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Rare Species Survey
Seneca Army Depot Activity
Romulus, New York

September 1996

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Prepared for Department of Defense, Seneca Army Depot Activity (SEDA), including a review by New York State, Department of Environmental Conservation (NYSDEC)

Administrative Report No. 96-03

This survey report of threatened and endangered species has been reviewed and accepted by Department of Defense functioning through the Installation Commanding Officer, Seneca Army Depot Activity; State of New York functioning through the Director, New York State Department of Environmental Conservation; and U.S. Department of Interior, functioning through the Regional Director of the Fish and Wildlife Service.

This report is accepted by the following agencies:

BY: Donald C Olson Date: 2 Sep 97

Installation Commanding Officer:

Seneca Army Depot Activity, Department of Army

BY: Ronald E Lambertson Date: 2-3-97

Regional Director, Region 5

U.S. Fish and Wildlife Service

BY: Gary R Parsons Date: 12/23/96

Bureau Chief of Wildlife

New York State of Department of Environmental Conservation

Executive Summary

Field surveys were conducted by the U.S. Fish and Wildlife Service to determine presence or absence of threatened or endangered species of State or national concern occurring at Seneca Army Depot Activity (SEDA), Romulus, New York. The purpose of the study was to identify those species that the Department of Defense should consider when addressing potential impacts to these species from proposed activities of developments at SEDA and to identify opportunities for the Department of Defense to afford protection to species of State, regional, or national concern.

The time frame in which to accomplish these surveys for rare species allowed only one field season of data collection; therefore, in order to focus efforts, those areas having the highest habitat potential to support rare species were targeted, with areas of lesser potential being surveyed as time allowed. Thus, not all areas of SEDA were surveyed.

No federally listed species were found at SEDA. Therefore this report is focused on describing state listed species which are in decline or unusual for the region. The term rare refers to these species of state or regional concern; it is not a legal status.

A total of five New York State listed species were confirmed to occur at SEDA including:
3 plants (*Aster schreberi* (large-leaf aster), *Calamagrost stricta* var. *inexpansa* (northern reedgrass), *Geum virginianum* (rough avans); and,
2 birds (osprey (*Pandion haliaetus*) and northern harrier (*Circus cyaneus*)).

In addition to species encountered during surveys, suitable habitat was documented to occur at SEDA for several species of unconfirmed occurrence, including:
10 plants (*Aster puniceus* (cornel-leaved aster), *Carex buxbaumii* (brown bog sedge), *Carex lupuliformis* (false hop sedge), *Corydalis flavula* (yellow harlequin), *Cyperus odoratus* (rusty flatsedge), *Descurainia pinnata* (northern tansey-mustard), *Desmodium nuttallii* (Nuttall's tick clover), *Hypericum prolificum* (shrubby St. John's wort), *Sparganium minimum* (small bur-reed), *Trollius laxus* (spreading globeflower);
1 amphibian (*Eurycea l. longicauda* (longtail salamander));
3 reptiles (*Clemmys guttata* (spotted turtle), *Clemmys insculpta* (wood turtle), and *Eumeces a. anthracinus* (northern coal skink));
6 birds (*Buteo lineatus* (red-shouldered hawk), *Tyto alba* (common barn-owl), *Asio flammeus* (short-eared owl), *Lanius ludovicianus* (loggerhead shrike), *Dendroica cerulea* (cerulean warbler), and *Ammodramus henslowii* (Henslow's sparrow)); and,
2 mammals (*Myotis leibii* (small-footed bat) and *Myotis sodalis* (Indiana bat)).

Protection and enhancement of rare species and their habitats occurring at SEDA can be accomplished through seasonal restrictions on mowing of grassland areas and roadside vegetation, avoidance of further disturbance to or fragmentation of forested areas, protection and restoration of wetland habitats, and restrictions on the use of herbicides and insecticides. Where possible, species-specific management recommendations were developed to assist the Department of Defense in managing rare species and their habitats at SEDA.

Since populations of flora and fauna can fluctuate from year-to-year, it is possible that suitable habitats could be occupied by rare species in future years. The Service recommends that further field investigations be conducted for those rare species not encountered during this initial survey attempt. Furthermore, documented occurrences of rare species should periodically be monitored to ensure that recommended management practices are correctly implemented and to alert resource managers to potential unanticipated threats to rare species from changes in land use practices or other activities at SEDA.

The information contained in this report does not address any current project-specific impacts to rare species occurring at SEDA, but rather serves to identify rare species and their habitats that should receive further consideration during future planning efforts. Planning for future projects at SEDA should include a determination of the occurrence of suitable habitat for rare species on or in the vicinity of the proposed project site. If suitable habitat is present, a site-specific survey should be conducted to determine the presence or absence of rare species and as assessment of project-related impacts to rare species should be conducted in coordination with the U.S. Fish and Wildlife Service - Ecological Services and New York Department of Environmental Conservation - Division of Fish and Wildlife, as appropriate, prior to implementation of the proposed project.

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I. INTRODUCTION

A. BACKGROUND

The United States Department of Defense (DoD), Seneca Army Depot Activity (SEDA) and the United States Department of the Interior, Fish and Wildlife Service (USFWS), Lower Great Lakes Fishery Resources office (LGLFRO) developed an interagency agreement under the authority of the Fish and Wildlife Coordination Act (487 stat. 401 as amended, 16 USC 661 et. seq.), Conservation Programs on Military Reservations ("Sikes Act", 16 USC 670 et seq.), and other laws. The interagency agreement established a basis for the USFWS to provide to the DoD assistance and technical support in the study and management of rare species at SEDA.

Surveys for plants, amphibians, reptiles, and birds were conducted March to September 1996. The time frame in which to accomplish surveys for rare species allowed only one field season of data collection; therefore, in order to focus efforts, those areas having the highest habitat potential to support species of national, regional, or State concern were targeted, with areas of lesser potential being surveyed as time allowed. Thus, not all areas of SEDA were surveyed for rare species.

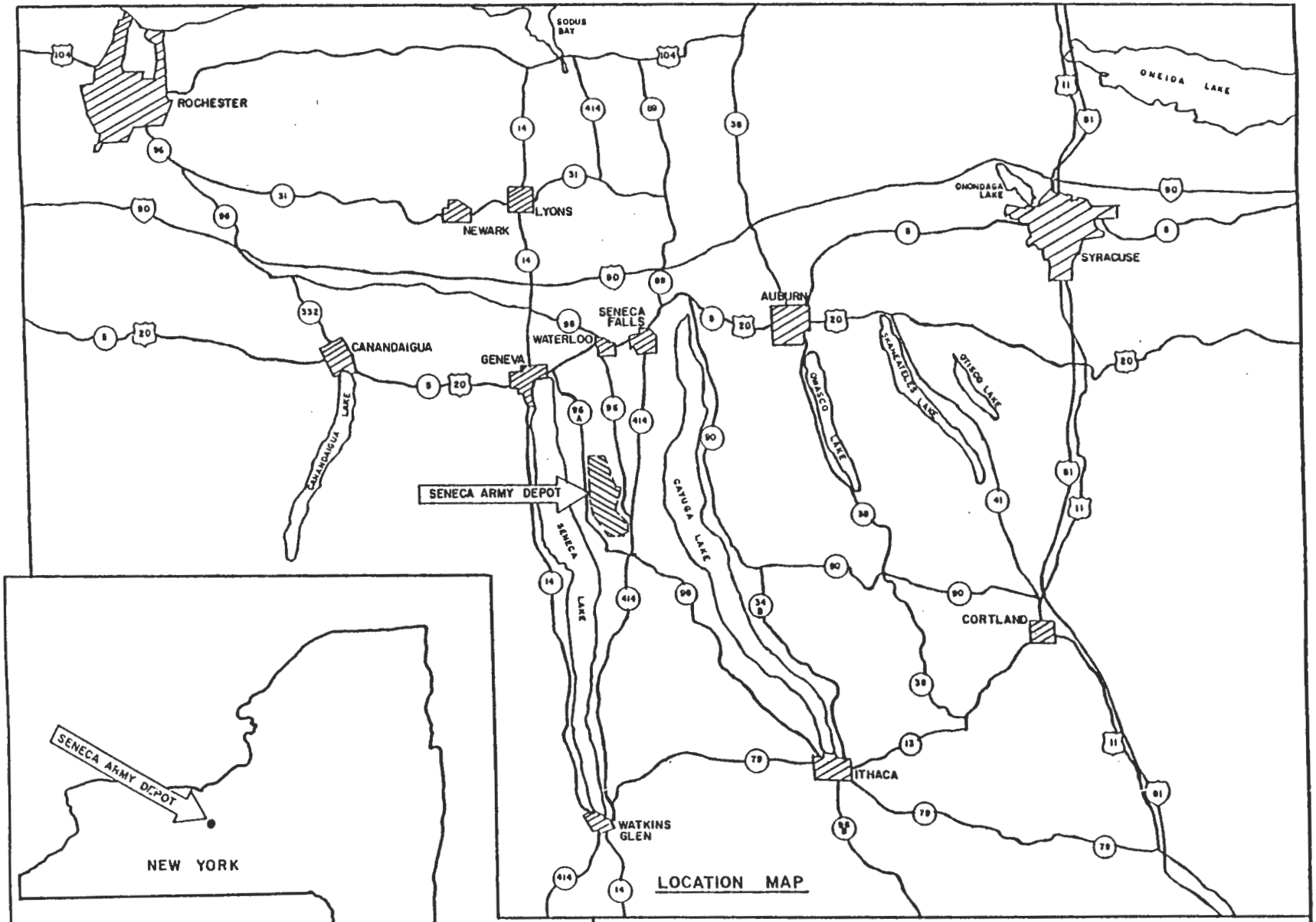
This report describes the results of field surveys that were conducted to determine the presence or absence of rare species and their habitats at SEDA so that future management and development activities on the facility will avoid or minimize adverse impacts to those species. In addition to identifying the specific locations of rare species occurrences documented at SEDA, areas are identified that may not have been surveyed but that may support rare species for reasons of habitat suitability, is provided.

Where possible, species-specific management recommendations have been provided that may be implemented by the DoD to afford additional protection to rare species at SEDA. The information contained within this report does not address any current project-specific impacts to rare species occurring at SEDA, but rather serves to identify rare species and their habitats that should receive further consideration during planning efforts. It is the Service's intent that the findings identified and management recommendations presented within this report could be incorporated into an overall management plan to protect the natural resources at SEDA, if such a plan were to be developed.

B. SITE DESCRIPTION

The Seneca Army Depot Activity, located in Romulus and Varick Townships, Seneca County, New York (Figure 1), is a DoD facility for the receipt, storage, maintenance and supply of munitions. Facilities located within SEDA include munitions-related storage and transportation structures, housing and administrative buildings, an airstrip, and a Loran C transmitting station operated by the U.S. Coast Guard.

The Depot's 4300 ha (10,600 acres) lie atop an inter-glacial plateau between Seneca Lake to the west and Cayuga Lake to the east. The region is underlain by glacial till and shale; soils are generally poor- or very-poorly drained silty loams. More than 4070 ha (10,100 acres), or 95 percent, of soils at SEDA are of the Darian-Angola association (SCS 1972).



SENECA ARMY DEPOT

ROMULUS, NEW YORK

Figure 1. Location map of Seneca Army Depot Activity.

The region is rural and largely characterized by open agricultural land interspersed with scattered hardwood stands, emergent marshes, and ribbons of scrub-shrub along drainage courses.

Prior to European settlement, the area supported dense forests of mixed white pine, hardwoods, and hemlock. The dominant hardwoods were beech, sugar maple, and red oak, but there were also black cherry, shagbark hickory, hornbeam, elm and aspen. Present forest stands have reforested with the same species, although most have practically disappeared because of repeated cutting or disease.

The Depot contains approximately 200 hectares (500 acres) of freshwater wetlands. The majority of these wetlands (100 hectares (240 acres)) are forested (McCosh 1995), with swamp white oak (*Quercus bicolor*), red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), and shagbark hickory (*Carya ovata*) being the predominant tree species. The remaining wetland areas are comprised of emergent, scrub/shrub, or non-vegetated freshwater wetlands (McCosh 1995).

C. SPECIES INCLUDED IN SURVEY

Field surveys for rare species included all species found on any of the following lists whose known geographic range encompasses SEDA:

1. The federal list of Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12, August 20, 1994).

2. Endangered and Threatened Wildlife and Plants; Animal Candidate Review for Listing as Endangered or Threatened Species; Proposed Rule (Federal Register, Vol. 59, No. 219, November 15, 1994).

3. Endangered and Threatened Species; Notice of Reclassification of 96 Candidate Taxa (Federal Register, Vol. 61, No. 40, February 28, 1996).

4. New York Rare Plant Status List (published by the New York Natural Heritage Program, revised January 1996).

5. New York Rare Animal Status List (published by the New York Natural Heritage Program, revised March 1996).

6. New York Rare Community Status List (published by the New York Natural Heritage Program, revised July 1995).

7. New York State Amphibian and Reptile Atlas (NYSDEC-Endangered Species Unit, unpublished database).

8. Checklist of the Amphibians, Reptiles, Birds and Mammals of New York State, including their protective status (NYSDEC, undated).

From these lists, a list of rare species possibly occurring at SEDA was compiled and is presented in Appendix A.

II. METHODS

A. HABITAT MAPPING

A vegetative cover-type map of SEDA was prepared by Morgan McCosh (1995). Wetland cover types were classified according to the wetland classification schemes developed by Cowardin et al. (1979) and the USFWS's National Wetlands Inventory. Once superimposed, wetlands were ground-truthed for accuracy of classification. Information obtained from field observations was used to produce a digitized base map using a geographic information system (GIS) (Figure 2).

B. RARE SPECIES SURVEY METHODS

Surveys for rare species were divided into the following phylogenic groups: plants, amphibians and reptiles, and birds. The survey for plants was conducted under contract with George Briggs, PhD. Methods and the results of Dr. Briggs' survey are presented in Appendix B.

For amphibian, reptile, and bird species targeted at SEDA, a preliminary evaluation of habitat suitability was conducted by the principal investigator for that respective group of species. Wetland maps, aerial photographs, and preliminary site investigations were used to aid in this evaluation. Those habitats determined to be most suitable to support the targeted species were then given the highest priority for surveys, with less suitable habitats surveyed as time permitted. Survey methodologies and target species are presented in Appendix C.

While not specifically targeted for investigation, two rare mammal species (*Myotis leibii* (small-footed bat) and *Myotis sodalis* (Indiana bat)) may occur at SEDA. Neither species was observed during the course of the survey, however potentially suitable habitat areas may exist at the facility. Surveys for *Myotis leibii* and *M. sodalis* should be conducted to determine their presence or absence at SEDA.

C. PRINCIPAL INVESTIGATORS

1. Plants

The principal investigator for targeted plant species at SEDA was George Briggs, PhD.

2. Amphibians and Reptiles

The principal investigator for targeted amphibians and reptiles at SEDA was E. Ann Poole, Fish and Wildlife Biologist, USFWS, LGLFRO. Field assistance was provided by the following volunteers: Karen Campbell (Daemen College), Bernie Guirey (noted naturalist), Bill Galloway (SUNY College of Environmental Science and Forestry), Glenn Johnson (SUNY College of Environmental Science and Forestry), and Maggie George (US Army Corps of Engineers - Cortland). Technical assistance, review, and comment were provided by Al Breisch, NYSDEC-Endangered Species Unit.

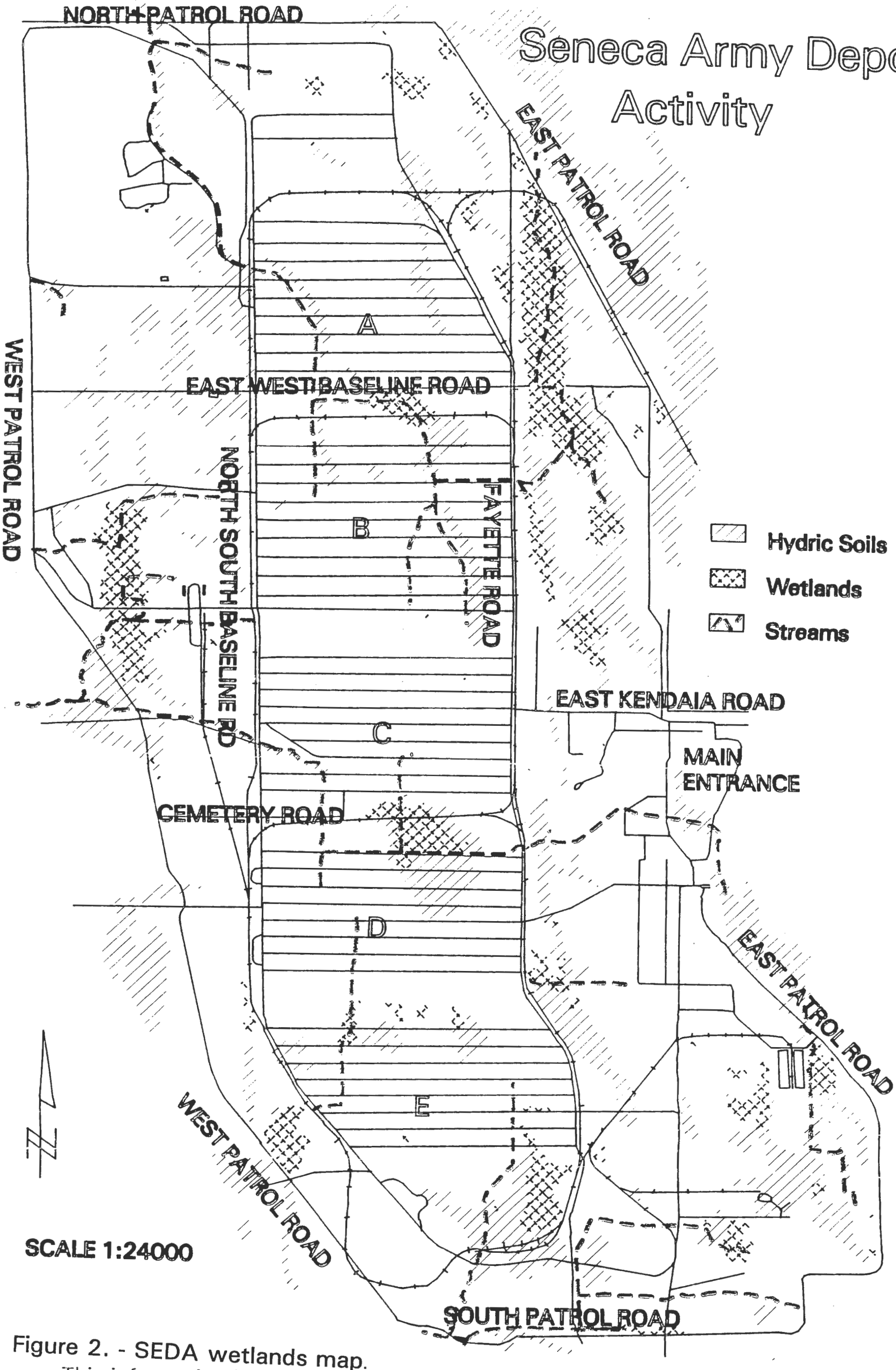


Figure 2. - SEDA wetlands map.

This information has been developed for the purpose of identifying wetlands as part of a wildlife management plan. Exact coordinate locations have not been verified through the use of GPS or other ground truthing methods.

3. Birds

The principal investigator for targeted birds at SEDA was E. Ann Poole, Fish and Wildlife Biologist, USFWS, LGLFRO. Field assistance was provided by the following volunteers: Bernie Guirey (noted naturalist), Bill Evans (Cornell Ornithological Laboratory, Cornell University), and Karen Campbell (Daemen College). Technical assistance, review, and comment were provided by Diane Pence (USFWS-Region 5) and Charles Smith (Arnot Teaching and Research Forest, Cornell University).

III. SURVEY RESULTS

No federally listed species were found at SEDA. Therefore this report is focused on describing state listed species which are in decline or unusual for the region. The term rare refers to these species of state or regional concern; it is not a legal status.

A. PLANT SPECIES

1. Summary of Findings

A survey for fifty-five species of rare plants with potential to inhabitat portions of SEDA (Table 1) was conducted between June and September 1996. Three rare plant species were confirmed to occur at SEDA including: *Aster schreberi* (large-leaf aster), *Calamagrost stricta* var. *inexpansa* (northern reedgrass), and *Geum virginianum* (rough avans)(Figure 3). In addition to those rare species encountered during surveys, suitable habitat was documented to occur at SEDA for ten species of unconfirmed occurrence, including: *Aster puniceus* (cornel-leaved aster), *Carex buxbaumii* (brown bog sedge), *Carex lupuliformis* (false hop sedge), *Corydalis flavula* (yellow harlequin), *Cyperus odoratus* (rusty flatsedge), *Descurainia pinnata* (northern tansey-mustard), *Desmodium nuttallii* (Nuttall's tick clover), *Hypericum prolificum* (shrubby St. John's wort), *Sparganium minimum* (small bur-reed), and *Trollius laxus* (spreading globeflower). Methods and survey results are presented in Appendix B.

Table 1. Rare plants with potential to inhabit SEDA.

Scientific Name	Common Name
Allium cernuum	wild onion
Aplectrum hyemale	puttyroot
Armoracia lacustris	lake-cress
Aster borealis	rush aster
Aster puniceus var. *firmus*	cornel-leaved aster
Aster schreberi	large-leaf aster
Astragalus neglectus	cooper milkvetch
Calamagrostis stricta var. *inexpansa*	northern reedgrass
Carex buxbaumii	brown bog sedge
Carex cumulata	clustered sedge
Carex decomposita	cypress-knee sedge
Carex gynocrates	northern bog sedge
Carex hitchcockiana	Hitchcock sedge
Carex lupuliformis	false hop sedge
Carex sartwellii	Sartwell sedge
Carya laciniosa	big shellbark hickory
Castilleja coccinea	scarlet indian paint-brush
Chamaelirium lutrum	blazing-star
Chenopodium rubrum	red pigweed

Corydalis flavula	yellow harlequin
Cyperus erythrorhizos	red-rooted flatsedge
Cyperus odoratus	rusty flatsedge
Descurainia pinnata ssp. *brachycarp*	northern tansey-mustard
Desmodium ciliare	little-leaf tick-trefoil
Desmodium nuttallii	Nuttall's tick clover
Desmodium pauciflorum	small-flowered tick clover
Dicentra eximia	bleeding heart
Dryopteris celsa	log fern
Eleocharis tricostata	three-ribbed spikerush
Equisetum palustre	marsh horsetail
Eriophorum angustifolium ssp. *scarbriusculum*	cottongrass
Geum virginianum	rough avens
Hydrastis canadensis	golden-seal
Hypericum prolificum	shrubby St. John's wort
Lathyrus ochroleucus	wild-pea
Liparis lilifolia	large twayblade
Listera australis	southern twayblade
Najas marina	holly-leaved naiad
Panicum flexile	wiry panic grass
Platanthera ciliaris	orange fringed orchid
Potomogeton filiformis var. *alpinus*	slender pondweed
Potamogeton filiformis var. *occidentalis*	sheathed pondweed
Potamogeton strictifolius	straight-leaf pondweed
Ranunculus cymbalaria	seaside crowfoot
Rumex maritimus var. *fueginus*	golden dock
Scirpus heterochaetus	slender bulrush
Scleria verticillata	low nutrush
Solidago ohioensis	Ohio goldenrod
Solidago rugusa var. *sphagnophila*	tall hairy goldenrod
Sparganium minimum	small bur-reed
Triglochin palustre	marsh arrow-grass
Triphora trianthophora	nodding pogonia
Trollius laxus ssp. *laxus*	spreading globeflower
Utricularia geminiscapa	hiddenfruit bladderwort
Wolffia brasiliensis	pointed watermeal

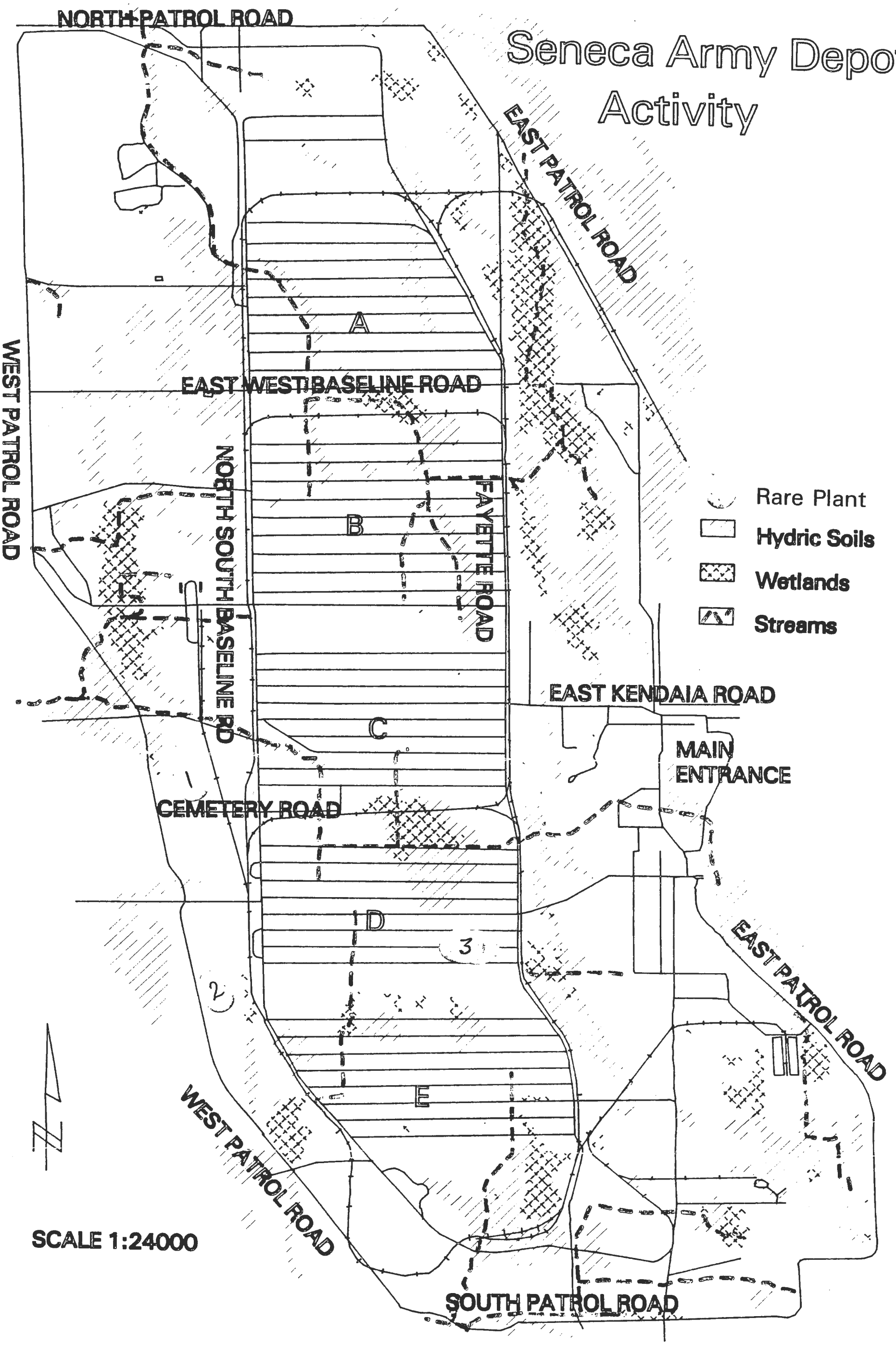


Figure 3. - Locations of rare plants found at SEDA. (#1) Aster schreberi - large leaf aster, (#2) Calamagrost stricta var. inexpansa-northern reedgrass , (#3) Geum virginianum-rough avans

B. AMPHIBIAN AND REPTILE SPECIES

1. Summary of Findings

A survey for twenty-two species of amphibians (Table 2) and nineteen species of reptiles (Table 3) with potential to inhabit portions of SEDA was conducted from March through August 1996. Investigation was primarily concentrated on SEDA's forested palustrine, emergent, and lacustrine wetlands, which contain better overall amphibian and reptile habitats during spring and summer. Per notification of and approval by the SEDA Environmental Protection Specialist, observations were reported to the NYSDEC Amphibian and Reptile Atlas Project for inclusion in a statewide database.

Table 2. Amphibians with potential to inhabit SEDA.

Scientific Name	Common Name
Notopthalamus v. viridescens	Red-spotted newt
Ambystoma jeffersonianum	Jefferson salamander
Ambystoma laterale	Blue spotted salamander
Ambystoma maculatum	Spotted salamander
Desmognathus f. fuscus	Northern dusky salamander
Desmognathus ochrophaeus	Mountain dusky salamander
Eurycea bislineata	Northern two-lined salamander
Eurycea l. longicauda	Longtail salamander
Gyrinophilus p. porphyriticus	Northern spring salamander
Hemidactylium scutatum	Four-toed salamander
Plethodon cinereus	Redback salamander
Plethodon g. glutinosus	Northern slimy salamander
Necturus maculosis	Mudpuppy
Bufo americanus	American toad
Hyla versicolor	Common gray treefrog
Pseudacris crucifer	Spring peeper
Pseudacris triseriata	Chorus frog
Rana catesbieana	Bull frog
Rana clamitans melanota	Green frog
Rana palustris	Pickerel frog
Rana pipiens	Northern leopard frog
Rana sylvatica	Wood frog

Table 3. Reptiles with potential to inhabit SEDA.

Scientific Name	Common Name
Chelydra serpentina	Common snapping turtle
Chrysemys p. picta	Eastern painted turtle
Clemmys guttata	Spotted turtle
Clemmys insculpta	Wood turtle
Clemmys muhlenbergii	Bog turtle
Kinosternon odoratum	Common musk turtle
Trionyx spiniferus	Eastern spiny softshell
Eumeces a. anthracinus	Northern coal skink
Coluber constrictor	Northern black racer
Diadophis punctatus edwardsii	Northern ringneck snake
Elaphe o. obsoleta	Black rat snakes
Lampropeltis t. triangulum	Eastern milk snake
Nerodia s. sipedon	Northern water snake
Opheodrys v. vernalis	Smooth green snake
Storeria dekayi	Brown snake
Storeria occipitomaculata	Red-belly snake
Thamnophis sauritus	Eastern ribbon snake
Thamnophis s. sirtalis	Common garter snake
Crotalus horridus	Timber rattlesnake

No rare amphibian (i.e., *Ambystoma jeffersonianum* (Jefferson salamander), *Eurycea l. longicauda* (longtail salamander)) or reptile species (i.e., *Clemmys guttata* (spotted turtle), *C. insculpta* (wood turtle), *C. muhlenbergii* (bog turtle), *Eumeces a. anthracinus* (northern coal skink), *Crotalus horridus* (timber rattlesnake)) were located during the study.

Almost no suitable habitats for *Gyrinophilus p. porphyriticus* (northern spring salamander), *Necturus maculosus* (mudpuppy), *Clemmys insculpta*, *C. muhlenbergii*, *Eumeces a. anthracinus*, *Sternotherus odoratus* (common musk turtle), *Apalone s. spinifera* (eastern spiny softshell), and *Crotalus horridus* are present at SEDA, and only marginally adequate habitat is available for *Ambystoma jeffersonianum*, *Eurycea l. longicauda*, and *Clemmys guttata*.

Relatively common species that almost certainly reside on SEDA, but were not sighted during the survey include: *Desmognathus* spp. (dusky salamanders), *Hemidactylium scutatum* (four-toed salamander), *Plethodon g. glutinosus* (slimy salamander), *Hyla versicolor* (gray treefrog), *Rana palustris* (pickerel frog), *Chelydra serpentina* (common snapping turtle), *Coluber c. constrictor* (northern black racer), *Diadophus punctatus edwardsii* (northern ringneck snake), *Elaphne o. obsoleta* (black rat snake), *Lampropeltis t. triangulum* (eastern milk snake), *Nerodia s. sipedon* (northern water snake), *Opheodys v. vernalis* (smooth green snake), and *Storeria* spp. (brown snakes).

However, thirteen species never before recorded on the site were found, including: *Eurycea bislineata* (northern two-lined salamander), *Plethodon cinereus* (redback salamander), *Pseudacris triseriata* (chorus frog), *Rana clamitans melanota* (green frog); and *Thamnophis s. sirtalis* (common garter snake).

2. Individual Rare Species Reports

The following species reports describe the results of the 1996 survey for rare species of amphibians and reptiles conducted at SEDA by the USFWS. A total of seven species accounts follow: *Ambystoma jeffersonianum* (Jefferson salamander), *Eurycea l. longicauda* (longtail salamander), *Clemmys guttata* (spotted turtle), *C. insculpta* (wood turtle), *C. muhlenbergii* (bog turtle), *Eumeces a. anthracinus* (northern coal skink), and *Crotalus horridus* (timber rattlesnake).

Ambystoma jeffersonianum

Jefferson salamander

Status: Federal - None;
State - Unprotected; Special Concern.

Range: Ne. U.S. and se. Canada; Nova Scotia, New England, and s. New York southwest to w. Virginia, and. Kentucky, and s. Indiana. Extant population(s) occur in Seneca County.

Habitat: Deciduous forests; under debris near swamps and ponds, esp. kettles; temporary ponds during breeding season (late winter - early spring).

Sampling Method Used:

Unbaited minnow traps placed in ponds from March through May for adults and larvae. Visual searches in and along pond and streams, and under forest debris.

Survey Results:

Confirmed locations:

- None. Extensive areas of poorly-drained and very poorly-drained soils of low relief may preclude suitable overwintering habitat.

Potentially suitable habitat areas:

- Unknown. Further study, if undertaken, should be focused on isolated palustrine-forested (PFO) wetlands, such as those west of Duck Ponds and east of Q-area.

Management Recommendations:

None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Ambystoma jeffersonianum*.

Eurycea longicauda longicauda

Longtail salamanderr

Status: Federal - None;
State - Unprotected; Very rare to uncommon.

Range: S. New York to n. Alabama and se. Missouri. Extant population(s) occur in Cattaraugus County. Possibly present in other scattered locations along the New York-Pennsylvania State border.

Habitat: In or under rotting logs, under stones, in shale banks near seepages, under rocks at streamside, and frequently in caves.

Sampling Method Used:
Visual searches along stream margins and seeps, under rocks and debris.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Margins of Kendaia (esp. between Rt.96A and Seneca Lake), Reeder, Indian, and Silver Creeks.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Eurycea l. longicauda*.

Clemmys guttata

Spotted turtle

Status: Federal - none;
State - Unprotected; Special Concern.

Range: S. Maine to extreme ne. Illinois; s. to central Florida; isolated colonies in s. Quebec, s. Ontario, and. Illinois; an isolated record in nw. Vermont. Extant population(s) occur in Seneca County.

Habitat: Marshy meadows, bogs, beaver ponds, ditches, or other shallow bodies of water. Most often seen basking in early spring.

Sampling Method Used:
Visual searches of basking sites and basking traps.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Duck Ponds, wet meadow north of WWTF discharge, and isolated unconsolidated bottom (UB) wetlands, esp. west of Duck Ponds and east of Q-area, and west of Loran station. Also, seasonally-wet areas along fire lanes.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Clemmys guttata*.

Clemmys insculpta

Wood turtle

Status: Federal - none;
State - Unprotected; Special Concern.

Range: Nova Scotia to e. Minnesota; south in the east to the Virginias; an isolated colony in ne. Iowa; isolated records in s. Quebec and n. New York. Extant population(s) occur in Seneca County.

Habitat: Cool streams in deciduous woodlands and associated banks.

Sampling Method Used:
Visual searches in and along streams.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Forested headwaters in and along Kendaia (esp. between Rt.96A and Seneca Lake), Reeder, Indian, and Silver Creeks.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Clemmys insculpta*.

Clemmys muhlenbergii

Bog turtle

Status: Federal - Category 2 (Species-at-risk);
State - Endangered; Very rare.

Range: New York to w. North Carolina and extreme ne. Georgia in disjunct colonies; from near sea level in the North to 1200 m (4000 ft.) in the southern mountains. Extant population(s) occur in Seneca County.

Habitat: Sphagnum bogs, wet cow pastures, and clear, slow-moving meadow streams with muddy bottoms.

Sampling Method Used:
Visual searches in and along streams flowing through meadows.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Improbable; suitable habitat is severely limited.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Clemmys muhlenbergii*.

Eumeces anthracinus anthracinus

Northern coal skink

Status: Federal - none;
State - Unprotected; Very rare to uncommon.

Range: Disjunct from New York to North Carolina and Kentucky; isolated colonies in Ohio and w.-cen. Kentucky. Extant population(s) occur in Tompkins County. Reported, but unconfirmed in Seneca County.

Habitat: Humid portions of wooded hillsides with abundant leaf litter or loose stones; also vicinity of springs and rocky bluffs overlooking creek valleys.

Sampling Method Used:
Visual searches of limestone outcrops and forest debris along streams.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- South-facing wall of Kendaia Creek ravine (between Rt.96A and Seneca Lake). Forested limestone outcrops along Kendaia, Reeder, Indian, and Silver Creeks.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Eumeces a. anthracinus*.

Crotalus horridus

Timber rattlesnake

Status: Federal - None;
State - Threatened; Rare to uncommon.

Range: S.-cen. New Hampshire and the Lake Champlain region south to n. Florida, west to se. Minnesota and cen. Texas. Inexplicably absent from parts of Louisiana, se. New England and n.-cen. Tennessee. Extant population(s) occur in Ontario County. Historically scattered throughout cen. New York.

Habitat: Remote, heavily-wooded hillsides with rock outcrops; often found in second growth where rodents abound.

Sampling Method Used:
Visual searches of limestone outcrops and forest debris along streams.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Improbable; suitable habitat is severely limited.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Crotalus horridus*.

C. BIRDS

1. Summary of Findings

Rare bird species included on the lists of federally-listed, State-listed, and federal candidate species with potential to inhabit portions of SEDA include: *Ixobrychus exilis* (least bittern), *Pandion haliaetus* (osprey), *Haliaeetus leucocephalus* (bald eagle), *Circus cyaneus* (northern harrier), *Buteo lineatus* (red-shouldered hawk), *Falco peregrinus* (peregrine falcon), *Tyto alba* (common barn-owl), *Asio flammeus* (short-eared owl), *Cistothorus platensis* (sedge wren), *Lanius ludovicianus* (loggerhead shrike), *Dendroica cerulea* (cerulean warbler), and *Ammodramus henslowii* (Henlow's sparrow).

Visual and auditory surveys were primarily concentrated on SEDA's hardwood stands, emergent marshes, and ribbons of scrub-shrub along drainage courses, which contain better overall bird habitat during spring and summer. Two rare bird species were located during the study; *Pandion haliaetus* and *Circus cyaneus*. Locations of rare bird sightings and raptor nests are presented in Figure 4.

A list of non-targeted bird species incidentally observed during field surveys for rare birds is provided in Appendix D.

2. Individual Rare Species Accounts

The following individual species accounts report the results of the 1996 survey for rare birds conducted at SEDA by the USFWS. A total of twelve species accounts follow.

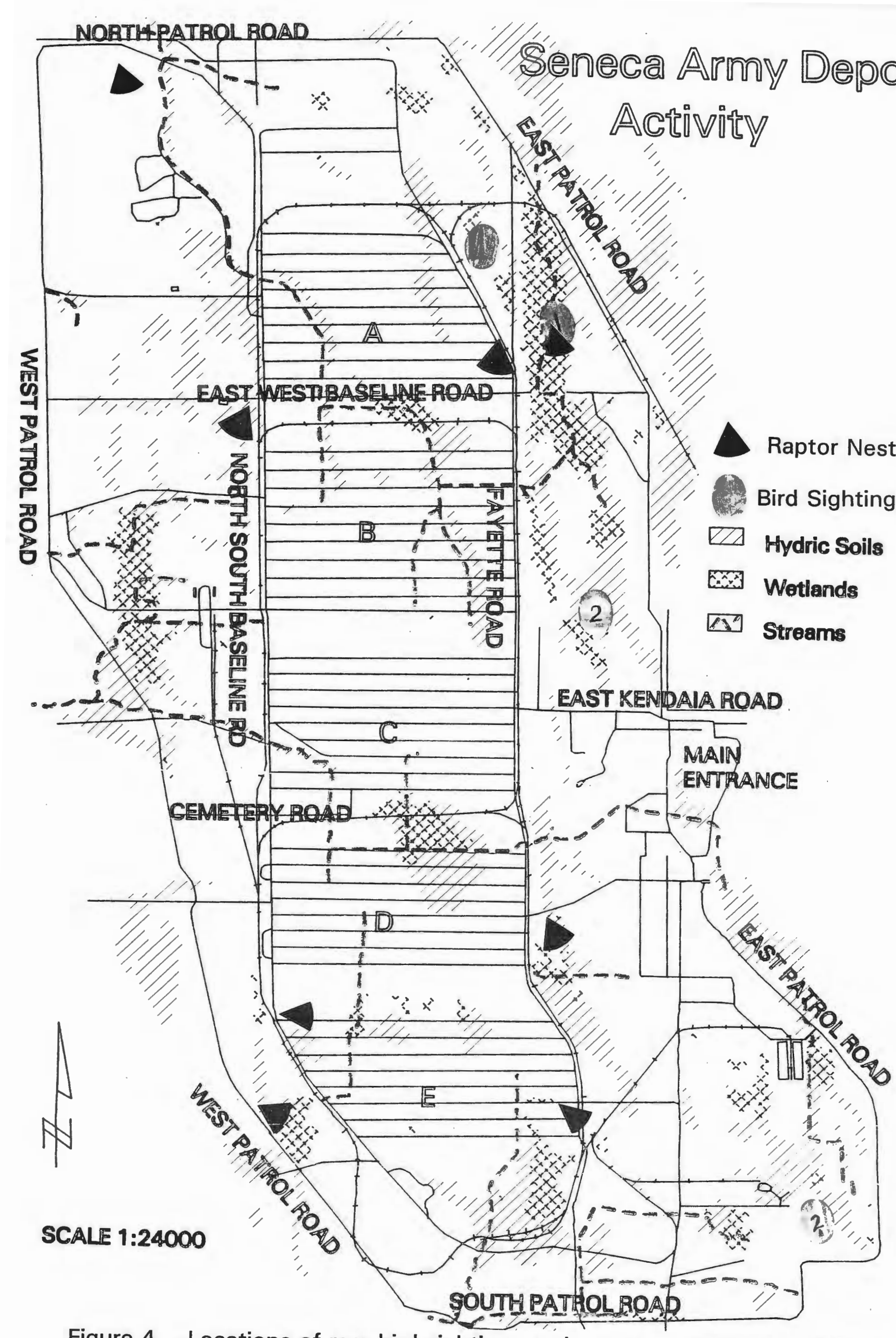


Figure 4. - Locations of rare bird sightings and raptor nests found at SEDA : (#1) osprey (#2) northern harrier

Ixobrychus exilis

Least bittern

Status: Federal - none;
State - Special concern; Rare to uncommon.

Range: S. Canada, e. and cen. U.S. to Texas and the West Indies; generally absent from Appalachian highlands, including n. New York and n. New England. Also breeds in S. America.

Habitat: Freshwater marshes where cattails and reeds predominate.

Sampling Method Used:
Surveyed by visual and audible observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Improbable; marshes north and south of Duck Pond are likely of insufficient size to support these shy birds.

Management Recommendations:

Loss of wetland habitat is likely the greatest threat to least bitterns in the Northeast. Preservation of wetlands >5 ha with dense, tall (>1 m) emergent vegetation over relatively deep (10-50 cm) interspersed with patches of open water is the most important management need.

Equal ratios of cover to open water are preferred by least bitterns, so wetland managers may need to periodically reverse vegetative succession while maintaining suitable habitats nearby to serve as alternate nesting areas during wetland manipulations (e.g. at other wetlands in a complex).

Dense stands of cattail and bulrush, often eliminated with cutting, burning or flooding to improve waterfowl habitat, should be partially retained as habitat for least bitterns. Maintaining stands of deep-water cattail is important because water levels at or below the base of emergent vegetation may reduce nesting activity by least bitterns. Least bitterns prefer foraging over deep water (10-50 cm). Infestations of purple loosestrife, which are detrimental to least bitterns, should be controlled to the extent practicable.

Complete drawdowns, sometimes undertaken for waterfowl management, should be avoided so that populations of small fish and dragonfly larvae, which make up the majority of the least bittern's diet, are conserved for the following season.

Pandion haliaetus

Osprey

Status: Federal - none;
State - Threatened.

Range: Breeds from Alaska and Newfoundland s. to Florida and the Gulf Coast. Winters regularly from the Gulf Coast and California s. to Argentina. Also breeds in Eurasia, n. Africa, the East Indies, and Australia.

Habitat: Lakes, rivers, marshes, and seacoasts.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed locations:

- Aerie on west side of Duck Pond has been occupied for at least the past 3 years.

Potentially suitable habitat areas:

- Osprey require large areas of open water (> 25 ha) to feed on fish. The Duck Pond and associated pools, as well as larger beaver ponds having fish, could support osprey.

Management Recommendations:

Breeding *Pandion haliaetus*, perhaps hacked at Montezuma National Wildlife Refuge, have been observed at SEDA in the vicinity of the Duck Pond for at least 3 years. No specific plan for continued occupation by *P. haliaetus* has been prepared, however SEDA natural resource managers have been in contact with NYSDEC biologists regarding construction of nesting platforms. If undertaken, construction of platforms should take place in winter, prior to spring arrival and pair-formation. A heavy cover of ice on the Duck Pond would facilitate construction over or adjacent to the water. In addition, the following recommendations should be implemented:

- Retain snags and standing dead trees, especially those several meters out and over water, in secluded areas near open water.
- Avoid disturbing potential nest sites during the early part of the nesting cycle, especially from the pre-laying and egg-laying stages (mid-March to late June) up to hatching (late July).
- Implement strategies to benefit fisheries. Fishery management strategies are applicable to osprey with respect to food-supply management.

Haliaeetus leucocephalus

Bald eagle

Status: Federal - Threatened;
State - Endangered; Extremely rare.

Range: Formerly bred throughout most of N.S.; breeding now restricted to Aleutians, Alaska, n. and e. Canada, to n. U.S. and Florida.

Habitat: Lakes, rivers, marshes, and seacoasts.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Incidental observations of *Haliaeetus leucocephalus* soaring above SEDA and vicinity during migration periods have occasionally been reported. Transient eagles, attracted by the Duck Pond and open grassland areas, may occasionally feed or rest at SEDA during any time of year. Nesting or winter roosting, however, is improbable as suitable habitat is severely limited.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Haliaeetus leucocephalus*.

Circus cyaneus

Northern harrier

Status: Federal - none;
State - Threatened; Rare to uncommon.

Range: E. Aleutians, Alaska, Canada to Virginia and n. Mexico; n. Eurasia. Winters to n. S. America, n. Africa.

Habitat: Marshes and open grasslands.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed locations:

- South of Duck Ponds, area bounded by East-West Baseline, East Patrol, West Romulus, and Fayette Roads.
- Southeast corner of SEDA, vicinity of the U.S. Coast Guard Loran-C station.

Potentially suitable habitat areas:

- Q-area, esp. moist, eastern portion.
- Open areas in southwest corner of SEDA, bounded by Kendaia Creek, North-South Baseline Road, Indian Creek, and West Patrol Road.
- Mowed grassland areas around airport landing strip.

Management Recommendations:

This raptor has been negatively affected by changes in agricultural practices (e.g., increased use of cropland versus hayfields, earlier haying) and losses of open habitats (e.g., re-forestation, the filling of wetlands). Because harriers nest on the ground, their eggs and young are vulnerable to destruction from human and natural causes. A number of mammalian and avian predators (i.e., skunk, mink, raccoons, dogs, other raptors) may prey upon eggs and young; nests can also be trampled by deer and cattle. Activities such as mowing may cause nest abandonment by adults and destruction of nests and young. Maintenance of early successional stages and the protection of nest sites are the most important management needs.

Recommended management practices for harriers at SEDA are:

- plow, disk, and plant fields with annual seed-producing plants and perennial grasses every 2-3 years;
- avoid disturbing potential nest sites during the early part of the nesting cycle, especially from the pre-laying and egg-laying stages (mid-March to late June) up to hatching (late July); and,
- mow fields and fire lanes every 2-3 years, after chicks have fledged (approx. mid-September).

Buteo lineatus

Red-shouldered hawk

Status: Federal - none;
State - Threatened.

Range: Across s. Canada and ne. U.S. s. to the Gulf Coast; on the Pacific Coast from n. California to Baja-California. Winters north to s. New England and the Ohio Valley.

Habitat: Mature, mixed deciduous forests, esp. where there is standing water; often seen near streams.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
Large contiguous areas of mature forested wetlands, esp.
- south of E-08 Road and north of perimeter railroad,
- between D-08 and E-01 Roads, and
- Kendaia Creek ravine west of State Route 96A.

Management Recommendations:

The reversion of abandoned farmlands to forests across much of the Northeast is gradually creating more extensive habitat for red-shouldered hawks, although the silvicultural treatments of these forests largely influence use by the species.

Nest competition between red-shouldered and red-tailed hawks is well documented (Peterson and Crocoll 1992). In contrast to red-tails which are abundant at SEDA, red-shouldered hawks show a preference for more canopy cover (>70% closure), larger woodlot size (>250 ha), increased tree densities, and greater crown diameters. Selective cutting that creates small openings in large, closed-canopy forest stands may be the best habitat treatment for red-shouldered hawks.

Although some red-shouldered hawks are seemingly unaffected by human presence, most are apparently secretive and avoid areas of human use. To minimize disturbance, areas where red-shouldered hawks could potentially nest should closed to access during the breeding season (mid-March to late July).

Falco peregrinus

Peregrine falcon

Status: Federal - Endangered;
State - Endangered; Very rare.

Range: Formerly bred from Alaska and Greenland s. to Georgia and Baja-California, but now restricted to the n. parts of its range in the East. Winters n. to British Columbia and Massachusetts. Also breeds in s. S. America and in Eurasia, Africa, and Australia.

Habitat: Open country along rivers and the coast, esp. near cliffs; in some cities will nest on tall structures; prey chiefly on ducks, shorebirds, seabirds, and rock dove.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Transient *Falco peregrinus*, attracted by the open grassland areas, may occasionally feed or rest at SEDA during migration periods. Nesting, however, is improbable as suitable habitat is severely limited.

Management Recommendations:
None. Contact State Endangered Species Unit and Natural Heritage Program biologist if any future surveys reveal the presence of *Falco peregrinus*.

Tyto alba

Common barn-owl

Status: Federal - none;
State - Special concern; Rare to uncommon.

Range: Nearly worldwide in tropical and temperate regions; in New World from s. Canada to Tierra del Fuego.

Habitat: Forest edges and clearings, groves, cemeteries, idle farmland, barns, and deserted buildings.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed ocations:
- None.

Potentially suitable habitat areas:
- SEDA-wide, except heavily wooded areas.

Management Recommendations:

In the Northeast, barn owls inhabit grasslands and marshlands where they typically nest in tree cavities or in barns, silos, church steeples, warehouses, and other structures. Limited data suggests a general decline throughout the Northeast and several states (including New York) consider it a rare and declining species. The loss of dense grass habitats for foraging appears to be the species' most significant limiting factor, but this could be overcome by grassland management techniques aimed at preserving large (60-260 ha) fields near to nesting sites.

Dense grass habitat can be managed by mowing to maintain the grass sere without altering dense ground cover used by small mammals. Recommended grassland management practices for barn owls at SEDA are similar to those for harriers:

- plow, disk, and plant fields with annual seed-producing plants and perennial grasses every 2-3 years; and,
- mow fields and fire lanes every 2-3 years, after chicks have fledged (approx. mid-August).

Where stable habitats exist, barn owls have high recovery and management potential. The species has a potentially high reproductive output because of its large clutch size, occasional second broods, sexual maturity at one year, lack of strict territoriality, and occasional polygyny. These characteristics provide mechanisms for rapid population expansion during times of prey availability. Where an abundance of quality foraging habitat exists though few natural nest sites, nest boxes are recommended to aid in expanding barn owl populations.

Asio flammeus

Short-eared owl

Status: Federal - none;
State - Special concern; Very rare.

Range: Nearly worldwide. In N. America breeds from Arctic to cen. U.S. Winters in s. part of breeding range s. to Mexico.

Habitat: Open country, marshes, tundra, weedy fields, dunes; nests on the ground.

Sampling Method Used:
Surveyed by visual observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Southeast corner of SEDA, vicinity of the U.S. Coast Guard Loran-C station.
- Q-area.
- Open areas in southwest corner of SEDA, bounded by Kendaia Creek, North-South Baseline Road, Indian Creek, and West Patrol Road.
- Mowed grassland areas around airport landing strip.

Management Recommendations:

The short-eared owl has never been an abundant breeder in the Northeast. Its numbers are, nonetheless, definitely declining; this decline seems tied to habitat loss resulting from changing land-use patterns. Short-eared owls require broad expanses of open land with low vegetation for nesting and foraging. In general, any area that is large enough (>60 ha), has low vegetation with some dry upland for nesting, and that supports suitable prey may be considered potential breeding habitat, although many will not have breeding short-eared owls.

Management for suitable habitat includes maintaining large tracts of open grassland, marshes, or other appropriate habitat. Dense grass habitat can be managed by mowing to maintain the grass sere without altering dense ground cover used by small mammals. Recommended grassland management practices for short-eared owls at SEDA are similar to those for harriers and barn owls:

- plow, disk, and plant fields with annual seed-producing plants and perennial grasses every 2-3 years;
- avoid disturbing potential nest sites during the early part of the nesting cycle, especially from the pre-laying and egg-laying stages (mid-March to mid-May) up to hatching (mid-June); and,
- mow fields and fire lanes every 2-3 years, after chicks have fledged (approx. early August).

Cistothorus platensis

Sedge wren

Status: Federal - none;
State - Special concern; Very rare.

Range: Saskatchewan, Manitoba, and New Brunswick s. to Delaware, Missouri, and Kansas; Cen. America s. to Tierra del Fuego and the Falkland Islands. Winters n. to New Jersey and Tennessee. Scarce, very local.

Habitat: Wet, grassy meadows and shallow sedge marshes; also brackish marshes and wet meadows in winter.

Sampling Method Used:
Surveyed by visual and audible observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Improbable; suitable habitat is severely limited.

Management Recommendations:

Loss of nesting habitat may be the major cause of declines in sedge wren (formerly short-billed marsh wren) populations in the Northeast. Sedge wrens nest among dense, tall growths of sedges and grasses in wet meadows, hayfields, retired croplands, and upland margins of ponds and marshes. Scattered shrubs and an absence of standing water are also typical features of nesting habitat. Sedge wrens are highly sensitive to habitat conditions, and will abandon sites rendered too dry by drainage or drought or too wet by flooding. They will also abandon sites if shrubs or cattails become too prevalent.

Management for suitable habitat at SEDA includes preservation and creation of sedge meadows adjacent to waterfowl impoundments and other wetlands. Fluctuations in water levels at these locations should be prevented during the nesting season (mid-April to late July).

Lanius ludovicianus

Loggerhead shrike

Status: Federal - none;
State - Endangered; Extremely rare.

Range: Breeds from s. Canada to s. Mexico. Winters n. to Virginia and n. California. Rare and declining in the midwest and northeast.

Habitat: Grasslands, orchards, and semi-open areas, with lookout posts, scattered trees, scrub, wires.

Sampling Method Used:
Surveyed by visual and audible observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Extensive portions of the Ammo Area in early- to mid-stages of vegetative succession could potentially support loggerhead shrike.

Management Recommendations:

The loggerhead shrike has undergone a dramatic 87% decline in population in the Northeast in the past 25 years. Shrikes are small avian predators that hunt from perches and impale their prey on sharp objects such as thorns and barbed-wire fences in pastures. Habitat loss from changes in land-use may be causing widespread declines, although seemingly suitable unoccupied habitat remains.

Many questions remain as to the cause of the sweeping population decline, though the maintenance of active pastures is believed essential to the continued survival of the species. Pastures used by shrikes for hunting typically have many potential perches (e.g., tops of trees, utility wires, fencerows) and areas for impaling food items (e.g., thorny shrubs or trees, barbed-wire fences). Herbaceous vegetation that is allowed to grow too tall or woody vegetation that becomes too dense eliminates the area as potential foraging habitat for shrikes.

Management for suitable loggerhead shrike habitat at SEDA includes preservation of areas of short-grass with scattered perch sites and thorny shrubs (e.g., hawthorns).

Dendroica cerulea

Cerulean warbler

Status: Federal - Species at risk (Category 2);
State - Protected.

Range: E. U.S. Winters Columbia to n. Bolivia. Discontinuous range, local; expanding in ne. and s.

Habitat: Tops of tall trees in mixed, deciduous forests near water, especially in river valleys and bottomlands.

Sampling Method Used:
Surveyed by visual and audible observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
Large contiguous areas of mature forested wetlands, esp.
- south of E-08 Road and north of perimeter railroad,
- between D-08 and E-01 Roads, and
- Kendaia Creek ravine west of State Route 96A.

Management Recommendations:

Cerulean warblers inhabit mature deciduous forests on both their breeding grounds in North America and their wintering range in the Peruvian Andes. Breeding areas in the Northeast are typified by large, mature trees and closed or semi-open forest canopies, often in floodplains. It is usually found high in the treetops, where it is difficult to see in the thick foliage.

Cerulean warblers have declined in population size across their range in the eastern U.S., although the species has expanded its range, particularly in the Northeast, perhaps in response to large-scale forest maturation. Large tracts of mature forest (at least 4000 ha) should be managed for cerulean warblers by regulating timber harvest and allowing immature stands to reach maturity (approx. 80 y). Recovery of habitats for this species will require an unavoidably long-term commitment.

Management of existing habitat consists mainly of protecting sites from timber harvest, preventing chemical contamination, and maintaining the natural hydrology. Planting of trees and protection of young trees on large, lowland tracts should provide habitat for the future.

Ammodramus henslowii

Henslow's sparrow

Status: Federal - Species at risk (Category 2);
State - Special concern.

Range: Cen. and ne. U.S. s. to e.-cen.. Winters in the Gulf and s. Atlantic states. Uncommon, local, and declining.

Habitat: Wet, shrubby grasslands and weedy meadows. In winter, found also in the understory of pine woods.

Sampling Method Used:
Surveyed by visual and audible observations.

Survey Results:

Confirmed locations:
- None.

Potentially suitable habitat areas:
- Southeast corner of SEDA, vicinity of the U.S. Coast Guard Loran-C station.
- Q-area.
- Open areas in southwest corner of SEDA, bounded by Kendaia Creek, North-South Baseline Road, Indian Creek, and West Patrol Road.
- Mowed grassland areas around airport landing strip.

Management Recommendations:

Henslow's sparrows breed in a variety of grassland habitats with tall, dense grass and herbaceous vegetation. In the Northeast, the species uses hayfields, pastures, wet meadows, dry saltmarsh areas, and old grassy fields. Nests are typically constructed on or near to the ground, and are comprised of woven grasses. Population declines have been attributed to the loss of grassland breeding habitats, either from encroaching urbanization or succession to shrubland and forests. Fragmentation of grasslands to areas less than 30 ha in size may also preclude use by Henslow's sparrows.

Dense, tall grass habitat can be managed by mowing to maintain a grass height of > 30 cm. Recommended grassland management practices for Henslow's sparrow at SEDA are similar to those for other grassland bird species:

- plow, disk, and plant fields with annual seed-producing plants and perennial grasses every 2-3 years; and,
- mow fields and fire lanes every 2-3 years, after chicks have fledged (approx. mid-August).

IV. SUMMARY OF FINDINGS

In order to assist the DoD in meeting its obligation to protect federally-listed and State-listed species, the USFWS LGLFRO conducted field surveys at SEDA, Romulus, New York, to determine the presence or absence of rare species and their habitats. The information presented in this report includes the habitat requirements of those rare species that occur or are likely to occur at SEDA in areas where suitable1372Xhabitats Where possible, management recommendations have been povided to aid SEDA facility managers in avoiding or minimizing adverse impacts to rare species as a result of current or future activities and developments at SEDA.

A total of five rare species (three plants and two birds) were confirmed to occur at SEDA (Table 4).

Table 4. Rare species confirmed to occur at SEDA.

Scientific Name	Common Name
Aster schreberi	large-leaf aster
Calamagrost stricta var. *inexpansa*	northern reedgrass
Geum virginianum	rough avans
Pandion haliaetus	osprey
Circus cyaneus	northern harrier

In addition to those rare species found, suitable habitat was documented to occur at SEDA for twenty-two unconfirmed species including: ten plants (*Aster puniceus* (cornel-leaved aster), *Carex buxbaumii* (brown bog sedge), *Carex lupuliformis* (false hop sedge), *Corydalis flavula* (yellow harlequin), *Cyperus odoratus* (rusty flatsedge), *Descurainia pinnata* (northern tansey-mustard), *Desmodium nuttallii* (Nuttall's tick clover), *Hypericum prolificum* (shrubby St. John's wort), *Sparganium minimum* (small bur-reed), *Trollius laxus* (spreading globeflower); one amphibian (*Eurycea l. longicauda* (longtail salamander)); three reptiles (*Clemmys guttata* (spotted turtle), *Clemmys insculpta* (wood turtle), and *Eumeces a. anthracinus* (northern coal skink)); six birds (*Buteo lineatus* (red-shouldered hawk), *Tyto alba* (common barn-owl), *Asio flammeus* (short-eared owl), *Lanius ludovicianus* (loggerhead shrike), *Dendroica cerulea* (cerulean warbler), and *Ammodramus henslowii* (Henslow's sparrow)); and, two mammals (*Myotis leibii* (small-footed bat) and *Myotis sodalis* (Indiana bat)).

It is important to note that the information presented in this report represents the results of only one field season of survey effort and not all areas of SEDA were surveyed. In order to focus efforts, those areas having the highest potential to support rare species were targeted for surveys and areas of lesser potential were surveyed only as time allowed. Furthermore, as previously indicated, some areas of SEDA were determined to contain suitable habitat for rare species although the species were not encountered during

the surveys. Since populations of flora and fauna can fluctuate from year to year, it is possible that suitable habitats could be occupied by rare species in future years. Therefore, planning for future projects at SEDA should include surveys to determine if suitable habitat for rare species is present on the proposed project site. If suitable habitat is present, a site-specific survey should be conducted to determine the presence or absence of rare species. Further confirmed occurrences of rare species should be reported to: USFWS, Ecological Services, Cortland, New York; and, New York State, Department of Environmental Conservation, Endangered Species and Natural Heritage Programs, as appropriate.

V. SUMMARY OF MANAGEMENT RECOMMENDATIONS

A. PLANTS

Calmagrostis stricta: This species occurs in wet meadows and marshes. It is a perennial, rhizomatous species that often occurs in patches several square meters in extent. The population on the Depot appeared robust. The main recommendation would be to avoid elimination the wetland (e.g. by draining it, or conceivably by altering the road that runs west of the area in which it occurs)

Geum virginianum: This is a perennial species with relatively broad habitat requirements, being reported from moist woods, dry woods and thickets, all of which are present at the Seneca Army Depot. It was found just inside the margin of a forest, a common habitat in the Depot at this time. Given the relatively broad habitat requirements of the species, it doesn't require any special consideration in terms of management.

Aster schreberi: The second edition of Gleason and Cronquist lists the habitat for this species as "woods", which is where it was found. Like many asters, it is a perennial species that spreads vegetatively. The primary recommendation with regard to this species would be to avoid logging (at least heavy cutting). Like Geum virginianum:, this species is not typical of old growth forests and probably prefers the more open conditions that occur in habitats with some disturbance in their history. Consequently, a total "preservationist" approach might not be particularly favorable for either of these species and management plan that includes some disturbance (both natural and man-made) seems reasonable.

B. AMPHIBIANS AND REPTILES

Protect wetlands having potential to support breeding populations of amphibians from disturbance, pollution, and predation by fish. The most favorable habitats were:

- Palustrine forested wetlands (PFOs), especially: 1) west of Duck Pond and east of Q-area, 2) south and east of Duck Pond, 3) south of E-08 Road, 4) between D-08 and E-01 Roads, and 5) scattered beaver ponds.
- Kendaia, Reeder, Indian, and Silver Creeks, and drainage ditches along roads and fire lanes.
- Small, isolated perennial pools with unconsolidated bottom sediments (UBs) and devoid of fish.

Avoid construction of roads between nesting areas and ponds or wetlands occupied by turtles. Nest sites are generally characterized as being sparsely-vegetated, uncompacted or well-drained mineral soils or fill (e.g., railroad ballast, roadway sub-grade material) within 100 m of ponds or wetlands. Where 'turtle crossings' are known to exist, post driver-advisories and lower speed limits to avoid deaths caused by moving vehicles.

Protect talus and bedrock outcrops on steep, south facing slopes that could provide winter hibernacula for snakes, especially species that congregate (e.g., *Elaphe obsoleta* (black rat snake)).

C. BIRDS

SEDA provides habitat for a variety of rare birds during the nesting, migration, and wintering periods. Specific management recommendations for rare bird species, presented for grassland, forest-dependent, transient, and wetlands species, follow:

Grassland birds: Proper management of grassland habitat within SEDA can meet DoD munitions handling and fire safety requirements while providing for the habitat requirements of grassland birds.

- Prohibit mowing in areas utilized by ground-nesting grassland birds during the nesting and brood-rearing periods (mid-April to mid-September) to prevent nest destruction or mortality of incubating adults or flightless young. This seasonal prohibition on mowing will also benefit other grassland species, such as *Asio flammeus* (short-eared owl) and *Ammodramus henslowii* (Henslow's sparrow) that could potentially nest at SEDA.
- Maintain fields as early successional fallow fields. To provide preferred habitat condition for grassland birds, fallow fields should contain a mixture of short grass areas for feeding and courtship, interspersed with taller grasses and forbs of >30 cm height to provide nesting and brood-rearing cover. Additionally, leaving patches of higher vegetation within mowed areas would enhance habitat suitability by providing hunting/singing perches for species such as *Lanius ludovicianus* (loggerhead shrike).

Forest-dependent birds: Maintain the existing large contiguous tracts of upland and wetland forested habitat at SEDA to provide nesting and migratory habitat for rare species, such as *Buteo lineatus* (red-shouldered hawk) and *Dendroica cerulea* (Cerulean warbler), that were not found during this survey, but could potentially utilize the area for all or a portion of the year.

Transient raptors: Retain large trees and snags adjacent to open fields, emergent wetlands, and the reservoir to provide attractive feeding perches and roosting sites for transient rare species such as *Haliaeetus leucocephalus* (bald eagle), *Circus cyaneus* (northern harrier), *Accipiter cooperii* (Cooper's hawk), *Accipiter gentilis* (northern goshawk), and other migratory raptors.

Wetland birds: Maintain the existing marshes, wet meadows, and open grassland feeding areas at SEDA to provide habitat for *Ixobrychus exilis* (least bittern), *Circus cyaneus* (northern harrier), *Pandion haliaetus* (osprey), and *Cistothorus platensis* (sedge wren). Harrier nesting sites are often difficult to detect and may be abandoned if disturbed. Therefore, suspected nest sites should be protected from human disturbance and reported to the New York State Endangered Species Program. Additionally, maintaining wetland habitats at the facility will also provide feeding habitat for uncommon wetland birds (e.g., *Podilymbus podiceps* (pied-billed grebe), *Ixobrychus exilis* (American bittern), *Rallus limicola* (Virginia rail), and a variety of migratory birds.

VI. RECOMMENDATIONS FOR FURTHER FIELD INVESTIGATIONS

The management recommendations presented above focus only on those species that were, via this rare species survey, documented to occur at SEDA. It should be noted that the results of this survey are based on a single field-season's effort. Since habitat suitability was reported for some species targeted but not found, further field surveys may document additional species. Therefore, coincident with the management recommendations for documented species, the USFWS recommends that further field investigations be conducted for those rare species not found during this initial survey attempt. Furthermore, documented occurrences of rare species should periodically be monitored to: ensure that recommended management practices are correctly implemented; and, alert resource managers about potential unanticipated threats to rare species from changes in land use practices or activities at SEDA.

The USFWS recommends the following field investigations be conducted to identify/monitor rare species at SEDA:

A. PLANTS

- Populations of flora may fluctuate from year to year depending on climatic conditions, particularly in the case of annual and biennial plants; therefore, it is possible that suitable habitats could be occupied by rare plant species in future years. Field surveys for rare plants should be continued through two additional field seasons, focusing particularly on temporal and transitional habitats.

- Documented occurrences of (list species) at SEDA should be monitored annually to assess habitat conditions and determine population viability.

B. AMPHIBIANS AND REPTILES

- Conduct additional surveys for amphibians (*Ambystoma jeffersonianum*, *Eurycea l. longicauda*, Desmognathus spp. (dusky salamanders), *Hemidactylium scutatum* (four-toed salamander), *Plethodon g. glutinosus* (slimy salamander), *Hyla versicolor* (gray treefrog), *Rana palustris* (pickerel frog)). Searches should focus on those areas having the highest habitat potential to support said species, including:
  - Palustrine forested wetlands (PFOs), especially: 1) west of Duck Pond and east of Q-area, 2) south and east of Duck Pond, 3) south of E-08 Road, 4) between D-08 and E-01 Roads, and 5) scattered beaver ponds.
  - Kendaia, Reeder, Indian, and Silver Creeks, and drainage ditches along roads and fire lanes.
  - Small, isolated perennial pools with unconsolidated bottom sediments (UBs) and devoid of fish.

- Conduct additional surveys for reptiles (*Clemmys guttata*, *Chelydra serpentina* (common snapping turtle), *Coluber c. constrictor* (northern black racer), *Diadophus punctatus edwardsii* (northern ringneck snake), *Elaphne o. obsoleta* (black rat snake), *Lampropeltis t. triangulum* (eastern milk snake), *Nerodia s. sipedon*

(northern water snake), *Opheodys v. vernalis* (smooth green snake), and Storeria spp. (brown snakes)). Searches should be focused on those areas having the highest habitat potential to support said species, including:

- Turtle basking sites in ponds and wetlands.
- Potential turtle nesting areas (i.e., sparsely-vegetated, uncompacted or well-drained mineral soils or fill, such as railroad ballast, roadway sub-grade material, within 100 m of ponds or wetlands).
- Talus and bedrock outcrops on steep, south facing slopes, especially on warm, sunny days in spring and fall.

C. BIRDS

- Conduct an annual census of wetland birds at SEDA to provide information on use of marshes and wet meadows and population trends of rare wetland species such as *Circus cyaneus* (northern harrier), *Pandion haliaetus* (osprey), *Podilymbus podiceps* (pied-billed grebe), *Ixobrychus exilis* (American bittern), and *Rallus limicola* (Virginia rail).

- Conduct an annual census of grassland birds at SEDA to provide information on use of grassland habitats and population trends of rare grassland species such as *Asio flammeus* (short-eared owl), *Ammodramus henslowii* (Henslow's sparrow), and *Lanius ludovicianus* (loggerhead shrike).

- SEDA contains large contiguous tracts of forested wetlands south of E-08 Road and north of perimeter railroad, between D-08 and E-01 Roads, and in the vicinity of Kendaia Creek ravine west of State Route 96A. These forested areas should be surveyed for *Buteo lineatus* (red-shouldered hawk) and *Dendroica cerulea* (Cerulean warbler), and other woodland raptors prior to changes in land use or other activities that may create disturbance to these areas.

D. MAMMALS

While not specifically targeted for investigation, two rare mammal species (*Myotis leibii* (small-footed bat) and *Myotis sodalis* (Indiana bat)) may occur at SEDA. Neither species was observed during the course of the survey. The nearest documented populations for the Indiana bat are in Syracuse and Watertown, NY (Alan Hicks pers. comm.). Potentially suitable foraging habitat areas may exist at the facility, yet, there are no suitable caves known to exist on the Post and therefore it is unlikely these species would occur.

E. ALL SPECIES

Further confirmed occurrences of rare species or significant changes in the populations or habitats of known rare species occurrences should be reported to: USFWS, Ecological Services, Cortland, New York; and, New York State, Department of Environmental Conservation, Endangered Species and Natural Heritage Programs, as appropriate.

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APPENDICES

APPENDIX A

LIST OF RARE SPECIES POSSIBLY OCCURING AT SEDA

LIST OF RARE SPECIES POSSIBLY OCCURING AT SEDA

Scientific Name	Common Name
Aster puniceus	Cornel-leaved aster
Carex buxbaumii	Brown bog sedge
Carex lupuliformis	False hop sedge
Corydalis flavula	Yellow harlequin
Cyperus odoratus	Rusty flatsedge
Descurainia pinnata	Northern tansey-mustard
Desmodium nuttallii	Nuttall's tick clover
Hypericum prolificum	Shrubby St. John's wort
Sparganium minimum	Small bur-reed
Trollius laxus	Spreading globeflower
Notopthalamus v. viridescens	Red-spotted newt
Ambystoma jeffersonianum	Jefferson salamander
Ambystoma laterale	Blue spotted salamander
Ambystoma maculatum	Spotted salamander
Desmognathus f. fuscus	Northern dusky salamander
Desmognathus ochrophaeus	Mountain dusky salamander
Eurycea bislineata	Northern two-lined salamander
Eurycea l. longicauda	Longtail salamander
Gyrinophilus p. porphyriticus	Northern spring salamander
Hemidactylium scutatum	Four-toed salamander
Plethodon cinereus	Redback salamander
Plethodon g. glutinosus	Northern slimy salamander
Necturus maculosis	Mudpuppy
Bufo americanus	American toad
Hyla versicolor	Common gray treefrog
Pseudacris crucifer	Spring peeper
Pseudacris triseriata	Chorus frog
Rana catesbieana	Bull frog
Rana clamitans melanota	Green frog
Rana palustris	Pickerel frog
Rana pipiens	Northern leopard frog
Rana sylvatica	Wood frog
Chelydra serpentina	Common snapping turtle
Chrysemys p. picta	Eastern painted turtle
Clemmys guttata	Spotted turtle
Clemmys insculpta	Wood turtle
Clemmys muhlenbergii	Bog turtle
Kinosternon odoratum	Common musk turtle
Trionyx spiniferus	Eastern spiny softshell
Eumeces a. anthracinus	Northern coal skink
Coluber constrictor	Northern black racer
Diadophis punctatus edwardsii	Northern ringneck snake
Elaphe o. obsoleta	Black rat snakes

Lampropeltis t. triangulum	Eastern milk snake
Nerodia s. sipedon	Northern water snake
Opheodrys v. vernalis	Smooth green snake
Storeria dekayi	Brown snake
Storeria occipitomaculata	Red-belly snake
Thamnophis sauritus	Eastern ribbon snake
Thamnophis s. sirtalis	Common garter snake
Crotalus horridus	Timber rattlesnake
Ixobrychus exilis	Least bittern
Pandion haliaetus	Osprey
Haliaeetus leucocephalus	Bald Eagle
Circus cyaneus	Northern harrier
Buteo lineatus	Red-shouldered hawk
Falco peregrinus	Peregrine falcon
Tyto alba	Common barn-owl
Asio flammeus	Short-eared owl
Cistothorus platensis	Sedge wren
Lanius ludovicianus	Loggerhead shrike
Dendroica cerulea	Cerulean warbler
Ammodramus henslowii	Henslow's sparrow

APPENDIX B

REPORT ON RESULTS OF RARE PLANT SURVEY

Report submitted by:

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May - September 1996

Methods

The Seneca Army depot was visited on three days, one in late May, one in mid-July and one in early September. On each occasion a variety of habitats were explored, some of which were seen only on that single visit, while others were inspected on all of the visits. While I did not see the whole of the Depot, I feel that I did get a good sense of the majority of the habitats present. During each visit a majority of the plants were identified on sight; plants that were not recognized were either keyed on in the field (using Newcombe's Guide to the Wildflowers) or were collected for identification in the laboratory. Most of the plants identified in the laboratory were graminoids or plants that were not in flower. A variety of materials aided in identification of plants in the laboratory, in particular the Manual of Vascular Plants of the Northeastern United States and Canada (Gleason and Cronquist, 2nd Edition) and The Peterson Guide to Trees and Shrubs, (Petrides). The small herbarium at SUNY-Geneseo was also used to verify some of the identifications. All species found were checked in the Atlas of New York State Flora (preliminary edition, 1990) to see if they had been found in the vicinity of the Depot.

General Site Description

The Depot's vegetation is characterized by diversity and disturbance, both of which contribute to a relatively rich flora. The disturbance comes primarily from the recent human use; the diversity of habitats stems from both the natural setting of the land and also to a variety of human activities on the site. Portions of the depot could be characterized by the following: fields, shrub thickets, a variety of young-growth forests, plantations of conifers, relatively old growth forest, a variety of wetland habitats, mostly the result of recent human activities and beaver activity, a few more ancient wetlands, in particular some minor stream habitats.

None of these communities are particularly diverse in and of themselves, but taken together they result in a substantial diversity for the area as a whole. The number of species observed, approaching 200, reflects this diversity. For comparison, New York as a whole has a little over 3000 species.

Rare and Endangered Species

The U.S. Fish and Wildlife provided me with a list of 55 taxa (mostly species) that were rare or endangered and had been found in Schulyer or Seneca county. Three taxa on that list I identified as being present: *Calmagrostis stricta* var. *inexpansa*, *Geum virginianum* and *Aster schreberi*. [Figure 3 depicts the locations where these rare plant species were found.]

Calmagrostis stricta:
This is a plant that I did collect and I am relatively certain of this identification. It is not a species that I am familiar with, but it does key out (using Gleason and Cronquist) fairly easily. Although I do not have specimens in our herbarium to compare it to, it does match the species description well. I do not have a key to the varieties (or subspecies) of

this species. But in the Atlas of New York State Flora the subspecies (not variety) inexpansa is the only subspecies found in the region of the Seneca Army Depot, so it would seem likely that this is what I collected. As I remember, it was relatively common (i.e. seen over a substantial area, perhaps in more than one locality) in a wet area just east of the road that runs north and south along the western side of the depot.

Geum virginianum:
I am surprised that this is on the list. It is found in our herbarium (which doesn't include many rare things) and has been found in localities that are hardly unique (e.g. in back of the biology building!!!). Its NYS listing is "unlisted" and it probably is on the list I received because it somehow is considered as having "no extant sites known in NYS". The Atlas of New York State Flora indicates that there are no vouchered specimens after 1980, but I would suspect that this is just an oversight. However, it is NOT an oversight that I can correct since I did NOT collect it!! As I recall I did see it more than once.

Aster schreberi:
The plant identified was only just coming into bloom and was not collected. It was identified using the less technical Newcombe guide (cf. to Gleason and Cronquist), and my identification would need to be verified with a specimen compared to others before I would be certain of the identification.

Possibility of other rare and endangered plants

Most of the species on the list supplied to me are unlikely to be found on the depot. Table 1 [see text], which lists the taxa and the habitat descriptions, was given to me as well as habitat at descriptions from Gleason and Cronquist. Of this list of 55 species I have eliminated all but 13 on the basis of their habitat description and the fact that this type of habitat did not seem likely to be present on the Depot. For example, five of the species on the list have a habitat of "bog", a habitat that I didn't find on the Depot and that I don't consider likely to be on the Depot. Another eight species are found in "rich woods", another type of habitat that I consider as being unlikely on the Depot. A group of 13 plants remain as being "possible" after this analysis, but other than the three that I did find, I don't think it very likely to find anymore of them.

Remaining "possible" species to find include:

Aster puniceus (cornel-leaved aster),
Carex buxbaumii (brown bog sedge),
Carex lupuliformis (false hop sedge),
Corydalis flavula (yellow harlequin),
Cyperus odoratus (rusty flatsedge),
Descurainia pinnata (northern tansey-mustard),
Desmodium nuttallii (Nuttall's tick clover),
Hypericum prolificum (shrubby St. John's wort),
Sparganium minimum (small bur-reed), and
Trollius laxus (spreading globeflower).

APPENDIX C

RARE HERPTILE SURVEY METHODOLOGIES

Basking Traps

Target species:
Eastern painted turtle (*Chrysemys picta picta*)

Personal and Equipment:
Observer (1)
Assistant (1)
Basking traps (3 - 40"x20"x30", 2" wire mesh cage)
Clipboard
Data sheets
Field guides
Pencils

Standard practices:
1. Basking traps will only be used on warm, sunny and relatively calm days. Turtles will not bask when water temperature is greater than air temperature or on cloudy or windy days.

Methodology:
Basking traps will be placed in shallow swamps or marshy areas that have few or no natural basking sites.

Cover boards

Target species:
Northern water snake (*Nerodia sipedon sipedon*)
Smooth green snake (*Opheodrys vernalis vernalis*)
Brown snake (*Storeria dekayi*)
Red-belly snake (*Storeria occipitmaculata*)
Eastern ribbon snake (*Thamnophis sauritus*)
Common garter snake (*Thamnophis sirtalis*)

Personal and Equipment:
Observer (1)
Assistant (1)
Clipboard
Coverboards (4 - 2'x4' weathered plywood)
Data sheets
Field guides
Leather gloves
Pencils

Specific practices:
None.

Methodology:
Coverboards will be used at random locations along wetland edges and streams and checked periodically during the study period. The boards will be weighted if necessary to prevent them from drifting away during times of high-water.

Area-constrained searches

Target species:
Red-spotted newt (*Notopthalamus viridescens viridescens*)
Jefferson salamander (*Ambystoma jeffersonianum*)
Blue-spotted salamander (*Ambystoma laterale*)
Spotted salamander (*Ambystoma maculatum*)
Northern dusky salamander (*Desmognathus fuscus fuscus*)
Mountain dusky salamander (*Desmognathus ochrophaeus*)
Northern two-lined salamander (*Eurycea bislineata*)
Longtail salamander (*Eurycea longicauda longicauda*)
Northern spring salamander (*Gyrinophilus p. porphyriticus*)
Four-toed salamander (*Hemidactylium scutatum*)
Redback salamander (*Plethodon cinereus*)
Northern slimy salamander (*Plethodon glutinosus glutinosus*)
Mudpuppy (*Necturus maculosis*)
American toad (*Bufo americanus*)
Common gray treefrog (*Hyla versicolor*)
Spring peeper (*Pseudacris crucifer*)
Chorus frog (*Pseudacris triseriata*)
Bull frog (*Rana catesbieana*)
Green frog (*Rana clamitans melanota*)
Pickerel frog (*Rana palustris*)
Northern leopard frog (*Rana pipiens*)
Wood frog (*Rana sylvatica*)
Common snapping turtle (*Chelydra serpentina*)
Eastern painted turtle (*Chrysemys picta picta*)
Spotted turtle (*Clemmys guttata*)
Wood turtle (*Clemmys insculpta*)
Bog turtle (*Clemmys muhlenbergi*)
Common musk turtle (*Kinosternon odoratum*)
Eastern spiny softshell (*Trionyx spiniferus*)
Northern coal skink (*Eumeces anthracinus anthracinus*)
Northern black racer (*Coluber constrictor*)
Northern ringneck snake (*Diadophus punctatus edwardsi*)
Black rat snake (*Elaphe obsoleta obsoleta*)
Northern water snake (*Nerodia sipedon sipedon*)
Brown snake (*Storeria dekayi*)
Red-belly snake (*Storeria occipitomaculata*)
Eastern ribbon snake (*Thamnophis sauritus*)
Common garter snake (*Thamnophis sirtalis sirtalis*)
Smooth green snake (*Opheodrys vernalis vernalis*)
Eastern milk snake (*Lampropeltis triangulum triangulum*)
Timber rattlesnake (*Crotalus horridus*)

VENOMOUS

Personal and Equipment:
Observer (2)
Assistant (1)
5 gal. plastic buckets (2)
Clipboard
Coleman lamp
Coverboards (15 - 2'x4' weathered plywood)
Data sheets
Dip nets (2 - 0.25" mesh)
Field guides
Latex gloves
Leather gloves
Pencils

Methodology:
Searches will be conducted in areas that have been pre-determined to be likely habitat for target species. Searches will be conducted along a random sample path in order to maximize search efficiency and cover as much area as possible within a given time period (0.5-1.0 hr/site).

Moderately-sized debris (i.e., rocks, logs and any other objects) under which herptiles may be concealed will be carefully searched and returned to its original position if disturbed. No cover object will be searched for more than five minutes. Where adequate cover is lacking, coverboards will be used to provide searchable cover. The boards will be anchored if necessary to prevent then from blowing away.

VENOMOUS snakes will be identified in-situ and left undisturbed. Hand collection or nets will be used for all other species.

APPENDIX D

LIST OF NON-TARGETED BIRD SPECIES INCIDENTALLY OBSERVED AT SEDA

October 1995 - August 1996

LIST OF NON-TARGETED BIRD SPECIES
INCIDENTALLY OBSERVED AT SEDA

October 1995 - August 1996

Pied-billed Grebe	*Podilymbus podiceps*
American Bittern	*Botaurus lentiginosus*
Great Blue Heron	*Ardea herodias*
Green-backed Heron	*Butorides virescens*
Canada Goose	*Branta canadensis*
Wood Duck	*Aix sponsa*
Green-winged Teal	*Anas crecca*
American Black Duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Northern Pintail	*Anas acuta*
Blue-winged Teal	*Anas discors*
Northern Shoveler	*Anas clypeata*
American Wigeon	*Anas americana*
Ring-necked Duck	*Aythya collaris*
Bufflehead	*Bucephala albeola*
Hooded Merganser	*Lophodytes cuculatus*
Common Merganser	*Mergus merganser*
Turkey Vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Cooper's Hawk	*Accipiter cooperii*
Red-tailed Hawk	*Buteo jamaicensis*
Rough-legged Hawk	*Buteo lagopus*
American Kestrel	*Falco sparverius*
Ring-necked Pheasant	*Phasianus colchicus*
Ruffed Grouse	*Bonasa umbellus*
Wild Turkey	*Meleagris gallopavo*
Virginia Rail	*Rallus limicola*
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
Common Snipe	*Gallinago gallinago*
American Woodcock	*Scolopax minor*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Eastern Screech-Owl	*Otus asio*
Great Horned Owl	*Bubo virginianus*
Belted Kingfisher	*Ceryle alcyon*
Red-bellied Woodpecker	*Melanerpes carolinus*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*

Northern Flicker	*Colaptes auratus*
Eastern Wood-Pewee	*Contopus virens*
Yellow-bellied Flycatcher	*Empidonax flaviventris*
Alder Flycatcher	*Empidonax alnorum*
Willow Flycatcher	*Empidonax traillii*
Least Flycatcher	*Empidonax minimus*
Eastern Phoebe	*Sayornis phoebe*
Great Crested Flycatcher	*Myiarchus crinitus*
Eastern Kingbird	*Tyrannus tyrannus*
Purple Martin	*Progne subis*
Tree Swallow	*Tachycineta bicolor*
Barn Swallow	*Hirundo rustica*
Blue Jay	*Cyanocitta cristata*
American Crow	*Corvus brachyrhynchos*
Black-capped Chickadee	*Parus atricapillus*
Tufted Titmouse	*Parus bicolor*
White-breasted Nuthatch	*Sitta carolinensis*
House Wren	*Troglodytes aedon*
Marsh Wren	*Cistothorus palustris*
Ruby-crowned Kinglet	*Regulus calendula*
Eastern Bluebird	*Sialia sialis*
Veery	*Catharus fuscescens*
Hermit Thrush	*Catharus guttatus*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Brown Thrasher	*Toxostoma rufum*
Cedar Waxwing	*Bombycilla cedrorum*
Northern Shrike	*Lanius excubitor*
European Starling	*Sturnus vulgaris*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Blue-winged Warbler	*Vermivora pinus*
Tennessee Warbler	*Vermivora peregrina*
Nashville Warbler	*Vermivora ruficapilla*
Yellow Warbler	*Dendroica petechia*
Chestnut-sided Warbler	*Dendroica pensylvanica*
Magnolia Warbler	*Dendroica magnolia*
Yellow-rumped Warbler	*Dendroica coronata*
Blackpoll Warbler	*Dendroica striata*
American Redstart	*Setophaga ruticilla*
Ovenbird	*Seiurus aurocapillus*
Mourning Warbler	*Oporornis philadelphia*
Common Yellowthroat	*Geothlypis trichas*
Wilson's Warbler	*Wilsonia pusilla*
Yellow-breasted Chat	*Icteria virens*
Scarlet Tanager	*Piranga olivacea*

Northern Cardinal	*Cardinalis cardinalis*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Indigo Bunting	*Passerina cyanea*
Eastern Towhee	*Pipilo erythrophthalmus*
Chipping Sparrow	*Spizella passerina*
Field Sparrow	*Spizella pusilla*
Savannah Sparrow	*Passerculus sandwichensis*
Grasshopper Sparrow	*Ammodramus savannarum*
Fox Sparrow	*Passerella iliaca*
Song Sparrow	*Melospiza melodia*
Swamp Sparrow	*Melospiza georgiana*
Slate-colored Junco	*Junco hyemalis*
Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Eastern Meadowlark	*Sturnella magna*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Baltimore Oriole	*Icterus galbula*
House Finch	*Carpodacus mexicanus*
American Goldfinch	*Carduelis tristis*
House Sparrow	*Passer domesticus*