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January 07, 2021

NMC3, LLC
Sugar Loaf Bypass
Chester, NY 10918

RE: Endangered Species Habitat Assessment on the Sugar Loaf Bypass Subdivision

Dear Sirs/Madam,

The New York State Department of Environmental Conservation (NYSDEC) New York Natural Heritage Program has identified the bog turtle (*Glyptemys muhlenbergii*), Indiana bat (*Myotis sodalis*), Northern long-eared bat (*M. septentrionalis*) and rocky summit grassland plant community occurring in the vicinity of the subject property.

ERS Consultants, Inc. conducted an endangered species habitat assessment on December 29, 2020 and January 06, 2021 at the Sugar Loaf Bypass Subdivision Project located off Sugar Loaf Bypass (County Highway 13A) in the Town of Chester, Orange County, New York. The subject property consists of approximately 72.6 +/- acres and is known as Section 13, Block 1, Lots 39 & 41.22. The site is undeveloped consisting of agricultural lands, wetlands and forested uplands. The site is shown on the Warwick, NY US Geological Survey Quadrangle. Prior to conducting field investigations the following maps were reviewed: National Resource Conservation Service (NRCS) Soils Maps, the US Fish & Wildlife Services (USFWS) National Wetland Inventory Maps (NWI) and the NYSDEC Freshwater Wetlands Maps. The NRCS Soils Maps show seven soil units within the entire subject site. Alden and Erie soils were associated with the wetland areas. Alden soils are considered hydric soils and Erie soils are considered potentially hydric soils. The USFWS NWI Maps show no wetlands except for the pond on the subject site. The NYSDEC Freshwater Wetland Maps also show no State regulated wetlands on site.

Habitats occupied by bog turtles in the Hudson Valley are wet meadows, sedge meadows, and red maple swamps (New York Natural Heritage Program, NYSDEC Bog Turtle Fact Sheet, USFWS 2001). Bog turtles have specific habitat requirements that include spring-fed, open-canopy wetlands with shallow, slow-moving water, deep mucky soils, and tussock-forming herbaceous vegetation. For example, tussock sedge (*Carex stricta*) or moss (*Sphagnum* spp.) covered hummocks are typical habitat for these species. A diversity of microhabitats within these wetlands provide areas that the turtles require for basking, foraging, nesting, and hibernation.

The methodology used to conduct this habitat evaluation followed the guidelines of the USFWS Bog Turtle Habitat (Phase 1) Survey Report. The bog turtle survey consisted of an evaluation of the wetlands for potential suitable bog turtle habitat. The survey is completed by assessing the presence and suitability of three key habitat criteria: hydrology, soils, and vegetation. Suitable hydrology is identified by the presence of springs or seeps, year-round saturated soils, and shallow surface water, particularly slow-moving rivulets; although, the wetland can be interspersed with both wet and dry pockets. Suitable soils are generically described as mucky. The term "mucky" does not refer to a technical soil type, rather mucky soils are described as soft and penetrable to a depth equal to or greater than 3 inches. Suitable vegetation includes shrub and herbaceous species, primarily sedges, grasses, and rushes.

Based upon observations of hydrology, soils, and vegetation, no suitable bog turtle habitat existed within the delineated wetlands. No mucky soils were identified on-site. Dominate tree and shrub species included green ash (*Fraxinus pennsylvanica*), tatarian honeysuckle (*Lonicera tatarica*) and red osier dogwood (*Cornus sericea*). Herbaceous vegetation is dominated by purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*) and reed canary grass (*Phalaris arundinacea*).

Based upon this habitat investigation, no hibernacula (winter habitat) for either Indiana or Northern long-eared bats exists on-site. However, potential summer habitat may exist within the project area. These bat species use live trees greater than 5 inches DBH, especially trees containing dead wood and snags or even dead trees and trees with exfoliating bark. The NYSDEC recommends that in areas where potential summer habitat exists, clearing of trees over 5 inches DBH should occur between October 1 and March 31. If this recommendation is followed then no impacts to these species would occur.

Rocky summit grassland plant community is a grassland community that occurs on rocky summits, ridges, and exposed outcrops. The vegetation is dominated by herbaceous plants, especially grasses. Woody species, such as red oak (*Quercus rubra*) and lowbush blueberry (*Vaccinium pallidum*, *V. angustifolium*), are scarce. Though this plant community can be seen throughout New York State, it was not observed within the subject site.

Very truly yours,
ERS Consultants, Inc.

A handwritten signature in cursive script, appearing to read "David Griggs".

David Griggs
Senior Scientist

PHASE 1 BOG TURTLE HABITAT SURVEY

**Sugar Loaf Bypass Subdivision
Town of Chester
Orange County, New York**

Prepared for:

NMC3, LLC

Prepared by:

**ERS Consultants, Inc.
11 Forester Avenue
Warwick, NY 10990**

December 2020

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INTRODUCTION

A Phase 1 Bog Turtle Habitat Survey was conducted on December 29, 2020 in wetlands located within the Sugar Loaf Bypass Subdivision Project in the Town of Chester, Orange County, New York. The site is shown on the Warwick, NY US Geological Survey Quadrangle, Figure 1 in Appendix A. The study area consists of approximately 72.6 acres. Prior to conducted field investigations the New York State Department of Environmental Conservation (NYSDEC) Mapper website (Figure 2 in Appendix A), the US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) Maps (Figure 3 in Appendix A), and the National Resource Conservation Service (NRCS) Soils Maps (Figure 4 in Appendix A) were reviewed.

The bog turtle is a small and elusive semi-aquatic turtle that grows to no more than 4.5 inches in length and spends much of its life underground or hidden in vegetation. In New York, the bog turtle range occurs in two separate regions: the Hudson Valley Region and the Lake Plain Region along the southern and eastern shores of Lake Ontario. The majority of bog turtle populations occur in the Hudson Valley, which is part of the Hudson/Housatonic Recovery Unit.

HABITAT CHARACTERISTICS

The bog turtle (*Glyptemys muhlenbergii*) is a Federally-listed threatened and State-listed endangered species whose occurrence is documented within one mile of the Project site. Bog turtles generally inhabit open canopy wetlands with soft, saturated soils that are fed by seeps and springs of cold groundwater that has been in contact with calcium-rich bedrock or soils (USFWS, 2001). Bog turtle habitat in New York is further described (USFWS, 2001) as associated with rivulets having a deep mucky substrate and very shallow surface water depths (i.e., few inches). In the Hudson River Valley, bog turtle habitats may be isolated from other wetlands or they may exist as part of larger wetland complexes (New York Natural Heritage Program, 2019). As described above, these wetlands are often fed by groundwater and the vegetation always includes various sedges (*Carex* species). Other plant species commonly associated with bog turtle habitat (New York Natural Heritage Program, 2019; USFWS, 2001) include: tamarack (*Larix laricina*), cinquefoils (*Potentilla* spp.), alders (*Alnus* spp.), willows (*Salix* spp.), dogwoods (*Cornus* spp.), grass-of-parnassus (*Parnassia glauca*), sphagnum mosses (*Sphagnum* spp.), horsetails (*Equisetum* sp.), jewelweed (*Impatiens capensis*), rice cut-grass (*Leersia oryzoides*), tearthumb (*Persicaria sagittata*), arrow arum (*Peltandra virginica*), red maple (*Acer rubrum*), skunk-cabbage (*Symplocarpus foetidus*), rushes (*Juncus* spp.), and bulrushes (*Scirpus* spp.). Plants such as common reed (*Phragmites australis*) can quickly invade such areas, resulting in the loss of suitable basking and nesting habitat (New York Natural Heritage Program, 2019).

METHODOLOGY

ERS Consultants, Inc. scientists have extensive experience in conducting bog turtle surveys in New York State and possess current New York Scientific Collecting Permits for this species. The resume of the investigator is found in Appendix C. The methodology used to conduct this habitat evaluation follows the guidelines of the USFWS Bog Turtle Habitat (Phase 1) Survey Report. The USFWS developed this template (revised 4/13/06) to document sufficient data for agency review. The Phase 1 bog turtle survey consists of an evaluation of the wetlands for potential suitable bog turtle habitat. The survey is completed by assessing the presence and suitability of three key habitat criteria: hydrology, soils, and vegetation. Suitable hydrology is identified by the presence of springs or seeps, year-round saturated soils, and shallow surface water, particularly slow-moving rivulets; although, the wetland can be interspersed with both wet and dry pockets. Suitable soils are generically described as mucky. The term "mucky" does not refer to a technical soil type, rather mucky soils are described as soft and penetrable to a depth equal to or greater than 3 inches. Pockets of deeper mucky soils, usually associated with a woody root mass or hummock, serve as overwintering locations.

Suitable vegetation includes shrub and herbaceous species, primarily sedges, grasses, and rushes. Fen species, such as yellow sedge (*Carex flava*), grass-of-parnassus, and shrubby cinquefoil (*Potentilla fruticosa*), are other good indicators of suitable vegetation. Other plant species commonly found in bog turtle habitat include, but are not limited to sphagnum moss, sensitive fern (*Onoclea sensibilis*), tussock sedge, jewelweed, skunk cabbage, poison sumac (*Toxicodendron vernix*), alder, and red maple. Suitable hydrology and soils are considered to be the primary determinants of suitable bog turtle habitat (USFWS 2006).

During the Phase 1 survey, observations of hydrology, soils, and vegetation were made in the wetland areas within the study area. Cover types within the wetlands were characterized by the species and structure of the dominant plant species in that portion of the wetland.

RESULTS

Table 1 below lists plant species found in the delineated onsite wetlands. Figure 5 in Appendix A shows the wetland identifications and locations along with the USFWS wetland system classification. Color photographs for each delineated wetland can be found in Appendix B.

Wetland A is the largest wetland area, 2.9+/- acres, located on the west side of County Highway 13A and contains an open water pond. This wetland would be classified by the USFWS partly as both palustrine forested broad-leaved (PF01) as well as palustrine scrub/shrub broad-leaved (PSS1) wetland system. The pond appears on the USFWS NWI maps. Soils within this wetland consist of Erie gravelly silt loam (ErB) with 3 to 8% slopes. Hydrology during the field investigation consisted of stormwater flowing into the ponded area. Dominant vegetation included green ash (*Fraxinus pennsylvanica*) in the overstory, tatarian honeysuckle (*Lonicera tatarica*) and red osier dogwood (*Cornus sericea*) in the shrub layer. The conditions of this wetland are not representative of suitable bog turtle habitat.

Wetland B is 1.2+/- acres in size, also located on the west side of County Highway 13A. This wetland would be classified as a palustrine forested broad-leaved (PF01), palustrine scrub/shrub broad-leaved (PSS1) and palustrine emergent (PEM) wetland system. Soils within this wetland consist of Erie gravelly silt loam (ErB) with 3 to 8% slopes. Stormwater flows from the pond and from the highway north through this wetland. Dominant vegetation included green ash in the overstory, tatarian honeysuckle and red osier dogwood in the shrub layer and purple loosestrife (*Lythrum salicaria*) in the herbaceous layer. The conditions of this wetland are not representative of suitable bog turtle habitat.

Wetland C is 0.2+/- acres in size, and located in the northern portion of the site, on the west side of County Highway 13A. This wetland would be classified as a palustrine forested broad-leaved (PF01) wetland system. Soils within this wetland consist of Erie gravelly silt loam (ErB) with 3 to 8% slopes. Stormwater flows from the pond and from

the highway north through this wetland. Dominant vegetation included green ash in the overstory, red osier dogwood in the shrub layer and common reed in the herbaceous layer. The conditions of this wetland are not representative of suitable bog turtle habitat.

Wetland D is 0.5+/- acres in size, and located on the east side of County Highway 13A. This wetland would be classified as a palustrine scrub/shrub broad-leaved (PSS1) and palustrine emergent (PEM) wetland system. Soils within this wetland consist of Erie gravelly silt loam (ErB) with 3 to 8% slopes. Stormwater flows from the highway north through this wetland and under County Highway 13A. Dominant vegetation included tatarian honeysuckle in the shrub layer and common reed in the herbaceous layer. The conditions of this wetland are not representative of suitable bog turtle habitat.

Wetland E is 0.4+/- acres in size, located in the northern section of the site, on the east side of County Highway 13A. This wetland would be classified as a palustrine forested broad-leaved (PF01) and palustrine emergent (PEM) wetland system. Soils within this wetland consist of Erie gravelly silt loam (ErB) with 3 to 8% slopes. Surface waters flow from the east through this wetland. Dominant vegetation included green ash in the overstory, tatarian honeysuckle and red osier dogwood in the shrub layer and purple loosestrife (*Lythrum salicaria*) in the herbaceous layer. The conditions of this wetland are not representative of suitable bog turtle habitat.

TABLE 1

Plant List

COMMON NAME	SCIENTIFIC NAME
	<i>Wetlands</i>
Multiflora Rose	<i>Rosa multiflora</i>
Arrowwood	<i>Viburnum dentatum</i>
Red Osier Dogwood (D)	<i>Cornus sericea</i>
Reed Canary Grass (D)	<i>Phalaris arundinacea</i>
Common Reed (D)	<i>Phragmites australis</i>
Japanese Stiltgrass	<i>Microstegium vimineum</i>
Water Smartweed	<i>Persicaria amphibia</i>
Goldenrod	<i>Solidago gigantea</i>
Swamp Agrimony	<i>Agrimonia parviflora</i>
Jewelweed	<i>Impatiens capensis</i>
Nutsedge	<i>Cyperus esculentus</i>
Sedge	<i>Carex lurida</i>
Sensitive Fern	<i>Onoclea sensibilis</i>
Purple Loosestrife (D)	<i>Lythrum salicaria</i>
Black Haw	<i>Viburnum prunifolium</i>
Red Maple	<i>Acer rubrum</i>
Green Ash (D)	<i>Fraxinus pennsylvanica</i>
Red Cedar	<i>Juniperus virginiana</i>
Skunk Cabbage	<i>Symplocarpus foetidus</i>
Tatarian Honeysuckle (D)	<i>Lonicera tatarica</i>
Tearthumb	<i>Persicaria sagittata</i>
Tussock Sedge	<i>Carex stricta</i>
Soft Rush	<i>Juncus effusus</i>
Woolgrass	<i>Scirpus cyperinus</i>
Elm	<i>Ulmus americana</i>
Sneezeweed	<i>Helenium autumnale</i>
Sphagnum sp.	<i>Sphagnum sp.</i>
Monkey Flower	<i>Mimulus aurantiacus</i>
Vervain	<i>Verbena officinalis</i>

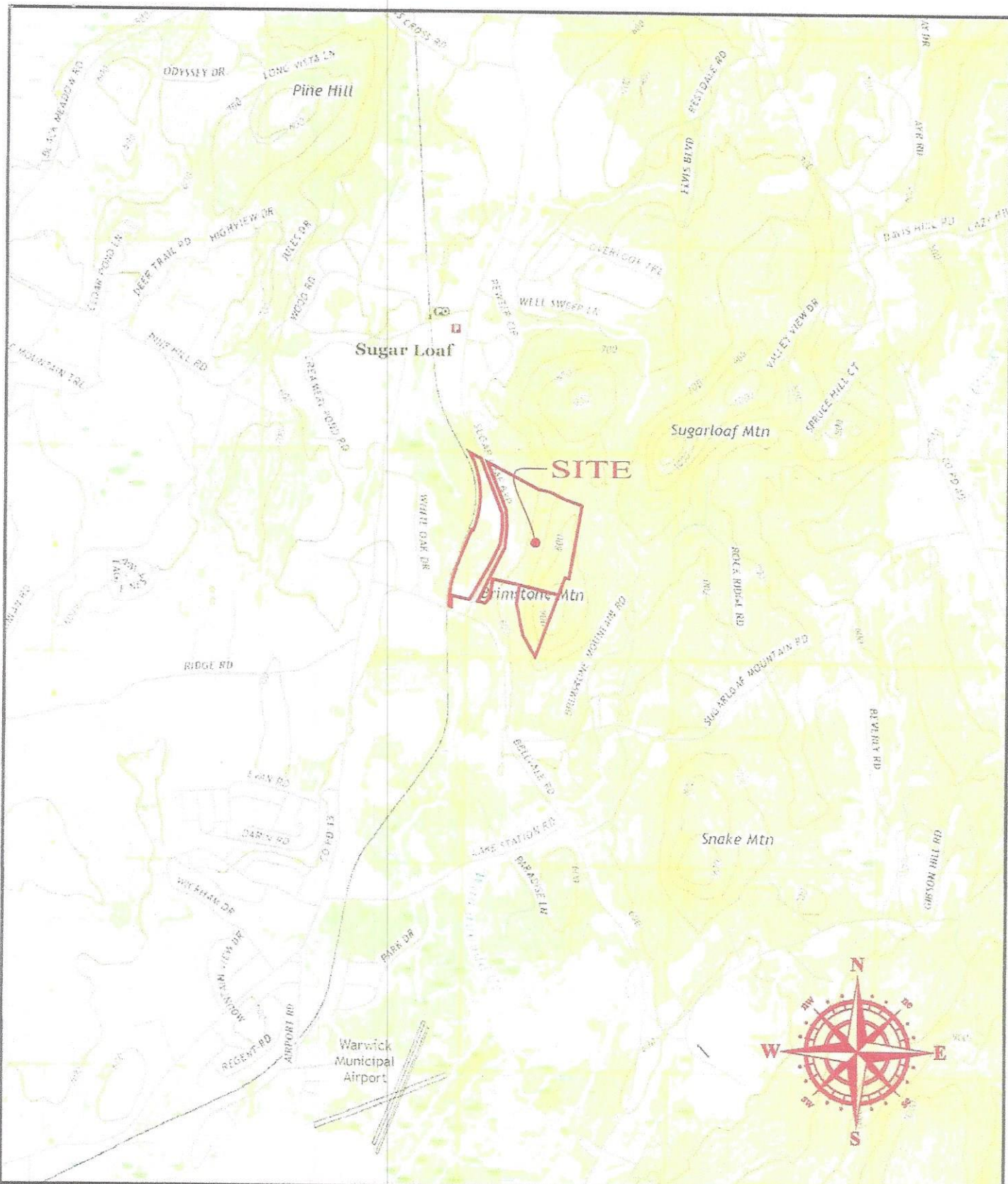
D = Dominant plant species.

REFERENCES

- Cowardin, L.M. 1979. Classification of Wetlands and Deepwater Habitats of the United States.
- Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2014. Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. New York Natural Heritage Program, New York Department of Environmental Conservation, Albany, NY.
- Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>.
- New York State Department of Environmental Conservation. Bog Turtle Fact Sheet. <http://www.dec.ny.gov/animals/7164.html>.
- New York Natural Heritage Program. NYNHP Conservation Guide – Bog Turtle. Albany, NY. <http://www.acris.nynhp.org/guide.php?id=7507>.
- U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population Recovery Plan. Hadley, MA. 103 pp.
- U.S. Fish and Wildlife Service. 2006. Guidelines for Bog Turtle Surveys. A revision to the Bog Turtle (*Clemmys muhlenbergii*), Northern Population Recovery Plan (dated May 15, 2001, Revised 2017). <http://www.fws.gov/northeast/nyfo/es/btsurvey.pdf>.
- U.S. Fish and Wildlife Service, Revised 2018. Guidelines for Bog Turtle Surveys for the Northern Population Range Phase 1 and 2 surveys.

Appendix A

Figures



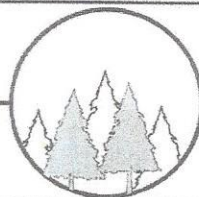
SOURCE: UNITED STATES GEOLOGICAL SURVEY

USGS 7.5 MIN. QUADRANGLE
WARWICK, NEW YORK

PREPARED FOR:
NMC3, LLC

SECTION 13 BLOCK 1 LOTS 41.22 & 39
 TOWN OF CHESTER, COUNTY OF ORANGE, NEW YORK
 SCALE: 1"=2,000'

FIGURE 1

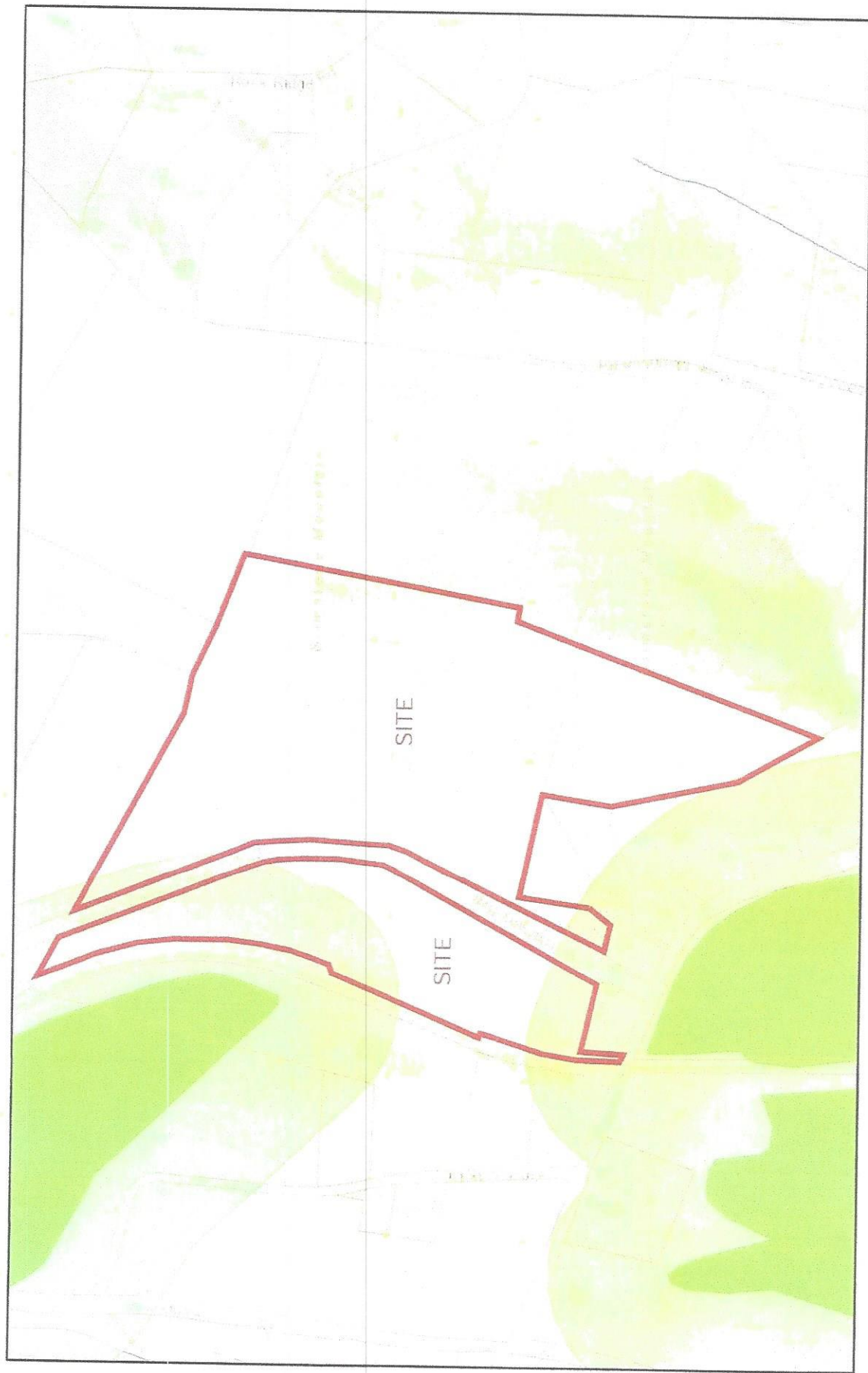


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SUGAR LOAF-13-1-41.22 & 39



1:9,028
0 0.05 0.1 0.2 mi
0 0.07 0.15 0.3 km

SOURCE:

NYS Department of Environmental Conservation
Not a legal document

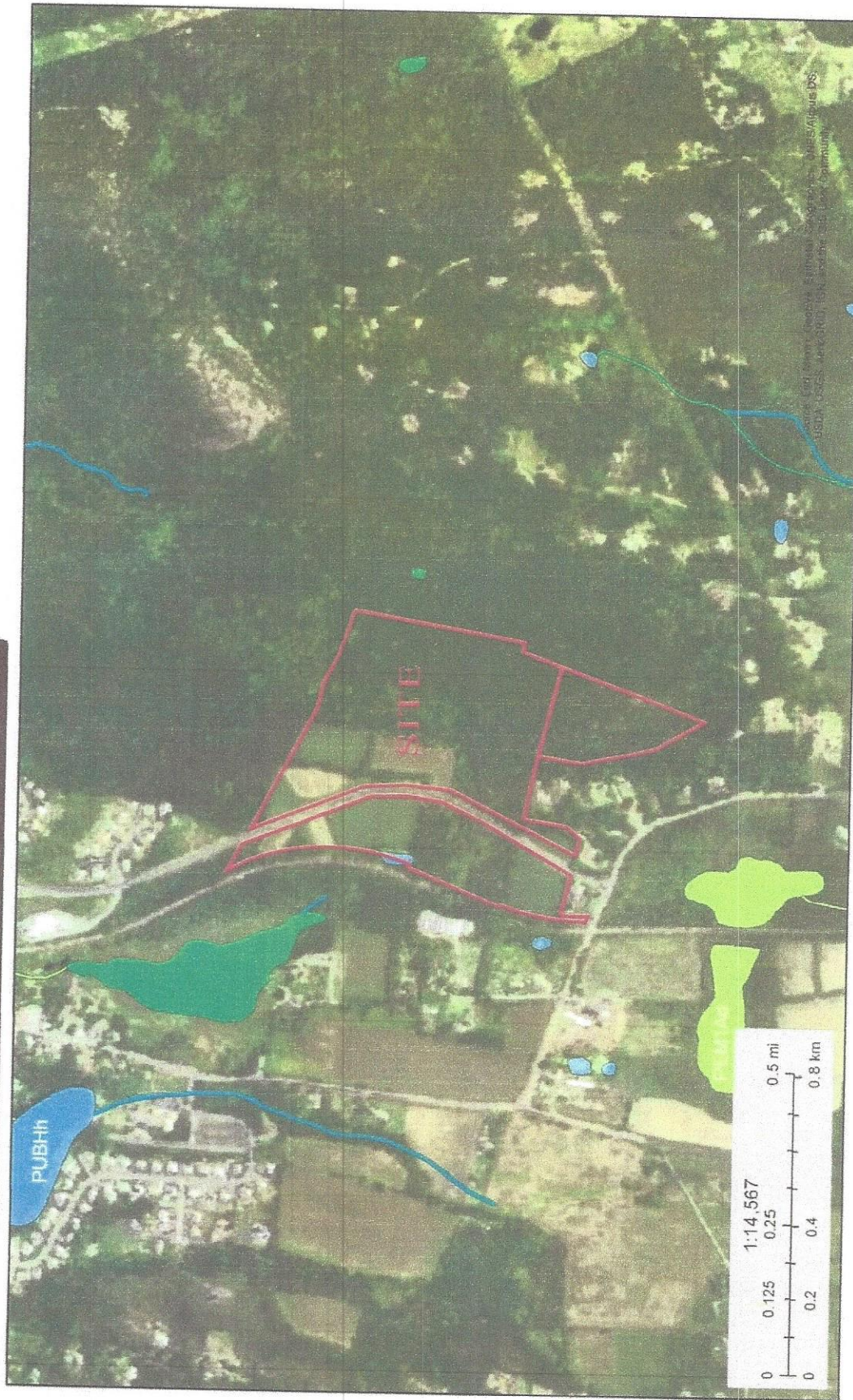
FIGURE 2



U.S. Fish and Wildlife Service

National Wetlands Inventory

SUGAR LOAF-13-1-41.22 & 39



Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond

- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

FIGURE 3 SOURCE:
National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Soil Map—Orange County, New York
(SUGAR LOAF-13-141.22 & 39)



Map Scale: 1:5,780 if printed on A portrait (8.5" x 11") sheet.

0 50 100 200 300 Meters

0 250 500 1000 1500 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



Natural Resources
Conservation Service

SOURCE:
Web Soil Survey
National Cooperative Soil Survey

FIGURE 4A

Page 1 of 3

MAP LEGEND

Area of Interest (AOI) Area of Interest (AOI) Soils Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points Special Point Features Blowout Borrow Pit Clay Spot Closed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot	Spoil Area Stony Spot Very Stony Spot Wet Spot Other Special Line Features Water Features Streams and Canals Transportation Rails Interstate Highways US Routes Major Roads Local Roads Background Aerial Photography
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MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County, New York
Survey Area Data: Version 21, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 7, 2013—Feb 26, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ab	Alden silt loam	0.7	0.9%
ErA	Erie gravelly silt loam, 0 to 3 percent slopes	7.4	10.2%
ErB	Erie gravelly silt loam, 3 to 8 percent slopes	5.5	7.6%
HLC	Hollis soils, sloping	9.2	12.7%
MdB	Mardin gravelly silt loam, 3 to 8 percent slopes	5.5	7.6%
MdC	Mardin gravelly silt loam, 8 to 15 percent slopes	2.0	2.8%
MdD	Mardin gravelly silt loam, 15 to 25 percent slopes	11.6	15.9%
RhB	Riverhead sandy loam, 3 to 8 percent slopes	3.8	5.3%
ROD	Rock outcrop-Hollis complex, 15 to 35 percent slopes	26.7	36.8%
SXC	Swartswood and Mardin soils, sloping, very stony	0.1	0.2%
Totals for Area of Interest		72.6	100.0%

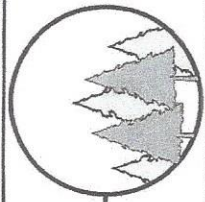
SOURCE:



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE 4C
Page 3 of 3



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PHOTO LOCATIONS

PREPARED FOR:
NMC3, LLC
 SECTION 13 BLOCK 1 LOTS 41.22 & 39
 TOWN OF CHESTER, COUNTY OF ORANGE, NEW YORK

SCALE: 1"=180'

FIGURE 6

Appendix B

Photographs



Photo 1: Looking north at intermittent stream in Wetland A.

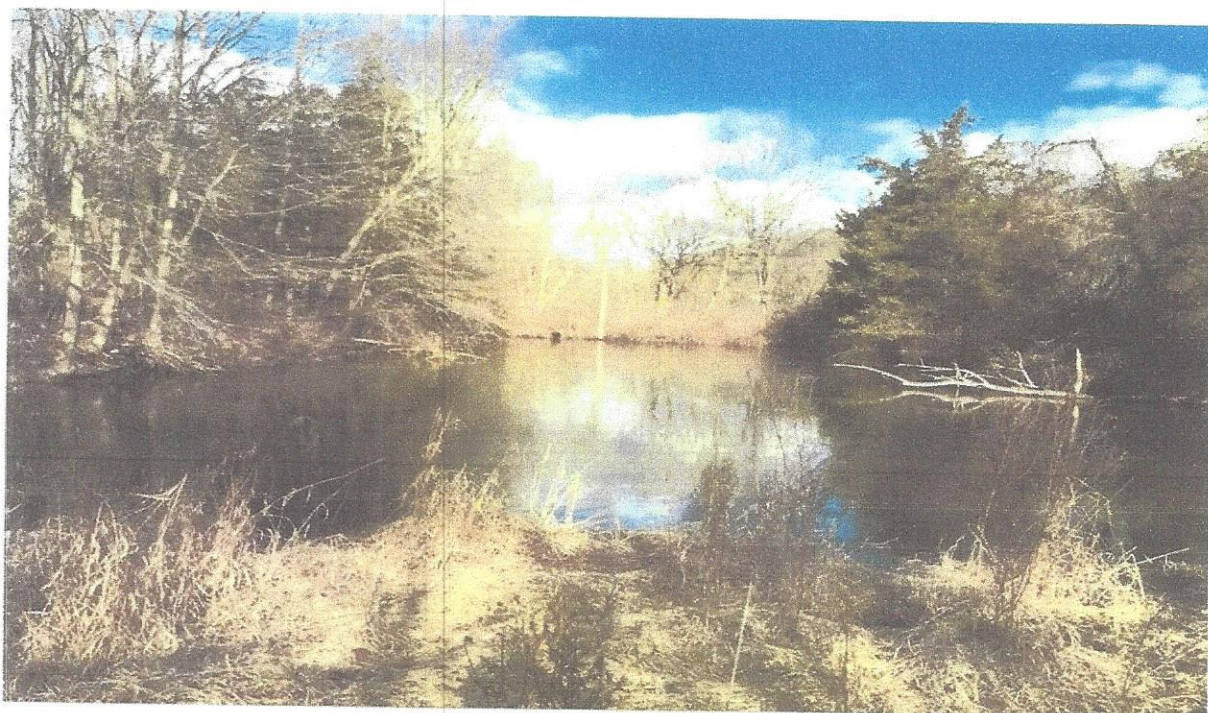


Photo 2: Looking north at pond in Wetland A.

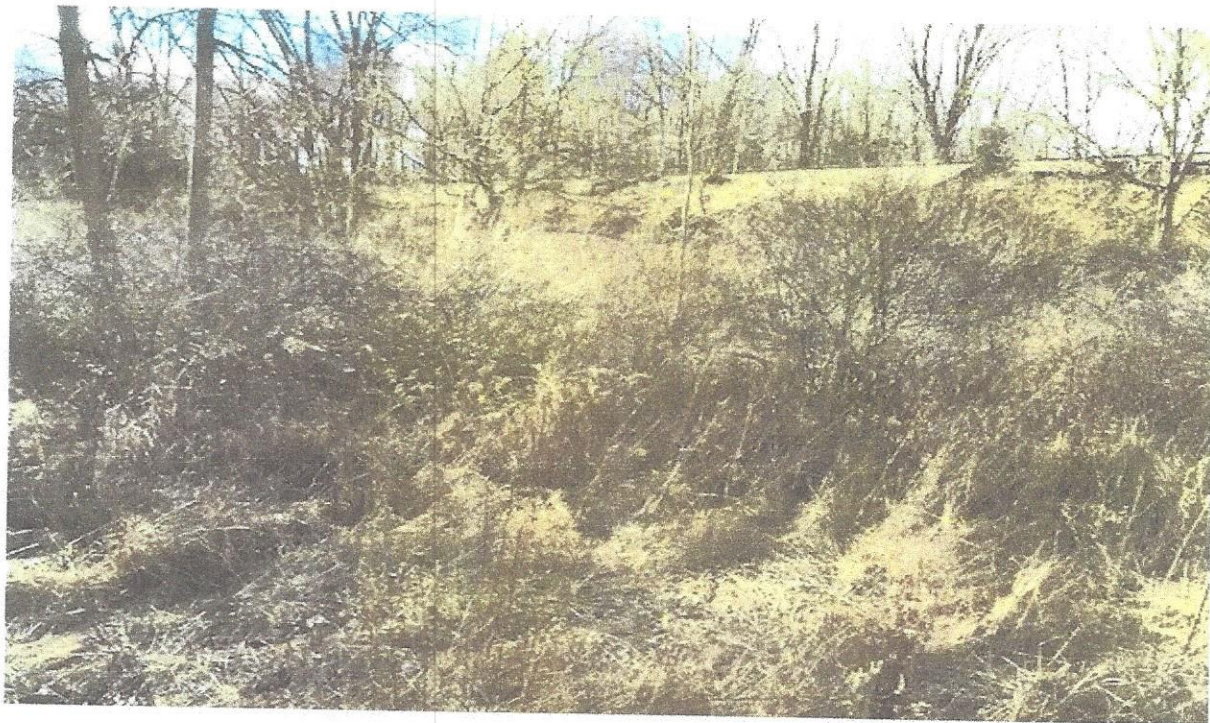


Photo 3: Looking west at Wetland B.



Photo 4: Looking northwest at emergent area in Wetland B,



Photo 5: Looking north at Wetland C.



Photo 6: Looking north at Wetland E.



Photo 7: Looking south at Wetland D.

Appendix C

Resume

EDUCATION	<p>Duke University, MS - Environmental Management SUNY College of Environmental Sciences & Forestry, BS Wildlife Biology & Mgmt Syracuse University, BS Biology Brevard College, North Carolina, AS Forest Biology</p>
TECHNICAL TRAINING	<p>US Fish and Wildlife Service Habitat Evaluation Procedures (HEP), Certified Adamus Wetland Functional Assessment Methodology (WET), Certified US Fish and Wildlife Service Instream Flow Incremental Methodology (IFIM) NYSDEC Certificate of Erosion and Sediment Control</p>
RESPONSIBILITIES	<p>Principal Scientist. As a Certified Wildlife Biologist and Professional Wetland Scientist, Mr. Griggs is responsible for coordinating and supervising environmental impact statements, natural resource/endangered species inventories and assessments, wetland delineations and mitigation projects, environmental permitting and technical training in wetland ecology.</p>
EXPERIENCE	<p>Twenty years of professional experience in wetlands ecology and wildlife management in the US and overseas.</p> <p>Representative Projects include:</p> <p>Pipeline Projects including Millennium Pipeline; Tennessee Gas Pipelines; Spectra Energy's Algonquin Pipeline, and Columbia Gas Pipelines, NY, NJ, PA. Environmental Inspector and conducted environmental monitoring for endangered species including timber rattlesnake, bog and Blandings turtles. Complied with Federal Energy Regulatory Commission (FERC).</p> <p>Ramapo Mountain Land Company, Rockland County, New York. Conducted endangered species assessment including flora and timber rattlesnake; habitat assessment; mark and recapture; radio-tracking.</p> <p>Manhattan Woods Golf Course, Rockland County, New York. Supervised wetland delineation for a 220-acre proposed golf course. Services also included wetland permits; preparation, approval and implementation of mitigation (wetland creation) plans.</p> <p>Pine Barrens Work, New York, New Jersey, New Hampshire. Utility ROW corridor work conducted presence/absence as well as habitat assessments and restoration for endangered & threatened species. Species included various flora, Eastern tiger salamander, Northern pine snake, timber rattlesnake, Pine Barrens tree frog, barred owl, and Karner blue butterfly.</p> <p>Harmon Meadow Wetland Mitigation Design and Construction Services, Secaucus, New Jersey. Field Manager for a 150-acre wetland mitigation project, including design, federal and state regulatory coordination and approvals, pre/post project environmental monitoring and coordination of public presentations. Preparation of environmental assessments using a computer-based Habitat Evaluation Procedures (HEP) and Adamus (WET) analysis development and coordination of biologic, water and sediment quality sampling programs.</p> <p>Landfill Design and Environmental Studies for Major New York State Regional Landfill. Performed wildlife and habitat inventories of proposed landfill and resource recovery sites for environmental impact statements conducted under NYSEQRA. Ecological assessments included methods to avoid and mitigate impacts. Evaluation of sensitive environmental features including endangered species and wetlands, including a Wetlands Delineation and Permitting.</p>

Wetland Investigation, Permitting and Mitigation, New York and New Jersey. Responsible for wetlands delineation, report preparation and permitting, in accordance with U.S. Army Corps of Engineers, New Jersey Department of Environmental Protection and New York State Department of Environmental Conservation regulations. Preparation of freshwater and brackish wetland mitigation plans. Clients included the U.S. Navy, United Parcel Service, Hartz Mountain Development Corporation, Bellemead Development Corporation, Rivervale Realty Company, numerous land developers, golf courses, municipalities, and engineering firms.

Virginia Department of Transportation - Environmental Services (statewide). Field Manager of Williamsburg and Alexandria Environmental Assessments and Springfield Bypass 4(f) statements for the Virginia Department of Highways and Transportation to meet FHWA environmental requirements. Conducted biotic surveys, including the computer-based Biotic of Virginia (BOVA) analysis, Phase 1 bog turtle surveys, and preparation of mitigation concepts for wetland impacts.

Air Force Base Joint Use Master Plan and Environmental Assessment, Illinois. Technical Specialist responsible for the coordination of the environmental assessment for the proposed expansion of the air base and introduction of civil air traffic for the Illinois Department of Transportation. Analysis focused on impacts to the natural resources including wetlands and farmlands, and mitigation plans for bottomland hardwoods. Endangered turtle survey work included spotted, Eastern river, yellow mud, and Blandings turtles.

Pumped Storage Hydroelectric Project and FERC License Application, New Jersey. Assessment of existing conditions and potential impacts on terrestrial and aquatic fauna and flora for the FERC license application. Endangered species surveys included Indiana bat, timber rattlesnake, copperhead, and bog turtle.

Wetland Mitigation Plan and Permitting, New Jersey. Vegetative survey for the Bellemead Development Corporation EPA Section 309 Order and environmental analysis using the HEP program. This work was conducted on the Hackensack River, Berry's Creek, Mill Creek and Cromakill Creek in New Jersey.

New York University Medical Center (Laboratory for Experimental Medicine and Surgery in Primates). Consultant for primate release program in tropical portions of Africa. Responsible for breeding and behavior analyses and monitoring environmental conditions for 300 primates.

Lawler, Matusky and Skelly Engineers, New York. Field Technician responsible for the analysis of ichthyoplankton samples, seining, identifying and sorting various species of fish for the FHWA/NYS DOT Westway project.

MEMBERSHIPS

Society of Wetland Scientists-Certified Professional Wetland Scientist
Wildlife Society-Certified Wildlife Biologist
Adjunct Faculty for Continuing Education, Rutgers University