives are challenging and often require multiple treatments (currently, for many species, herbicide is the only cost-effective means to control large infestations). A native species of reed (*Phragmites americanus*) occurs on the WMA and is visually similar to common reed (*Phragmites australis*); control efforts will avoid the native reed.

It is the concentration, quantity, quality, and diversity of wetland habitats provided by the impoundments and natural wetlands that make this WMA and the MWC so valuable and important to wildlife. Many species of wetland-dependent birds, mammals, amphibians, reptiles, and invertebrates occur here. Many of these species have differing habitat requirements; therefore, maintaining a diversity of wetland conditions is needed to provide quality habitat used by target species for breeding, migrating, and in some cases overwintering.



Photo 5: Monocultures of common reed degrade wetland habitat values for wildlife.

Photo: Leslie J. Mehrhoff, University of Connecticut, Bugwood.org

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

Habitat Type	Description	Wildlife Benefit	Management Technique
Early Successional Marsh	A wetland dominated by early successional, disturbance-dependent annual plants (e.g., smartweed, beggar-ticks, and wild millet) that develop during periods of low water and exposed soils (e.g., droughts). When water levels rise again, (typically from late summer/early fall rains) the seeds from these plants become available to migrating waterfowl.	Provides a valuable source of carbohydrate rich food for fall migrating waterfowl. During the following spring migration, residual annual vegetation provides excellent invertebrate habitat and therefore a source of protein important to migrating hen ducks, as well as carbohydrates in the form of seeds.	This habitat is typically established by drawing down wetland impoundment water levels in spring and reflooding in fall, mimicking a natural drought. The association between these plants and exposed moist soils has led to this technique being referred to as “ <i>moist-soil management</i> ” and these plants as “ <i>moist-soil vegetation</i> .” This habitat will typically be created in different/rotating impoundments every year, but certain marshes will be drawn down more frequently and managed to provide moist soils (<i>moist-soil units</i>). Once drained, the substrate is sometimes mowed or disked to encourage desired plant growth.
Emergent Marsh	A wetland dominated by perennial herbaceous vegetation (e.g., cattail, bur-reed, and bulrush) and may contain saturated soils or be inundated under variable water depths. This habitat is highly diverse, being influenced by vegetative composition, a gradient of water depths, and degrees of open water interspersion. A ratio of approximately 50:50 vegetation to water is referred to as “ <i>hemi-marsh</i> .”	Various species of waterfowl and marshbirds use emergent marsh. Deeper water depths benefit black tern, pied-billed grebe, and least bittern, while shallower water benefits American bittern, sora, and Virginia rails. This habitat is also important to muskrat, which create openings in dense cattails and construct huts and feeding platforms that can be used as nesting substrate by birds and basking sites for turtles. Hemi-marsh provides the widest range of habitat conditions and thus is a goal over time in many marshes.	This is typically maintained or established by drawing down water levels when an impoundment has developed a large open water component (usually every 3 to 6 years). The drawdown will establish annual plants that same year but will also allow perennial plants to germinate and recolonize the open areas of the marsh. Vegetation can become quite dense the years following a drawdown, but over time higher water levels and muskrat activity start to create openings and the marsh transitions toward a hemi-marsh condition. Other tools that are used to manage habitat in emergent marsh impoundments are mowing, disking, herbicide, biological control of invasive species, and controlled burns.
Secluded Open Water Areas	These areas are typically small openings (less than 1 acre) of open water interspersed throughout emergent vegetation.	The secluded nature of these areas provides important habitat for waterfowl pairing, breeding, and brood rearing.	This habitat is provided by impoundments in the hemi-marsh stage and where potholes and/or ditching have been excavated in dense cattail areas.

Table 3. Continued

Habitat Type	Description	Wildlife Benefit	Management Technique
Large Open Water Areas	These are expansive open water areas, typically 10 acres or more in size.	These provide important roost habitat for migrating waterfowl (especially spring migrating geese), and foraging areas for bald eagle and osprey.	These areas are generally located in deeper parts of an impoundment when water levels are held high.
Mud Flats	These habitats contain unvegetated, saturated soil that is exposed due to receding or managed waters.	Mud flats provide important foraging habitat for shorebirds during migration.	These are established by drawing down water levels. These often turn into Early Successional Marsh if dry during 1 st half of growing season. Management can also include mechanical vegetation control by disking
Wet Shrub Thickets	These wetlands are dominated by shrubs such as alder, buttonbush, and winterberry, and may also contain an abundance of stunted tree growth. At different seasons these wetlands may be inundated under several inches or feet of water, or may be fairly dry.	Scrub-shrub wetlands are important to a variety of wildlife, including American woodcock, alder and willow flycatchers, and wood duck.	These wetlands typically occur at the edges of an impoundment or at areas of high ground within an impoundment. Water level management to achieve other habitat goals generally allow this habitat to persist in these locations. Prolonged inundation can limit tree establishment and promote continued wetland shrub dominance.

Wetland Management Target Species:

To address the diverse needs of wetland-associated wildlife, multiple target species were designated for wetland habitat management on Northern Montezuma WMA (Table 4, Photo 6). These species were designated as targets because they are SGCN and/or popular game animals that have well-studied habitat requirements that can be provided with established management practices. Management to maintain, enhance, or create habitat for these species will also benefit numerous other species that utilize similar habitats.



Photo 6: Marshbirds, such as Virginia rail, breed in emergent marsh on the WMA.

Photo: Douglas Racine

Table 4. Target species for wetland management on Northern Montezuma WMA.

Target Group	Example Species	Beneficial Habitat Structure
Migrating waterfowl	American black duck, blue and green-winged teal, Canada goose, canvasback, mallard, pintail, redhead, ruddy duck, scaup, and tundra swan	Secluded areas in hemi-marsh for courtship and pair bonding. Flooded early successional marsh for food in fall and spring. Large open water areas for resting and roosting.
Breeding waterfowl	Wood duck	Artificial nest boxes and natural tree cavities near water for nesting. Brood-rearing in wooded wetlands, beaver ponds, and secluded areas in impounded marshes.
Migrating shorebirds	Least sandpiper, greater and lesser yellowlegs, semipalmated sandpiper, semipalmated plover, short and long billed dowitchers	Mud flats, sheet water, and shallow water areas (less than 6”) that provide abundant invertebrate prey during spring and fall migrations.
Breeding marshbirds	American and least bitterns, black-crowned night heron, black tern, pied-billed grebe, sandhill crane, sora, and Virginia rail	Diverse emergent marsh with varying levels of water depth and vegetation height and density to provide different conditions preferred by each species. Black tern and other marshbirds will sometimes nest on muskrat huts.
Furbearers	Beaver, mink, muskrat, and otter	A diversity of wetland types that support preferred foods: beaver (woody plant material), muskrat (cattails), mink (small mammals), otter (fish, crayfish).
Wintering raptors	Bald eagle, northern harrier, and short-eared owl	Wetlands with large open water areas for eagle foraging. Emergent marshes, upland fields adjacent to impounded marshes, and grassy dikes with abundant small mammals for northern harrier and short-eared owl foraging.

MANAGEMENT HISTORY

Historically, the MWC contained over 40,000 acres of contiguous wetlands, commonly referred to as the Montezuma Marshes. Throughout the year, water levels within the flat basins north of Cayuga Lake would fluctuate greatly and during high water events would even cause some drumlins to become islands. Archaeological evidence shows that the periphery of these wetlands were inhabited by the indigenous Cayuga Nation, who obtained various food and medicine from these wetlands. The Sullivan Expedition of 1779 destroyed several Cayuga villages and shortly thereafter European settlement began.

Pioneer settlement included extensive logging and forest clearing to establish farms on upland areas around and throughout the marshes. The hydrology of the Montezuma Marshes was extensively lowered during the 1800s with the construction of the Erie Canal and several connector canals. The completion of the New York State Canal System (Barge Canal) in 1918, which rerouted much of the original Erie Canal into various rivers, including the Seneca River, led to the most significant lowering of water levels in the region. This lowering of several feet

caused by the canal system facilitated increased conversion of marshes to agriculture. Throughout the following decades farmers dug extensive ditching, constructed dikes, and installed pumps to further drainage. The once expansive wetlands were transformed into a thriving agricultural economy producing abundant root crops (e.g., potatoes, carrots, onions, beets) from the rich muck soils.

State acquisition of the WMA began with the purchase of Howland Island in 1932, followed by the Cayuga Lake unit in the mid-1960s, and part of Crusoe Lake wetlands in 1986. The nearby Montezuma National Wildlife Refuge was originally established with initial acquisition in 1938, furthering the shared state and federal mission of protecting the Montezuma Marshes. The completion of the North American Waterfowl Management Plan in 1986, which identified the MWC as a focus area, led to the acquisition of numerous other parcels by DEC from 1991 to 2014 (DEC is still working to acquire additional lands within the MWC).

A primary goal of the WMA has been to protect and restore wetlands and adjacent uplands, and projects here have worked closely with several partners, including Ducks Unlimited, the Nature Conservancy, and the U.S. Fish and Wildlife Service. Several habitat projects on the WMA focused on restoring wetland conditions to agricultural fields by plugging ditches, reshaping existing dikes, constructing new dikes, adjusting microtopography, and installing water control structures.

Since the 1990s, 20 wetlands have been restored for a total of approximately 926 acres. Examples of restored wetlands include Morgan Road Units 1 and 2, Marten’s Marsh, Guy’s Marsh, and Colvin Marsh. The most recent project was completed in 2019, which restored natural hydrology to a 150-acre former agricultural field between Loop Road and the Seneca River. Enhancement projects in existing but less productive wetlands have included excavation of level ditches and potholes to increase open water interspersion. Many potholes were excavated around Howland Island in the early years of DEC management, and since the 1990s, numerous potholes were excavated at two general sites, adjacent to Crusoe Creek and the Seneca River.

Active management has been recurring within impounded wetlands to maintain or enhance habitat values and has included water level drawdowns and reflooding, mowing and disking of wetland substrate, and invasive plant control (Photo 7). Invasive vegetation has been a challenge on the WMA for decades and has included mechanical control, herbicide application, and the release of biocontrol agents, such as the *Galerucella* beetle that controls purple loosestrife.



Photo 7: Control efforts have been ongoing to remove common reed and prevent its dominance in emergent marshes on the WMA.

Photo: Frank Morlock, DEC

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

Multiple actions are necessary to ensure that wetlands on the WMA provide suitable and adequate amounts of habitat for target species throughout the year. Table 5 describes objectives, management actions, and provides a schedule for the WMA. In some instances, the schedule will be variable, corresponding to changes in vegetation, seasonal conditions, water flow, staffing, and funding.

Table 5. Wetland habitat management objectives and actions planned to be implemented on Northern Montezuma WMA, 2020-2029 (Figures 14 through 21).

Objective	Description of Actions	Schedule
<p>Maintain integrity of existing wetland impoundments (berms, spillways, and water control structures) in accordance with Dam Safety Inspection and Management Plans (currently being developed).</p>	<p>Mow dikes during the growing season to prevent establishment of woody vegetation. It is preferred to delay mowing of the side-slopes of dikes until after the nesting season, unless dike inspection and critical maintenance requires earlier mowing.</p>	<p>Annually, several times each year.</p>
	<p>Remove large trees and root systems that are well-established on or near dams.</p>	<p>As needed.</p>
	<p>Inspect dams and spillways and repair as needed, including the filling and compacting of animal burrows.</p>	<p>Annually.</p>
	<p>Inspect water control structures; remove plugging by beaver, repair and replace as needed. Regular inspection for evidence of plugging by beaver and removal of debris by hand or long-reach excavator is a priority.</p>	<p>Annually, several times each year.</p>
	<p>Water control structures identified as priorities for replacement are at Marten’s Marsh and Gander Pond.</p>	<p>Once during 2020-2029.</p>
<p>Manage wetland impoundments to provide a variety of habitat conditions to meet the needs (nesting, brood rearing, feeding, and resting) of target species. Manage to provide net conservation benefit within the context of a wetlands complex. Plans for specific marshes are provided in Table 6.</p>	<p>To achieve these diverse conditions, water levels will be managed at different depths throughout the year and should mimic or enhance natural water level fluctuation to increase productivity. This includes well-timed periodic drawdowns and reflooding to balance interspersions of emergent vegetation and open water over time in each marsh. Favored drawdown rates are generally slow, extending from 1 to 3 weeks.</p>	<p>Variable – annual to every few years, depending on impoundment and existing conditions.</p>
	<p>In shallow water marshes where moist-soil management is desirable and feasible, water levels will be drawdown to expose mud flats to grow beneficial annual plants and reflooded to provide access to seeds from these annual plants. The exposed mudflats can also be timed to provide foraging areas for shorebirds. Generally, early-season drawdowns will be favored for maximum seed germination and root development. It is also preferred to perform drawdown in early-season before any waterbird nest initiation. Reflooding is desired to provide access for foraging waterfowl but is dependent on water availability in late summer/fall and</p>	<p>Drawdowns can occur annually or less frequently and should consider balancing habitat conditions available throughout other adjacent marshes and within the context of species annual cycles.</p>

(Continued)	should be delayed until seeds of desirable plants have ripened and plants can tolerate higher water.	
	In marshes with a planned hemi-marsh component (a 50:50 ratio of open water to vegetation), water levels should be drawn down approximately every 3 to 6 years to maintain the desired emergent vegetation to open water ratio, and/or to mimic a natural marsh cycle. Moist-soil drawdowns may also be used occasionally in units planned as emergent or hemi-marsh to set back succession, including control and removal of dense cattail and invasives. As needed and where practical, water levels may be increased to a suitable depth as a means to drown overabundant cattails or other undesirable vegetation.	Every 3 to 6 years.
	Provide an open water component by holding water levels high. This will be beneficial to drown undesirable plants, provide resting/loafing habitat, and to provide a submergent aquatic community with valued protein-rich invertebrates.	Variable - as needed in some marshes, annually in others.
In both natural wetlands and wetland impoundments, manage soils and vegetative response to maintain or enhance habitat value for target wildlife.	When conditions allow, mow, burn, or disk marsh substrate to stimulate desired plant growth, expose soil, create openings or control undesirable growth.	As needed.
	Maintain level-ditching and potholes to provide open water interspersed in dense emergent vegetation.	As needed.
	Monitor for invasive vegetation (e.g., common reed, narrowleaf cattail, purple loosestrife, flowering rush, European frog bit, water chestnut and early detection of new invasives) and control mechanically, biologically, with water level manipulation, and/or with herbicide.	Ongoing.
Restore and enhance drained or impaired wetlands and agricultural fields to improve wetland conditions.	Fields and/or impaired marshes that are planned to be restored or enhanced to improve wetland habitat and function are described in Table 7. Restoration can be accomplished in multiple ways including: redesigning existing dikes, constructing new dikes, installing water control structures, and plugging or removing ditches and other drainage features.	As resources allow during 2020-2029.
Consider additional wetland projects that will benefit wetland-dependent species.	As opportunities and funding arise, consider continued wetland protection through easements or acquisition, additional restoration or enhancement projects, and partnerships with private landowners and other conservation organizations.	As needed.

An individual marsh may lend itself to specific types of management by virtue of characteristics such as topography, height of dike, connections to water sources and outlets, internal ditching, seed bank, soil type, and existing vegetation. A single marsh may also contain multiple habitat conditions and may require a combination of management approaches to maintain or enhance habitat values over time. Table 6 provides an overview of management objectives for individual marshes on the WMA.

Table 6. Summary of habitat objectives and management actions planned for wetland impoundments on Northern Montezuma WMA, 2020-2029. Locations of marshes are labeled on Figures 14 through 21.

Marsh Name	Acres	Planned Management
Arum Pond	21	Managed as an emergent marsh with occasional drawdowns to mimic a natural marsh cycle.
Black Duck Pond	4	Managed primarily as an emergent marsh with strong open water component. Occasional drawdowns advised. Used for re-watering Arum Pond.
Breeder Pond	38	Managed primarily as an emergent marsh with frequent drawdowns providing moist-soil habitat. Open water component maintained in southeast corner due to relative depth of bottom. This impoundment serves an important water storage function as it has two outlets (water control structures) which allow waters to be diverted to an east or west series of downstream impoundments.
Brooder Pond	15	Managed as emergent marsh with occasional drawdowns to mimic a natural marsh cycle.
CCC Pond	16	Managed as an emergent marsh with occasional partial drawdowns and an open water component. Managed as a unit with and directly connected to Goose and Gander Ponds.
Carncross Flats	99	Managed primarily as a moist-soil unit and inland salt marsh. Mowing and disking used to set back succession to provide waterfowl, water-bird, and shorebird habitat.
Colvin Marsh	26	Managed as an emergent marsh with occasional drawdowns. Constructed with irregular bottom to encourage plant diversity and open water interspersion.
Camel Island Marsh	40	Managed as an emergent marsh with an open water component. Subject to occasional drawdowns. Excellent candidate for wetland enhancement by redesigning existing berms.
Cook Pond	16	Managed as an emergent marsh with occasional drawdowns. Typically maintained with a large open water component.
Coot Pond	31	Managed as an emergent marsh with occasional drawdowns to mimic a natural marsh cycle.
Deep Muck	36	Managed as an emergent marsh with occasional drawdowns. Constructed with internal interconnected potholes to provide areas of open water. An observation platform overlooks this marsh.
Foster Marsh	17	Managed as an emergent marsh with occasional drawdowns. Constructed with irregular shaped bottom to encourage vegetative diversity.
Frost Hill Marsh West (Recchio)	16	Managed as an emergent marsh with occasional drawdowns. An excellent candidate for enlargement.
Frost Hill Marsh East (Howell)	23	Managed primarily as a wooded wetland. This marsh would benefit from adding ditch plugs or a water control structure to provide the ability to raise water levels. Constructed with aggressive irregular shaped bottom (islands or habitat mounds) as mitigation for loss of off-site wooded wetland.

Table 6. Continued

Marsh Name	Acres	Planned Management
Gander Pond	18	Managed primarily as an emergent marsh with occasional partial drawdowns and an open water component. Often managed as a unit with Goose and CCC Ponds, although it does contain two water control structures – providing outlets to Seneca River and Lost Pond.
Goose Pond	18	Managed primarily as an emergent marsh with occasional partial drawdowns and an open water component. Connected to Gander and CCC Ponds; often managed as a unit.
Guy’s Marsh	73	Managed primarily as an emergent marsh, but also occasionally as a moist-soil unit, depending on the vegetation. Contains upland and transitional areas in addition to wetland due to internal topography. Cattail and invasive species control are a current focus. An observation platform overlooks this marsh.
Headquarters Pond	64	Managed primarily as an emergent marsh with occasional drawdowns to mimic a natural marsh cycle. Invasive species control required, especially in western finger.
Helmer Marsh	117	Managed as emergent marsh and as an open forested wetland. Access to water control structure provided over private land. Culvert under northernmost east-west berm provides water connection between north and south sections.
Hickory Pond	6	Managed primarily as an emergent marsh with occasional drawdowns.
Locust Pond	1	Managed as an emergent marsh with open water marsh. This marsh does not have a water control structure.
Loosestrife Pond	24	Managed primarily as an emergent marsh with occasional drawdowns to mimic a natural marsh cycle.
Lost Pond	13	Managed primarily as an emergent marsh with occasional drawdowns to mimic a natural marsh cycle.
M&M Marsh	45	Currently being managed as a moist-soil unit with intensive common reed control each year since 2017, which followed removal of willow and cottonwood via forestry cutter/grinder. Future management as moist-soil unit or hemi-marsh to be determined based on vegetative response.
Montezuma Audubon Center (MAC) North	13	Managed primarily as an emergent marsh with occasional drawdowns and an open water component. Enhancement by removal of island of cottonwood and willow completed in 2019. Public observation platform overlooks this marsh.
MAC South	15	Managed primarily as an emergent marsh with an annual late-summer drawdown to provide shorebird habitat.
Malone Marsh	45	Managed as flooded forest and as emergent marsh with occasional drawdowns.
Marten’s Marsh	148	Managed as flooded woods and as an emergent marsh with occasional drawdowns, and with an open water component. Invasive species control a current focus. A good candidate for enhancement and expansion by reshaping bottom and increasing height of dike. Water control structure to be replaced 2020-2021. Some tree removal in the interior may benefit waterbirds.

Table 6. Continued

Marsh Name	Acres	Planned Management
Mitigation Muck	26	Managed as an emergent marsh with frequent drawdowns.
Morgan Road Unit 1	57	Managed primarily as an emergent marsh with frequent drawdowns incorporating cattail and invasive species control. Mowing and disking used to enhance habitat as needed during drawdowns.
Morgan Road Unit 2	32	Managed as an emergent marsh with occasional drawdowns incorporating cattail and invasive species control. Mowing and disking used when needed during drawdowns.
Muckrace Flats	6	Managed primarily as a moist-soil unit incorporating mowing and disking to provide shallow marsh, wet meadow, and mud flat habitat for summer/fall shorebird migration. Occasionally managed as an emergent marsh.
Mulligan Marsh	23	Managed primarily as an emergent marsh with occasional drawdowns to mimic a natural marsh cycle.
Nursery Pond	6	Managed as an emergent marsh and source of seeds, tubers, and plugs of annual and perennial marsh plants.
Pintail Pond	7	Managed as an emergent marsh with occasional drawdowns and a large open water component.
Pump Pond	10	Managed primarily as an emergent marsh with occasional drawdowns and a large open water component
South Winter Pond	4	Managed as an open-water marsh.
South Butler Wooded Mitigation Unit	23	Managed under forested wetland mitigation agreement; forested wetland conditions are currently developing.
Storage Pond	65	Managed primarily in lake-marsh stage (with deep and open water) and used as the source of re-watering marshes to the south and downstream on Howland Island. Provides wooded wetland habitat in northwest section when held high and provides shorebird habitat in late-summer and fall as it is de-watered.
Teal Pond	14	Managed primarily as an emergent marsh with an open water component. Perform occasional full and partial drawdowns that incorporate invasive species control. Public observation platform overlooks this marsh.
Torrey Marsh	41	Managed primarily as an emergent marsh with an open water component. Perform occasional drawdowns to mimic a natural marsh cycle and facilitate invasive species control.
Warder Marsh	12	Managed primarily as an emergent marsh with occasional partial drawdowns.
Winter Pond	1	Managed as a wooded wetland with a large open water component.
Wood Duck Pond	4	Managed as an emergent marsh with a large open water component. No water control structure present.

Historic land uses drained much of the former wetlands in this region and there are opportunities to restore wetland quality and function at many of those historic sites. Likewise, in some natural wetlands, enhancements can occur to improve habitat values. DEC will continue to prioritize the restoration and enhancement of wetlands on the WMA. Table 7 provides an overview of restoration and enhancement projects proposed for 2020-2029.

Table 7. Summary of proposed wetland restoration and enhancement projects for Northern Montezuma WMA, 2020-2029 (Figures 14 through 21).

Site Name / Location	Acres	Type	Method	Habitat Objective
Ag Field I-945 / fallow field southwest of DEC Field Office	10	Restoration	Replant	Restore to sedge meadow
Ag Field K-940 / Montana Road (former Warrick muck)	19 to 38	Restoration	Acquisition of adjacent muck required before restoration. Construct new dike and/or plug ditches	Restore to emergent marsh or moist-soil unit
Ag Field K-942 / North Foster Marsh	42	Restoration	Construct new dike and/or plug ditches	Restore to emergent marsh or moist-soil unit
Seneca River, just south of Carncross Bridge	40	Enhancement	Excavate potholes, level ditches and scrapes; planned for 2021	Enhance degraded wetland to add vegetative and structural diversity
Camel Island Marsh	60	Enhancement	Improve 2,000 feet of existing dike and remove 1,900 feet of dysfunctional dike	Expand and enhance management capabilities
Frost Hill Marsh	47	Enhancement	Construct new dike and plug ditches	Expand emergent marsh and improve water level management capabilities
Marten's Marsh	165	Enhancement	Excavation, tree removal, dike repair/rehabilitation.	Expand emergent marsh and management ability

Approximately 8 acres of new dike are anticipated to be constructed as part of the above restoration and enhancement projects. Actual length, size, and acreage of new dikes may vary and will be determined as individual projects are designed. These projects should increase impounded wetlands from 1,290 to 1,343 acres, natural wetlands from 1,614 to 1,624 acres, and dikes from 79 to 87 acres.

BEST MANAGEMENT PRACTICES

Management activities within wetlands will take into consideration the timing of wildlife breeding and hibernation seasons and negative impacts will be minimized to the extent practical while still meeting goals for target species. All necessary permits will be obtained and associated public review will be welcomed.

MANAGEMENT EVALUATION

Current monitoring of wetland habitat use by wildlife at Northern Montezuma WMA includes surveys to document marshbird presence and impacts of management, wood duck nest box use, bald eagle and black tern nesting success and numbers, spring waterfowl counts, winter raptor surveys, and muskrat winter hut surveys. Current monitoring of restored wetlands and wetland vegetation includes water gauge readings, aerial imagery analysis, and plant assessments associated with formal waterbird surveys. These surveys should continue; however, additional surveys and methods may be needed to better understand species diversity and use.

RIVERS AND STREAMS

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

MANAGEMENT OBJECTIVES

- Maintain the quality of waters found on the WMA.
- Control aquatic invasive species.

DESCRIPTION OF EXISTING RIVER AND STREAM HABITAT AND TARGET SPECIES

Approximately 19 miles of rivers and streams occur on Northern Montezuma WMA, composed of the Seneca River/Barge Canal, Butler Creek, Crusoe Creek, Black Creek, Crane Brook, Spring Lake Outlet, Demont Creek, and their tributaries (Figures 8, 9, and 10). Stream length calculations include distances where streams flow through wetlands.

During normal flow levels, these rivers and streams compose approximately 112 acres of the WMA. Flooding events occur annually, causing rivers and streams to overflow their natural courses and temporarily increase in surface area (in most places it doubles, but in several places it quadruples or more). In late winter/early spring, while wetland impoundments are often still frozen, high waters in these waterways will flood hundreds of acres of adjacent fields and low-lying adjacent areas on the WMA, creating large expanses of shallow open water (sheet water) that provide easily attainable food resources to migrating waterfowl.

The Seneca River and Barge Canal are the largest watercourses on or adjacent to the WMA and surround Howland Island, flowing northeast (Photo 8). Although they share the same channel for much of their extent, they are separate as they encircle the island. The Seneca River flows along the west, north, and east sides of the island, the Barge Canal flows along the southeast side, and the Swiftwater Channel connects the two along the southwest side (Figure 9).

Aquatic, non-native, invasive plant species (e.g., water chestnut) are present in slow-moving streams on the WMA, especially the Seneca River. At some sites infestations are very thick, negatively affecting habitat values for wildlife. Efforts to control aquatic invasive plants is challenging, often requiring multiple treatments and integrated pest management principles. Past control efforts have included hand pulling and herbicide treatment, have shown temporary effectiveness, and need to be repeated and expanded.

Several species of fish inhabit the waters of the WMA. The Seneca River/Barge Canal near the WMA contains a diverse warm-water fish community, including most common species (e.g., brown bullhead, common carp, largemouth and smallmouth bass, northern pike, and walleye) and some less common species (e.g., bowfin and longnose gar). Lake sturgeon, a threatened species, is also known to inhabit this stretch of river and canal, and anglers should immediately release any accidentally caught. Several common warm-water species are also likely to occur in the other slow-moving streams on the WMA connected to the Barge Canal, such as Butler and Crusoe Creeks. Survey of fish within wetland impoundments has not occurred on the WMA, but brown bullhead, bluegill, pumpkinseed, chain pickerel, and various minnow and shiner species are likely present.



Photo 8: During normal water levels, the Seneca River averages 100 to 200 feet in width and provides important foraging habitat for fish-eating raptors, such as bald eagle and osprey.

Photo: Michael Palermo, DEC

Bald eagles and osprey, both iconic bird species of the MWC, depend upon this fish resource as a food source. Similarly, both mink and river otter spend much of their time foraging for fish in streams and rivers here. River otter was reintroduced to the MWC in the mid-to-late 1990s and a population is now successfully established.

Recent surveys for freshwater mussels have occurred in streams near the WMA and found sixteen native species and three non-native species. Of the native mussels found, one is threatened (green floater), two are high priority SGCN (rainbow and Wabash pigtoe), and three are SGCN (elktoe, lilliput, and pink heelsplitter). 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.

Non-native, invasive aquatic animals known to occur in watercourses on and near the WMA include one fish (round goby) and three mussels (Asian clam, quagga mussel, and zebra mussel). In some cases these species have significant negative impacts on native species, through both direct competition for resources and by altering habitat conditions. Fisheries management within

these waters is beyond the scope of this HMP; however, the potential effects of invasives on the fishery will be considered as habitat management actions are implemented on the WMA.

Table 8. Target species for river and stream management on Northern Montezuma WMA.

Target Group	Example Species	Beneficial Habitat Structure
Warmwater fish	Walleye, northern pike, largemouth & smallmouth bass, black crappie, yellow perch, bluegill, brown bullhead, bowfin, longnose gar.	Clean, undegraded water resources with native submerged aquatic vegetation and cover objects.
Native freshwater mussels	Eastern elliptio, eastern floater, eastern lampmussel, fat mucket, fluted shell, and giant floater.	Unpolluted, unfragmented waterways with undisturbed substrate and low rates of sedimentation.
Furbearers	Mink and river otter	Rivers and streams with abundant prey and den sites (both species use dens excavated by beaver or muskrat).
Fish-eating raptors	Bald eagle and osprey	Healthy fish populations.

MANAGEMENT HISTORY

Historically, much activity occurred to drain the wetlands of the MWC, including ditching of wetlands and dredging of waterways. During the 1800s, excavation of canals and the building of dams and locks on the Seneca River occurred to improve the transport of goods from the area to the Erie Canal. Berms were constructed and pumps installed in the floodplains of various streams to restrict and remove floodwaters to allow farming of the wetland soils. These activities left the hydrology of the MWC greatly altered and few streams unimpacted.

Several of the smaller streams here currently flow into ditches and wetland impoundments and portions of these small streams are sometimes inundated, depending on impoundment management and associated water levels. In some locations, DEC has excavated ditches and potholes in riparian marsh along streams, such as the Seneca River, in order to improve riparian habitats. DEC has avoided altering existing stream channels during wetland restoration projects. Activities to control aquatic invasive plant species have occurred on and near the WMA, including public events to pull water chestnut in the Seneca River/Barge Canal. Occasionally, beaver and dams have been removed from ditches if the outflow of a wetland impoundment was restricted.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figures 14 through 21):
 - Maintain the quality of waters found on the WMA.
 - All habitat management activities on the WMA will adhere to the Environmental Conservation Law and follow best management practices 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, flowering rush).
 - 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). All necessary permits will be obtained and associated public review will be welcomed.

MANAGEMENT EVALUATION

Streams on the WMA are not routinely surveyed to document fish diversity and abundance; however, the local lake sturgeon spawning population is monitored by the United States Geologic Survey. Monitoring of invasive vegetation control efforts will be necessary to ensure success and prevent future spread.

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. This includes floodplain and riparian forest stands.

Young forest: young or regenerating forested acres, which are typically aged 0-10 years since a disturbance or regeneration cut, depending upon the site conditions. May include both natural forest and plantations.

Young forest (forested wetland): young, regenerating forested wetland acres.

Forest management on Northern Montezuma 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.¹⁷ Currently, very little of this habitat occurs on this WMA; therefore, its creation is a priority.

¹⁷ Additional information about DEC's Young Forest Initiative and the YFI Strategic Plan is available online at <http://www.dec.ny.gov/outdoor/104218.html>.

MANAGEMENT OBJECTIVES

- Maintain 3,416 acres (94% of WMA forested acreage) in an intermediate or mature age class to provide a diversity of forest habitats to benefit associated wildlife.
- Increase young forest from 16 to 208 acres (6% of WMA forested acreage, 12% of upland forest) to improve habitat for young forest-dependent species.
- Monitor impacts from emerald ash borer and subsequent regeneration of ash-dominated stands. As needed, control invasive plants to ensure desirable tree and shrub regeneration.
- Encourage regeneration of native hardwoods (e.g., aspen, black cherry, red oak, swamp white oak, silver and sugar maple) to increase availability of mast and cover for wildlife.
- Encourage natural and artificial (planting) regeneration of conifers to increase overall conifer component on the WMA.
- Retain tree species uncommon to the region but present on the WMA (e.g., blackgum, chinquapin oak, Kentucky coffee tree, shellbark hickory) to benefit associated wildlife.
- Release apple trees in historic orchards to provide a soft mast food source for wildlife.
- Control non-native invasive vegetation to maintain forest biodiversity.

DESCRIPTION OF EXISTING FOREST HABITAT AND TARGET SPECIES

There are 3,604 acres of forest covering approximately 44% of Northern Montezuma WMA (Figures 14 through 21). Table 9 provides a summary of the forested areas, including the most common tree species present in each.

Forest is located on most parcels of the WMA, with the majority concentrated on Howland Island, South Butler, and Crusoe Lake units. Although forest cover in the surrounding landscape is mostly fragmented, much of the forest on the WMA is fairly well connected, with a few large blocks (100 to 400 acres). Several smaller stands also occur here and are found adjacent to or surrounded by fields and/or marshes. In many places, forests on the WMA are also contiguous with large, private forests, providing extensive tracts of forest cover uncommon in this part of the Finger Lakes.

Forested wetlands are abundant on the WMA, composing approximately 53% of WMA forest cover (Photo 9). Many of these forested wetland stands are floodplain forests and may be completely inundated during flooding events or may contain just saturated soils and scattered pools at other times. Much of the floodplain forest on the WMA is part of a significant ecological community tracked by the New York Natural Heritage Program.



Photo 9: The majority of forest cover on the WMA is forested wetland that is seasonally inundated.

Photo: John Mahoney, DEC

Forest communities on the WMA include bottomland hardwoods, successional northern hardwoods, oak-hickory, overgrown fruit orchards, and both hardwood and conifer plantations. Bottomland hardwoods is the dominant forest type on the property and the most abundant tree species present are silver and red maples, green ash, cottonwood, and swamp white oak. Upland stands are dominated by red oak, bitternut and shagbark hickory, red and sugar maple, beech, and aspen. The most common plantation types on the WMA are black locust, black walnut, and Norway spruce. Black locust has widely naturalized here and is a concern in some areas. Aside from plantations, conifers are a very minor component of forests on the WMA and typically are scattered cedar, hemlock, and white pine. In addition to these dominant species, tree diversity on the WMA is exceptionally high and includes over 40 identified species; notable uncommon species include Kentucky coffee tree, chinquapin oak, blackgum, and shellbark hickory.

Some forested wetland stands are located within wetland impoundments, where water levels are actively manipulated, such as Malone Marsh. These forest stands are managed as part of the impoundment unit, where water levels are adjusted to achieve vegetation objectives. In most cases tree establishment is not desired in managed marshes, as emergent wetland is the primary habitat goal, but these stands are intended to persist, in part, for their value as wood duck nesting habitat.

The majority of stands on the WMA are composed of poletimber or sawtimber sized trees (Photo 10). Some stands contain exceptionally large trees for New York; this is attributed to the excellent growing conditions here (e.g., abundant moisture and nutrients), and in some cases old age (100+ years, Photo 11). This composition of large trees within large blocks of forest (100+ acres) associated with wetlands, provides uncommon and important habitat for some wildlife, especially the cerulean warbler. The MWC is one of just a few sites in New York where exceptional numbers of breeding cerulean warblers occur.



Photo 10: Most stands here contain poletimber or sawtimber sized trees and many stands are part of large forested blocks (100+ acres).

Photo: Michael Palermo, DEC

Young forest stands currently comprise less than 1% of the WMA's forested area. In recent decades throughout the Northeast, young forests have declined due to forest maturation and fewer natural and human-caused disturbances.

Several wildlife species associated with young forest have also declined due to this loss of habitat. It is an important goal of this plan to increase the acreage of young forests while protecting mature stands of exceptional habitat value, especially those important to breeding cerulean warblers.

Several stands here, both upland and wetland, are degraded due to invasive plant species in the understory (e.g., buckthorn, honeysuckle, multiflora rose, and swallow-wort). Correcting these negative attributes provides a good opportunity to create young forest habitat while improving stand quality.

The imminent, widespread infestation of emerald ash borer (EAB) is expected to cause extensive mortality of ash trees and will significantly alter forest composition here. Ash is a dominant or codominant species in many stands on the WMA, with green and black ash in forested wetlands, and white ash in upland forests.



Photo 11: Some stands on the WMA contain uncommonly large trees that provide important late-successional forest habitat structure.

Photo: Tom Rawinski, United States Forest Service

The primary concern is that this disturbance could promote the spread and establishment of non-native, invasive plant species rather than native trees and shrubs. Monitoring forest regeneration and controlling invasive vegetation will be important.

Table 9. Summary of the acreage and dominant overstory species for each forest type present on Northern Montezuma WMA.

Forest Type	Acres (as of 2018)	Desired Acres	Overstory species
Natural forest (mature/intermediate)	1,633	1,472	Red and sugar maples, red oak, black cherry, black locust, aspen
Plantation (mature/intermediate)	56	51	Norway spruce, larch, white & red pines, black locust, black walnut
Forested wetland (mature/intermediate)	1,899	1,893	Silver maple, ash, cottonwood, bur and swamp white oaks, sycamore
Young forest	16	202 ^a	Black locust, aspen
Young forest (forested wetland)	0	6	Currently not present on WMA
Total Forested Acres:	3,604	3,624^b	

^a Th acreages may vary depending on the severity of EAB infestation and its effects on forest structure. In some cases, where ash is dense, the loss of ash may result in the establishment of additional young forest.

^b The change in total forested acres is due to the planned reversion of shrubland (3 acres), grassland (13 acres), and agricultural land (9 acres) to forest, and the planned conversion of forest to grassland (5 acres).

Forest Management Target Species:

To address the diverse needs of various wildlife, the target species for forest habitat management on Northern Montezuma WMA are categorized by the dominant forest types present and are

shown in Table 10. These species were designated as targets because they are SGCN and/or popular game animals that have well-studied habitat requirements with established best management practices. These species were also selected because they can be considered umbrella species, meaning habitat management to maintain, enhance, or create their habitat will also benefit numerous other species that utilize similar habitats.

Table 10. Target species for forest management on the WMA and their habitat needs.

Forest Type	Target Species	Beneficial Habitat Structure
Forested wetland	Woodland salamanders	<i>Breeding</i> : shaded waterbodies lacking fish.
		<i>Non-breeding</i> : nearby forested uplands with undisturbed soil and downed woody debris.
	Wood duck	<i>Nesting</i> : snags or live trees with cavities near accessible water.
		<i>Brood-rearing</i> : wetland or other waterbody with abundant aquatic invertebrates.
	Prothonotary warbler	<i>Nesting</i> : mature, flooded bottomland hardwood forest and riparian forests near large lakes and rivers. Abundant tree cavities or nest boxes are required.
	Mature upland forest	Wild turkey
<i>Nesting</i> : varied, includes woody debris cover and overturned tree root wads in mature forest, to dense areas in young forest.		
<i>Brood-rearing</i> : small herbaceous openings near forest.		
Wood thrush		<i>Nesting</i> : hardwood forest of intermediate to old age with tall shrub and sapling layer to conceal nest.
		<i>Foraging</i> : thick leaf litter on open forest floor for invertebrates, and fruit-bearing trees and shrubs for migration.
Cerulean warbler		<i>Nesting</i> : well-spaced, large diameter trees in stands with uneven-aged structure, including canopy gaps and tall trees with exposed perches.
	<i>Foraging & post-fledging</i> : high density understory vegetation.	
Young forest	American woodcock	<i>Nesting</i> : Young, open, second growth woodlands.
		<i>Foraging</i> : Moist, rich soils with dense overhead cover.
		<i>Singing ground</i> : open areas, such as fields or recent clearcuts.
	Ruffed grouse	<i>Drumming</i> : downed trees surrounded by small diameter woody cover with high stem density.
		<i>Nesting</i> : young, open forest stands or second growth woodlots.
		<i>Brood-rearing</i> : herbaceous ground cover with a high midstory woody stem density.

The MWC is one of the few breeding sites in New York with exceptional numbers of cerulean warblers (SGCN, special concern) and consistent occupancy of prothonotary warblers (high priority SGCN). Cerulean warblers utilize deciduous forests that contain well-spaced, large diameter trees, and favor stands with the complex canopy structure characteristic of uneven-aged stands. Prothonotary warblers require mature forest that is situated in close association with water (preferably flooded) that contains large dead or live trees that provide nesting cavities.

Forests of the MWC have been identified as important stopover habitat for migrating songbirds. These species concentrate in areas of high-quality habitat to rest and refuel before they continue traveling. In the fall, an especially important component of this stopover habitat is a calorie-rich, soft-mast food source (e.g., berries), which is abundant in many stands on the WMA (e.g., spicebush, gray dogwood, and viburnums). These native shrubs should be encouraged, and non-native invasive shrubs should be controlled.

Young forest habitat has been declining throughout the state in recent decades and wildlife species dependent upon that habitat have experienced significant declines, including multiple SGCN (e.g., Canada warbler has declined 62% since 1970).¹⁸ Establishing a higher percentage of this habitat type on the WMA is a priority and will benefit multiple SGCN, as well as more common wildlife species, such as cottontail, wild turkey, and white-tailed deer.

It is important to note that young forest habitat is also beneficial to many species typically associated with mature forest. The abundant and diverse food (e.g., berries, catkins, insects) present in young forests attract juvenile interior nesting songbird species (e.g., scarlet tanager and wood thrush) during critical growth periods, as well as juveniles and adults preparing for energy intensive migrations.

A variety of pollinator species, such as bees and butterflies, are also expected to benefit from the abundance of flowering plants in young forests. Pollination is critical to the reproduction of wild and cultivated plants and providing habitat to sustain these pollinator populations is important both ecologically and economically.¹⁹

MANAGEMENT HISTORY

The lands of and around the WMA were originally inhabited by the indigenous Cayuga Nation, who utilized and manipulated the forest. In order to increase food sources, they actively altered forest composition to select for and promote fruit and nut trees. They also used controlled fires to maintain or alter conditions to produce food plants and improve game habitat and hunting.

European settlement in this part of New York began in the late 1700s, which led to extensive logging and forest clearing during the 1800s (forests were cleared to create agricultural fields). By the late 1800s, some of these fields were already abandoned and naturally reverting back to forest, and around the 1930s this abandonment and reforestation significantly increased. Most of the WMA forest shares this history of heavy logging or complete clearing followed by reforestation; however, some areas of floodplain forest may not have been cut.

¹⁸ USGS Breeding Bird Survey data. This can be viewed at <https://www.mbr-pwrc.usgs.gov/bbs/bbs.html>.

¹⁹ The NYS Pollinator Protection Plan can be viewed at <http://www.dec.ny.gov/animals/279.html>.

State management began here in the 1930s and many activities have occurred since to manage forest habitats. The Civilian Conservation Corps (CCC) was encamped on Howland Island from the early 1930s to the early 1940s and planted hundreds of thousands of trees. Occasional small timber harvests (generally less than 10 acres) were relatively consistent from acquisition up until the early 1990s. Larger timber harvests have been less frequent, with a few sizeable harvests (40+ acres) occurring in the 1970s, and a 62-acre harvest in 1989.

Very little forest cutting has occurred on the WMA in the past 25 years. Recent cuts include a hedgerow removal in 2005, a 1-acre cut near the Montezuma Audubon Center in 2012, an 11-acre black locust cut in 2013, and less than 1-acre cut in 2017. Numerous trees have been planted in association with some of these cuts and protective tubes have been installed to prevent deer browse damage. In 2019, an 8-acre agricultural field was planted with tree seedlings to establish young forest.

Herbicides have been applied in many stands on the WMA (regardless of whether the stand was cut or not) to control non-native invasive plants. This has helped to maintain native plant diversity; however, there are still several stands that have understories dominated by multiflora rose, honeysuckle, and/or buckthorn.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

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

- **Management planned for 2020-2024** (Table 11, Figures 16, 18, and 19):
 - Clearcut 40 acres (Stands A-6, A-14, A-18, A-30, and I-4)
 - Seed tree harvest 36 acres (Stands A-11, A-13, D-1, and E-8)
 - Apple tree release 11 acres (Stand C-7)
 - Selection harvest 9 acres (Stands A-8 and A-9)
- **Management planned for 2025-2029** (Table 12, Figures 15 through 20):
 - Clearcut 22 acres (Stands B-2.1, B-2.2, F-4, G-11, and I-13)
 - Seed tree harvest 43 acres (Stands B-14, F-12, H-5, I-10, and J-16)
 - Shelterwood harvest 10 acres (Stand H-2)
 - Apple tree release 7 acres (Stand E-2)
 - Crop tree release 3 acres (Stand B-2.2)
 - Timber stand improvement of 35 acres (Stands D-3, D-6, G-7, and G-9)
 - Convert to grass 5 acres (Stand F-5)
- **Ongoing management throughout 2020-2029** (Figures 14 through 21):
 - Maintain quality of late-successional Stands A-21, C-12, & C-18 (162 acres):
 - As needed, control beech thickets associated with beech bark disease to promote regeneration of desirable shade-tolerant trees (e.g., sugar maple and basswood).
 - Monitor for invasive vegetation throughout all forest stands and as needed control mechanically, biologically, with herbicide, and/or prescribed fire.
 - Priorities:
 - Monitor EAB impacts in ash-dominated stands and subsequent forest regeneration to ensure desirable regeneration.
 - Control swallow-wort on Howland Island.
 - Reduce the overall extent of black locust on the WMA.

Table 11. Forest management schedule for the first five-year period of this HMP (2020-2024).

Stand	Acres	Size Class	Forest Type		Treatment Type	Figure / Page
			Current	Future		
A-6	6	Poletimber 6"-11" DBH	Other (Locust)	Young Forest	Clearcut	Fig. 18, Pg. 78
A-8	6	Small Sawtimber 12"-18" DBH	Northern Hardwoods	Northern Hardwoods	Single Tree Selection	Fig. 19, Pg. 79
A-9	3	Small Sawtimber 12"-18" DBH	Pioneer Hardwood	Northern Hardwoods	Single Tree Selection	Fig. 19, Pg. 79
A-11	9	Poletimber 6"-11" DBH	Other (Locust)	Young Forest	Seed Tree	Fig. 19, Pg. 79
A-13	8	Poletimber 6"-11" DBH	Other (Locust)	Young Forest	Seed Tree	Fig. 19, Pg. 79
A-14	10	Small Sawtimber 12"-18" DBH	Other (Locust)	Young Forest	Clearcut	Fig. 19, Pg. 79
A-18	3	Small Sawtimber 12"-18" DBH	Aspen	Young Forest	Clearcut	Fig. 19, Pg. 79
A-30	14	Poletimber 6"-11" DBH	Aspen	Young Forest	Clearcut	Fig. 19, Pg. 79
C-7	11	Poletimber 6"-11" DBH	Other (Apple/Ash)	Young Forest	Apple Tree Release	Fig. 19, Pg. 79
D-1	14	Poletimber 6"-11" DBH	Ash	Young Forest	Seed Tree	Fig. 19, Pg. 79
E-8	5	Small Sawtimber 12"-18" DBH	Other (Locust)	Young Forest	Seed Tree	Fig. 19, Pg. 79
I-4	7	Poletimber 6"-11" DBH	Pioneer Hardwood	Young Forest	Clearcut	Fig. 16, Pg. 76

Table 12. Forest management schedule for the second five-year period of this HMP (2025-2029).

Stand	Acres	Size Class	Forest Type		Treatment Type	Figure / Page
			Current	Future		
B-2.1	4	Poletimber 6"-11" DBH	Other (Locust)	Young Forest	Clearcut	Fig. 18, Pg. 78
B-2.2	6	Seedling/Sapling <6" DBH	Young Forest	Young Forest Black Locust	Clearcut (3 ac.), Crop Tree Release (3 ac.)	Fig. 18, Pg. 78
B-14	6	Small Sawtimber 12"-18" DBH	Walnut / Basswood	Young Forest	Seed Tree	Fig. 19, Pg. 79
D-3	8	Large Sawtimber >25" DBH	Oak / Shrub	Oak	Timber Stand Improvement	Fig. 19, Pg. 79
D-6	11	Poletimber 6"-11" DBH	Ash / Oak	Oak	Timber Stand Improvement	Fig. 19, Pg. 79

Table 12. Continued

Stand	Acres	Size Class	Forest Type		Treatment Type	Figure / Page
			Current	Future		
E-2	7	Poletimber 6"-11" DBH	Transition Hardwood	Young Forest	Apple Tree Release	Fig. 19, Pg. 79
F-4	6	Small Sawtimber 12"-18" DBH	Aspen	Young Forest	Clearcut	Fig. 18, Pg. 78
F-5	5	Small Sawtimber 12"-18" DBH	Conifer Plantation	Grassland	Convert to Grassland	Fig. 18, Pg. 78
F-12	8	Poletimber 6"-11" DBH	Ash	Young Forest	Seed Tree	Fig. 18, Pg. 78
G-7	4	Seedling/Sapling <6" DBH	Alder / Buckthorn	Young Forest	Timber Stand Improvement	Fig. 17, Pg. 77
G-9	12	Seedling/Sapling <6" DBH	Buckthorn / Aspen	Young Forest	Timber Stand Improvement	Fig. 17, Pg. 77
G-11	7	Poletimber 6"-11" DBH	Aspen	Young Forest	Clearcut	Fig. 20, Pg. 80
H-2	10	Small Sawtimber 12"-18" DBH	Conifer Plantation	Conifer Plantation	Shelterwood	Fig. 20, Pg. 80
H-5	16	Poletimber 6"-11" DBH	Black Locust	Young Forest	Seed Tree	Fig. 20, Pg. 80
I-10	9	Seedling/Sapling <6" DBH	Buckthorn / Cottonwood	Young Forest	Seed Tree	Fig. 16, Pg. 76
I-13	2	Small Sawtimber 12"-18" DBH	Transition Hardwood	Young Forest	Clearcut	Fig. 16, Pg. 76
J-16	4	Small Sawtimber 12"-18" DBH	Pioneer Hardwood	Young Forest	Seed Tree	Fig. 15, Pg. 75

Stand locations and planned management actions are also summarized in Figures 14 through 21. Specific forest stand descriptions and detailed management prescriptions will be prepared for each proposed forest management area prior to implementation (see template, Appendix C). Most mature forest stands on the WMA are not planned to receive a cutting treatment and will be managed passively, maintaining current habitat values for the next 10 years. Planned timber management would convert 6% of WMA forested acreage (12% of upland forest) to young forest. Establishing more than 6% would be challenging here because of difficult access into wetland stands, the exceptional habitat value of some existing mature stands, and avoidance of stands occupied by breeding cerulean warblers (Species of Special Concern, SGCN).

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

- **Management planned for 2020-2024 (Table 11, Figures 16, 18, and 19):**
 - **Stand A-6 (6 acres):** This clearcut targets a part of this stand that has high stocking of black locust. Desirable hardwoods should be retained and planting a component of conifer seedlings should be considered.

- **Stand A-8 (6 acres):** This is a sawtimber northern hardwood stand composed mostly of sugar maple and bitternut hickory. Individual trees will be harvested to promote sugar maple regeneration. This harvest will remove poor quality / low vigor trees to maintain a mature aged forest.
- **Stand A-9 (3 acres):** This is a sawtimber stand composed mostly of black cherry, ash, and black locust. A selection of ash and locust trees will be harvested (maintaining a canopy dominated by cherry) to stimulate the regeneration of shade-tolerant tree species (sugar maple, basswood).
- **Stand A-11 (9 acres):** This stand is dominated by black locust, black cherry, and basswood. A seed tree harvest is planned to remove black locust while retaining cherry and basswood.
- **Stand A-13 (8 acres):** This stand is dominated by black locust and ash with a component of hickory. A seed tree harvest is planned to remove black locust and ash while retaining hickory.
- **Stand A-14 (10 acres):** This is a northern hardwood stand with a component of black locust. This stand will be clearcut to regenerate black locust. A few sporadic apple trees exist and will be retained and released. Desirable hardwoods should be retained.
- **Stand A-18 (3 acres):** This is a hardwood stand of mixed upland and lowland species. A portion of this stand with aspen will be clearcut to promote aspen regeneration.
- **Stand A-30 (14 acres):** This stand primarily contains pole-sized ash, aspen, and elm. A few patch clearcuts (2 to 5 acres each) are intended to regenerate and expand areas of aspen. Hawthorn and other native shrubs should be retained.
- **Stand C-7 (11 acres):** Nearly 50% of this stand is ash, with much of the remainder being hawthorn and apple. This treatment is intended to remove competition around and overtopping hawthorns and apples, and to control invasive vegetation that would likely dominate once the ash succumb to EAB.
- **Stand D-1 (14 acres):** Over half of this stand is composed of ash, while the rest is a mix of apple, hickory, oak, and butternut. A seed tree harvest will retain desirable mast trees and control invasive vegetation that would likely dominate once the ash succumb to EAB.
- **Stand E-8 (5 acres):** This is a hardwood mix stand with mostly ash, hickory, and black locust with a component of sugar maple. A seed tree cut of 5 acres will target ash and black locust while retaining sycamore, hickory, and maple.
- **Stand I-4 (7 acres):** This is a mostly poletimber stand of maple, ash, and aspen, with areas of sparse cherry. A clearcut will promote aspen regeneration.
- **Management planned for 2025-2029 (Table 12, Figures 15 through 20):**
 - **Stand B-2.1 (4 acres):** This is a pole-sized stand of black locust with some aspen. A clearcut is planned to promote aspen regeneration. Planting of conifer seedlings should be considered.
 - **Stand B-2.2 (6 acres):** This is a seedling/sapling stand of black locust that was cut in 2013. A portion of this stand (3 acres) was treated with herbicide to kill competing undesirable vegetation and locust are now between 15 and 20 feet tall in this section. A crop tree release will promote the growth of the best locust.

The portion that was not previously treated with herbicide (3 acres) will be clearcut with a forestry cutter followed by selective herbicide application to promote black locust regeneration and kill competing undesirable vegetation.

- **Stand B-14 (6 acres):** This stand is mostly composed of sawtimber black walnut and basswood, with some ash and hickory. A seed tree harvest will retain select walnut and basswood, and control understory invasive plants. Patches of white cedar should be retained.
- **Stand D-3 (8 acres):** This stand is highly variable with large diameter red oak in the southern portion and dense multiflora rose and honeysuckle in the northern portion. This TSI treatment targets the northern portion of this stand where the canopy is fairly open and should improve cerulean warbler habitat by controlling invasives and promoting oak establishment. Swallow-wort is present in the stand.
- **Stand D-6 (10 acres):** This is a mixed hardwood stand with a dense understory of multiflora rose, honeysuckle, and buckthorn. The canopy is dominated by ash and oak, and the ash component is expected to die in the next few years. A TSI treatment is planned to control invasive vegetation and promote desirable regeneration.
- **Stand E-2 (7 acres):** This treatment intends to release apple trees from competition.
- **Stand F-4 (6 acres):** This stand contains a mix of sawtimber swamp white oak and aspen. Two patches about 3 acres each will be clearcut, targeting areas of dense aspen and avoiding the sections dominated by oak. Performing this harvest in winter should stimulate the dense regrowth of aspen.
- **Stand F-5 (5 acres):** This stand is a mature Norway spruce plantation. A clearcut and conversion to grassland is planned to connect the adjacent grasslands, which will benefit grassland-dependent breeding birds.
- **Stand F-12 (8 acres):** The majority of this stand is composed of ash (75%+) and is expected to significantly decline in upcoming years due to EAB. A seed tree harvest is planned to remove competition around healthy black cherry and red maple, and to control invasive plants in the understory in order to prevent their domination of the aftermath forest.
- **Stand G-7 (4 acres):** This stand is primarily composed of alder and buckthorn with some aspen. A timber stand improvement cut is planned to control buckthorn while regenerating and stimulating the spread of alder and aspen. Some desirable hardwoods (walnut, oak) are present and will be released from competition.
- **Stand G-9 (12 acres):** This stand is composed of aspen and cottonwood with some bur oak. Buckthorn comprises about 20% of the stand. A timber stand improvement cut is planned to control buckthorn while regenerating and stimulating the spread of aspen. Select cottonwood and bur oak will be released from competition.
- **Stand G-11 (7 acres):** This is a poletimber stand composed primarily of red maple and aspen. Approximately 9 acres of patch cuts (1.5 to 2 acres each) will regenerate dense aspen.

- **Stand H-2 (10 acres):** This is a mixed softwood plantation of white pine, Norway spruce, and red pine. A shelterwood harvest will establish natural regeneration of pine and spruce mixed with native hardwoods.
- **Stand H-5 (16 acres):** This stand likely grew from an abandoned field. It is a natural stand with black locust, black walnut, and other pioneer hardwoods. A seed tree harvest will promote pioneer hardwoods while retaining black walnut for wildlife mast. Control of the invasive understory will be needed.
- **Stand I-10 (9 acres):** Nearly half of this stand is buckthorn and the other half is mostly cottonwood with some aspen. A seed tree harvest is planned to control buckthorn, regenerate and spread aspen, and retain large cottonwoods.
- **Stand I-13 (2 acres):** A clearcut is planned to regenerate patches of aspen within this stand.
- **Stand J-16 (4 acres):** This stand is poorly stocked and is dominated by red and silver maples, with a component of aspen. Significant buckthorn is present in the understory. A seed tree harvest is planned to control invasive vegetation while promoting regeneration of maples and aspen.

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 13).

Table 13. Best Management Practices for forest management on WMAs.

Resource	Guidance Document ²⁰
Soils	<i>Rutting Guidelines for Timber Harvesting on Wildlife Management Areas</i>
Water quality	<i>NYS Forestry Best Management Practices for Water Quality</i>
Wildlife	<i>Retention Guidance on Wildlife Management Areas</i>
Plantations	<i>Plantation Management Guidance on Wildlife Management Areas</i>

Wildlife Considerations:

Sensitive species known to be present on or near Northern Montezuma WMA that warrant special consideration include:

- *Bald eagle.* Eagles are known to nest on and near the WMA. Forest management will avoid disturbing any nesting should it occur within or adjacent to a stand with proposed timber harvest actions. This may include delaying nearby harvest actions until after the breeding season and/or the maintenance of a forested buffer around the nest.
- *Forest raptors.* Pre-timber harvest surveys will be conducted in suitable habitat and if nesting is documented, harvest activities nearby may be adjusted to occur outside the breeding season and nest buffers may be established.
- *Indiana, northern long-eared, and tri-colored bats.* Indiana and tri-colored bats are known to occur on and near the WMA during the summer. To avoid impacts, timber harvests will only take place between October 1 and March 31 in areas where these bats are considered present.

²⁰ All guidance documents referenced here are available online at <http://www.dec.ny.gov/outdoor/104218.html>.

- *Blue-spotted and Jefferson salamanders.* These salamanders breed in vernal pools and then spend the majority of their adult lives in the surrounding uplands. In stands planned for timber harvest, vernal pools should receive at least a 100-foot buffer where 75% of canopy cover is retained and soil/leaf litter disturbance is minimized.
- *Cerulean and prothonotary warbler.* A point-count survey to detect presence may be utilized in suitable habitat prior to a timber harvest. If detected, the harvest may be conducted outside the breeding season or may avoid the occupied habitat.

Considering the needs of various at-risk species that occupy differing forest habitats can be a challenge. Two targets for forest management on the WMA (ruffed grouse and cerulean warbler) have varying habitat requirements that may conflict and merit further consideration. Overall, because of planned timber harvests and natural processes, habitat for both species is expected to be enhanced over the time span of this HMP:

- The majority of forest on the WMA is not planned to receive a cutting treatment, including all stands identified as important to breeding cerulean warblers (CERW).
- The planned selection harvests will provide lasting enhancement of CERW habitat by providing increased spacing between trees. This should create nesting structure in stands currently not known to be occupied by breeding CERW.
- Most harvests planned to create young forest (grouse habitat) are in stands that do not contain the structure favored by CERW.
- EAB-related ash mortality could improve habitat for CERW in hundreds of acres of unmanaged stands as individual ash trees die and produce canopy gaps.

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

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 Northern Montezuma WMA must consider these forest pests, diseases, and invasive species and ensure that measures are taken to control their presence or prevent their establishment.

Infestations of introduced insects such as emerald ash borer (EAB), gypsy moth, and pear thrips, are of present concern and bear persistent monitoring. Gypsy moth and pear thrips densities fluctuate and occasionally can reach outbreak levels where complete defoliation of host trees can occur. Gypsy moth most often attacks oak and aspen while pear thrips favors sugar maple.

EAB is present on the WMA; the infestation is expected to increase in the near future and cause widespread ash mortality within the next decade, which may significantly alter forest composition in some stands. However, these changes may benefit some wildlife species; recent studies have shown increases in abundance for some woodpecker and nuthatch species after

EAB infestation. Likewise, cerulean warblers are known to respond positively to reduction in forest stocking levels. Monitoring forest regeneration and controlling invasive vegetation in stands effected by EAB will be important. In forested wetlands with high ash density, ash may naturally be replaced by cattail and reed canarygrass, changing the site into emergent marsh.

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

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

Invasive plants that are known to be on or near the forested areas of Northern Montezuma WMA include: autumn olive, black locust, common reed, common and glossy buckthorns, garlic mustard, honeysuckle, Japanese barberry, Japanese stiltgrass, knotweed, multiflora rose, Norway maple, and swallow-wort.

Black locust is a regulated species in NY because it is not native (although it is native in other eastern states) and spreads aggressively, particularly in disturbed sites and fields. This species was extensively planted on the WMA in the mid-1900s and has widely naturalized since. Although locust provides food and cover beneficial to some wildlife (including cerulean warbler), a goal of this plan is to reduce its overall extent on the WMA to decrease negative impacts. Eradication is not feasible nor desired here, but control should occur at field edges (to reduce invasion pressure) and in some forest stands heavily dominated by locust (to increase tree diversity). Black locust is shade-intolerant and should naturally decrease as a component in some stands overtime as they age, die, and are replaced by shade-tolerant tree species. Some stands on the WMA will be actively managed to regenerate locust and establish young forest habitat, taking advantage of this species' prolific root suckering habit in high light conditions.

Pre- and Post-treatment Considerations:

Regeneration of a forest stand requires suitable conditions to ensure that desired species will succeed. Non-native invasive vegetation and undesirable native plants (e.g., beech, ironwood, poison ivy, striped maple, and wild grape) are present in many stands here and have the potential to interfere with forest regeneration. Although these native species have many beneficial qualities, they are considered undesirable when they have the potential to decline forest health and interfere with forest regeneration. If invasives or other undesirable species become significantly abundant, pre-treatment herbicide application may be necessary.

Conifers are currently a minor component of forests on the WMA (1%) and increasing this component would be beneficial. Stand H-2 is a conifer plantation planned to be harvested but it is intended to naturally regenerate as a mixed conifer/hardwood stand. Although 5 acres of conifer plantation (Stand F-5) are planned to be converted to grassland, this loss of conifers will

be compensated by planting conifers in fields planned to revert to forest (22 acres). The regeneration of naturally occurring conifers (e.g., cedar, hemlock, and white pine) should be encouraged throughout the WMA wherever practical. Some non-native conifers (e.g., Norway spruce) may also be regenerated and/or planted.

Deer herbivory following a timber harvest is expected to be an issue here. However, the high fertility of soils may produce seedlings that grow above deer browse height before regeneration is suppressed. If it is determined that herbivory is intense enough to prevent regeneration of desired tree species, installation of tree shelters or fencing may be necessary (Photo 12). Efforts to promote deer hunting on the WMA to manage the local deer herd at desired levels will continue and could be expanded.



Photo 12: These tree tubes were installed on the WMA to protect tree seedlings from deer browse damage.

Photo: Emily Bonk, DEC

Prescribed fire would be a valuable tool to utilize on the WMA, both to control invasive understory growth and to promote a fire-adapted forest community, such as oak and hickory.

If it is determined post-treatment that desired tree species are not regenerating in a high enough frequency, or that undesirable species are dominating the area and suppressing regeneration, then the stand may be re-treated. This may include mechanical and/or herbicidal control of undesirable species, removal of additional trees to increase available sunlight, scarification of forest floor to stimulate seedling establishment, and/or the direct planting of desired tree species.

Pre- and post-treatment actions to promote the desired forest regeneration will be addressed in detail in the silvicultural prescriptions.

MANAGEMENT EVALUATION

In order to determine whether the desired forest regeneration and wildlife response(s) have been achieved by the management outlined above, pre- and post-management assessments will be conducted in accord with guidelines established in the Young Forest Initiative Monitoring Plan²¹. The Monitoring Plan provides statewide standards for evaluating vegetation and target wildlife responses to forest management to determine if the outcome is as prescribed. Regeneration assessments will be conducted within one year of harvest completion, three and five years after the harvest, or until the forester determines adequate natural or artificial (i.e., planting) regeneration has been securely established.

²¹ Available online at <http://www.dec.ny.gov/outdoor/104218.html>.

YFI wildlife target species selected for Northern Montezuma WMA, which will be assessed to determine response to management, include American woodcock and ruffed grouse. Monitoring of these species will include woodcock singing-ground surveys and ruffed grouse drumming surveys to determine habitat use and abundance in response to forest management. The establishment of periodic bird point counts and amphibian and reptile surveys in all forest types would be beneficial to better understand species diversity and use.

SHRUBLAND

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

MANAGEMENT OBJECTIVES

- Maintain approximately 33 acres of shrubland habitat to provide dense cover, abundant soft mast, and an interspersed of grass and wildflowers that benefit associated wildlife.
- Allow 3 acres of shrubland to revert to forest.
- Control invasive vegetation and promote dominance of native shrub species.

DESCRIPTION OF EXISTING SHRUBLAND HABITAT AND TARGET SPECIES

There are 36 acres of shrubland on Northern Montezuma WMA (Figures 14 through 21). These shrublands originated from grassland and agricultural fields not being maintained and naturally succeeding to a shrub-dominated plant community.

Stands of shrubland on the WMA are typically small, less than a few acres each. The largest concentration of this habitat occurs adjacent to Helmer Marsh and covers approximately 8 acres (Photo 13). These stands vary from sparse shrubs and grasses to dense shrub thickets with scattered mature trees.

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

Shrublands provide valuable habitat for several wildlife species because



Photo 13: This shrubland provides dense cover important to many wildlife species for breeding and foraging. Controlling invasive shrub species will enhance habitat values and set-back succession.

Photo: Michael Palermo, NYSDEC

they provide dense cover and contain abundant food (e.g., twig browse, insects, berries). The prolific flowers produced by these shrubs are also highly beneficial to pollinator species (Photo 14).



Photo 14: In spring, shrublands provide prolific blooms important to pollinators, and later in the summer and fall provide important soft mast (fruit) for songbirds and other wildlife.

Photo: Michael Palermo, NYSDEC

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

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

Extensive scrub-shrub wetland exists on the WMA (approximately 390 acres) and is described in the Wetlands section. These shrub swamps provide valuable early-successional habitat that also benefits several wildlife species that inhabit upland shrublands and young forests.

Table 14. Target species for shrubland management on Northern Montezuma WMA.

Target Species	Beneficial Habitat Structure
American woodcock	<i>Nesting:</i> Stands of an acre or more with woody stem density of at least 6,000 stems per acre, on mostly dry soil.
	<i>Foraging:</i> Moist, rich soils with dense overhead cover and abundant earthworms.
	<i>Singing ground:</i> open areas, such as fields or recent clearcuts near nesting and foraging habitat.
Eastern cottontail rabbit	<i>Breeding and escape cover:</i> 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.
	<i>Foraging:</i> 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. A particular difference is the woodcock's need for herbaceous openings within a shrubland for singing and courtship. 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

Past DEC management of Northern Montezuma WMA has included the maintenance of shrubland areas and the planting of wildlife food and cover shrubs. Shrubs were often planted along woodland edges to enhance the transition zone between habitat types. Once considered benign and beneficial, non-native species were sometimes included in these plantings. This was likely a significant source of some invasive shrub species that have become established here.

The majority of shrubland acreage on the WMA was established through natural reversion of grasslands and old agricultural fields. Several of these areas have been periodically maintained with a brush hog or other forestry equipment, including efforts to control invasive species.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figures 14 through 21):
 - Throughout shrubland stands, perform maintenance actions as needed.
 - 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.
 - Young trees that would eventually dominate and shade out shrubs should be selectively cut; stumps should be removed or cut low to facilitate future maintenance. Small stands of trees may be left as islands.
 - When and where feasible prescribed fire may be utilized.
 - Throughout shrubland stands, promote the dominance of native shrub species.
 - Control of invasive vegetation will be accomplished through mechanical removal, prescribed fire, and/or herbicide application. Native shrubs may be planted to replace invasives.
 - Habitat type conversion to grassland for a few years may be necessary to effectively control invasives. Either the converted stand or another area of grassland would then be planted or allowed to revert to a native shrubland to maintain acreage of each habitat type.
 - Allow 3 acres of shrubland (Stand G-950) to revert to forest (Figure 16).
 - This shrubland contains an abundance of trees that are expected to become dominant in the near future. Maintaining this stand as shrubland is not feasible due to difficult access across expansive wetlands.

BEST MANAGEMENT PRACTICES

In order to minimize disturbance to shrubland wildlife 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. It is often most effective to cut well-established invasive shrubs between flowering and fruit set to prevent seed production and dispersal.

MANAGEMENT EVALUATION

Current monitoring of shrubland habitat on the WMA is informal and data are often derived opportunistically and will be continued. However, the establishment of periodic wildlife surveys would be beneficial to better understand species diversity and habitat use.

GRASSLAND

Grasslands are open, grassy areas with a minimal amount of shrub and tree cover (<35%) that are maintained, or could be maintained, without significant brush cutting. Grasslands may include areas where hay is harvested by late season mowing once per year.

MANAGEMENT OBJECTIVES

- Increase grassland acreage from 458 acres to 595 acres by converting 145 acres of agricultural land and 5 acres of forest to grassland.
- Allow 13 acres of grassland to revert to young forest to reduce forest fragmentation and improve forest habitat connectivity.
- Maintain grasslands to encourage favorable herbaceous species and prevent reversion to shrubland and forest.
- Encourage a diversity of grasses and forbs beneficial to target species.
- Identify and control invasive plant species to prevent their dominance in fields.

DESCRIPTION OF EXISTING GRASSLAND HABITAT AND TARGET SPECIES

There are currently 458 acres of grassland habitat on Northern Montezuma WMA (Figures 14 through 21). This is composed of several small fields (1 to 25 acres) and a few large fields (25+ acres).

The numerous small grassland fields here are typically located adjacent to forest or wetland and provide valuable habitat for several wildlife species associated with these other habitat types. Fields near forest cover are often used for deer fawning and turkey brood rearing. Fields adjacent to wetlands provide nesting habitat for waterfowl (Photo 15).

Grasslands also provide habitat for small mammals, such as deer mice and meadow voles, which are important prey for raptor species and other predators. Pollinators such as bees and butterflies, and various other insects, also thrive in grassland and provide an important high-protein food for grouse chicks, turkey poults, and songbirds.²²

The larger grasslands on the WMA are located near the Montezuma Audubon Center (MAC) and on Savannah Spring Lake Road (often referred to as the Giancarelli Field). Approximately 50 acres of grassland habitat is concentrated around the MAC and about 170 acres comprise the

²² The NYS Pollinator Protection Plan can be viewed at <http://www.dec.ny.gov/animals/279.html>.

Giancarelli Field. These large patches of grassland habitat are especially valuable for grassland-dependent bird species.

The majority of the WMA is within the Finger Lakes Region Grassland Focus Area. These focus areas are regions of the state that support key, residual populations of grassland birds. Large grassland patches are a rare habitat on the landscape and provide important habitat to grassland-dependent birds that are area-sensitive, meaning they require extensive habitat to be successful. Many of these species will use these fields for breeding in the spring and summer, such as bobolink (Photo 16) and eastern meadowlark, while others will use them for foraging and roosting through winter, such as northern harrier and short-eared owl. Habitat management of large fields on the WMA should utilize best management practices for grassland birds and attempt to increase the size of available habitat patches.



Photo 15: Grasslands adjacent to wetland, such as the small field to the west of Brooder Pond, provide important nesting habitat for some waterfowl species.

Photo: Frank Morlock, DEC

Habitat preference of individual wildlife species vary widely, so providing a range of grassland conditions (including shrub density, vegetation height and density, litter depth, and availability of perches) on the WMA helps meet the needs of multiple species. A variety of warm and cool season grasses and forbs (e.g., legumes and wildflowers) are present here and in some cases were intentionally planted to enhance available food and cover. Warm season grasses (e.g., big bluestem, indiagrass, 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 (e.g., wildrye, timothy) develop rapidly in spring, providing a flush of valuable cover with high forage value.

Some of the fields on the WMA contain an abundance of woody growth (e.g., ash, dogwood, honeysuckle). These shrubs and tree saplings are typically suppressed by routine mowing, but not completely controlled. Continued restoration and



Photo 16: Larger fields on the WMA (25+ acres) provide important habitat for grassland birds, such as bobolink.

Photo: Douglas Racine

replanting of fields is necessary to prevent reversion to shrubland and to maintain long-term habitat values for wildlife.

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

Table 15. Target species for grassland management on Northern Montezuma WMA.

Target Group	Example Species	Beneficial Habitat Structure
Grassland-dependent breeding birds	Bobolink, savannah sparrow, eastern meadowlark, horned lark, vesper sparrow, northern harrier	Large grassland patches, generally greater than 25 acres, with a low perimeter-to-area ratio. A diversity of grass types (e.g., warm and cool season), with varying height and density, provide for a greater range of species use.
Wintering raptors	Northern harrier, rough-legged hawk, and short-eared owl	Large grassland patches that support high populations of small mammals (e.g., meadow vole and deer mouse).
Upland game	Pheasant, white-tailed deer, and wild turkey	Fields that support abundant insect populations are important protein sources for turkey poults. Cool-season grasses offer early cover for fawns. Warm-season grasses provide valuable cover in winter.
Pollinators	Native bees, butterflies, and moths	Abundant, native wildflowers that have consistent blooming throughout spring, summer, and fall. Various grasses and forbs for larval food.

MANAGEMENT HISTORY

Most of the fields on the WMA were established by early European settlers during the 1800s, who extensively cleared forest and drained wetlands to make space for crops and pasture. However, some of these fields may have already been present at that time, due to the indigenous Cayuga Nation, who maintained clearings for crop cultivation. Under DEC management, these fields are routinely maintained to prevent reversion to shrubland and forest. Maintenance actions have included mowing, burning, agricultural practices, herbicide application, spreading of soil amendments, and reseeded to herbaceous plants of higher food and cover value to wildlife.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figures 14 through 21):
 - Throughout all grassland stands, routinely perform maintenance actions.
 - Mow fields every 1-3 years to prevent establishment of woody vegetation and provide desired habitat conditions.
 - Mowing of fields heavily invaded by woody plants may be most effective if conducted in early spring and again before senescence.
 - Incorporate prescribed burning in those fields with a warm-season grass component. Burning will control undesirable woody vegetation growth

- and promote warm-season grasses which are known to have a high food and cover value for wildlife.
- Control invasive vegetation mechanically, biologically, and/or with herbicide.
- Consider opportunities to incorporate rotational livestock grazing as a means to control invasive vegetation and maintain grasslands.
- As needed: lime, fertilize, disk, and replant grasslands. Promote native herbaceous species by following best management practices.
- Replant 145 acres of existing agricultural lands to grass and forb mixes favored by target wildlife (Fields A-941, B-941, G-942, I-943, I-944, and I-946).
 - The establishment of grassland in a few of these fields will be of sufficient size to benefit grassland-dependent birds: Fields B-941 (26 acres), I-943 (25 acres), and I-944 (46 acres).
- Convert forest Stand F-5 to grassland to connect adjacent fields and increase overall grassland habitat patch size.
- Allow 13 acres of grassland (Fields A-944, B-942, E-941) to revert to young forest to reduce forest fragmentation.
- As needed: grassland fields can be temporarily (3 to 5 years) converted to agricultural lands as a means to restore grassland quality.
 - Over a few years, the repeated tilling associated with cultivated crops disrupts root systems and depletes the seed bank of woody vegetation and other undesirable plants. This provides a clean slate for seeding desired herbaceous plants to establish a grassland of improved habitat value.

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*.²³ In particular, refer to the plan for species-specific habitat requirements and detailed recommendations regarding grassland management and restoration techniques.

General Management Recommendations

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

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

density), timing of planting, existing conditions, and vegetation removal techniques (including herbicide and intensive disking) in developing grassland planting or restoration projects.

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

Timing of Management

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

Additional Mowing Guidelines

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

MANAGEMENT EVALUATION

Current monitoring of grassland habitat use on Northern Montezuma WMA consists of surveys to document grassland birds during the breeding season and field use by wintering raptors. These surveys also include an assessment of habitat characteristics to determine wildlife response to management actions. Monitoring of invasive vegetation control efforts will be necessary to ensure success and prevent future spread.

AGRICULTURAL LAND

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

MANAGEMENT OBJECTIVES

- Manage approximately 582 acres as crops to provide agricultural habitat and supplemental food for associated wildlife species, especially migrating waterfowl.
- Convert 145 acres of agricultural land to grassland.
- Convert 71 acres of agricultural land to wetland.
- Allow 9 acres of agricultural land to revert to young forest.

DESCRIPTION OF EXISTING AGRICULTURAL LANDS AND TARGET SPECIES

There are currently 807 acres of agricultural lands on Northern Montezuma WMA (Figures 14 through 21). This consists of multiple crop fields throughout the property that are under “Cooperative Agreement for the Use of State Land.”

These cooperative agreements allow local farmers to grow crops on the WMA in exchange for monetary payment and/or habitat management services. Crops are generally rotated each year and typically include types that are beneficial for wildlife, such as corn, hay, or soybeans (Photo 17).

These agricultural fields are located in both upland and lowland fields. Lowland fields contain muck soils and agricultural practices are used to keep the land open until a wetland can be restored to the site. Crops are also occasionally rotated through grassland fields as a way to control woody plant growth and improve soil fertility.

When crops are grown on the WMA, conditions of the cooperative agreement require a percentage (typically at least 10%) of the crop remain standing after harvests.

Likewise, during harvest a portion of the crop is left on-site (waste grain) due to an inefficiency in harvest machinery. These resources that remain on the WMA after harvest provide important habitat for numerous wildlife, especially as a supplemental food for waterfowl during the migration south. In spring, sheet water often floods agricultural fields from snow melt or high waters of nearby waterways, which provides valuable foraging access to invertebrates for waterfowl and shorebirds.



Photo 17: In spring, waterfowl and shorebirds utilize shallowly flooded crop fields (sheet water) as important foraging habitat.

Photo: John Major

White-tailed deer, ring-neck pheasant, and wild turkey also benefit from the abundant, high-quality food resource produced by agricultural fields on the WMA. Some species of grassland birds prefer a higher amount of bare soil, such as horned lark and vesper sparrow, and can benefit from agricultural fields as well.

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. This WMA is one of the few public lands in New York where snow geese can reliably be hunted (Photo 18).



Photo 18: Thousands of snow geese congregate in agricultural fields each year to feed on waste grain left on site after harvest, Photo: Jeff Thompson, DEC

Table 16. Target species for agricultural land management on Northern Montezuma 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	Pheasant, 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

Cooperative agreements with local farmers have been utilized on the WMA since the property was acquired and have allowed farmers to temporarily plant crops in exchange for payments or habitat management services. This technique has been an important tool for maintaining the open character of the WMA and providing a food resource for migrating waterfowl.

Since the 1990s, hundreds of acres of former agricultural fields have been restored to wetland cover on the WMA. Some of these restored wetlands are actively managed as moist-soil units, which provides abundant high-value food for migrating waterfowl, compensating for lost food resources that the former crops had provided. Some agricultural fields have also been converted to grassland over the past few decades to benefit grassland wildlife.

IMPLEMENTATION PLAN AND ANTICIPATED SCHEDULE

- **Management planned for 2020-2029** (Figures 14 through 21):
 - Manage approximately 582 acres as crops to provide agricultural habitat.
 - Rebid or renew existing cooperative agreements/contracts as they expire.
 - Plant approximately 145 acres of agricultural land (Fields A-941, B-941, G-942, I-943, I-944, and I-946) to grass and forb mixes favored by grassland wildlife.
 - Convert 71 acres of agricultural land to wetland (Fields I-945, K-940, and K-942) in order to restore wetland habitat and function.
 - Allow 9 acres (Fields A-941 (partial) and I-942) to revert to young forest.
 - As needed, temporarily (3 to 5 years) convert grassland to crops as a means to restore grassland quality.

The primary purpose for converting approximately 145 acres of agricultural land to grassland over the next ten years is to provide habitat for grassland wildlife. Additional grassland near emergent wetland will benefit some breeding waterfowl species and large patches of grassland will benefit grassland-dependent birds, some of which are listed species and/or SGCN. Maintaining approximately 582 acres as crops will continue to provide supplemental food for related wildlife and ample public hunting opportunity. The abundant food provided by dedicated moist-soil units on the WMA are expected to compensate for the decline in crop food sources for migrating waterfowl.

BEST MANAGEMENT PRACTICES

Agricultural activities involve mowing, tilling, and the use of pesticides, which have potential to impact wildlife and the environment, therefore guidelines will be provided within cooperative agreements/contracts to minimize impacts. For Northern Montezuma WMA this will include: soil conservation practices, buffers between cropland and water bodies, review of planned pesticide use, no fall plowing without a winter cover crop, and no harvest of hay, alfalfa, or other grasses prior to July 15.

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.

HABITAT MANAGEMENT SUMMARY

In summary, Table 17 lists the habitat management actions planned for Northern Montezuma WMA over the next ten years. Any substantive changes will be appended to this HMP annually or as needed (Appendix D).

Table 17. Summary of habitat management actions recommended for Northern Montezuma WMA, 2020-2029. (Also see Figures 14 through 21)

Habitat	Management Action	Acres	Timeframe
Wetlands	Maintain impounded wetland dikes and control structures (e.g., inspect, mow, disk, repair and replace as needed)	79,297 ft	Annually
Wetlands	Replace water control structures at Marten's Marsh and Gander Pond		2020-2025
Wetlands	Manipulate wetland habitat conditions within managed marshes (e.g., drawdowns, flooding, mowing, tilling, excavation of potholes)	≤ 1,290	2020-2029, as needed
Wetlands	Maintain level-ditching and marsh potholes	1,000 ft	2020-2029, as needed
Wetlands	Replant Ag Field I-945 to restore sedge meadow	10	2020-2029
Wetlands	Construct new dike and/or plug ditches in Ag Fields K-940 and K-942 to restore emergent marsh or early-successional marsh	61	2020-2029
Wetlands	Excavate potholes, level ditches and scrapes on both sides of Seneca River near Carncross bridge	40	2021
Wetlands	Improve and/or remove portions of existing dike at Camel Island Marsh	60	2020-2029
Wetlands	Construct new dike and plug ditches at Frost Hill Marsh	47	2020-2029
Wetlands	Excavate substrate, remove some trees, and repair/rehabilitate dike at Marten's Marsh	165	2020-2029
Wetlands / Streams	Monitor and control invasive species	≤ 3,016	2020-2029, ongoing
Forest	Clearcut harvest of Stands A-6, A-14, A-18, A-30, and I-4	40	2020-2024
Forest	Seed tree harvest of Stands A-11, A-13, D-1, and E-8	36	2020-2024

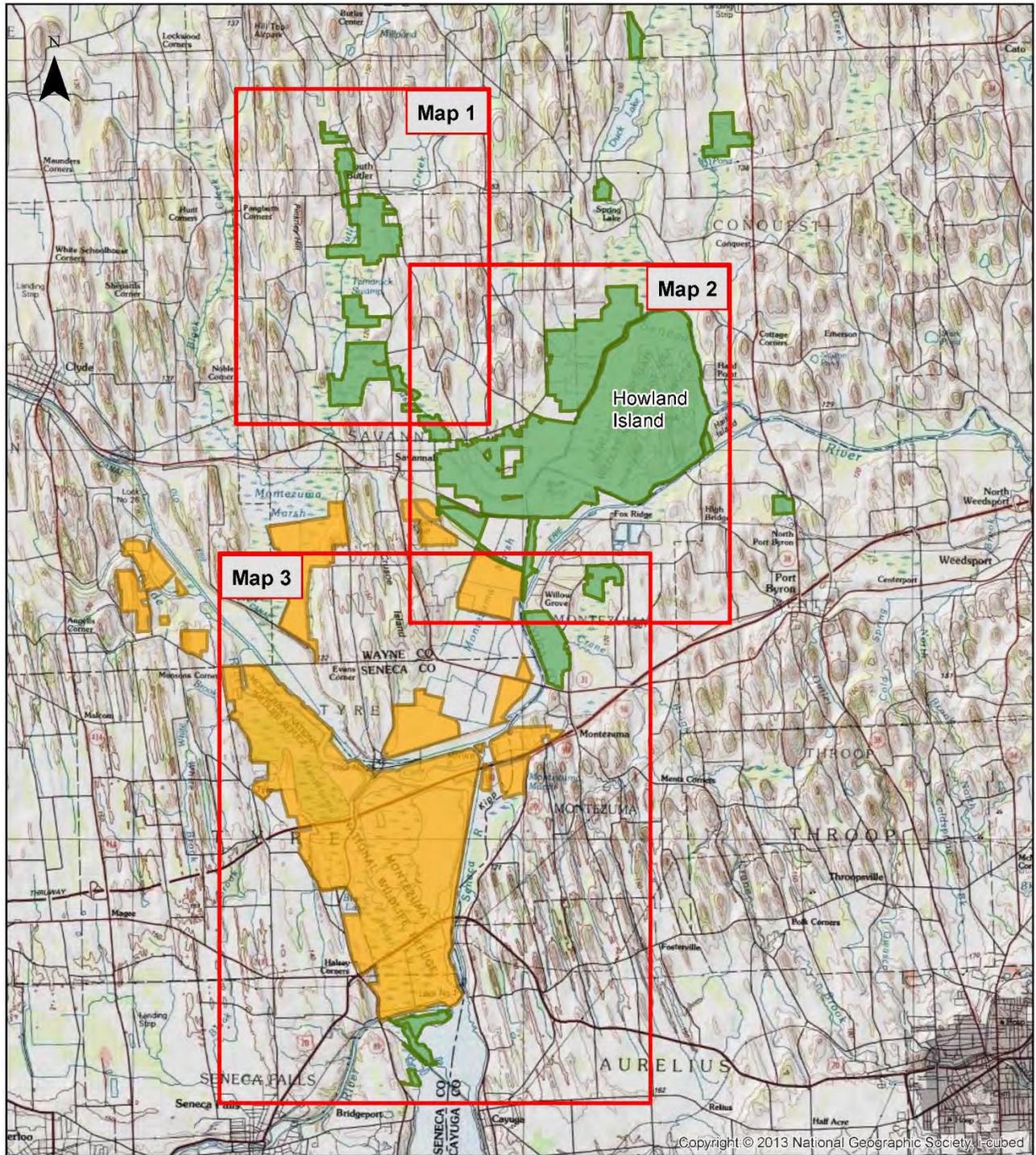
Table 17. Continued

Habitat	Management Action	Acres	Timeframe
Forest	Apple tree release in Stand C-7	11	2020-2024
Forest	Selection harvest of Stands A-8 and A-9	9	2020-2024
Forest	Clearcut harvest of Stands B-2.1, B-2.2 (partial), F-4, G-11, and I-13	22	2025-2029
Forest	Seed tree harvest of Stands B-14, F-12, H-5, I-10, and J-16	43	2025-2029
Forest	Shelterwood harvest of Stand H-2	10	2025-2029
Forest	Apple tree release in Stand E-2	7	2025-2029
Forest	Crop tree release in Stand B-2.2 (partial)	3	2025-2029
Forest	Timber stand improvement of Stands D-3, D-6, G-7, and G-9	35	2025-2029
Forest	Convert Stand F-5 to grass	5	2025-2029
Forest	Monitor and control invasive species	≤ 3,624	2020-2029, ongoing
Shrubland	Maintain shrubland acreage by cutting trees, brush cutting and potentially prescribed fire	≤ 33	2020-2029, as needed
Shrubland	Promote dominance of native shrubs by controlling invasive shrub species	≤ 33	2020-2029, ongoing
Shrubland	Allow Stand G-950 to revert to young forest	3	2020-2029
Grassland	Maintain grassland acreage by mowing and potentially prescribed fire	≤ 595	Annual, biennial, or triennial
Grassland	Improve grassland quality (e.g., lime, fertilize, disk, and/or reseed)	≤ 595	2020-2029, as needed
Grassland	Monitor and control invasive species	≤ 595	2020-2029, ongoing

Table 17. Continued

Habitat	Management Action	Acres	Timeframe
Grassland	Allow Fields A-944, B-942, E-941 to revert to young forest	≤ 13	2020-2029
Agricultural Lands	Maintain agricultural habitat by continuing cooperative agreements/contracts with local farmers	≤ 582	2020-2029, ongoing
Agricultural Lands	Convert Fields I-945, K-940, and K-942 to restored wetland	≤ 71	2020-2029
Agricultural Lands	Convert Fields A-941, B-941, G-942, I-943, I-944, and I-946 to grassland	≤ 145	2020-2029
Agricultural Lands	Allow Fields A-941 and I-942 to revert to young forest	≤ 9	2020-2029

III. FIGURES



Map Index for Figures 2 through 10 - Northern Montezuma WMA

Legend

- WMA Boundary
- National Wildlife Refuge

Map created on 12/2018
by M. Palermo, Bureau of Wildlife

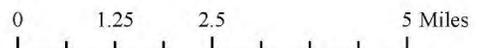


FIGURE 1. Map index for Figures 2 through 10.

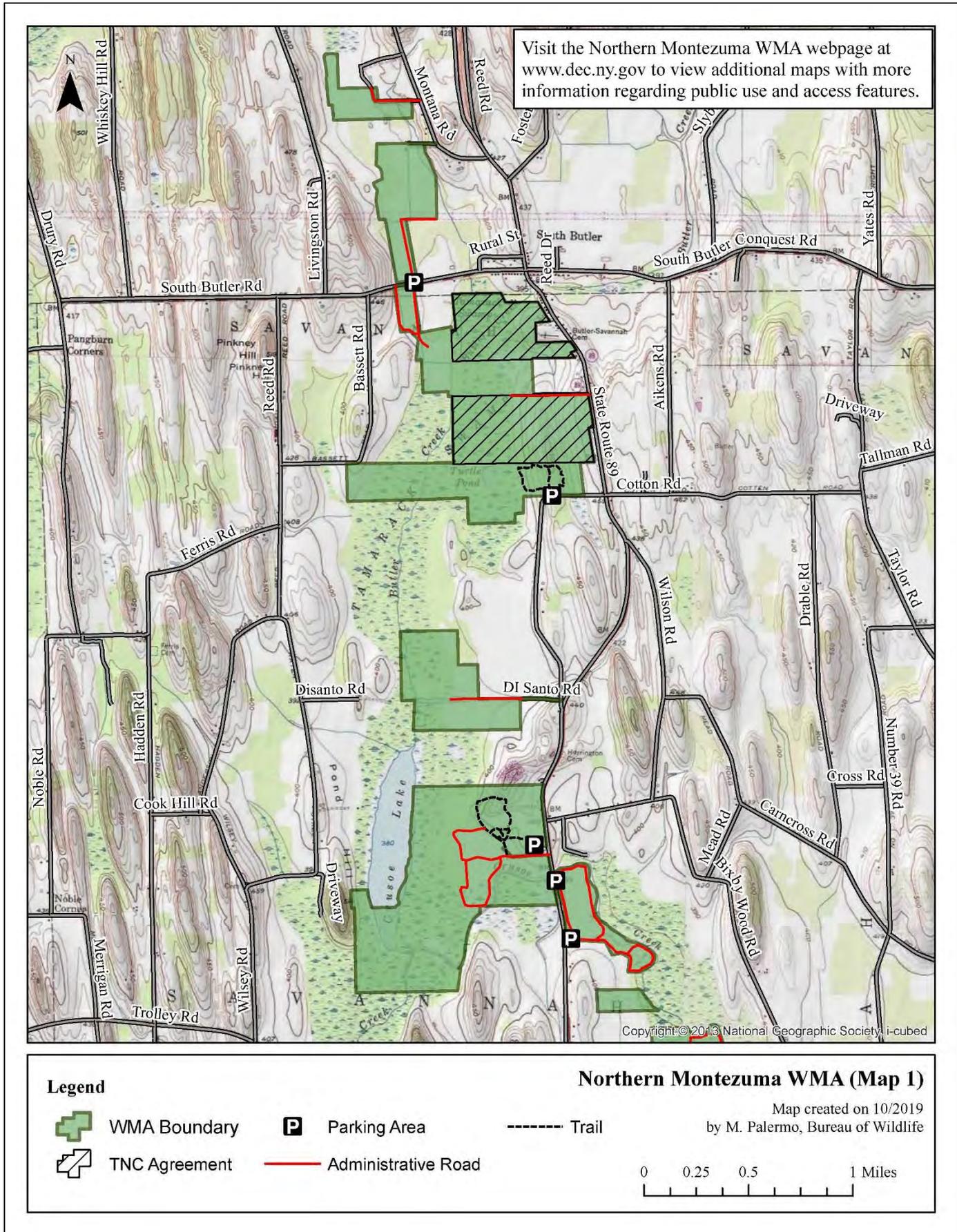
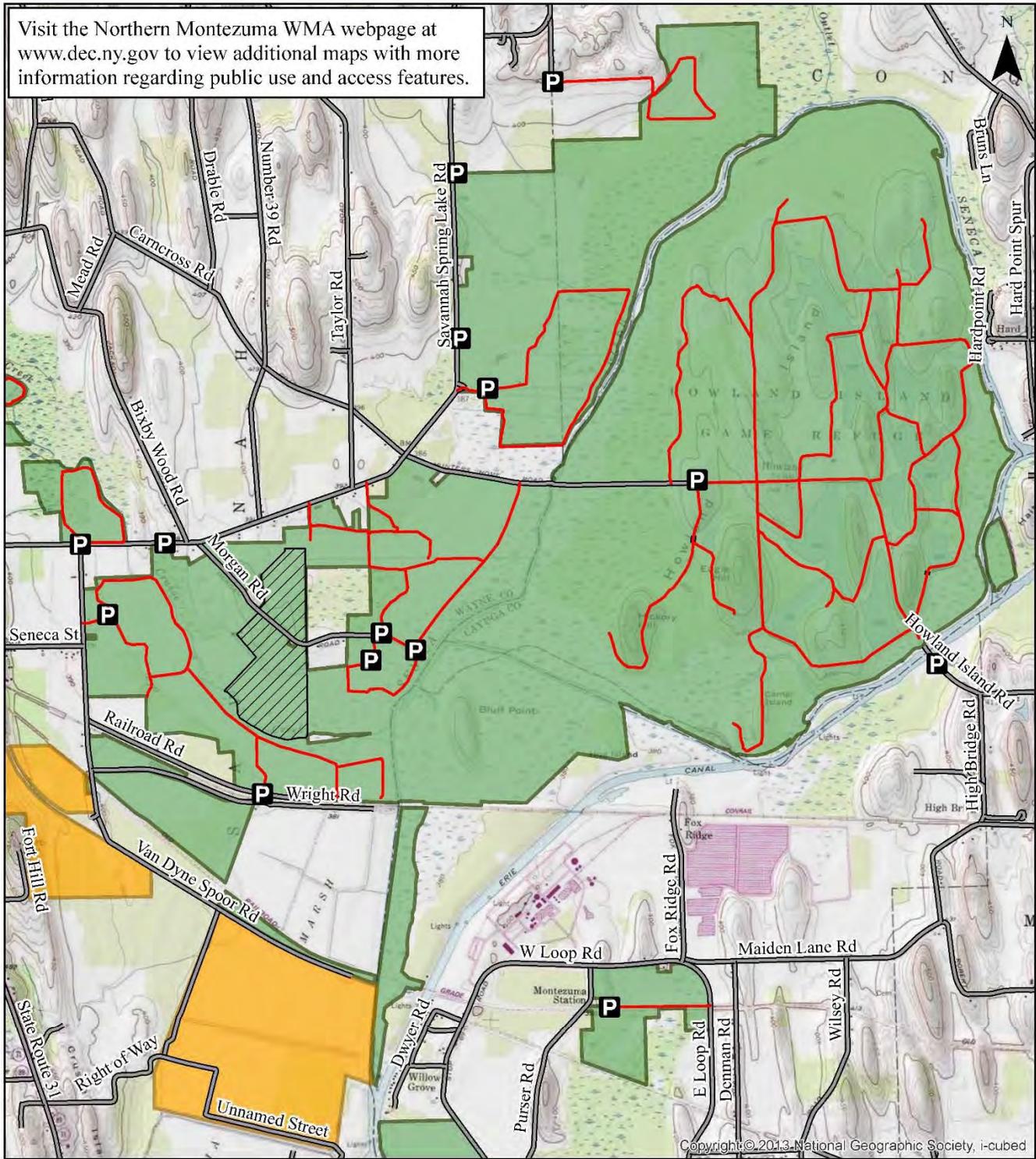


FIGURE 2. Location and access features at Northern Montezuma WMA (Map 1).

Visit the Northern Montezuma WMA webpage at www.dec.ny.gov to view additional maps with more information regarding public use and access features.



Legend

- WMA Boundary
- TNC Agreement
- National Wildlife Refuge
- Parking Area
- Administrative Road
- Trail

Northern Montezuma WMA (Map 2)

Map created on 10/2019
by M. Palermo, Bureau of Wildlife

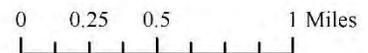


FIGURE 3. Location and access features at Northern Montezuma WMA (Map 2).

Visit the Northern Montezuma WMA webpage at www.dec.ny.gov to view additional maps with more information regarding public use and access features.

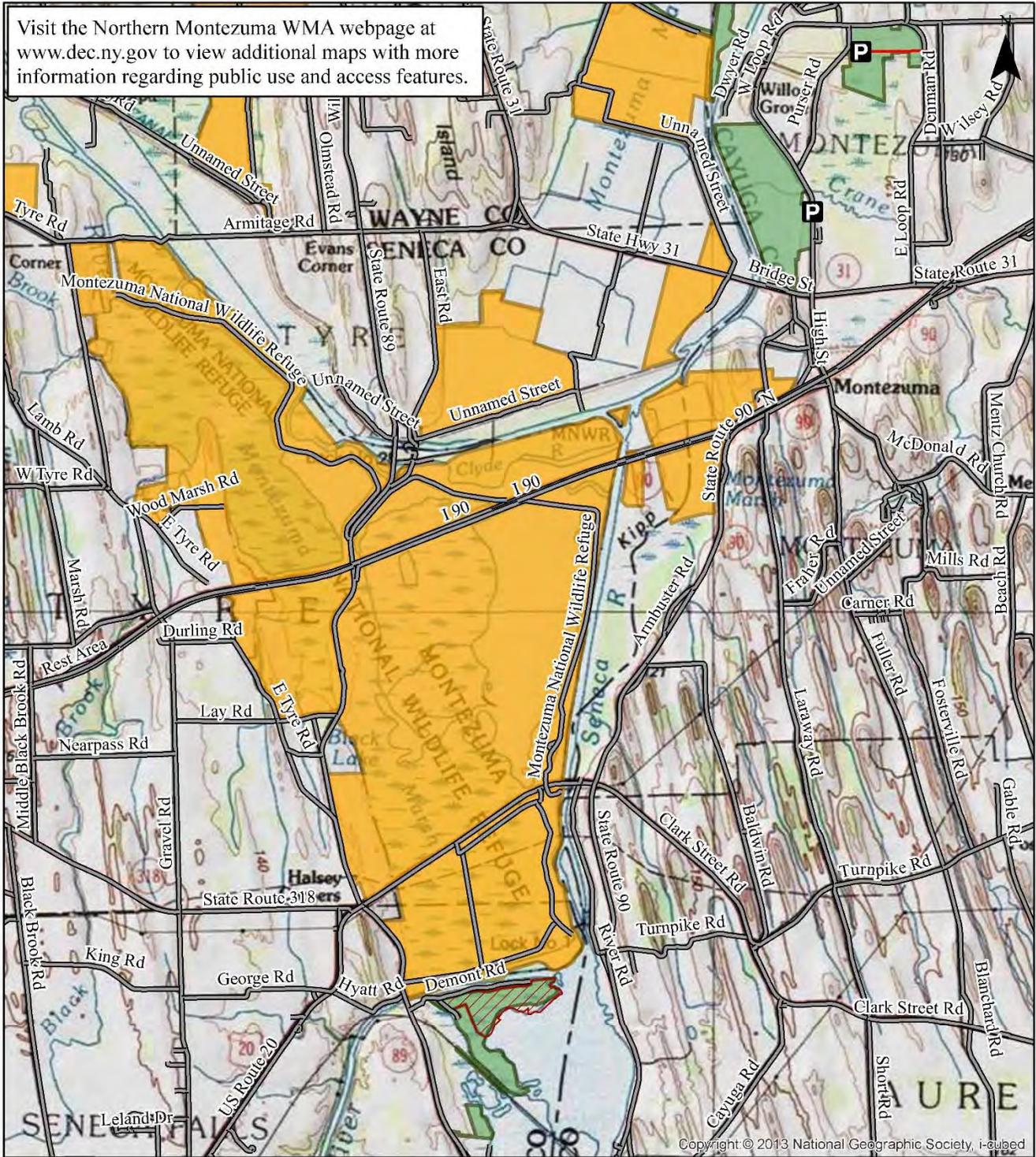
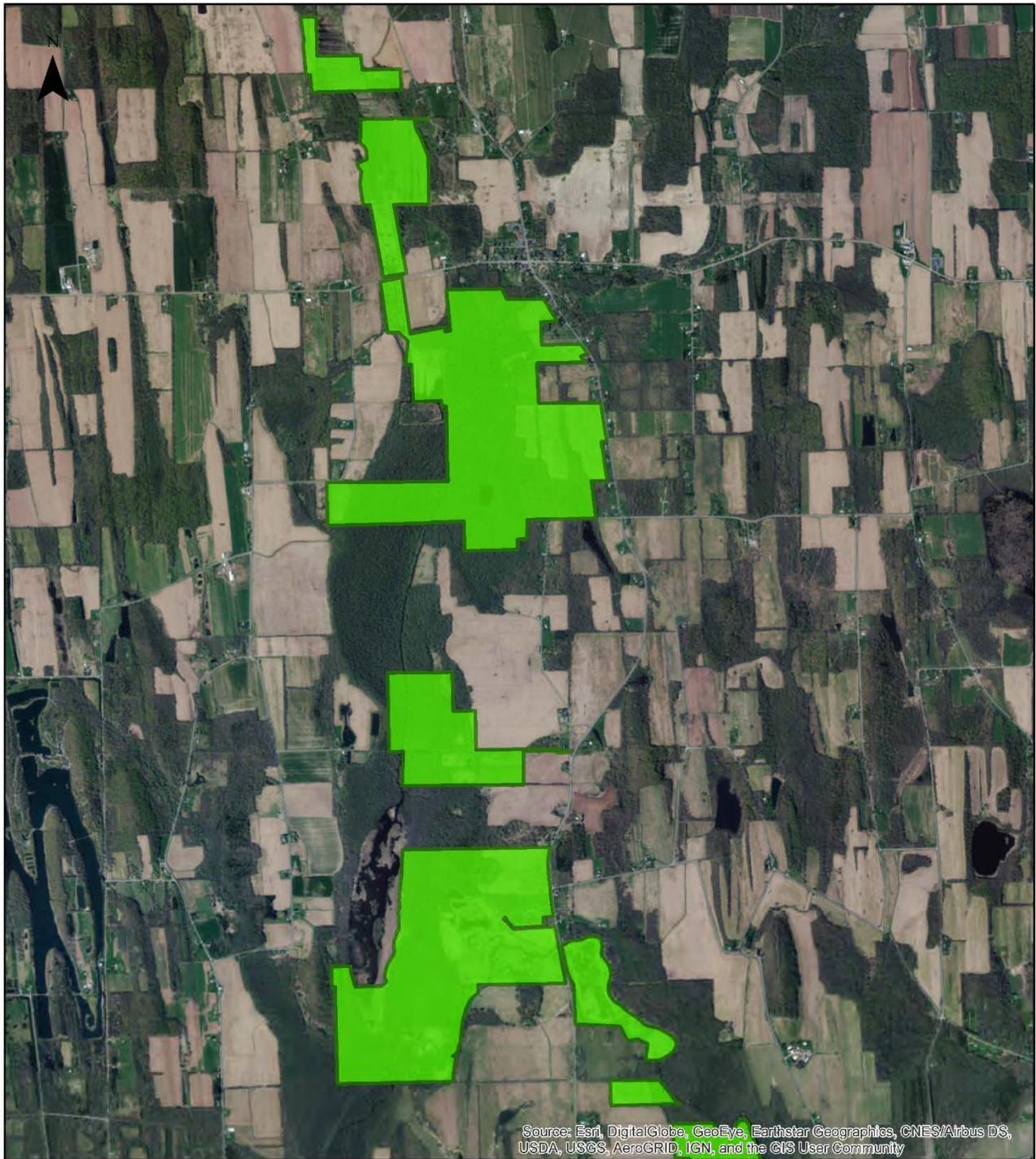


FIGURE 4. Location and access features at Northern Montezuma WMA (Map 3).



Legend

 WMA Boundary

* There are no significant ecological communities on this portion of the WMA. From community delineations in the 1990's, conditions may have changed.

Northern Montezuma WMA (Map 1)

Map created on 12/2018
by M. Palermo, Bureau of Wildlife

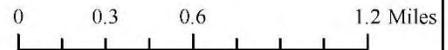
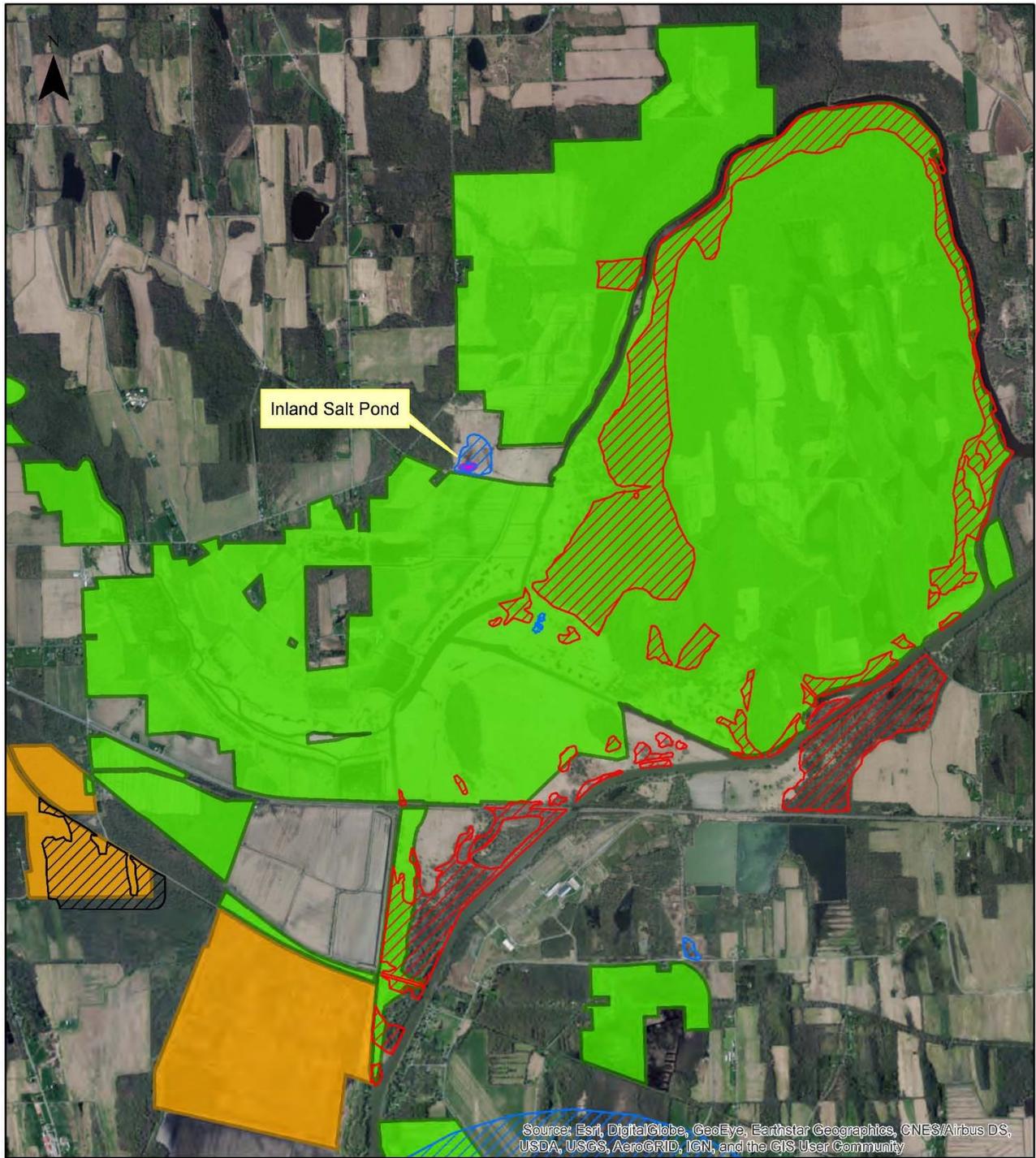


FIGURE 5. Significant ecological communities on Northern Montezuma (Map 1). Data from the NY Natural Heritage Program.



Legend			Northern Montezuma WMA (Map 2)	
Inland salt pond	Inland salt marsh	WMA Boundary	Map created on 12/2018 by M. Palermo, Bureau of Wildlife	
Floodplain forest	Silver maple-ash swamp	National Wildlife Refuge	0 0.325 0.65 1.3 Miles	
* From community delineations in the 1990's, conditions may have changed.				

FIGURE 6. Significant ecological communities on Northern Montezuma (Map 2). Data from the NY Natural Heritage Program.

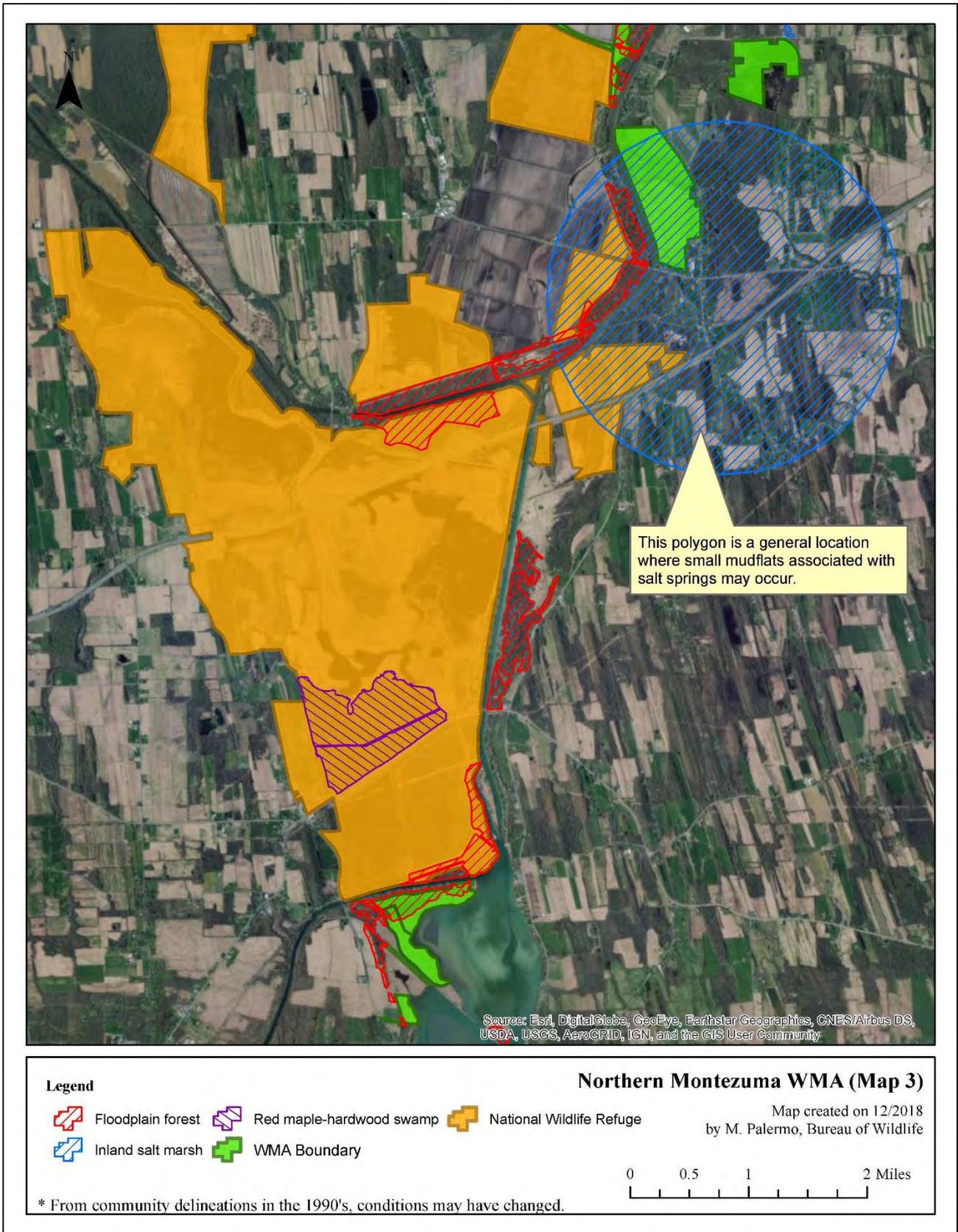


FIGURE 7. Significant ecological communities on Northern Montezuma (Map 3). Data from the NY Natural Heritage Program.

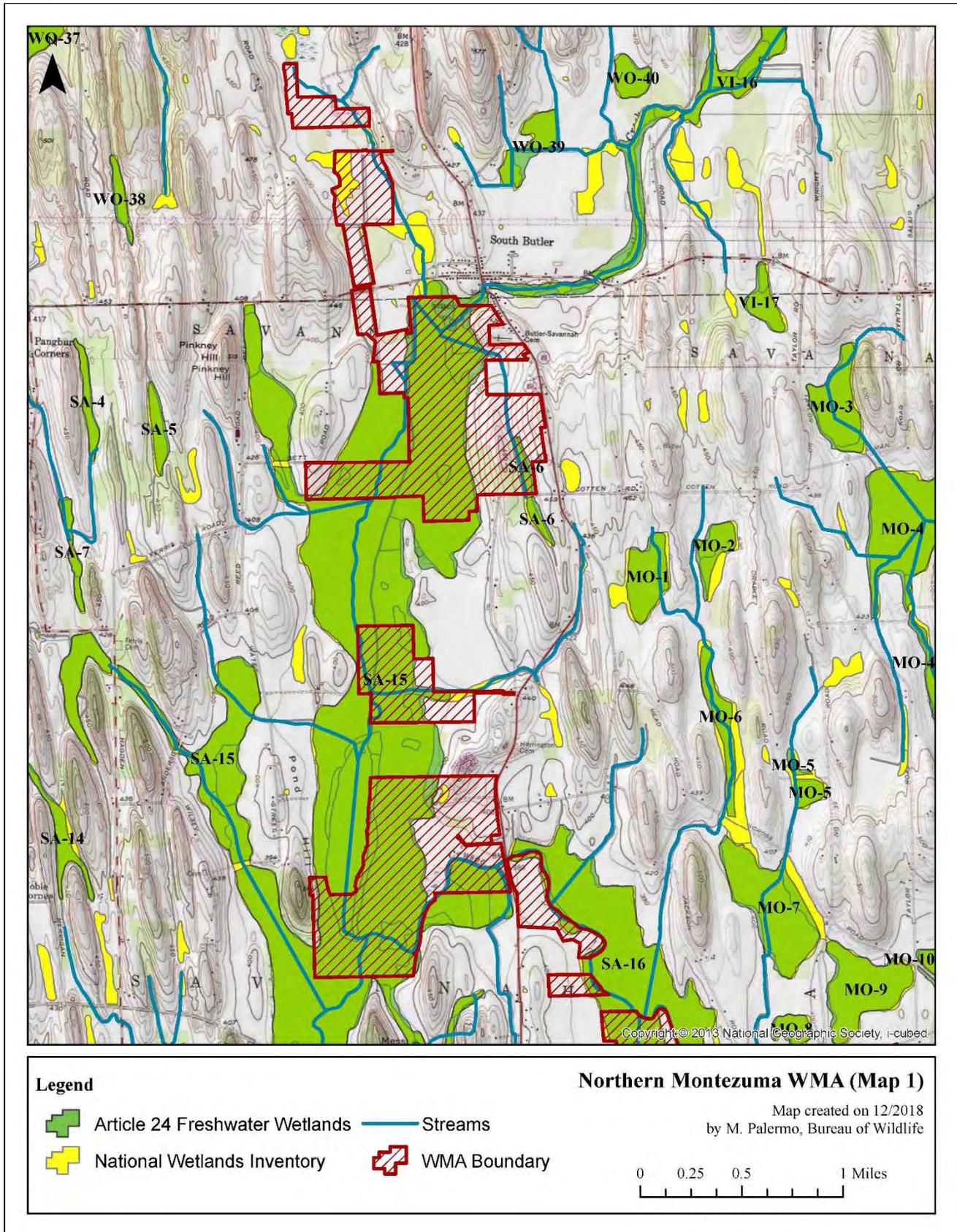
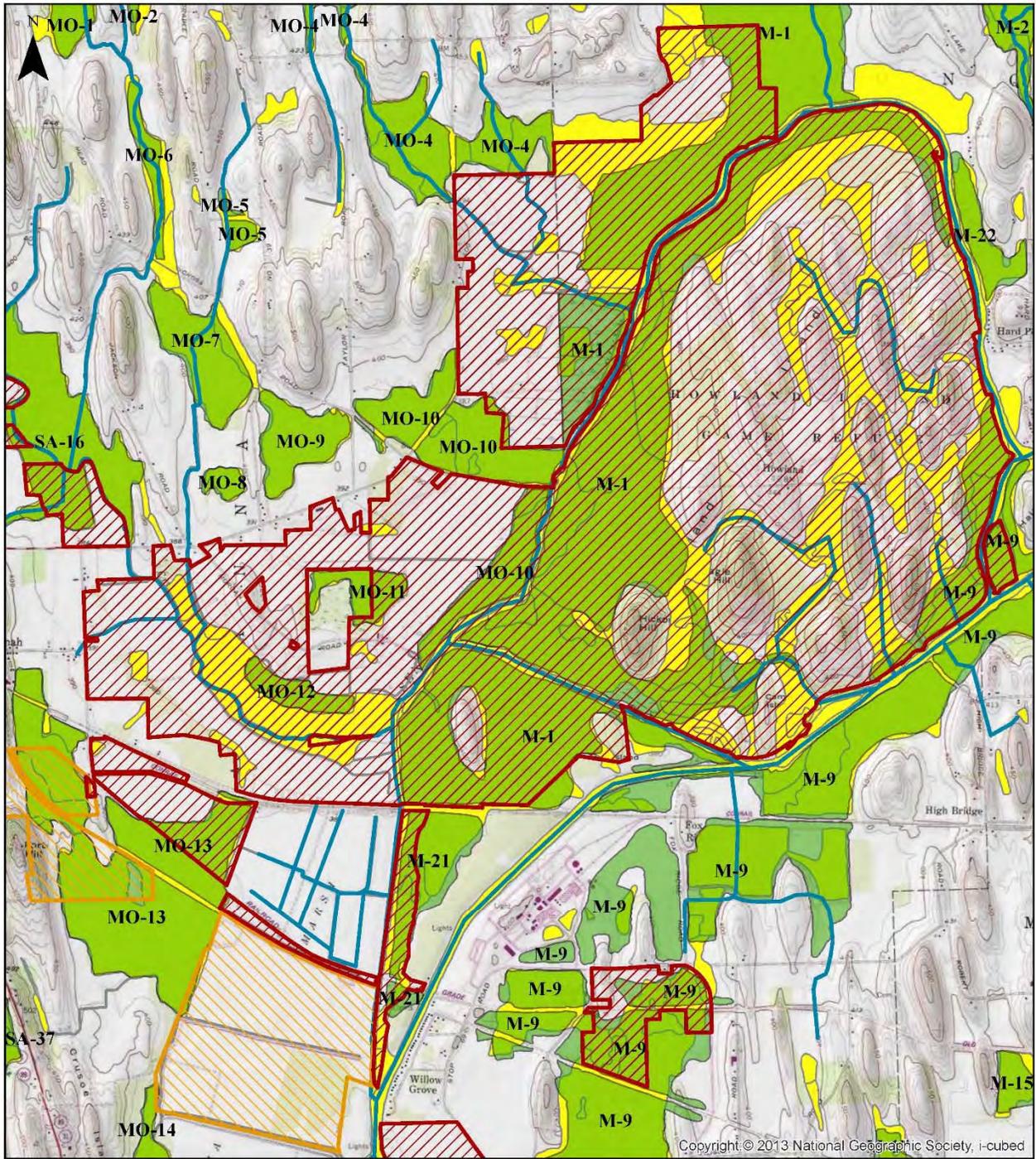


FIGURE 8. Wetlands, open water, and streams of Northern Montezuma WMA (Map 1). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.



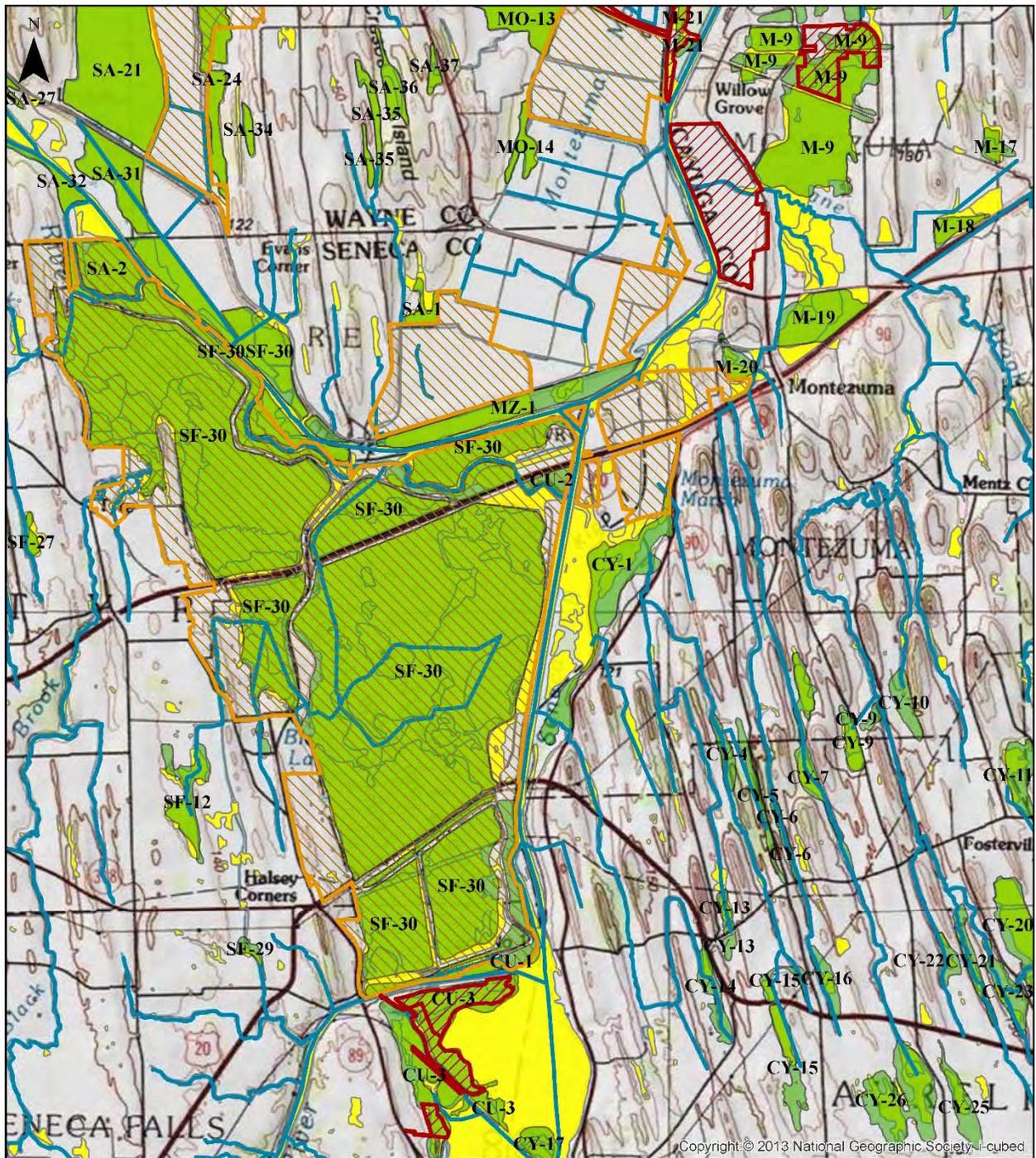
Northern Montezuma WMA (Map 2)
Map created on 12/2018
by M. Palermo, Bureau of Wildlife

Legend

Article 24 Freshwater Wetlands	Streams	National Wildlife Refuge
National Wetlands Inventory	WMA Boundary	

0 0.25 0.5 1 Miles

FIGURE 9. Wetlands, open water, and streams of Northern Montezuma WMA (Map 2). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.



Northern Montezuma WMA (Map 3)
 Map created on 12/2018 by M. Palermo, Bureau of Wildlife

Legend

- Article 24 Freshwater Wetlands
- National Wetlands Inventory
- Streams
- WMA Boundary
- National Wildlife Refuge

0 0.375 0.75 1.5 Miles

FIGURE 10. Wetlands, open water, and streams of Northern Montezuma WMA (Map 3). Note: Wetland boundaries are not exact and may not be used for regulatory purposes without a current delineation.

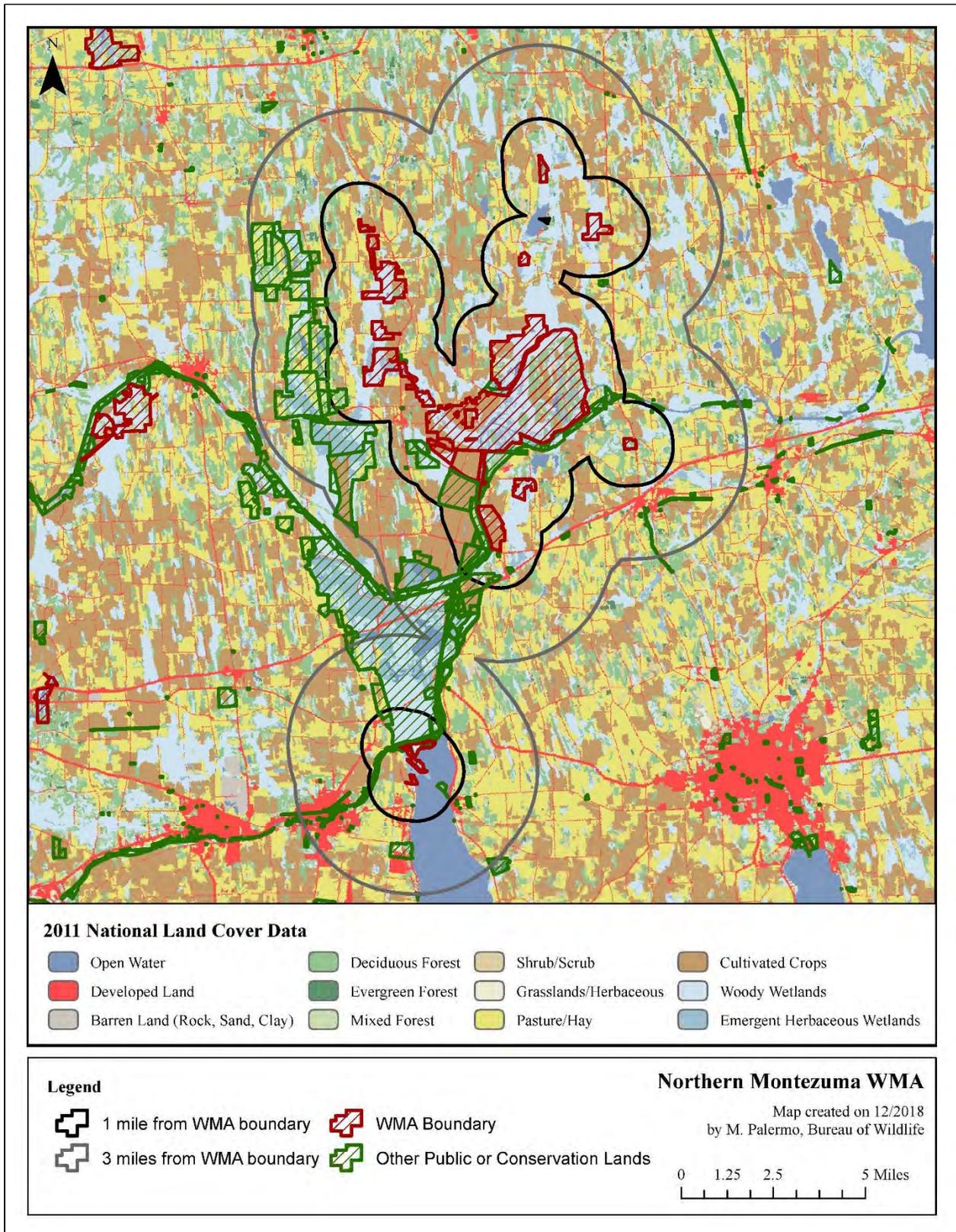


FIGURE 11. Land cover types and conservation lands in the landscape surrounding Northern Montezuma WMA. Conservation lands are from the NY Protected Areas Database available online at <http://www.nypad.org/>. Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at <https://www.mrlc.gov/data/legends/national-land-cover-database-2011-nlcd2011-legend>.

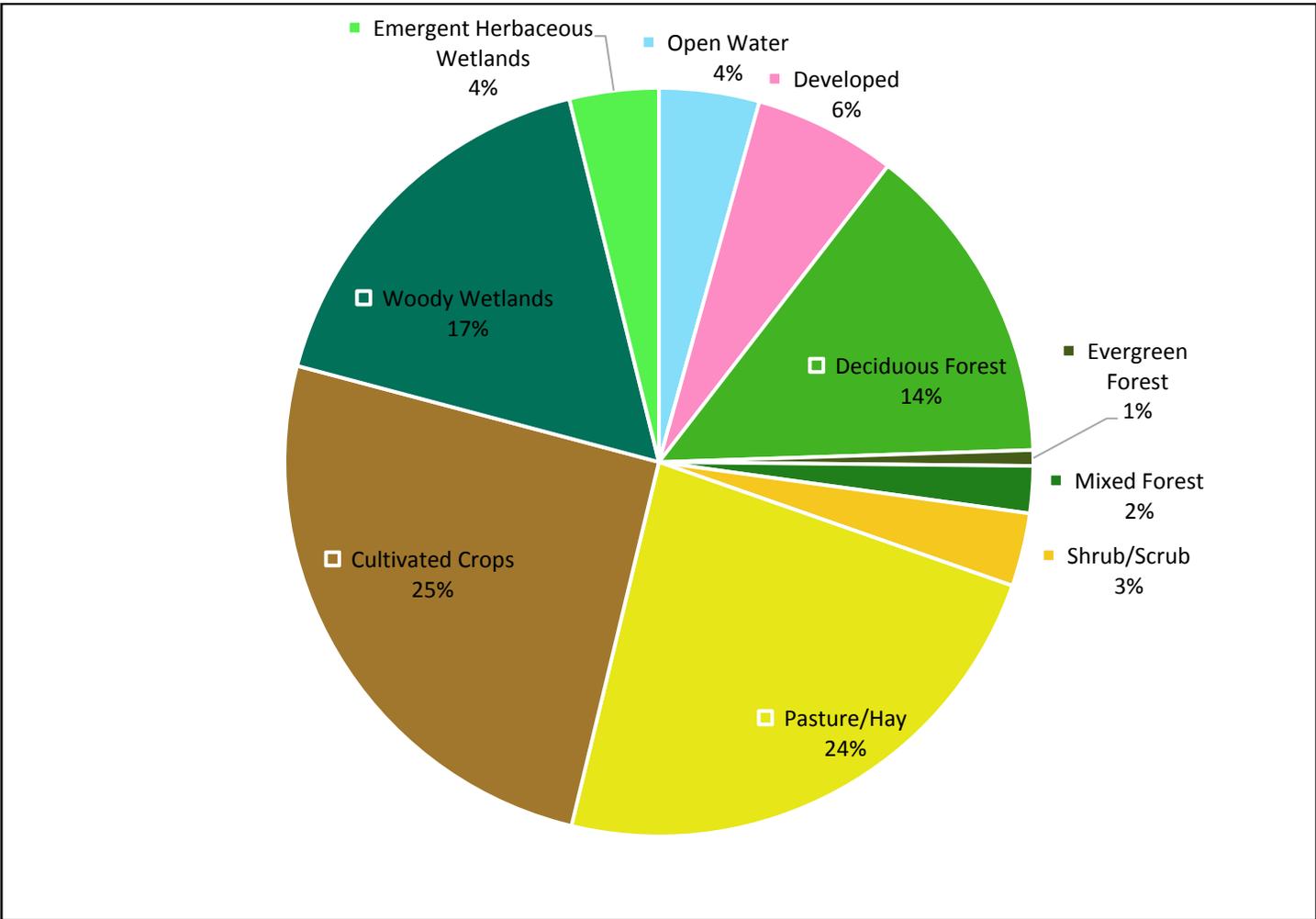
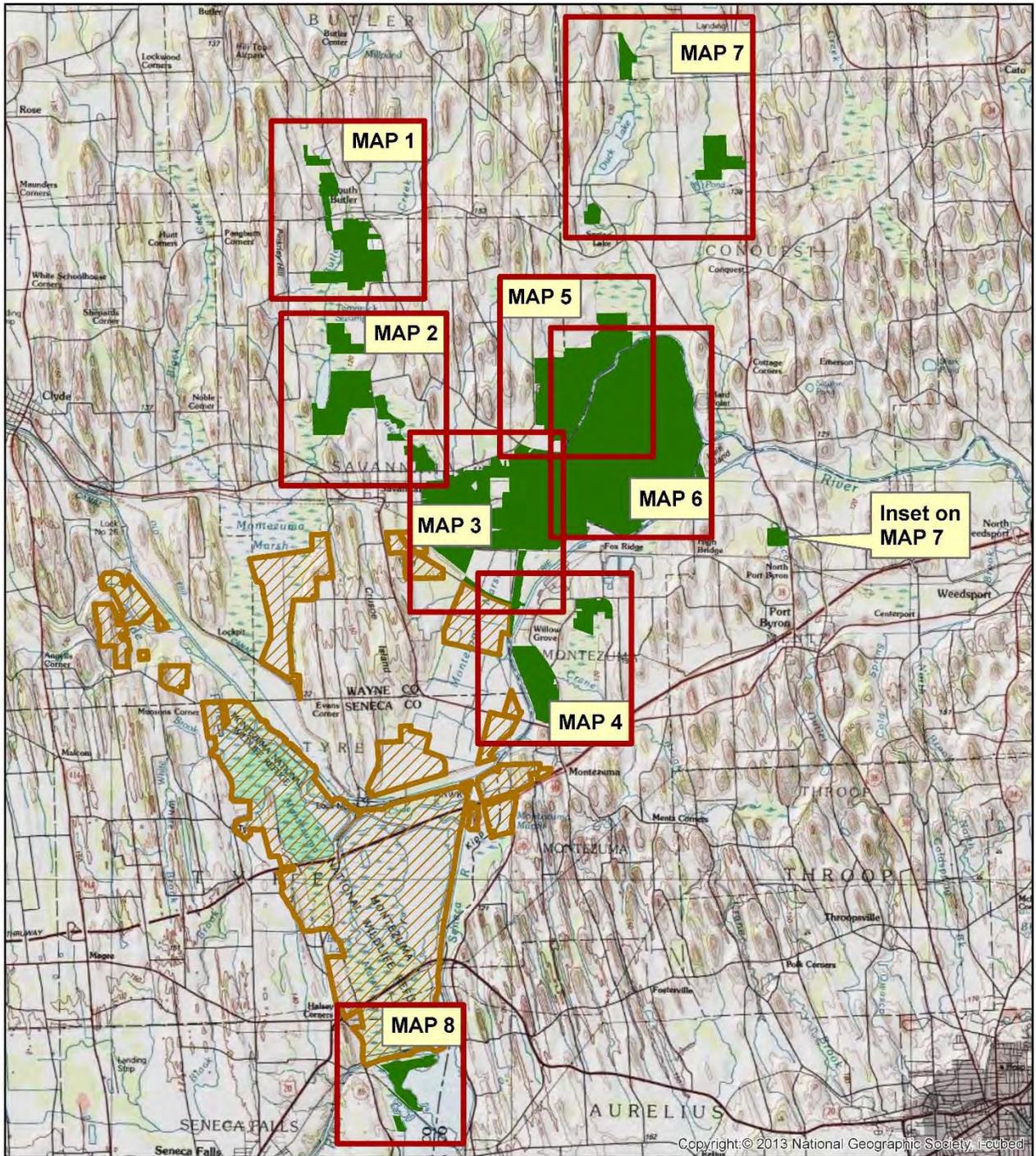


FIGURE 12. Percent cover of land cover types within three miles of Northern Montezuma WMA.

Land cover types are from the 2011 National Land Cover Data (NLCD) and differ from the habitat types used in the WMA habitat inventory. NLCD definitions are available online at <https://www.mrlc.gov/data/legends/national-land-cover-database-2011-nlcd2011-legend>.



Copyright © 2013 National Geographic Society, Inc.

Management Map Index - Northern Montezuma WMA

Legend

-  WMA
-  National Wildlife Refuge

Map created on 10/2019
by M. Palermo, Bureau of Wildlife

0 0.5 1 2 Miles



FIGURE 13. Map index for Figures 14 through 21.

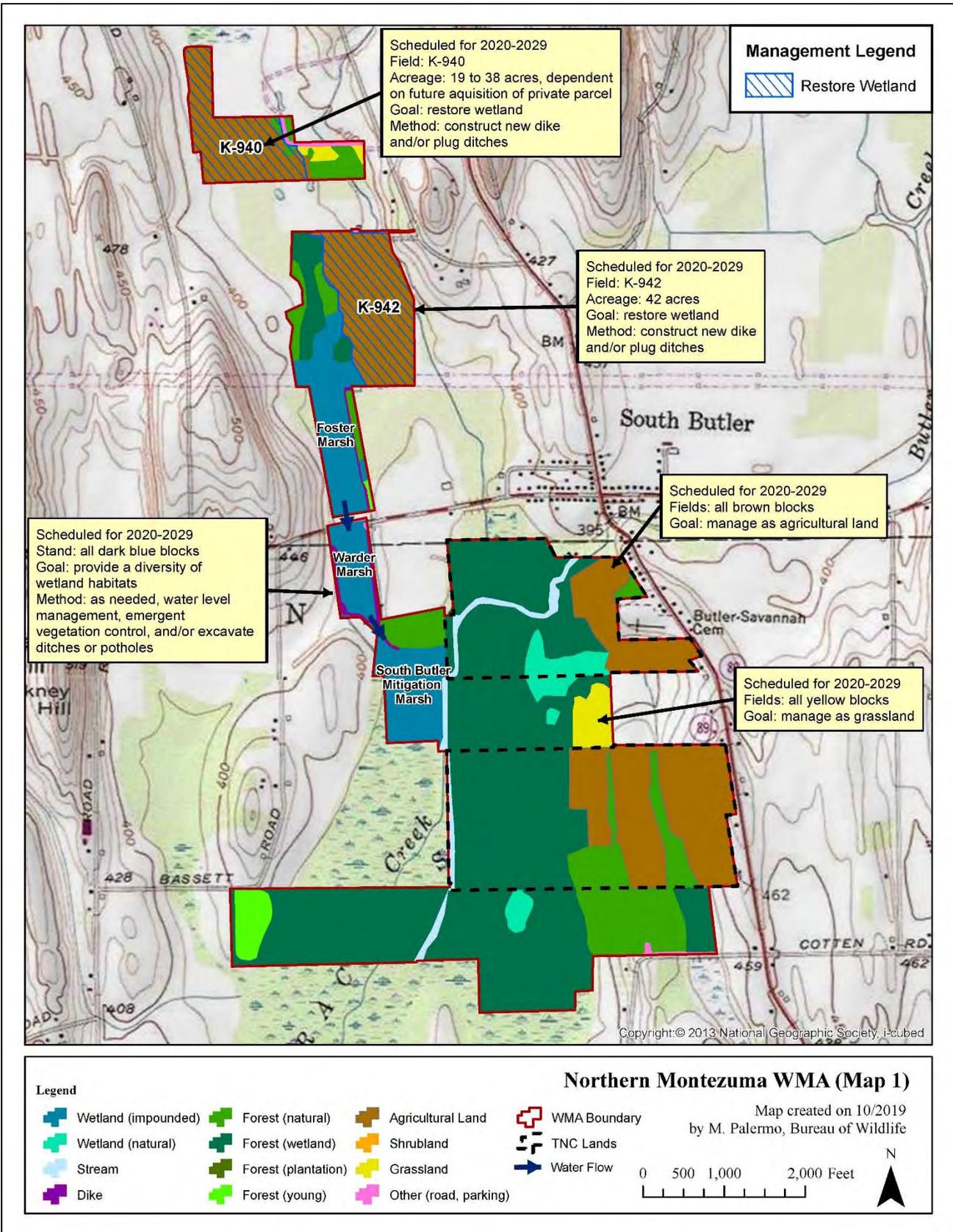


FIGURE 14. Habitat types and location(s) of proposed management on Northern Montezuma WMA (Map 1).

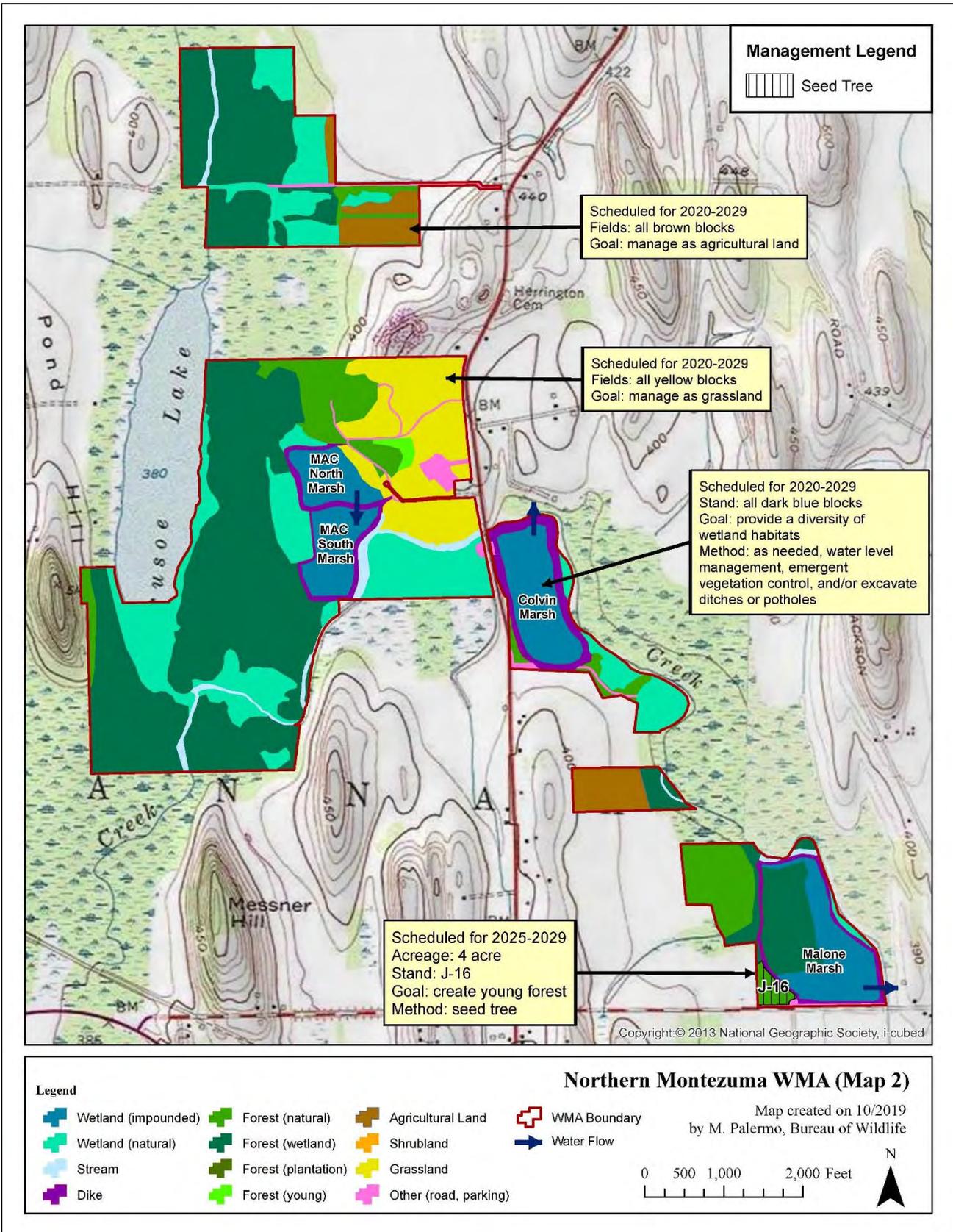


FIGURE 15. Habitat types and location(s) of proposed management on Northern Montezuma WMA (Map 2).

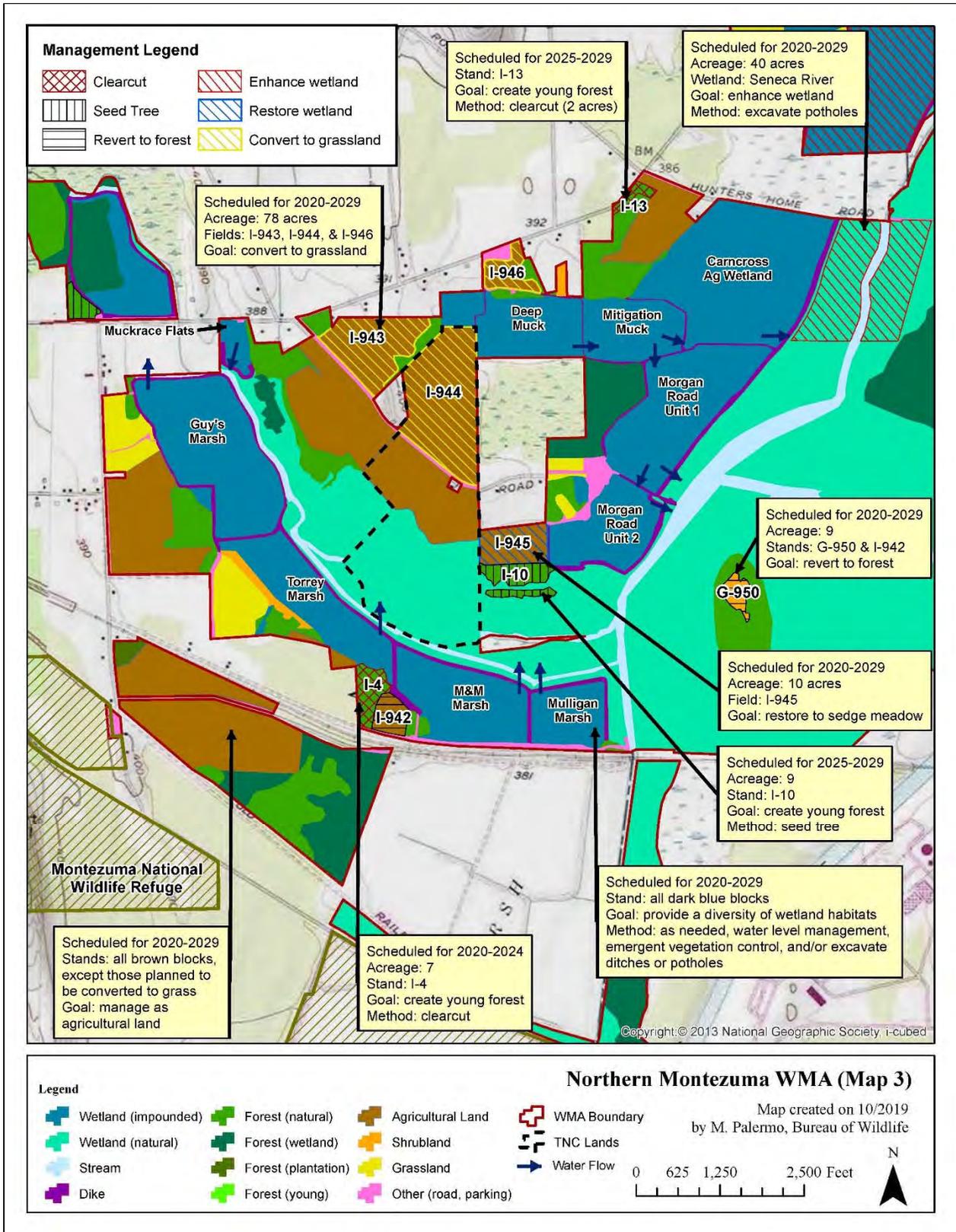


FIGURE 16. Habitat types and locations of proposed management on Northern Montezuma WMA (Map 3).

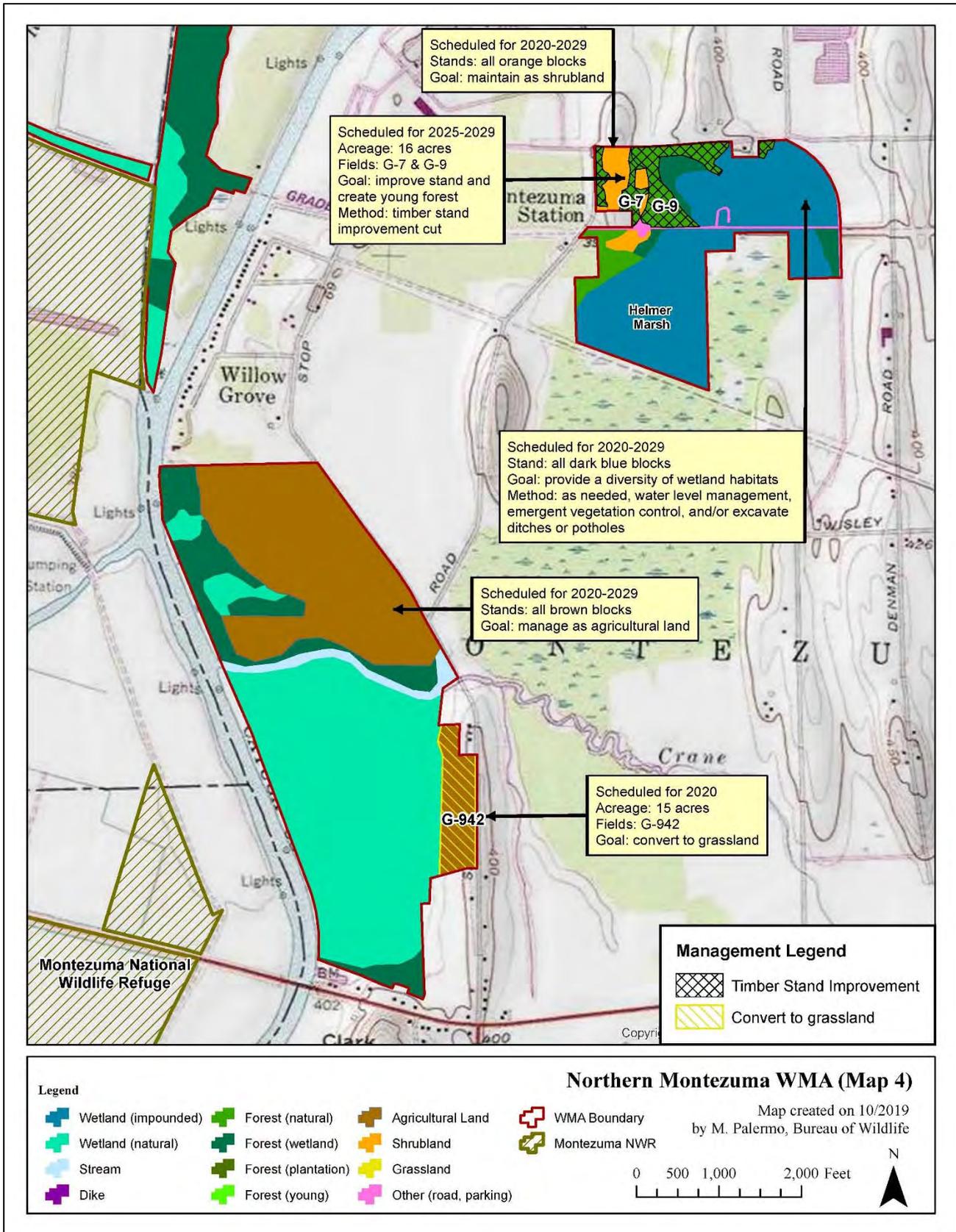


FIGURE 17. Habitat types and locations of proposed management on Northern Montezuma WMA (Map 4).

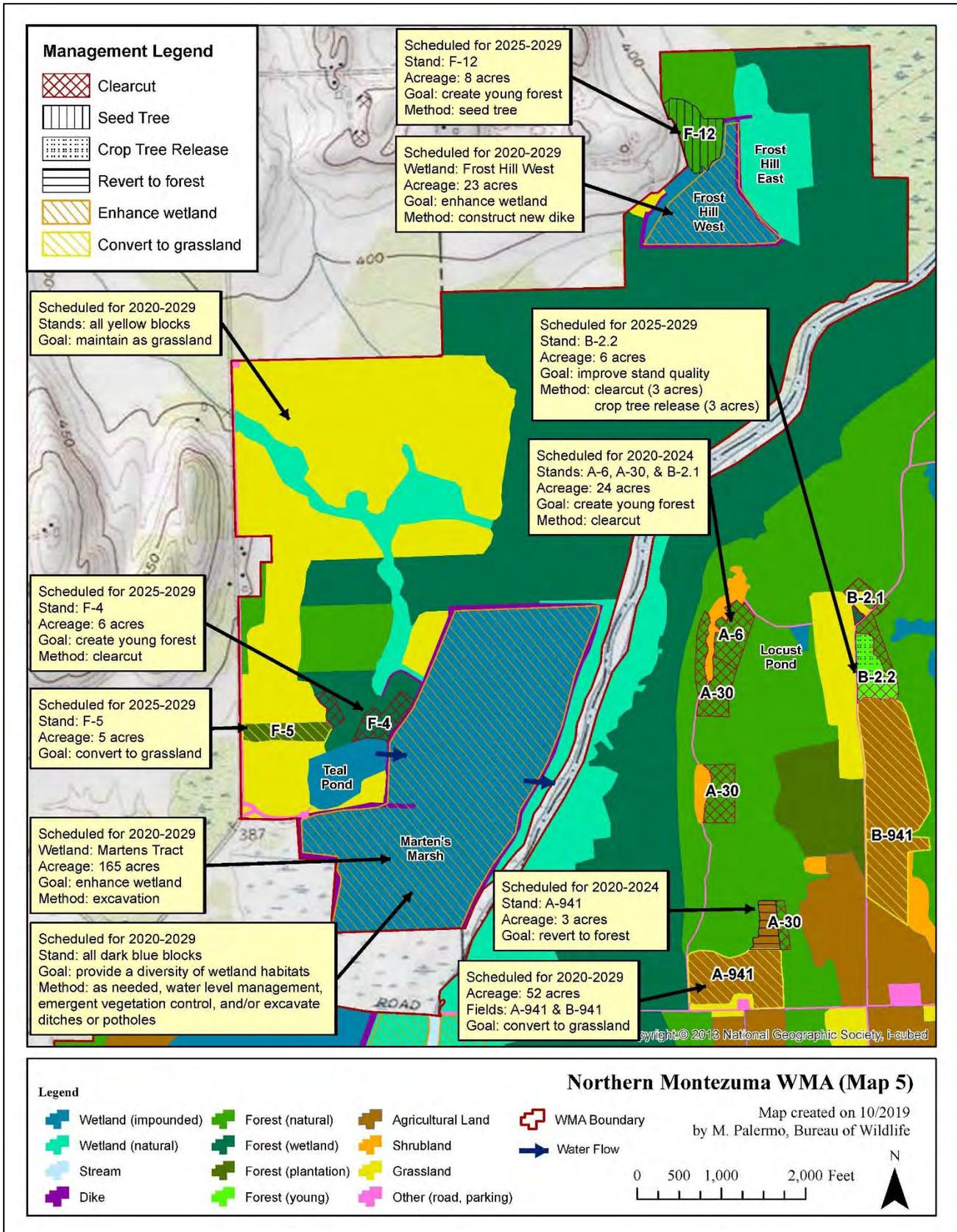


FIGURE 18. Habitat types and locations of proposed management on Northern Montezuma WMA (Map 5).

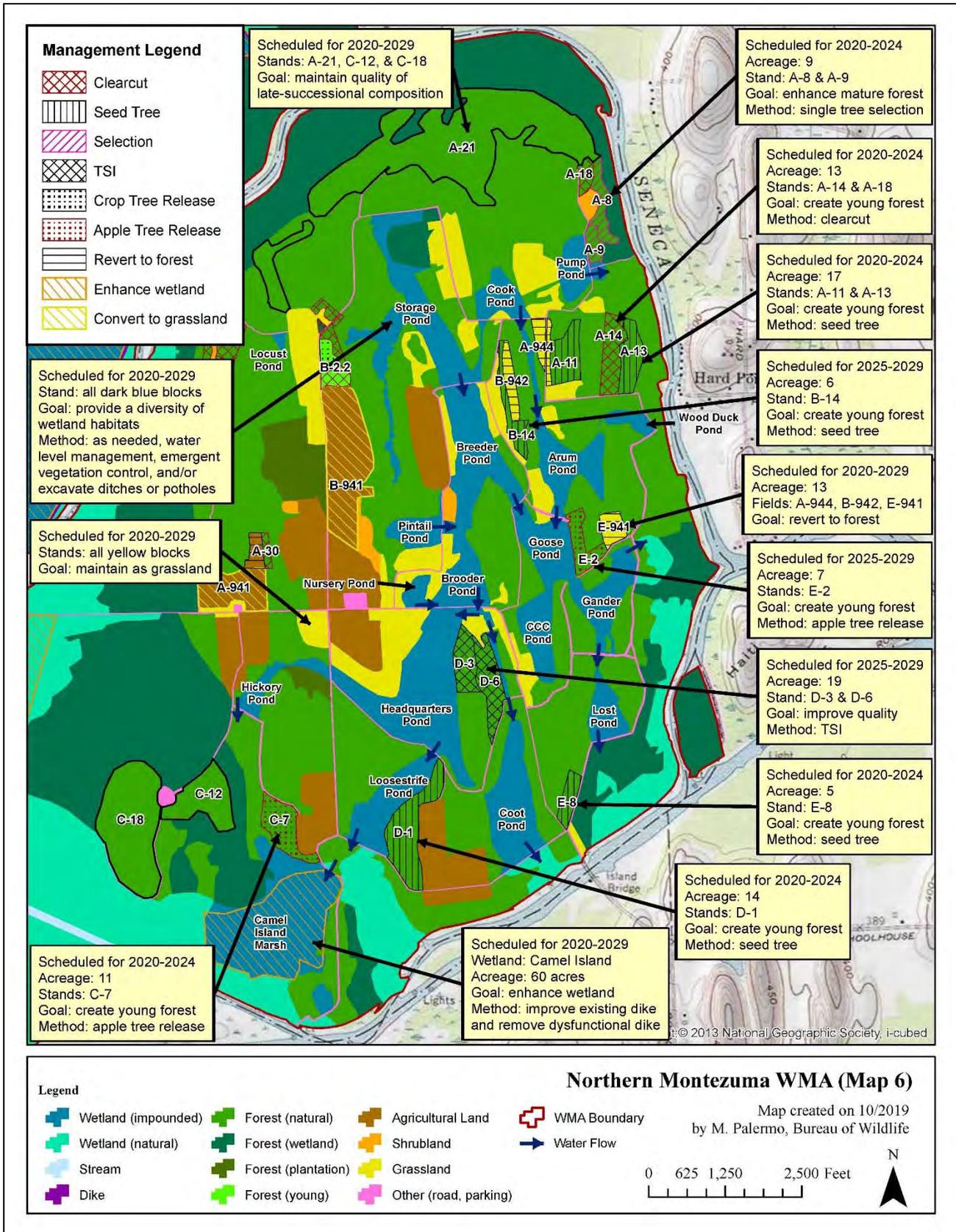


FIGURE 19. Habitat types and locations of proposed management on Northern Montezuma WMA (Map 6).

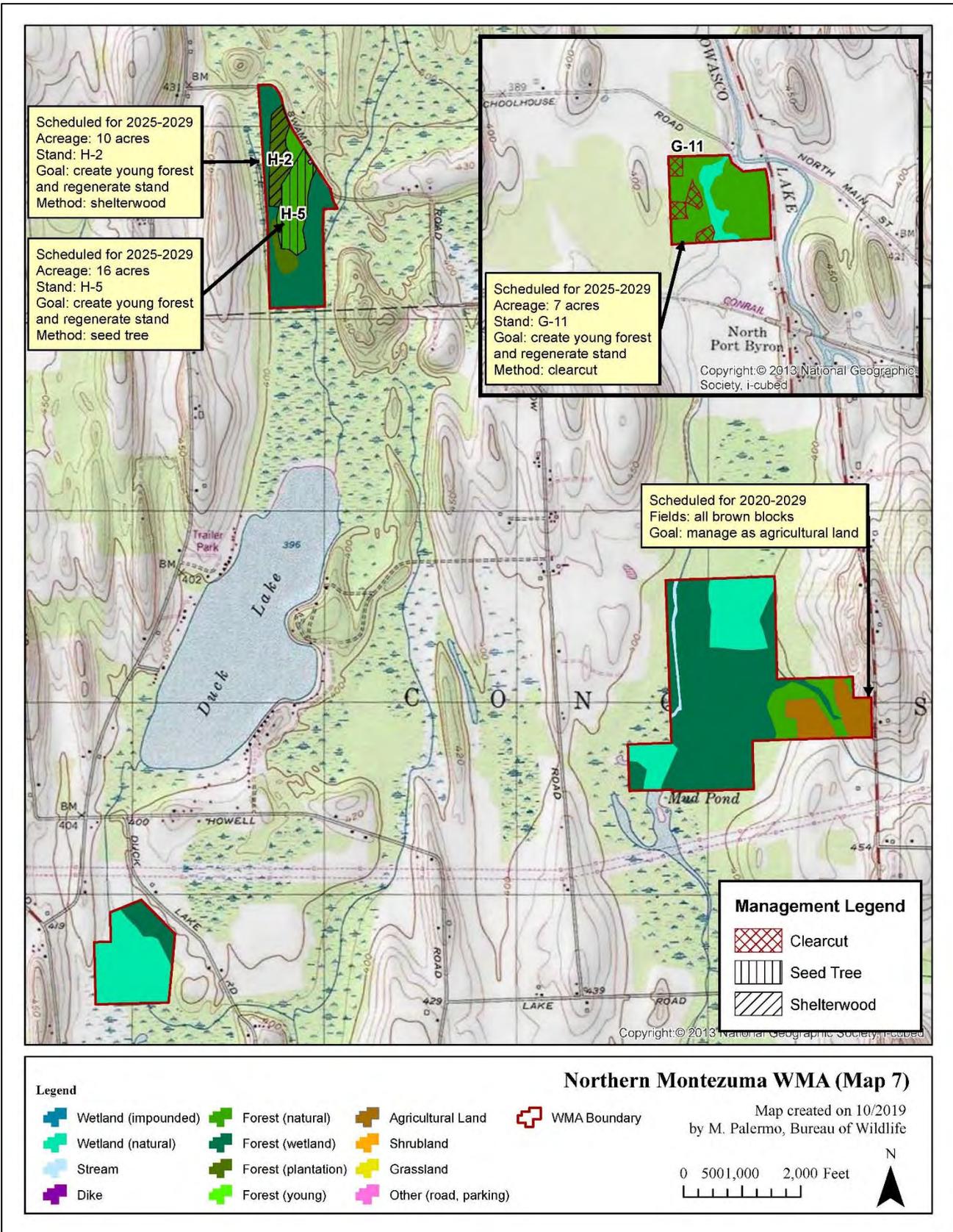


FIGURE 20. Habitat types and location(s) of proposed management on Northern Montezuma WMA (Map 7).

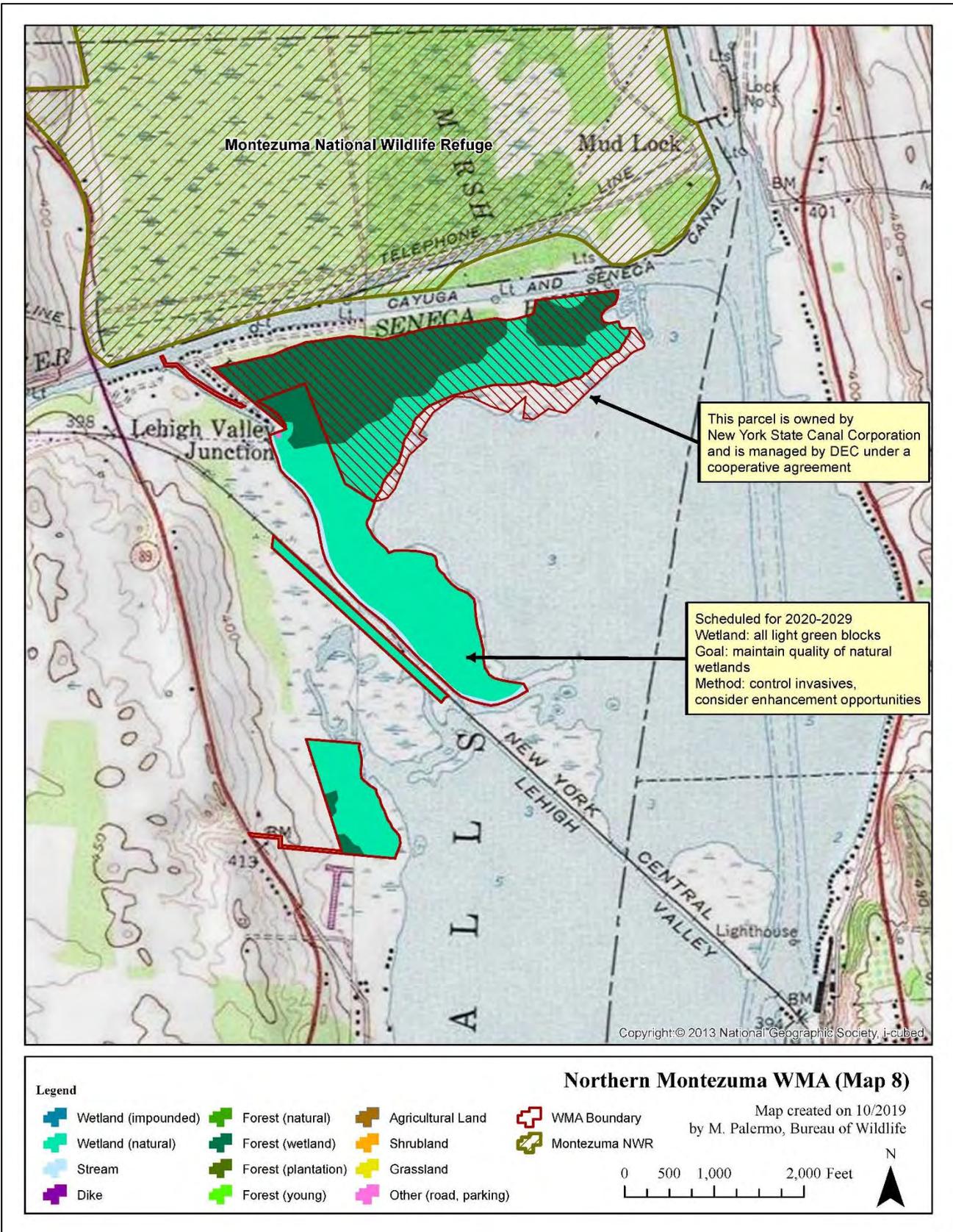


FIGURE 21. Habitat types and locations of proposed management on Northern Montezuma WMA (Map 8).

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.

Emergent wetland: In this wetland, emergent plants (i.e., erect, rooted, herbaceous hydrophytes, excluding mosses and lichens) are the tallest life form with at least 30% areal coverage. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. (Classifications of Wetlands and Deepwater Habitats of the United States, Federal Geographic Data Committee, 2013)

Forb: Any broad-leaved, 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.

Forested wetland: In forested wetlands, trees are the dominant life form (i.e., the tallest life form with at least 30% areal coverage. Trees are defined as woody plants at least 6 meters (20 ft) in height. Forested wetlands regenerating after a natural or human-caused disturbance are considered young forest (forested wetland) in this HMP. (Adapted from Classifications of Wetlands and Deepwater Habitats of the United States, Federal Geographic Data Committee, 2013)

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

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

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

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

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

Level Ditching: The excavation of ditches and small potholes through a near-dry marsh bed with the spoil deposited as flattened ridges between channels or piled as islands. Ditching is established to improve cover-water ratios in dense vegetation, which can increase the quality of brood-rearing and courtship habitat for waterfowl as well as increase furbearer production and aquatic plant growth. (Adapted from Baldassarre and Bolen, 2006. Waterfowl Ecology and Management)

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.

Scrub-shrub wetland: In scrub-shrub wetlands, woody plants less than 6 meters (20 ft) tall are the dominant life form (i.e., the tallest life form with at least 30% areal coverage). This includes various shrub species and also trees that are stunted because of adverse environmental conditions. Forested wetlands regenerating after a natural or human-caused disturbance are considered young forest (forested wetland) in this HMP, rather than scrub-shrub wetlands. (Adapted from Classifications of Wetlands and Deepwater Habitats of the United States, Federal Geographic Data Committee, 2013)

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

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

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

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

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

State Rank of Significant Ecological Communities:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.

S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.

S4 = Apparently secure in New York State.

S5 = Demonstrably secure in New York State.

SH = Historically known from New York State, but not seen in the past 15 years.

SX = Apparently extirpated from New York State.

SE = Exotic, not native to New York State.

SR = State report only, no verified specimens known from New York State.

SU = Status unknown.

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

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

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

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

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

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

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

- (a) lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic or semi-aquatic vegetation of the following types: wetland trees, wetland shrubs, emergent vegetation, rooted,

floating-leaved vegetation, free-floating vegetation, wet meadow vegetation, bog mat vegetation, and submerged vegetation;

- (b) lands and submerged lands containing remnants of any vegetation that is not aquatic or semi-aquatic that has died because of wet conditions over a sufficiently long period, provided that such wet conditions do not exceed a maximum seasonal water depth of six feet and provided further that such conditions can be expected to persist indefinitely, barring human intervention;
- (c) lands and waters substantially enclosed by aquatic or semi-aquatic vegetation as set forth in paragraph (a) or by dead vegetation as set forth in paragraph (b) the regulation of which is necessary to protect and preserve the aquatic and semi-aquatic vegetation as set forth in paragraph (a) or by dead vegetation as set forth in paragraph (b) the regulation of which is necessary to protect and preserve the aquatic and semi-aquatic vegetation; and
- (d) the waters overlying the areas set forth in (a) and (b) and the lands underlying.”

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

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

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

APPENDIX B: COMPLIANCE WITH STATE ENVIRONMENTAL QUALITY REVIEW

This plan identifies habitat management activities to be conducted on the Wildlife Management Area. These activities were analyzed in the 1979 *Programmatic Environmental Impact Statement on Habitat Management Activities of the Department of Environmental Conservation; Division of Fish and Wildlife* (PEIS), as updated and amended in 2017 by the *Supplemental Final Environmental Impact Statement* (SFEIS).²⁴ Any activity that exceeds the thresholds of, or was not analyzed in the 1979 PEIS as amended in 2017, will require individual, site-specific environmental review. Environmental assessment forms prepared as a result of this review will be posted on the Environmental Notice Bulletin (ENB).²⁵

The activities recommended in this plan:

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

²⁴ Available online at <http://www.dec.ny.gov/regulations/28693.html>.

²⁵ Available online at <http://www.dec.ny.gov/enb/enb.html>.

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 “Hershisier-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.