Original

106-02

INTEGRATED NATURAL RESOURCES MANAGEMENT PLAN

SENECA ARMY DEPOT ACTIVITY

1997 - 2001

SIGNATURE PAGE

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(DARCOM). In 1976 an Army Travel Camp was established at the lake. In 1977, the US Coast Guard "Loran C" transmitting station was built at SEDA. The years between 1976 and 1979 saw more modifications to existing facilities than new facilities. These modifications reflected a number of things. The new IPE mission required the modification of Buildings 316, 317, 318 and 360 into maintenance shops. Increased emphasis on morale support and personnel services, led to the construction of a Skeet and Trap Range (Bldg. 2301), and Handball Court at the Gymnasium, an Auto Hobby Shop, a new Health Clinic (Bldg. 106), and an MCA (Military Construction, Army) project "Improvements to Family Housing Quarters" in the year 1978. In 1979, the TVOR (Terminal Very High Frequency Omni - Directional Radar) site (Bldg. 2307) was built at the Airfield to meet future mission requirements in this area. A Child Day Care Center was established with an addition to the Chapel (Bldg. 740). The Army Community Services Office was built in Bldg. 116. A picnic shelter (Bldg. 136) was built in Hancock Park and an addition to the NCO (Noncommissioned Officers) Annex was begun. Also during 1979, the MCA Security Upgrade project was started (Bldgs. 800, 812, 819) and insulation of Bldgs. 704, 708, 323, 316, and 317 under the Energy Conservation Investment Program (ECIP) was begun.

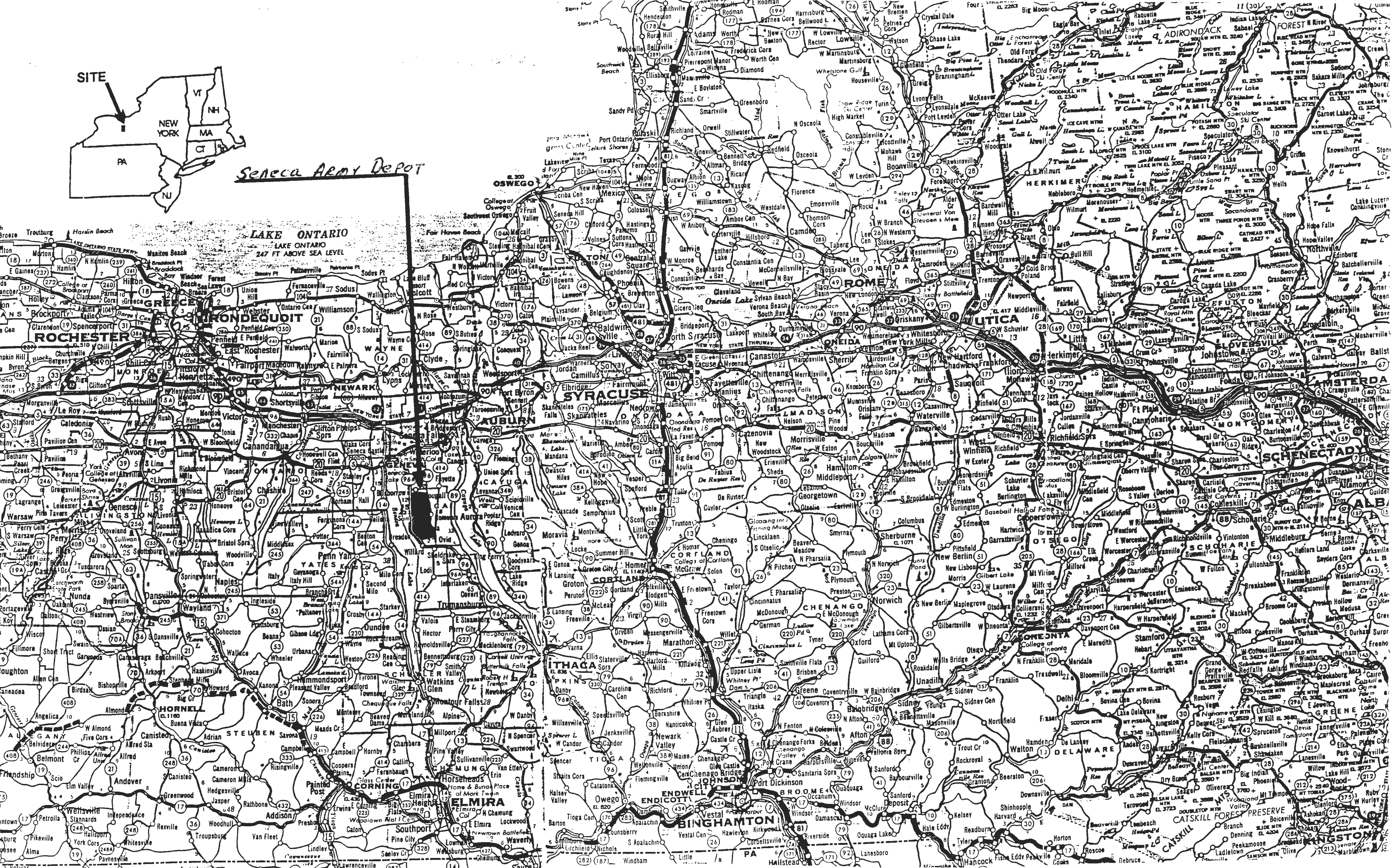
Between 1979 and the present, a substantial number of new facilities have been constructed at the Depot. The redeployment of the 833rd Ordnance Company from Korea to SEDA has necessitated the construction of several new buildings on the North Post including the Ammunition Training Facility (Bldg. 747), Vehicle Maintenance Shop (Bldg. 746) and a new wing connecting barracks 704 to barracks 708. Other projects recently completed include a new gymnasium (Bldg. 744), rock salt storage building (Bldg. 128), hazardous waste storage facility (Bldg. 307), Army Travel Camp Service Center (Bldg. 2485) and additions to the NCO Club Annex.

In 1995 SEDA was placed on the 95 Base Realignment and Closure list with a mandatory closure date of July 2001.

3.0 Military Mission:

3.1 Overview: SEDA has received, stored, maintained, and issued ammunition during World War II, the Korean War, the Vietnam Conflict and the Gulf War. From this basic mission SEDA had been given the task to receive, store and maintain general supplies, Industrial Plant Equipment, Special Weapons and tank and automotive items and assemblies. The depot had been assigned a geographical area of distribution and had also been a reserve depot for general supplies. SEDA had command assigned TOE and TDA units as well as providing logistical support and training assistance to US Army Reserve and National Guard Units. SEDA processed and provided for the movement of household goods, personal baggage, and passenger services for military and civilian personnel residing in 15 counties in Central New York State. SEDA provided medical, dental, veterinary, commissary, post exchange, claims and legal assistance services for authorized personnel. SEDA operated a Class C Military Airfield for logistics shipments and provided logistical and administrative support for the following tenant groups: 295th MP Company; 833rd Ordnance Company, US Army Readiness Group-Seneca; 143rd Ordnance Detachment (EOD); USACC-Seneca; US Army Health Clinic-MEDDAC; US Army Commissary; GAFB Exchange-Seneca; US Coast Guard-Loran C Station-Seneca; Property Disposal DLA/DPDO-Seneca Branch; and GSA Activity. In 1995 SEDA was placed on the Base Realinement And Closure (BRAC) list. Since then our mission has changed to closing the Installation.

TABLE OF CONTENTS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NEW YORK
VT
NH
MA
CT
PA
NJ
Seneca Army Depot
LAKE ONTARIO
LAKE ONTARIO 247 FT ABOVE SEA LEVEL
ROCHESTER
IRONDEQUOIT
GREECE
OSWEGO
SYRACUSE
AUBURN
GENEVA
ROME
UTICA
ONEIDA
AMSTERDAM
SCHENECTADY
ITHACA
CORTLAND
ELMIRA
CORNING
HORNELL
BINGHAMTON
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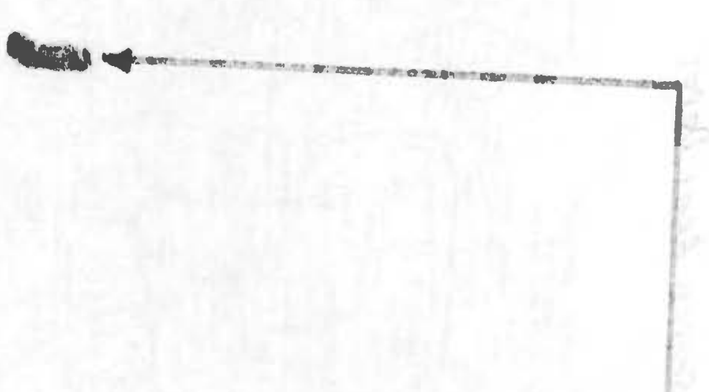

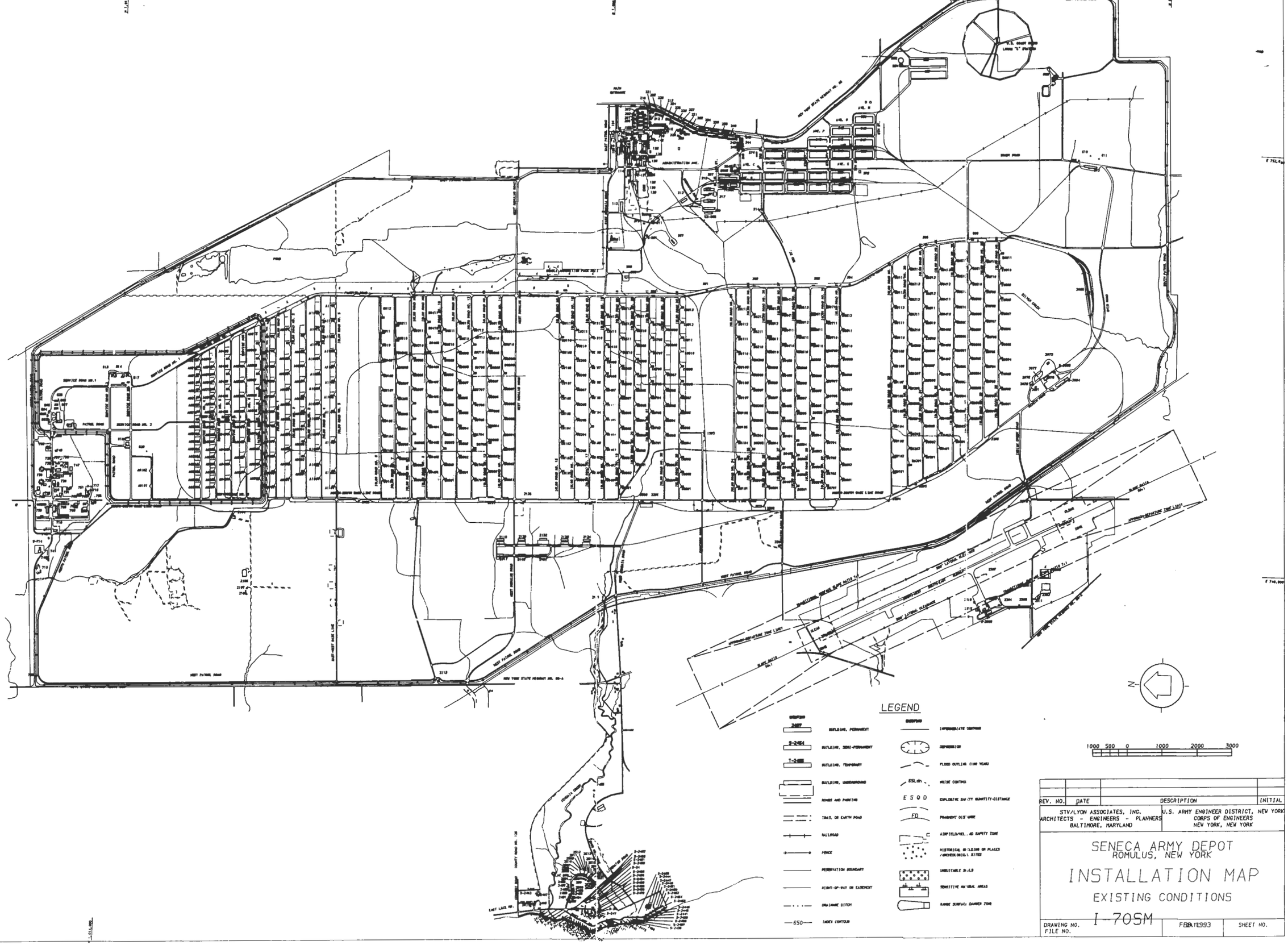

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SENECA ARMY DEPOT
ROMULUS, NEW YORK

INSTALLATION MAP
EXISTING CONDITIONS

I-70SM

DRAWING NO. FILE NO.	FEB 1993	SHEET NO.

2.0 Location and History:

2.1 Location: Seneca Army Depot Activity (SEDA) is located in Seneca County, New York adjacent to Seneca Lake. SEDA is situated due west of the village of Romulus, New York. The nearest major cities are Rochester, NY, Syracuse, NY located 60 miles northwest and northeast, respectively and Ithaca, NY located 30 miles south. SEDA sets on a plateau between Seneca Lake to the west and Cayuga Lake to the east in the Finger Lakes area of New York State.

2.2 Acreage: SEDA consists of 10,600 acres of farmland acquired on 11 June, 1941 from 105 farming families. In addition, the airstrip and lake housing area were acquired from the US Air Force and US Navy; these lands have also been historically farmed.

2.3 History: Prior to settlement in the early 1800's, both the French and English explored the area where the depot is located. Both undoubtedly made contact with the Cayuga and Seneca Indians, two nations of the Iroquois Confederacy that inhabited this area. After the Revolutionary War, a great deal of the land in this area was proportioned out as payment to those who fought for this country's independence from Great Britain. The Cayuga Indians signed a treaty (now disputed) selling the land to the new American Government. The land was settled and gradually cleared by the new owners for farmland. This use remained unchanged until acquisition by the military. On 11 June 1941, the War Department announced official approval of eight million dollars to start a munitions project in Central New York State. The site selected covered 10,600 acres of farmland and affected 105 families. Construction of Seneca Ordnance Depot was started in July 1941 and nearly 500 storage igloos were completed by 13 November 1941. Twenty miles of chain-link fence were erected at the boundaries to seal off the site.

By 1943 the administration area, ammunition facilities, warehouses, utility structures, and a few housing quarters were completed. Water, sewage, heat, and electrical facilities were available and the depot was ready to begin its primary mission of the receipt, storage, maintenance, and supply of ammunition. The peak number of civilians employed for construction gradually declined and only a handful of new facilities were built. The 1950's saw the addition of six ammunition related facilities reflecting the shift from wartime supply mission to the peacetime storage, maintenance and disposal mission. Two large General Services Administration warehouses were constructed in 1953-54 as Seneca received this tenant activity. The years 1956 through 1960 saw the development of the Special Weapons mission and the sites at the northern end of the base were designated as the North Depot Activity. Buildings 700-710, 715-741, 800-825, Quarters 200-207, 210-219, 221-245, and 17 additional storage igloos were constructed to support this new mission. Eight new buildings were built during 1961-62 in support of both missions. No new facilities were added again until 1969.

In 1961, the North Depot Activity was consolidated with the South Depot and overall command assumed by the Commanding Officer, Seneca Army Depot. During this period the depot was transferred from the Chief of Ordnance to the US Army Supply and Maintenance Command and renamed Seneca Army Depot (SEAD).On 1 July 1966, the depot was reassigned to the US Army Materiel Command (USAMC). In 1969, SEAD received the function of storing Industrial Production Equipment (IPE). This was eventually expanded into mission status in 1974. SEDA now has the task of rehabilitating this equipment prior to storage. From 1969 to 1976 ten new structures were added as well as eight trailers for temporary housing at the lake. In general, these were added to support additional military personnel. In 1976, the US Army Materiel Command was redesignated the Army Materiel Development and Readiness Command

4.0 Facilities:

4.1 Overview: SEDA is split between a north depot area and a south depot area. The north depot area contained barrack facilities capable of sustaining 450 troops. This area contains mess halls, PX, comissary, bowling alley, gymnasium, administrative buildings, and other recreational facilities. This was a small community in itself. The south area contains administrative buildings, warehouses, small amount of industrial buildings, and some capehart housing. A third area, called the Ammo Area contains 517 storage igloos and various ammunition workshops. SEDA has a airfield with a 7,000 foot long runway. SEDA also has approximately 56 housing units bordering Seneca Lake. This property is separate from the main Installation by approximately 2 to 3 miles to the west.

4.2 Transportation System: Railroad: A depot network of 42 miles of track provides access to all installation operational facilities. This network is served by the Conrail System along the depot's west boundary. This service is a single track to the north between SEDA and the rail hub which is located 14 miles distant in Geneva, New York. Routing from the rail hub is northwest to Buffalo via Rochester and east to Albany via Syracuse. Roadways: Primary access to the depot is provided by New York Routes 96 and 414. These routes run in a north-south direction and abut on the east border of the depot. Secondary access to SEDA is provided by State Route 96A which also has a north-south alignment, but abuts the west border of the depot. Each of these access roads are paved, two-lane highways with earth shoulders. The pavements are constructed of bituminous concrete and are well maintained. Each of these three highways provide a northern access to Interstate Route 90, which is located approximately 15 miles north of Romulus. The depot roadway network totals approximately 141 miles. Macadam paving comprising approximately 113 miles provides a complete roadway system for the Restricted Storage Area, Exclusion Storage Area, and North Post. Concrete roads totalling 14 miles are located in the Administration and General Warehouse Area. The balance of the remaining roadways are paved with shale and/or gravel. These are utilized for access to remote and infrequently travelled areas. Airfield: Air traffic to and from the post utilizes the depot airfield, formerly called Sampson Air Force Base. The airfield is designed to service both fixed-wing and rotary-wing aircraft. It has air traffic advisory facilities and operates on a limited IFR (instrument flight rules) system. The existing runway at 7,000 feet can accommodate C-141, C-130 cargo planes, DC-9, and occasionally C5A aircraft have used the depot airfield.

4.3 Water Supply: The Installation purchases water from the Town of Varick. Water is delivered to a pump station at the Lake property and then pumped to storage facilities. It is rechlorinated when pumped to the distribution system. The installation supplies approximately 180,000 gallons per day to the Installation and the towns of Varick and Romulus, both small communities. In 1998 a new water supply was put into effect for the Installation. The water line placed from the Waterloo Pump and Treatment Plant, approximately 5 miles to the north of the Depot treatment plant. This new line will supply water to private homes along it's route and to the Depot and be the new source for the Depot's water supply. The Waterloo Plant gets it's water from Seneca Lake.

4.4 Projected Changes: The Installation has no planned construction till closure date, with the exception of remedial actions on several Solid Waste Management Units (SWMU).

5.0 Responsible and Interested Parties:

5.1 Installation Organizations: Implementation of the Natural Resources Management Plan is the resposibility of all organizations on the Installation. The Commander sets policy and direction the Installation will take in managing the resources at the Installation. The Engineering and Environmental office will prepare and manage the Plan. The Maintenance Office will be involved regarding grounds maintenace.

5.2 Other Defense Organizations: The Headquarters, U.S. Army Industrial Operations Command will review the INRP and assist with technical support implementation of the Plan.

5.3 Other Federal Agencies: The U.S. Fish & Wildlife Service (USFWS), U.S. Forest Service (USFS) will be consulted where their technical expertise can assist in managing the Natural Resources on the Installation.

5.4 State Agencies: The New York State Department of Environmental Conservation (NYSDEC) will be consulted regarding management of the INRP.

5.5 Universities: Any universities involved in the implementation of the INRP will be for the most part be working with the NYSDEC or other similar organization and not directly with the Installation.

5.6 Contractors: Contractors involved with implementation of the INRP will be involved with pest control such as vegetation control or nusisance animal control such as raccoon or beaver trapping. This is due to the fact that the Installation is on BRAC and no longer has a pest control person on the Installation.

6.0 Natural Resources and Climate:

6.1 Setting: Wooded areas containing both hard and softwood trees cover approximately 3,600 acres. Hardwood stands account for 95% of the total woodland acreage. Hickory, maple, and oak are the dominant hardwood species. Softwood trees, such as pine and hemlock (mainly in plantation form) comprise the remaining 5% of the woodland area.

The agricultural fields which have been abandoned since the depot was established in 1941, have undergone secondary successional changes. This successional stage, characterized as a sapling shrub community, is currently dominated by maple, ash, elm, elder, hawthorn, berry bushes, vines, herbs, ferns and grasses. Recent information from the Seneca County Soil & Water Conservation District (SWCD) maintains that there are no noxious weeds listed for our area.

The remaining portions of the depot are in the initial stages of old field succession and are covered with grasses, annuals, and other herbaceous plants. Clear zones are maintained (mowed) as required along all roads and around all igloos.

The surrounding land area around the Installation still remains farmland with some wooded areas. This land use has not changed from the time the Depot was formed in 1941.

6.2 Topography: SEDA is situated on a plateau between Cayuga and Seneca Lakes. It is located within the glacial till plain of the Central Lowlands Physiographic Province with the glacial lake plain on the north and the Appalachian Plateau to the south. The land at the depot slopes gently from a high point of 765 feet above sea level at the southeast corner to an elevation of 585 feet at the northwest corner, about seven miles distant. In addition to the main depot lands, there is a narrow strip of steep and gullied land of nearly 300 acres that extends about two miles from the Conrail Railroad on the west side of the depot down to Seneca Lake. Also, Kendaia Creek, the main drainage artery for the central part of the depot, runs down this strip.

6.3 Geology: Poorly drained silty clay loam and clay loam soils are predominant at SEDA. These poorly drained soils have been mapped by the Soil Conservation Service as part of the Darien-Angola Association. Well drained and moderately well drained silt loams of the Honeoye-Lima Association are present along the western edge of SEDA and all land between the depot and Seneca Lake. The soil associations have been developed from the glacial till of underlying shale bedrock, deposited during the Wisconsin glaciation 10,000 - 15,000 years ago. The typical soil profile at SEDA is as follows:

1. Top soils vary in depth from 6 to 17 inches and consist of a siltyclay loam underlain with silty clay often intermixed with hard gritty calcareous fragments to a depth of 40 inches.
2. Substratum consisting of limestone till and shale bedrock is generally found from 24 to 48 inches below the surface.

The soils found on the depot have limited suitability for agriculture and construction due to their acidic characteristics, moderately fine texture and, low permeability. Several factors are important in terms of the engineering requirements for the construction of facilities: (1) the soils have a moderately high bearing capacity and generally are not compressible; (2) erosion is a potential hazard, but since the ground is level, soil losses can be controlled through simple erosion control measures; and (3) prolonged seasonal wetness and slow permeability make septic tank disposal systems unsuitable and place restrictions on the construction of building foundations. The depth to the water table at Seneca varies between 0.3 meters and 7.0 meters below the surface. Frost action within the soils on the depot seldom exceeds three feet in depth. During infrequent periods of extended sub-zero temperatures and light ground cover, frost may reach depths as great as four and one-half feet.

6.4 Climate: The climate of Seneca County is quite good in terms of human comfort. There are 80-90 days when there is summerlike weather (over 50 degrees F.), usually between the first week of June and the first week of September. Temperatures fall below 20 degrees F. for approximately three months (December through February) to form the winter season. The local climate is significantly moderated by Seneca, Cayuga and Ontario Lakes, both in terms of temperature and precipitation. The average annual precipitation is 75 cm and the average growing season 160 days. The first and last killing frosts usually occur October 11 and May 5, respectively. The prevailing winds are out of the west and northwest; the occurrence of an east wind is a rarity. Summer winds are usually out of the south. Wind speed averages 15-20 miles per hour (mph) with 90 mph the highest on record. Thunderstorms are common in spring and fall and tornadoes and hurricanes are rare.

6.5 Water Resources: There are four main watersheds on the installation. Surface runoff from within the southern part of SEDA which includes the Washout Plant area, the Ammunition Workshop area, and the E-800 area, flows into Indian Creek which empties into Seneca Lake just south of Sampson State Park. Kendaia Creek receives the run-off from the central part of the installation and flows into Seneca Lake. Areas drained by Kendaia Creek include the Warehouse Storage, GSA Open Storage, and the Headquarters complex. The storm drainage system in the Administration Area discharges directly into Kendaia Creek. Reeder Creek drains the major portion of the northwest and north central part of the depot. This drainage area includes a large part of the restricted area, the Demolition Grounds, Sewage Treatment Plant No. 715 and most of the built-up area of the North Post. All storm drains in this part of the Depot discharge directly into Reeder Creek . The northeast part of the reservation which includes part of the restricted area, the ponds and marsh areas north of Sewage Treatment Plant No. 4 drains into Kendig Creek, which flows north into the Cayuga-Seneca Canal. The ponds, which were created by damming, comprise 87 acres.

Drainage by water percolating through the soils on the depot is generally poor. However, due to the slight slope, most of the depot is drained sufficiently to prevent accumulation and stagnation of water. To augment surface drainage, an extensive system of channels and drains were constructed covering most of the depot to facilitate the flow of water into the natural streams within the area.

All of the streams which originate on the reservation are classified as intermittent. Sedimentation of the streams is not a major problem. There is no major evidence of downstream siltation. This is due to several factors which are: the large expanses of undeveloped and semi-developed land, the surface clays and shales are not highly erodible, the requirement for all new construction to have an approved sediment control plan.

6.6 Flora: In 1996 SEDA completed an endangered species survey for the Installation. No federally listed plants were found at SEDA. Three State-listed plant species were found. These were: aster schreberi (large leaf astor); calamagrost stricta var. inexpansa (northern reedgrass) ; and geum virginianum (rough avans). Suitable habitat for additional ten plant species was also found at SEDA.

In 1995 SEDA completed a wetlands inventory/delineation and mapping survey of the installation. A total of 87 wetlands are identified on SEDA land. These wetlands cover approximately 496 acres.

In 1994-1995 SEDA completed a timber inventory. This inventory found 1,166 acres of manageable timber on the installation. This results in 3,304,866 BF of total timber. A list of tree species found on the installation is located in 8.2 Forest Management.

6.7 Fauna: SEDA has today one of the largest white, whitetail deer herds in the country. These deer are not albinos. The gene(s) causing skin and/or hair color has been "selected" and the white deer persist. This herd is managed to insure their survival for future generations to enjoy. The present population is approximately 225 to 250 animals. Along with the white herd we have a brown deer herd also. This is also manged so that they do not overpopulate. The size of the brown herd is approximately 350 to 450 deer.

In 1996 SEDA completed an endangered species survey for the installation. No federally listed animals were found at SEDA. Two state-listed species were found: osprey and northern harrier . Suitable habitat for additional species was found at SEDA; one amphibian, three reptile, six birds and two mamals.

7.0 Land Use and Management Units:

7.1 Land Uses: The existing land use patterns at SEDA are well established, dating back to World War II. The development of the installation has centered around the depot's primary mission of providing for the receipt, storage, maintenance, and disposal of ammunition. The construction of new facilities since the end of World War II has proceeded in an orderly fashion in recognition of the basic land use pattern established by the depot's primary mission. The historic development of the installation and man-made boundaries have served to divide SEDA into three major land areas.

- Main Post
- Depot Airfield
- Lake Housing Area

The Main Post accounts for the bulk of the installation's area, comprising 9,832 acres out of a total of about 10,600 acres. The ammunition storage and exclusion storage areas occupy the central portion of the Main Post, accounting for 4,008 acres. The ammunition storage area consists of 455 reinforced concrete igloos and eight permanent general storage magazines spread over 3,609 acres. The exclusion storage area contains 64 reinforced concrete igloos and one warehouse in support of the Special Weapons Directorate.

Operational facilities designed for the maintenance and demilitarization of ammunition are located around the periphery of the ammunition storage area. Those operational areas are:

- Ammo Workshop Area - Southwest
- Ammo Workshop Area - Southeast
- Ammo Demilitarization Area
- Ammo Surveillance and Receiving Area
- Ammo Demolition Area

The cantonment areas of the Main Post are designated as the North Post and the South Post. The South Post is located in the southeast portion of the depot adjacent to Route 96. Facilities situated in the South Post include administration, family housing, community services, and warehouse storage.
Most warehouse storage at the depot is accomplished in 27 standard warehouses located within the South Post. Of these, two have floor space of 200,000 square feet each, while 21 contain 90,000 square feet each. The remaining five warehouses have considerably less storage space.

The North Post is situated on the northern end of the Main Post. Facilities situated within the North Post include troop housing, troop support, and community services. A majority of the new facilities constructed at SEDA over the past twenty years are located within the North Post.

The Depot Airfield is situated on a 500 acre parcel off the southwestern corner of the Main Post. SEDA operates a Class C Airfield for incoming and outgoing logistic shipments. The fixed wing runway is 7,000 feet long. A consolidated outdoor training area and small arms range is part of this parcel.

The Lake Housing Area provides 56 family housing quarters on 69 acres of depot property adjacent to Lake Seneca. To alleviate the strain on available on-post living quarters a new housing development was recently built. This provided an additional 30 housing units.

SEDA provided training areas for Active Component and Reserve Component units from central and western New York. There are seven designated areas that provide a variety of conditions for training. Some of the training includes obstacle courses, bivouacs, land navigation, and live fire at grenade and small arms ranges. All training was stopped in mid 1996 time frame.

Due to SEDA's isolated location in a sparsely populated, rural County any revisions to land usage within the confines of the post will have little direct effect on the surrounding communities. The rural nature of the land surrounding the installation provides a very compatible land usage with that of the post itself. Since placement on the BRAC 95 listing no land use changes will be intiated.

8.0 Natural Resources Management:

8.1 Objectives: SEDA's goals and objectives have changed dramatically. Our Installation will be closed on or before July 2001 due to BRAC 95 listing. In that short time SEDA will maintain present natural resources on the Installation to include the deer herd, both brown and white herds, forest lands, wetlands, and maintain lands in present status. SEDA will work closly with the Local Reuse Authority (LRA) to transfer lands to new owners or tenanats fully understanding all natural resources available on the Installation. Also helping LRA to insure new owners or tenants of the requirements regarding maintaining and developing or changing natural resources on the Installation.

8.2 Forest Management: High quality veneer logs and sawtimber are the main products to be grown under this management plan. Valuable quantities of firewood are also produced from thinning, cutting, etc., while at the same time promoting maximum yield and the desired composition of the major crop species. Each woodlot or group of woodlots can be managed separately depending on their size and proximity to each other. Because the present timber stand is basically small and scattered, small improvement type timber sales may not contain large enough volumes to economically attract commercial buyers. Nevertheless, we will treat the forest as uneven-aged and manage improvement cuttings with the selection system removing; overmature, inferior species, crooked, leaning, extremely limby, badly formed, or seriously injured trees. Some trees will be left if they are good den trees or good mast producers. Individual or group selection reproductive cuttings will be determined depending on the site with information from the inventory. Sales will be managed in association with the planned silvicultural practices.

The conifer plantations are scattered throughout the Depot and are small in size (mostly less than ten acres). Presently, their benefits as a source of cover and food for wildlife are greater than their value as a timber product. However, plantations that are stagnated from overstocking will be thinned to improve diameter growth.

The firewood program is designed to accomplish the goals of this plan while providing an alternate source of revenue to timber harvests. Anticipated management for the remainder of the cutting cycle consists of timber stand improvement work, selective thinning cuts, intermediate and harvest cuts, reforestation, and release work (pines, spruces).

Species to be Grown: The species of timber to be grown and managed for timber production, veneer production and firewood are listed below. They have been chosen on the basis of value, abundance, and adaptability to the depot soils.

Common Name	Product	Relative Abundance
Black Walnut	veneer/sawtimber	common
Black Cherry	veneer/sawtimber	scarce
Basswood	sawtimber/firewood	common
White Ash	veneer/sawtimber	common
Sugar Maple	veneer/sawtimber	abundant
Red Maple	sawtimber/firewood	abundant
Silver Maple	sawtimber/firewood	common
Red Oak	veneer/sawtimber	common
White Oak	sawtimber/veneer	common
Hickory (sp)	sawtimber/firewood	common
American Beech	firewood	common
Black Locust	firewood/fence posts	common
White Spruce	sawtimber/pulpwood	scarce
White Pine	pulpwood	scarce
Larch	pilpwood/poles	planted
Red Pine	pulpwood	planted

Compartments and Cutting Units: Because of the small total area of the existing stands of timber, the entire depot is divided into 68 cutting units. The approximate amount of tree covered area in each unit is:

Cutting Unit #	Acres	Cutting Unit #	Acres
1	22	36	16
2	0	37	22
3	46	38	40
4	0	39	39
5	0	40	44
6	28	41	16
7	43	42	15
8	25	43	10
9	0	44	0
10	16	45	0
11	18	46	96
12	0	47	12
13	0	48	0
14	17	49	5
15	16	50	10
16	0	51	10

17	20	52	5
18	10	53	8
19	3	54	90
20	0	55	0
21	12	56	67
22	0	57	20
23	10	58	6
24	0	59	37
25	0	60	53
26	6	61	72
27	3	62	45
28	3	63	0
29	3	64	37
30	3	65	0
31	3	66	30
32	4	67	62
33	3	68	0
34	0	Airfield	6
35	18		
Total Acres			1,166

Harvest Schedules, Timber and Firewood Sales and Marking: As noted earlier, SEDA is scheduled for closure under BRAC, therefore many of the following schedules and fire wood sales will not be completed if any. The following information is supplied as a guide to what would have been if SEDA was to stay open and may be useful to any agency taking over SEDA's property. Periodic harvests will be employed at SEDA due to the nature of the timber stand. If sufficient volumes are available to attract competitive bids, the harvests will be made once during each cutting cycle. The nature of the existing stands is such that this may not be feasible. Several stands were marked during October and November, 1982 in preparation for a declaration of availability. Following a new inventory of the forested areas, these stands will be reassessed for harvest. Trees will be remarked where sufficiently stocked stands are ready for harvest. In 1994-1995 a timber inventory was conducted for all of SEDA's larger blocks of timber. The following information concerning harvesting was derived from the inventory. All data from the inventory is compiled in two, three ring binders and labeled Timber Cruise Data 1995. There were 45 areas or blocks of timber inventoried. In almost every block the reccomendation was to remove the larger, older trees. This would create area for new growth and existing trees to grow larger quicker.

The firewood program will be utilized to perform timber stand improvement in conjunction with commercial harvests. Cutting units will be cruised and a prescription will be made by a qualified forester. A decision will be made as to the suitability of areas for the firewood program. When a cutting unit can benefit from the firewood program, the unit will be physically divided into smaller lots using engineering tape or twine. The trees will be marked in accordance with the prescription for the entire cutting unit. The volume of cordwood marked will be computed to determine the size of the lots. In general, the rate charged will be between 50-75% of the present commercial rate for cordwood delivered on site.

Military and civilian personnel will be allowed to buy a firewood lot. The buyer will be required to remove all marked trees. The branches and tops from trees that are not taken will be scattered on the same firewood lot. Cutting unmarked trees, cutting in other lots, and other like offenses will result in the loss of this privilege for the offender.

Special Areas:

1. Kendaia Creek Ravine (Lake Area) - This area contains 186 acres NCF and is part of the water shed for Kendaia Creek. The steep slopes and inaccessible nature of the land would make harvests difficult at best. This area is also adjacent to the Lake Housing Area and serves as a nature trail, fishing stream, and buffer zone for Kendaia Creek. Forest management is not contemplated here.
2. Freshwater Wetlands - While timber harvest may be conducted with an appropriate permit on hand, these areas were assigned a lower priority than others. Logging operations could possibly have adverse environmental impacts on these areas if harvesting took place at a time of the year when the areas were inundated.
3. Semi-Improved Grounds - The reforestation effort described elsewhere will focus on converting otherwise idle grounds into productive forest land. The by-products of this plan are a reduction in costs associated with maintaining (mowing) these areas and the possibility of biomass and firewood production.

Other Silvicultural Treatments: Prescribed burning is not planned as most forest land is within the Ammunition Storage Area. Silviciding is not required but mechanical treatment will be used for thinning and releasing conifer stands.

Environmental and Wildlife Conservation: Timber harvesting and tree planting will have environmental review as part of the integrated natural resources management plan (INRMP) environmental assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and Army Regulation (AR) 200-2. A Record of Environmental Consideration (REC) will be applied referencing this EA for all timber disposals and other natural resources management activities that may have a significant impact on the environment.

Large scale timber harvests could have immediate effects on wildlife habitat, runoff and erosion, and species composition. Therefore, silvicultural treatments described in this plan reflect the compromise between the production of mature timber and the responsibility to maintain adequate wildlife habitat with the use of best management practices. Predetermined silvicultural treatment as planned on a unit by unit basis will allow for management of woodlots and also serve the needs of the wildlife without adversely affecting growth rate of the stand. Areas that may require additional planning to ensure sound wildlife management techniques will be addressed on a unit by unit basis.

8.3 Agricultural/Grazing Outleases: Agricultural outleasing was attempted in 1948 for the first time. Invitations for the bids were first solicited for 14 October 1948. Three bids were received and two leases were negotiated. 50 acres leased from 1 November 1948 to 31 October 1949. This lease was terminated on 1 September 1950 as the lessee had never exercised the lease privileges. 77 acres were leased from 1 November 1948 to 31 October 1953 for a 5 year period. This lease was terminated on 29 October 1949 at the request of the lessee. Invitations for Bids for Outleasing were again solicited for 23 March 1949. There were no interested bidders. This was the last solicitation for Agricultural Outleasing until 1961. The difficulties experienced in coordinating outleasing with military use of the installation were numerous and in certain instances impossible to correct. Lessees complained that the limiting of working hours, to correspond with the established working hours for installation's personnel, caused extreme hardship in performing agricultural work. Farming operations were not governed by established working hours and working days. Crops needing care or harvesting could not be adequately handled during set hours.

This was the main reason for failure of the agricultural outleasing program. Secondary causes were the limitations regarding safety measures for the operations of farm equipment on the installation.

Outleasing of 6,886.81 acres was attempted in 1961 and again in 1962. Invitations for bids were issued under direction of the Corps of Engineers, New York District. The results in both instances were negative.

Today, there are no current agricultural leases. Agricultural outleasing at Seneca Army Depot has been discontinued due to problems, such as farmer access only during duty hours and low amount of interest, and master plan goals.

Money received from outleasing: $127 paid for two leases in 1948. There were no services provided by lessee in lieu of cash rent. No livestock have been grazed at the installation.

8.4 Habitat Management: Habitat management at SEDA now and until closure will be limited to presevering existing habitats for transfer to future managers. Some steps taken to ensure this happens are the establishment of several types of nesting structures for birds on the installation. Also doing a timber harvest to improve the mast crop for the deer herd at SEDA.

SEDA has a pair of nesting Osprey that have nested at SEDA for the past two seasons. These birds are listed as New York State threatened. The nesting tree that the birds were using has all but fallen down. The winter of 1996/1997 two nesting platforms were erected to provide this pair an alternative nesting site. Also hope to draw another pair of nesting birds to the area.

In the past SEDA has had a large nesting box program for bluebirds. This has declined in the past few years due to budget cuts and downsizing. SEDA has been talking with volunteer groups to help replace and maintain this program until closure. The bluebird is listed as special concern in New York State.

Talks with New York State Department of Environmental Conservation (NYSDEC) show a large use of the former Q Area by Kestrels. A small nesting box program for kestrels in the Q Area was started in 1996/1997. These birds are not listed at all in New York State as endangered, threatened, or of special concern. Program was started as a cooperative progrm with NYSDEC.

SEDA is planning a timber harvest for the winter of 1998/1999. This harvest is being conducted to improve the mast crop, hopefully providing more food for the deer herd at SEDA for the future. This harvest will take selected trees and remove less desirable or overcrowing trees from the selected tree perimeter causing the selected tree to increase it's crow and mast crop. This harvest will also target diseased trees for removal such as white ash. The size of this sale will run from 100 to 500 acres approximately.

8.5 Game Harvest Management: Discussions with wildlife biologists from NYSDEC have indicated that there is not a future in stocking gamebirds on depot. Studies indicate that the pen raised birds do not survive the first winter. The state would not consider a "put and take" pheasant program on the depot unless the general public was allowed to hunt.

With these considerations in mind, it appears that the depot must concentrate on providing ideal conditions for the few wild birds that remain. In this way, the population can be managed and, hopefully, increased to the point where it is again a viable and desirable species for hunting.

The reaction to our inquiries regarding the transfer of wild turkey to the depot was also negative. The state is of the opinion that turkeys have been reestablished in all of the former range through a "trap and transfer program." The introduction of birds into new areas and areas bordering existing ideal habitat (such as SEDA) is not planned. As turkey populations increase, a "spill over" is expected. Apparently this has recently occurred on the depot. There were six confirmed sightings of wild turkey during the 1987 deer harvest. It is hoped that these birds are not transient and that they will establish a breeding population consistent with the amount of habitat available here. As of 1996 the turkey is well established and thriving at SEDA.

Approximately 500 channel catfish (fingerlings) were obtained from the US Fish & Wildlife Service and stocked in the two main ponds in 1982-83. This was the second time we have stocked channel catfish. The objective is to supplement the large mouth bass and bullhead fishery existing there now in hopes of establishing a high quality fishery for military family members. Each year a children's fishing derby is held at the pond area, proving that previous stocking efforts were successful.

Small game hunting, trapping, and fishing are also permitted on SEDA. Procedures and responsibilities are outlined in SEDA Regulation 190-6. An annual fee of $10.00 is charged for hunting privileges on the Depot. This money is deposited into the 21X5095 account. Small game has been deleted as a result of access issues and manpower limitations.

The management of wild animal populations is performed as a function of Wildlife Management at SEDA. Management of all species is performed in accordance with the NYSDEC.

Fish management is not required at this time, since overpopulation is not a problem. However, a program to reduce the weed density in the two main ponds may be necessary if fishing is going to be a main objective of wetland use.

Management of the white-tailed deer herd is necessary to maintain the size and quality of the herd. Population indices are prepared by the Senior Wildlife Biologist, NYSDEC Division of Wildlife, and harvest recommendations are made prior to hunting season. The NYSDEC uses a computerized modeling program to predict the size and age class distribution of the herd. Information for the program is generated from aerial counts, deer harvest figures, and data collected by the deer agers. Trained depot deer agers sample the harvested population for age, sex, and beam diameter measurements. From all of the information gathered, the NYSDEC is able to predict the herd size and provide the Depot with a recommended harvest figure in order to winter over a specified number of deer that the range would support.

In order to maintain a white percentage of the herd, only a limited number of white deer are taken. This will insure that this unique resource remains for future generations to enjoy.

Management of the deer herd is a necessary and important aspect of wildlife management at SEDA. This is performed through an annual deer harvest. The harvest is performed with technical advice from the NYSDEC and in accordance with NYS regulations. Persons hunting deer must have a New York State big game license. Hunters can purchase a big game license at SEDA. Deer Management Unit (DMU) permits are sold at SEDA for antlerless deer because SEDA is its own DMU. Deer Management Unit permits may only be used to take deer which have no antlers or antlers both shorter than 3 inches long. This year was the first year that second DMU permits were available at SEDA.

Public use is limited to guests because security requirements on ammunition storage areas require that general public must be escorted. The guest policy is based on the logistics and practicality of 4 guests.

The deer herd is maintained at a level that will insure a healthy stock for the resources that are available. Data gathered by SEDA personnel during the deer harvest on sex and age distribution becomes a valuable tool in the management of the herd. The data will indicate the degree of annual replenishment of young stock as well as the decline or increase of certain age classes.

8.6 Rare, Threatened, or Endangered Species Management: SEDA has just completed an installation endangered species survey. No federally listed species were found. SEDA, at this time does not have a Endangered Species Management Plan (ESMP). Since there were no federally listed species found and SEDA will be closing by 2001 it is doubtfull that a ESMP will be prepared.

8.7 Furbearer Management: At present target animals at SEDA are muskrat, beaver, mink, and woodchuck. The first three are managed by trapping during the regular trapping season with an occassional nusiance beaver being trapped or removed during the off season. Woodchucks are a constant problem and at present are only controlled by natural predators such as coyotes. If they become a problem in a certain area they are trapped or controlled by poison baits.

8.8 Wetland Management: In 1994 SEDA and the USFWS signed a Memorandum of Understanding to conduct a wetlands survey. This survey was to achieve the following: Develop a mapped inventory and delineate and mark wetlands. Mapping to be compatible with SEDA mapping. This work was completed by 30 September, 1995 with a final report due early 1996. This goal was achieved. Wetlands were identified by three factors: a. standing hydrology, b. soil condition, c. wetland associated flora and fauna. Selected sites were cored for soil identification and firther validation. 1985 National Wetlands Inventory (NWI) maps were used to locate and compare present ground conditions during the growing season (early April-September). The survey identified 87 wetlands which cover approximately 496 acres. This was an increase from 1985 NWI estimate of 420 acres.

The NYSDEC on November 6, 1985 filed a Final Freshwater Wetlands Map for Seneca County which included eight wetlands located on SEDA. Four of the wetlands were classified as II and four were classified as III. Classification is based on the benefits provided by each wetland. A Class I wetland is the most valuable while a Class IV has the least importance.

One of the largest wetlands is the created pond area at the north part of the Depot. The other wetland areas are in woods in which the ground surface is covered with water for at least part of the year. Designated areas are identified in the Final Freshwater Wetlands Map.

On August 15, 1978 Sewage Treatment Plant (STP) No. 4 needed to be upgraded to meet National Pollution Discharge Elimination System (NPDES) permit requirements for advanced wastewater treatment or tertiary treatment (1). A sampling and analysis program indicated that the wetlands below STP #4 would be able to provide the required treatment. An agreement between SEDA, NYSDEC, and EPA outlined a monitoring program that checked the effectiveness of this treatment process. Analysis of the data indicated that the wetlands treatment in conjunction with treatment at STP #4 was meeting the NPDES requirements (2,3). Today, the wetlands below STP #4 continue to provide the advanced treatment required to meet NPDES permit requirements.

Management of wetlands will begin with comparing State and Federal wetlands maps along with field investigations. More intensive management will follow to include delineation of wetland boundries of the mapped wetlands. Before any construction or land disturbance occurs, areas will be surveyed to identify any wetlands. Wetland delineation information and management will be intergrated into the Master Planning process.

Activities that may occur in freshwater wetlands or their adjacent areas will be in compliance with the Freshwater Wetlands Act administered by the NYSDEC and Federal (Section 404 of the Clean Water Act) laws.

8.9 Water Quality Management: Internal drainage of the soils on the depot is very poor. Artificial internal drainage is expensive and, with the exception of the administrative, warehouse and airfield areas, it has not been required.

Present drainage channels are of long standing and have established width and depths adequate to provide for stream flow of low velocity. The majority of the stream beds are parent material comprised mostly of shale. Erosion control management is practiced when required. Erosion on igloos is controlled by vegetation and is not considered soil erosion control for the purpose of this paragraph.

SEDA is not in a dust region. Adequate moisture, heavy vegetation, and hardstands in parking areas control all dust. No program of dust control is required beyond the spreading of calcium chloride on the few roads where road dust is a problem.

Construction actions are performed in accordance with the environmental protection constraints of the National Environmental Policy Act. Drainage requirements at SEDA are small due to the slope of the area. Drainage systems involve surface drainage, which includes existing streams and open ditches.

Developed areas are drained by storm sewers, which exit to the surface drainage system (maps and tabulations of storm drainage system are available at the installation as part of the Master Planning Program).

Construction actions are performed in accordance with the environmental protection constraints of the National Environmental Policy Act.

8.10 Cantonment Area Management: The cantonment areas of the Main Post are designated as the North Post and the South Post. The South Post is located in the southeast portion of the depot adjacent to Route 96. Facilities situated in the South Post include administration, family housing, community services, and warehouse storage. Most warehouse storage at the depot is accomplished in 27 standard warehouses located within the South Post. Of these, two have floor space of 200,000 square feet each, while 21 contain 90,000 square feet each. The remaining five warehouses have considerably less storage space.

The North Post is situated on the northern end of the Main Post. Facilities situated within the North Post include troop housing, troop support, and community services. A majority of the new facilities constructed at SEDA over the past ten years are located within the North Post.

8.11 Pest Management: SEDA has an approved Intergrated Pest Management Plan, and updates the Plan Annually. In the past SEDA performed all of the herbiciding and pesticiding operations with two DOD certified applicators. Today, we no longer have these certified applicators due to downsizing and

retirements, therefore all pest related operations are conducted through contracts. All pesticides and herbicides have been removed from the Installation that were used by certified applicators. SEDA has one certified Quality Assurance Evaluator to oversee contract specifications and regulations and verify contractor work. At present SEDA has contracts for: Railroad vegetation control, fenceline vegetation control, Igloo, loading dock, and building vegetation control, and a general contract fot rodent, fly , bee , and cochroach control. Trapping during the regular trapping season is used to control beaver, mink, mushrat, and raccoon populations.

SEDA's reduction in usage of fertilizer and herbicides as required by 26 April, 1994 Presidential Memorandum is simple, as we near closure our requirements for maintaing areas continually decreases which in turn reduces the use of herbicides to maintain these levels. Noxious weeds are not a problem at SEDA so no herbiciding is used to control them. They are monitored each year for any increase which could create a need for control. Directorate of Engineering and Housing (DEH) Insect & Rodent Control personnel are responsible for the control of insects, diseases, and rodents of the forest. Surveillance and periodic inspections are made by the Roads & Grounds personnel and any evidence of damage is reported. No forest insects are known to be causing damage to the forest at this time. The following insects, although not now present in the forest, may become a threat in the future:

Common Name	Scientific Name
White Pine Weevil	Pissodies strobi
Spruce Gall Aphids	Chermes abiatis
Gypse Moth	Lymantria dispar (Linnaeus)

The white pine weevil attacks the terminal shoots of white pine and Norway spruce saplings causing deformity and sometimes exposing the trees to the entrance of heart rot. Closely spaced conifers usually suffer the least amount of damage. If large outbreaks occur, they may be controlled by spraying or dusting with insecticides from aircraft. Small outbreaks may be controlled by spraying using a knapsack sprayer. Only the terminal shoot or leader is sprayed using a nozzle that produces a hollow-cone spray. Spraying for adult insects is done in the early spring. Norway and white spruce are attacked by spruce gall aphids which also may be controlled by spraying. The insects are sprayed when in the nymph stage in early April. Field mice (Microtus spp.) are often a problem in new plantings. Damage to seedlings is usually worse in areas containing heavy grass and weed growth.

8.12 Fire Management: The purpose of fire protection is to prevent fire damage to personnel and property. Fires in military forest lands are especially damaging because of stored ammunition, supplies, and equipment. The partial or even complete destruction of timber, wildlife, and wildlife habitat may result from fire. The destruction of vegetative growth in forest or grass lands, can denude the soil and make it subject to erosion. For these reasons, fire protection on the installation is of major importance. There is no prescribed burning in connection with forest land management at the installation.

All roads, railways, division fences with mowed areas, and other mowed areas provide a complete firebreak network throughout the installation and no additional firebreaks are proposed. The division fence areas, maintained around the exclusion area, are mowed to a width of 40 feet for security reasons. The mowed strip and a vegetative free area within patrolled multiple fence lines account for the wide strip of 160 feet around the exclusion area. Boundary fence lines that are mowed 30 feet on each side of the perimeter fence are maintained at this width due to the proximity of the patrol road and public roads in relationship to the fence. The standard for mowing around the perimeter fence is 30 feet on the outside and 12 feet on the inside. This network, which has a total of 207 miles, is itemized below:

Roads	137 miles
Railroads	42 miles
Division fence w/mowed strip 40 ft. wide	4 miles
Division fence w/mowed strip and vegetative-free strip - total width of 160 ft.	4 miles
Boundary fence - total width 60 ft. (minimum)	18 miles

With the relatively small forest land areas, the extensive network of firebreaks, and the intensive patrol schedule, the danger of a fire reaching major size is definitely minimized. No additional facilities are required. The direct method of fighting grass and forest fires is used by this installation. Fire prevention on the installation consists of inspection, education and preventive maintenance. Inspection is a continuing process. Members of the depot's Fire Department and of the Security Patrols inspect all areas for any fire outbreak or for any accumulation of debris that would create a fire hazard. These problem areas are reported to the Roads and Grounds Department for correction. Education is through the use of daily orders bulletins, the installation newspaper, and releases from the Safety Manager. In addition, movies and lectures on fire prevention and suppression are occasionally given. Preventive maintenance consists of maintaining all fire breaks by the Roads and Grounds Department and the correction of unsafe conditions by the same department as requested. Fire prevention is also included in depot safety and conduct rules and regulations, for conduct in buildings as well as in the area. For example, no fire producing materials (lighters, matches, or spark producers) are allowed in the ammunition storage area. Vegetative fires are detected by security patrol, guards, or depot personnel who might be in the area of the fire breakout. Reporting is done by security patrol over shortwave radio, by guards and depot personnel over administrative and fire reporting telephone systems. Control of fires is directed by the Fire Chief or Assistant. Fires in grass areas are answered with two 1,000 GPM fire trucks equipped with two-way radio. If a fire is near an igloo area, then the vent doors and stacks of the igloos in the immediate area involved are closed automatically and responding crews will fight the fire with back pack pumps, fire brooms, fire rakes, and shovels. If large quantities of water are needed immediately, then the 1,000 gallon tanker (Roads and Grounds Equipment) and necessary distributing equipment is used. Backfiring may be used if necessary. Complete cooperation of the grounds maintenance personnel and equipment is always available. If necessary, firebreaks may be made with heavy equipment if necessary and other work as requested. This method will probably not be necessary due to the vast network of road and railroad locations acting as firebreaks throughout the depot.

Cooperative agreements are in effect with fifteen (15) fire companies located in Seneca County of which six (6) companies could be at SEDA within fifteen (15) minutes if requested. Under the terms of these plans, the depot may request the aid of any of these fire companies by telephone. All fifteen companies may be called if necessary. If additional assistance is needed, it may be obtained through the statewide Mutual Aid Program by calling the Seneca County Mutual Aid Base Station in Waterloo, New York, telephone 315-539-2425. The Seneca County Base Station may then request the assistance of fire companies that have mutual aid plans with adjoining counties. The responsibilities of Army supervisory personnel are to furnish equipment to the fire department and to maintain the fire stations. Army personnel, however, do not play any active part in directing fire fighting.

9.0 OUTDOOR RECREATION:

9.1 Hunting, Fishing, and Trapping Programs: In past years hunting and fishing on the Depot ranged from small game hunting, bow hunting for deer and gun hunting for deer. Due to downsizing and security requirements the hunting program has been limited to gun hunting for deer only. Deer hunting is limited to five days during the regular state hunting season. These days usually are the Friday and Saturday after Thanksgiving, the Saturday on the following weekend and the Friday and Saturday on the third following weekend. These are all non work days at the Installation which is required since the largest part of the Depot hunting area is situated in our ammo area. Data is collected during the deer hunt by Depot personnel to determine the age and health of the herd. This data is reported to the State Department of Environmental Conservation, who the Depot relies on to help manage the Installation deer herd, for evaluation and determine what should be harvested the following year.

Fishing on the Installation is limited to two man made ponds that were stocked with bullheads and bass in the late seventies or early eighties.

10.0 CULTURAL RESOURCES PROTECTION:

10.1 Cultural and Historic Resources: The cultural and historical program ar SEDA is in the process of being surveyed for buildings or sites that are of historical or cultural significance.

11.0 NATIONAL ENVIRONMENTAL POLICY ACT:

11.1 NEPA Responsibilities: At SEDA, NEPA related work is processed through and by the Environmental office with review by the Installation legal office. In the Environmental Office one person processes all NEPA related items, but the whole office becomes involved to review their related program items such as Natural Resources or Cultural and Historical as they relate to a specific project or action under NEPA review.

12.0 IMPLEMENTATION:

12.1 Organization, Roles, and Responsibilities: Implementation of SEDA's INRMP will be by the Natural Resources Manager of the Environmental Office under the verification by the base commander. Also involved will be the New York State Department of Conservation (NYSDEC) and the United States Fish and Wildlife Service (USFWS). As SEDA draws closer to closure SEDA will rely on the NYSDEC to implement the plan. NYSDEC will probably be the agency taking over management of much of SEDA's land and be responsible for deer management.

APPENDIX

A

Seneca Army Depot Activity Wetlands, Fish and Wildlife Plan: A habitat based inventory and management plan including guidelines for fisheries, North American Waterfowl Plan goals and nongame birds.

December 1995

By Morgan L. McCosh
U.S. Department of the Interior
Fish and Wildlife Service

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. 96-01

In partial fulfillment of the tripartite cooperative agreement by and between the Department of Defense functioning through the Installation Commanding Officer, Seneca Army Depot Activity, under the authority of Public Law. 86-797, the Sikes Act (16 USC 670a through o); the U.S. Department of Interior, functioning through the Regional Director of the Fish and Wildlife Service under the authority of Public Law 85-624 Fish and Wildlife Coordination Act (16 USC 661 through 667e, 1531 through 1543); the State of New York, functioning through the Director, New York State Department of Environmental Conservation, is entered into for the purpose of protecting, developing and managing the wetlands, fish and wildlife resources at Seneca Army Depot, Seneca County, New York. This agreement is within the purview of Public Law. 85-624. Public Law. 91-190, National Environmental Policy Act (42 USC 4321, 4331 through 4335, and 4341 through 4327), Public L. 93-205, The Endangered Species Act as amended (16 USC 1531-1544) and, Public Law. 96-366 and The Non-Game Act (16 USC 2901-2911) .

This cooperative plan for wetlands, fish and wildlife management pursuant to the Conservation Programs on Military Reservations (Sikes Act) is approved by the following agencies.

BY: Stephen Jr. Bush DATE: 30 May 96
Installation Commanding Officer:
Seneca Army Depot Activity, Department of the Army

ACTING
BY: Cathy Durst DATE: 4/8/96
Regional Director, Region 5
U.S. Fish and Wildlife Service

BY: Gary Parsons DATE: 5/3/96
Bureau Chief of Wildlife
New York State Department of Environmental Conservation

ACKNOWLEDGEMENTS

We thank the staff from the following federal agencies for their technical support in field exercises and editorial comments, without their help this plan would not be complete; USFWS - Lower Great Lakes Fishery Resources Office, USFWS - Ecological Services (NY), USFWS - Virginia Fishery Resources Office and New York State Department of Environmental Conservation for comments and editing assistance. Special thanks are extended to Kim Claypoole, USFWS - Ecological Services (New York) for her assistance in identifying wetland types, performing bird censuses and to Steve Carlisle, US Soil Conservation Service (Ithaca) for his instruction and field assistance in identifying hydric soils.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

I. PURPOSE

The Inter-Service Support Agreement (ISSA) between the U.S. Department of Interior, Fish and Wildlife Service (Service), and the U.S. Department of Defense, Seneca Army Depot Activity (SEDA), was developed 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 commonly referred to as the Sikes Act (16 USC 670 et. seq.) and other laws. The ISSA was initiated to provide assistance and technical support in the development and maintenance of natural resources at SEDA.

SEDA wishes to manage fish and wildlife resources for the benefit of natural resources, post personnel and recreational opportunities. The focus of the management objectives is on fisheries and waterfowl management. A migratory bird plan is desired because SEDA is located in the vicinity of an International Joint Venture migratory area. Specific recommendations for monitoring and managing for wood duck and eastern blue birds are developed. Habitat improvements specific to the duck pond areas are provided to improve and increase over-winter survival and recreational fishing opportunities.

This wetlands/aquatic resources plan should be considered as a part of the required comprehensive natural resources management plan to fulfill Sikes Act requirements. A tripartite agreement was signed between the Department of Defense, the Department of Interior and the New York State Department of Environmental Conservation in 1988, to develop a comprehensive fish and wildlife management plan.

II. GOALS

This report describes wetland and water habitat, fish and waterfowl and non-game migratory birds present at SEDA and management options to enhance the aquatic community to achieve common goals of the three partners, DOD, DOI, and the Department of Environmental Conservation (NYSDEC). Aquatic communities include wetlands, ponds, streams, fish, waterfowl, non-game migratory birds, amphibians, aquatic vegetation, and macro-invertebrates.

Broad goals are: 1) to maintain and improve the quality of habitats for a well-balanced community, and 2) to provide quality recreational opportunities. To accomplish these goals, evaluation of wetlands, fisheries, and North American Waterfowl Management Plan (NAWMP) recommendations will be incorporated to accomplish a habitat (wetland-complex) management approach.

Individual objectives to achieve the above goals follow:

A. The wetlands identification and classification portion of the plan allows for the development of a wetlands location map. The map will be instrumental in future land use planning and coordination of troop activity. The wetlands evaluation provides data on habitat quality and quantity for land use planning and natral resource management.

B. The fisheries evaluation includes an assessment of aquatic habitat and populations with recommended management opportunities. This assessment also documents the relative value of the existing fisheries, and identifies methods to enhance the duck ponds in order to prevent over-winter fish kills (due to anoxic conditions), and presents collected data necessary for an effective aquatic management plan. An assessment of the fishery resources on SEDA land was conducted by Service personnel during the Summer of 1994.

C. The waterfowl evaluation addresses species found on SEDA land with attention to species addressed in the North American Waterfowl Plan (NAWMP). The NAWMP's priority is to increase waterfowl populations. Primary recommendations included the conservation and enhancement/rehabilitation of wetlands as habitat for breeding and migrating waterfowl. Improving wetlands for waterfowl will benefit other species. In 1988, DOD and DOI signed an agreement to develop and implement waterfowl management plans on military lands in or near Joint Venture areas. SEDA is within the Lower Great Lakes/ St. Lawrence Basin Joint Venture Area. A preliminary assessment of waterfowl on SEDA land was conducted by Service personnel during the Spring and Summer of 1994.

D. Uplands management portion is not included in this report. Upland game management responsibilities are shared between NYSDEC and SEDA. These management activities may include whitetail deer, woodcock, and wild turkey species management.

III. LIMITATIONS

A. As of September 1995, the operating status of SEDA has been changed. SEDA is slated for closure by 2001. A minimal staff will remain for operations until lands are transferred under Base Realignment and Closure protocols. It is improbable that SEDA, due to its changed status, will receive enough funding and personnel to fully implement all proposed management activities. Those projects which are feasible according to time, funding and personnel, will be implemented by DoD; the remaining recommendations shall serve as guidelines for subsequent parties.

B. The area outside of outer Patrol Road was not included because wetlands were not identified on either NWI or SEDA maps and time and resources were limited. This area is the runway area and the approach to Seneca Lake.

C. It is necessary to identify and achieve objectives by low intensity management due to limited personnel, budget and time.

D. The wetlands, fisheries and wildlife field study was a rapid inventory of natural resources on SEDA lands. Emphasis focused on wetlands and their associated species including fish, birds and a few amphibians and reptiles. Water chemistry variables of dissolved oxygen (mg/l), pH, and temperature (° C) were recorded. No contaminant analysis was performed. In general, upland species and systems were not inventoried. Plants were not inventoried. A comprehensive threatened and endangered inventory was beyond this scope of the study.

Knowing these limitations, the field study is considered adequate for desired goals of determining wetlands status, fish and wildlife diversity in wetlands and aquatic habitat and recreational opportunities. This plan attempts to incorporate a holistic approach by integrating human, wildlife (game and non-game) and habitat into its recommendations.

Should SEDA request that the Service implement any or all of the recommendations set forth in this report, a separate Inter-Agency Service Agreement or addendum will be drawn up on a per project basis.

IV. STUDY SITE

A. Geography

SEDA is located in Seneca County, New York, adjacent to Seneca Lake on the east. Major U.S. cities within 120 km are Syracuse, and Rochester, New York (Figure 1).

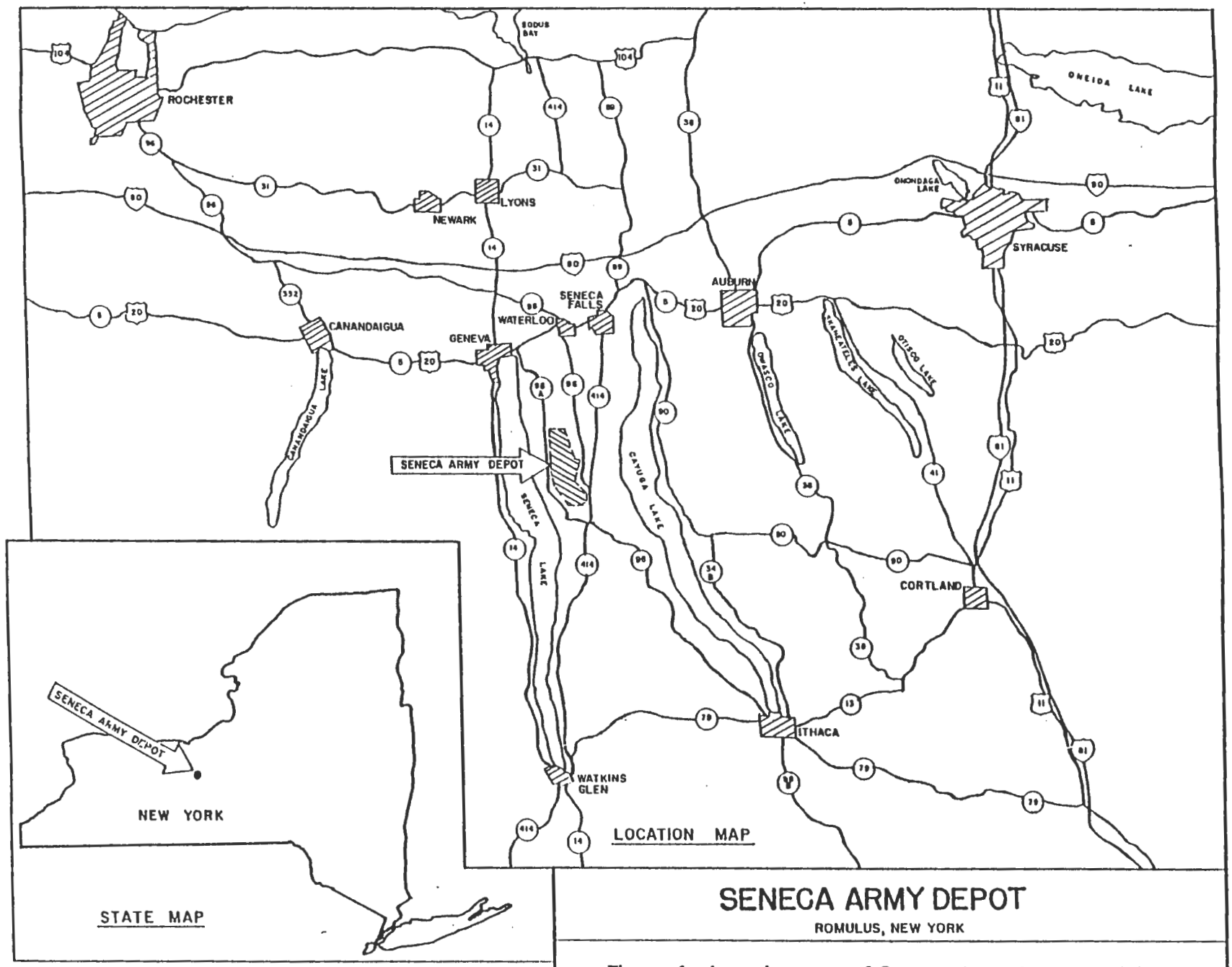
SEDA is on a plateau between Cayuga and Seneca Lakes. It is located with the glacial till plain of the Central Lowlands Physiographic Province and the Appalachian Plateau to the south. The land slopes southeast to northwest at 4.7 m/km (25 feet/mile).

Four watersheds on SEDA drain to Seneca Lake: Indian Creek, Kendaia Creek, Reeder Creek and Silver Creek. All streams which originate on the post are classified as intermittent. Drainage ditches collect and discharge stormwater from around storage igloos and buildings.

B. Land Use

The Cayuga and Seneca Indians inhabited this area prior to European settlement. There are no historic Indian villages or prehistoric archeological sites identified within the study area. SEDA consists of 10,600 acres of farmland acquired in 1941 from 105 farming families. In addition, the airstrip and lake housing area were acquired from the US Air Force and US Navy; these lands have also been historically farmed. More information may be found in the SEDA's Land and Management Plan. By 1943, the depot began its primary mission of the receipt, storage, maintenance, and supply of ammunition. In 1974, rehabilitation of industrial equipment was added to the mission. The US Coast Guard "Loran C" transmitting station was constructed in 1977. Since 1983, most of the construction has been modification and improvement on existing structures.

Transportation on the post consists of paved and un-paved roads, railroads, and airport facilities. Due to the quantity-safety distance criteria imposed by the depot's ammunition related activities, the transportation system reinforces the existing land use patterns. No major upgrading of the installation's transportation network is proposed at this time.



SENECA ARMY DEPOT

ROMULUS, NEW YORK

Figure 1. Location map of Seneca Army Depot Activity.

The present land use patterns within the study area are stable and have not been significantly changed for about twenty years. The main infrastructure consists of storage igloos, which are accessed by rail and road, two main building areas for administration and housing, a secondary sewage treatment plant, and the US Coast Guard Loran C station. Activities off the paved infrastructure are minimal. Troop training, mowing ditches and areas around the igloos and maintenance of fire lanes are the principal off-road activities. Troop training activities include obstacle courses, bivouacs, land navigation and live artillery fire at grenade and small arms ranges.

V. METHODS

HABITAT

A. Aquatic Habitat

Aquatic habitat and populations were assessed for sport fishery management and avian forage base. Habitat was measured qualitatively and quantitatively. Amount and type of cover and substrate for fish spawning and nursery areas were visually determined. Wetlands evaluations determined habitat quality and quantity for amphibians. Sites assessed were the duck ponds, Reeder, Silver, Indian and Kendaia Creeks. Summer diurnal patterns of pH, dissolved oxygen, and temperature were monitored in the duck ponds to determine if any oxygen depletion problems were present.

Kendaia, Silver and Indian Creeks were evaluated for quality and quantity of fish habitat. Water quality variables recorded at each site were water temperature, pH and oxygen. The number of sites per stream varied between 1-3. Stream sites were 40 - 50 m in length. Each site consisted of ten transects perpendicular to the stream. Transects were a stream's width to 10 m apart. Each transect consisted of 3-10 data collection points. Habitat variables of cover, substrate and depth were also recorded at these points.

B. Wetlands Habitat

The major focus on this habitat type was identification and classification of wetlands. Wetland identification and classification determined habitat quality and quantity for waterfowl, non-game migratory birds and associated mammals. Service personnel compared an early 1980's National Wetlands Inventory (NWI) map with present ground conditions during the growing season (early April - September). Wetlands were identified by standing hydrology, soil condition and wetland associated flora and fauna using Cowardin *et al.* (1979). A site was evaluated if wetlands were indicated on NWI or existing SEDA maps. The ground area was observed for 1) saturated soil for more than 15 days of the growing season, and 2) the site had obligate or facultative wetland plant and animal species present. Select sites were cored for soil identification and further validation. Actual soil mineral and organic interfaces will be delineated prior to future land use management plan chnges.

When an area marked on the NWI and/or the SEDA maps was located and identified as being a wetland, according to the above criteria, they were marked with plastic flagging for location and type of wetland. Information obtained from these field observations was used to produce a digitized map using a Geographic Information System (ARC INFO and ARC VIEW2 software) (figure 2). Although the maps were made with the best available information, they are not of 'dlg' standards.

Abbreviated descriptions of major wetland types applicable to SEDA follow:

1. Palustrine-shallow, low/no salinity wetlands (< 20 acres) usually bounded by upland and at least seasonally flooded.
   - Forested (fo) - dominated by trees
   - Scrub shrub (ss) - dominated by trees and shrubs < 20 feet in height
   - Emergent (em) - dominated by emergent macrophytes
2. Lacusterine - low/no salinity wetlands in a topographical depression with < 30 % areal cover and > 20 acres or > 2 m in depth usually bounded by upland and usually permanently flooded.
3. Riverine - all wetlands contained within a channel unless area is dominated by palustrine characteristics or salinity is >0.5%. These wetlands are bounded by upland or channels (natural or artificial). These are not represented on the NWI map because the line resolution is greater than 10 m.
   - (1) lower perennial - low grade and low velocities
   - (2) upper perennial - higher grade and faster velocities
   - (3) intermittent - part of the year flow may not exist and surface water may be in pools or absent

C. Uplands Habitat

Upland habitat was observed as it related to boundaries of aquatic or wetlands habitat, but was not evaluated for this report.

FISHERIES AND WILDLIFE

D. Ponds/Open Water Fishery Populations

Gillnet, minnow trap and creel were used to determine species composition, relative abundance, and reproduction. Sight or audio identification were used to record any reptiles, amphibians or macro-invertebrates observed. From these surveys relative abundance was determined.

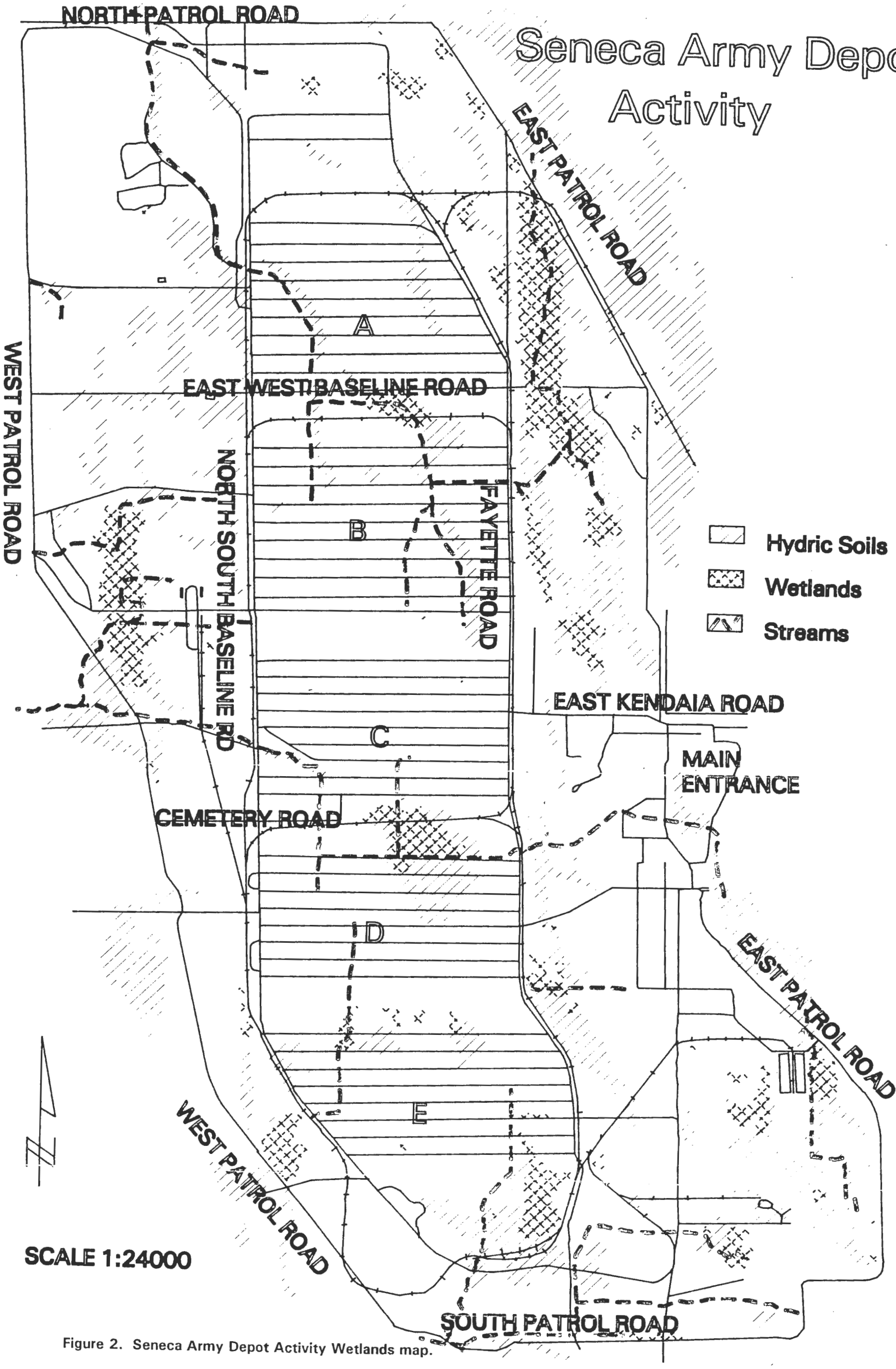


Figure 2. Seneca Army Depot Activity Wetlands map.

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.

E. Stream Fishery Populations

Alternate current (AC) backpack electro-fishers were used to determine species composition and relative abundance. Sight or audio identification were used to record any reptiles, amphibians or macro-invertebrates observed.

F. Waterfowl and Non-game Migratory Bird Populations

Dawn and dusk bird counts were performed. Sight and audio identification were used to determine species and relative abundance. Also, a continuous species list was kept during all field work. Wood duck boxes were located and assessed for use and condition.

G. Other Fish and Wildlife Populations

Mammals were identified on the continuous species list, when sighted. Significant wildlife sightings were also recorded, such as active red-tail hawk and killdeer nests. Bluebird boxes were located and checked for inhabitants and condition.

VI. RESOURCE FINDINGS

As mentioned earlier, the field work to assess SEDA's aquatic natural resources was limited because complete chemical analysis for contaminants and primary production was not performed. Aquatic resources including wetlands, associated species identification, and water quality parameters (DO, pH, ° C) were the main focus.

HABITAT

A. Wetlands Habitat

A total of eighty-seven wetlands are identified on SEDA land. These wetlands cover approximately 496 acres. This is an increase from the 1985 NWI estimates of 420 acres (Figure 3). This may be due to the cessation of previous farming practices on the poorly drained soil types. Many of these wetlands form combinations of different habitat types. Wetland systems represented are palustrine and lacustrine. Classes include open water, scrub/shrub, emergent, forested and some wet grasslands. For both frequency and area, the main wetland types are palustrine forested (47%) and emergent (Figure 4 & 5).

Palustrine (non-tidal emergent and forested) can be used as nutrient stores. Primary production is usually limited by nitrogen levels. The post's sewage treatment plant's success relies on the capacity of the wetlands to absorb nutrients as its' wastewater is filtered through the marsh. Beavers at the duck ponds have increased the wetland acreage and diversity of existing wetlands. Another large source of wetlands is the saturated area marked on the post maps in quadrant DF.

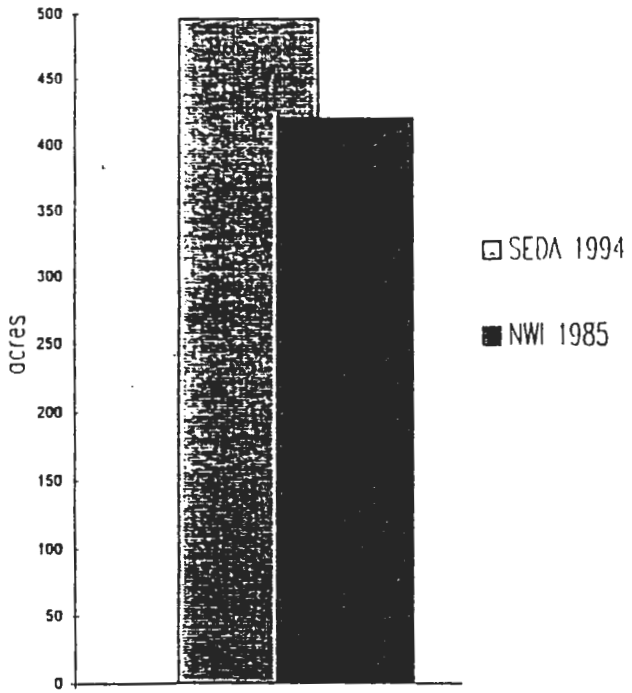


Figure 3. Total area of wetlands located on SEDA during the 1994 growing season compared with the 1985 National Wetlands Inventory maps (NWI).

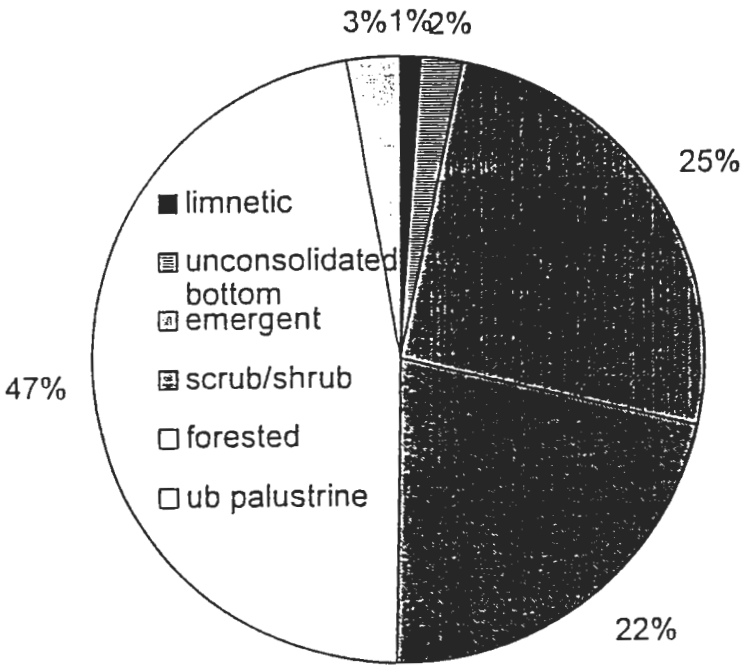


Figure 4. Area percentage of wetland types on SEDA. Pies are proportional. Class types are forested, scrub/shrub, unconsolidated, emergent, and limnetic.

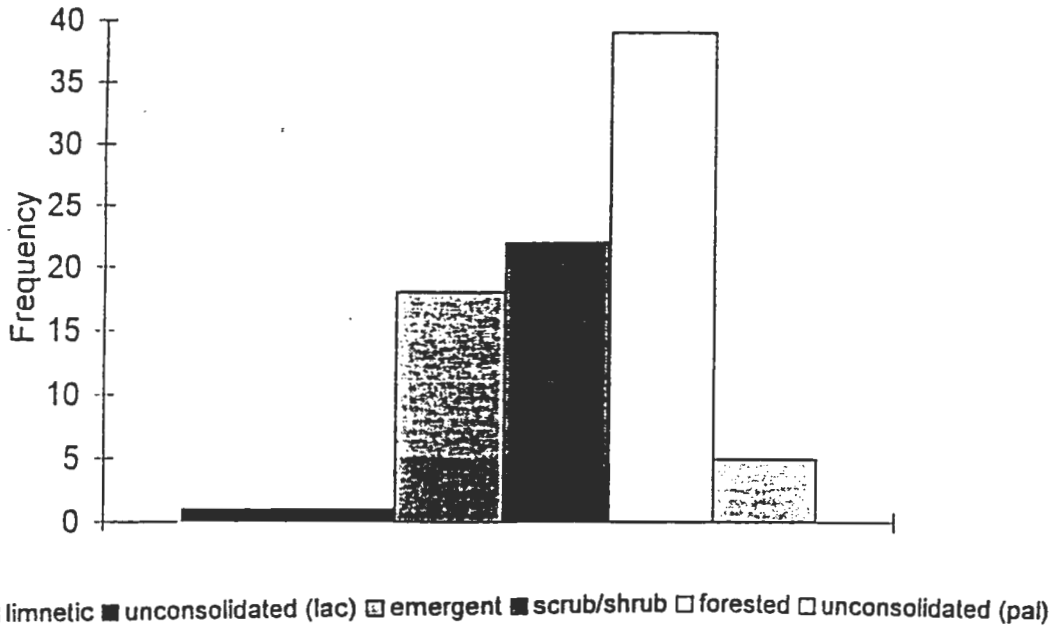


Figure 5. Percent frequency of wetland types on SEDA. Unconsolidated, scrub/shrub, emergent and forested wetland classes are represented.

1. Existing wetlands

Forty-nine wetlands equaling a total of 297 acres did not deviate from original NWI or SEDA maps. Wetlands of special note which were found to be consistent with NWI or SEDA maps were:

North of Ovid Road railroad yard. A palustrine forested area is perched within and south of the epsilon igloos. Soils are Romulus silty (hydric). This is an extensive varied wetland with interspersed upland habitat.

West of the North/South Baseline Road and the north side of east/west Gate Two road. This is exceptional open-water habitat, where two species of amphibians, american toad and spotted newt, were observed using it for breeding. The State of New York (NYS) is concerned with declining populations of amphibians due to the loss of habitat. Because of the scarcity of this habitat type, it should not be disturbed. Primary loss of these breeding areas occur when the ponds are connected to flowing water, or when fish are stocked.

Railroad between Charlie(C) and Delta(D) igloos. The forested palustrine wetland is Romulus silty clay loam and extends south to D-4(a hydric soil). If beaver dams continue to raise water levels, the wetland will increase. Presently, beaver tubes in place prevent flooding of roads.

The water treatment marsh. This is the largest mono-specific emergent wetland on SEDA. Cattails with increasing phragmites are the emergent species. No waterfowl broods were observed, possibly due to the stem density and lack of open-water. Because of the possible harmful effects from the effluent, this area should be monitored for sedimentation and soil and water quality. The northern end appears to be filling, the cause may be from decomposing vegetation sediment loading from the sewage treatment plant.

2. Reclassified wetlands

Thirty-nine wetlands equaling a total of 199 acres were classified differently than original NWI or SEDA maps indicated. Most of the differences in wetland type appear to be due to the low intensity Army use of many of these areas. This has allowed some to begin reverting to the hydrology present prior to farming and other ditching activities. A few appear to have been miss-classified when the original maps were created. Wetlands of special note, which were found to be different from NWI and SEDA maps, were:

The duck ponds - This is a man-made wetlands complex with a water control structure. Eleven acres of open water are present out of twenty-three acres total. This area is one of the most important on the post, due to its recreational use and habitat diversity. Many freshwater wetland habitat types are present. Among them are emergent, forested and shrub-scrub palustrine. The complex supports waterfowl, song and wading birds and mammals. In 1995, a pair of osprey built a platform at the complex and two young were hatched. Osprey are a NYS threatened species.

The northern end is filling in. Whether this is due to sedimentation or other causes is unknown and should be investigated. Management practices should protect and enhance these duck ponds.

The area along East Patrol Road and south of the duck ponds - This area is larger than indicated on the 1985 NWI map. Beaver activity is increasing this wetland to the south along the telephone line. While this area is becoming more inundated with water, the area north and south of Igloo Road #10 has less water. This could be in conjunction with the treatment plant activities.

East of buildings 608-612 and southwest of the USCG station - This palustrine wetland is the largest contiguous piece of the shrub/scrub type of habitat on post. The predominant soil type is Ilion (hydric) and Darien (inclusions). The surrounding open meadow habitat type plays an important role for northern harrier. This raptor is a NYS species of concern.

Numerous fire lanes disrupt the shrub/scrub vegetation in this area. The necessity of so many firelanes through the wetland should be reviewed. If these 'edges' were mowed

less frequently, they could provide wet herbaceous habitats for species such as woodcock, white-tail deer and song-bird. Timing of the mowing is crucial to not disturb any breeding birds. Further development and disturbance may warrant a specific soil delineation.

Indian Creek - The wetlands have been altered by beaver dams. This area is unique because it is the only one with Sloan silt loam soils (hydric) on post. The area is degraded by the overabundance of *phragmites* spp., a non-native which displaces many native wetland vegetation including *scirpus spp.* (bulrush) and *typhus* (cattails). The area has increased 50% in one summer season due to raised water levels from beaver dams. Increased water levels may limit the *phragmites,* however, it may be necessary to install a beaver tube to prevent road flooding and wash outs. This creek is the only one sizable enough to support warm-water sport fishes if the channel was open. SEDA goals will determine management option implemented.

North of epsilon igloos - This area is a complex of questionable forested wetlands. Principle anthropogenic changes of these wetlands are due to the ditching systems. Predominant soils are inclusion classes with some non-hydric and some hydric present. These wetlands are inaccessible, for the most part, due to brush and their juxtaposition between the delta igloos. Soil type is marginally hydric, and the water table is low except for areas which border a north south ditch and an intermittent stream bed. As it is, this area provides some upland habitat with a open under-story.

Swamp area north and south of West Romulus Road, and quadrant DF - An extensive palustrine forest south of Romulus Road and saturated soils north of Romulus Road are interspersed with upland. NWI maps did not identify this site. Post maps indicated the wetland location to be north of Romulus Road. Both Romulus (hydric) and Darien (inclusions) soils are abundant.

Beaver dam at Charlie(C)/Delta(D) railroad - Due to beaver activity, this forested palustrine has increased. The wetland is east and west of the straightened creek. Romulus silty clay loam (hydric) is east of the creek. The border is unclear. An intensive soil validation would help in deciding how much has been converted to wetlands. The beaver tubes are working to keep road flooding to a minimum.

North end of the post, and east of the housing quarters - This palustrine forested area has a few older facultative trees (maple and ash). Soils are Darien which can have inclusions if not well drained. Soil identification in combination with the above marginal conditions identified an existant wetland. It is smaller than indicated on the NWI map as a small elongated piece crosses the road.

Surrounding areas of Buildings 356 and 357 - Forested palustrine wetland follows the Ilion silty/clay loam soil(hydric) outlines and the palustrine shrub/scrub is in transition towards forest. Due to marginal drainage this wetland is increasing in area.

3. Unidentified wetlands

Some wetlands were not located as original NWI or SEDA maps indicated. Most of the 'unlocated' wetlands were smaller in size ($\leq$ 1 acre). Also, in place drainage systems do not retain the hydraulic qualities needed to support hydrophytes. Wetlands of special note which were found to be different from NWI and SEDA maps were:

Silver Creek, North of South Patrol Road - A shrub/scrub is mapped on the NWI map which would have indicated a unique suspended wetland at the southern end of the post. Hydric soil was not identified. Plants were mostly facultative in nature, not obligate. Soil maps show non-hydric conditions (Darien-Danby-Cazanova). The areas are circular in shape and mono-specific in grass species present, which would lend to misidentification from aerial vegetative maps.

North of Brady Road and South Patrol intersection - Forested palustrine, also indicated on NWI maps at the southern end of the post, has remnant red maples. It may still function as a water absorption area, though the road ditches divert any standing water outside of the immediate drainage area (straightened streambed). Soil maps show small amounts of Ilion soils present. The remaining soils are Darien which have inclusions and Darien-Danby-Cazanova.

B. Aquatic Habitat

The four streams selected for stream habitat assessments were Indian, Kendaia, Reeder and Silver Creeks. All of these streams are headwater streams and flows vary from perennial to intermittent. The average width for all streams was 4.5 m. The average depth for all streams was 13 cm; depths greater than 2 m occasionally occurred in culvert and beaver pools. Substrate habitat ranged from organic and silt/clay bottoms to bedrock. Gravel and silt/clay were the most predominant substrate type. Most of the substrate classified as bedrock was artificial, because it was cement under bridges.

A winter-kill was evident from spring shoreline observations of dead channel catfish, carp and largemouth bass fish carcasses at the duck ponds. This kill followed an extremely cold winter. Mortality could have been caused by freezing, or lack of oxygen. Temperature and dissolved oxygen were recorded throughout the day for three different days during the summer, in order to examine any temporal changes which could create undesirable conditions.

1. Water quality

Only water temperature was recorded for the streams, mechanical problems prevented stream pH and dissolved oxygen from being recorded. Summer temperatures for all streams had a mean of around 21° C. Table 1 shows the ranges in water temperature, dissolved oxygen and depth during the summer for the duck pond.

Table 1. Summary of the duck ponds summer water quality. Variables recorded were water temperature (wat°c), dissolved oxygen (mg_l) and depth(cm).

Variable	n	Mean	Std dev	Minimum	Maximum
WAT°C	9	24.5	1.32	22.5	26.5
MG_L	9	6.3	0.66	4.7	7.0
DEPTH	9	43	4	40	50

During July, water variables were as expected; dissolved oxygen was inversely related to depth and water temperature. In August, dissolved oxygen increased as daytime temperature rose up to levels of 7 mg/l, then declined to around 4 mg/l during the early morning hours when temperatures were lowest. These conditions may indicate that because of the eutrophic conditions of these ponds, algae and macrophytes may be driving the oxygen levels, not temperature. Oxygen would be released during the days from photosynthesis and used through respiration of plants during the night. In the winter, with an ice cover light for photosynthesis and wind to mix air, these conditions are intensified. Unless action is taken, these problems will continue to progress as the pond is gradually filled in with more organic material. The long-term solution is to stop the input of excess nutrients. An immediate, albeit temporary cure, would be to remove organic materials which use oxygen when decomposing. The removal of organic material would also increase the depth which could provide temperature refuges for fish in the summer and spatial refuges during the winter.

2. Stream habitat

Indian Creek was the widest and deepest, as a result of beaver activity causing flooding of the flood plain. Silver Creek is the narrowest with a minimal floodplain and cliffs bordering it. Reeder had the shallowest depths and flow due to at least two active beaver dams which minimized flow through its straightened ditch channel.

Indian Creek substrates are predominantly sand (50%) and clay/silt (15%) which settled out from the low flows of the beaver pools. Rubble and cobble make up most of the remaining substrate (15%). Kendaia Creek substrates are predominantly gravel (60%) and rubble (27%), with sand and bedrock making up the remainder (10%). Reeder Creek substrates are rubble (60%) and cobble (23%) with the remainder comprising of silt/clay (19%) and gravel (19%). Silver Creek substrates are natural bedrock (37%), gravel (30%) and boulders (30%) derived from the parent material.

Other instream habitat consisted of vegetation, hard cover and overhead shade. All streams but Reeder Creek had some amount of overhead shade. Reeder Creek runs

through the igloo area where mowing keeps the area open and free of taller shrubs and trees. Indian and Reeder Creeks had the most vegetative cover of emergent and submergent varieties. Flooding of shores by beaver dams support this type of cover. Slower water flows allow an increase in organic sediments. Hard cover provided by large boulders, fallen logs, root wads and undercut banks was present in Indian and Silver Creeks, and minimally in Kendaia. Table 2 gives percentages of these substrate and cover types (Figures 6 and 7).

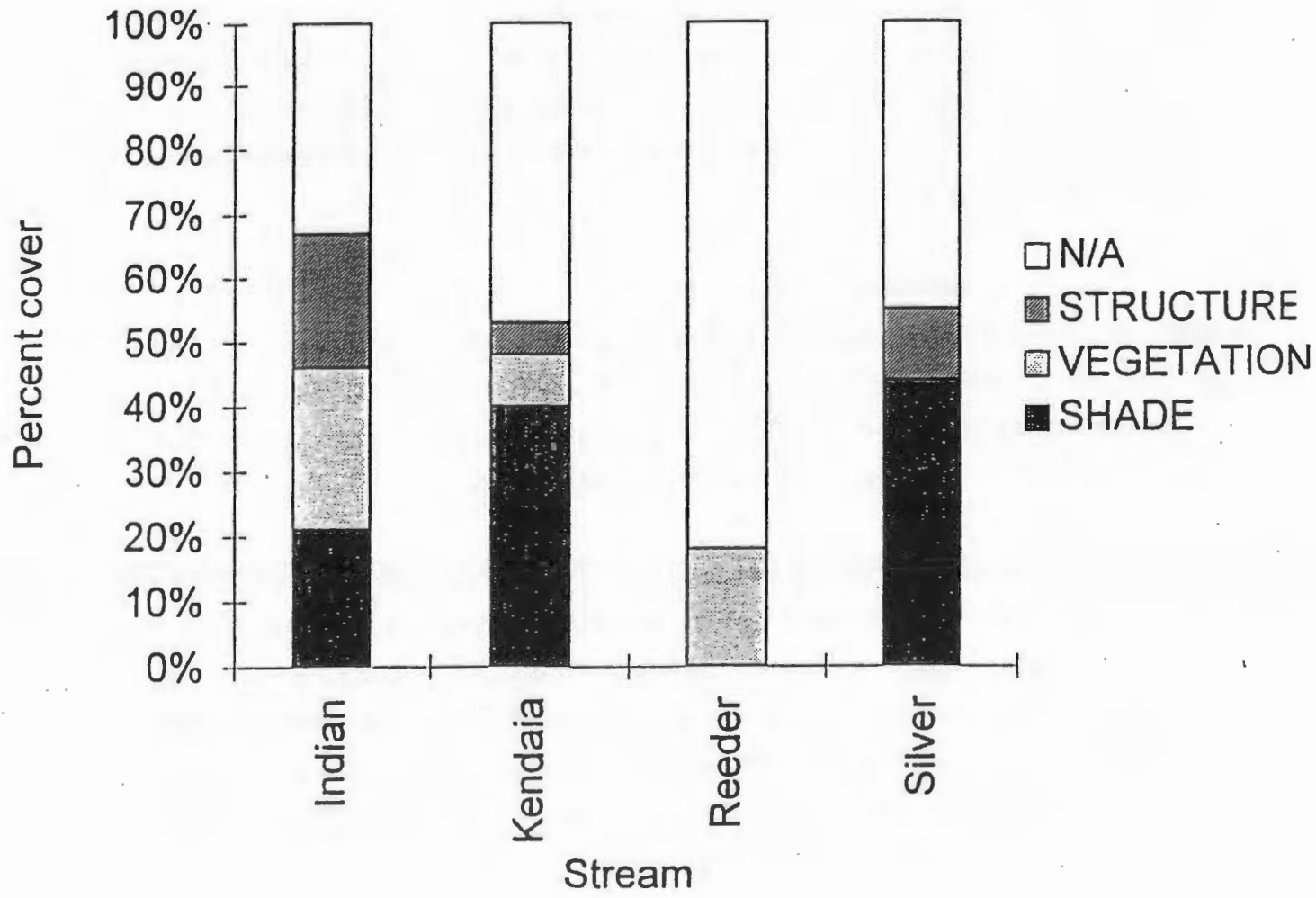


Figure 6. Comparison of percent cover of four SEDA streams. Shade, vegetation and hard cover for refugia are represented.

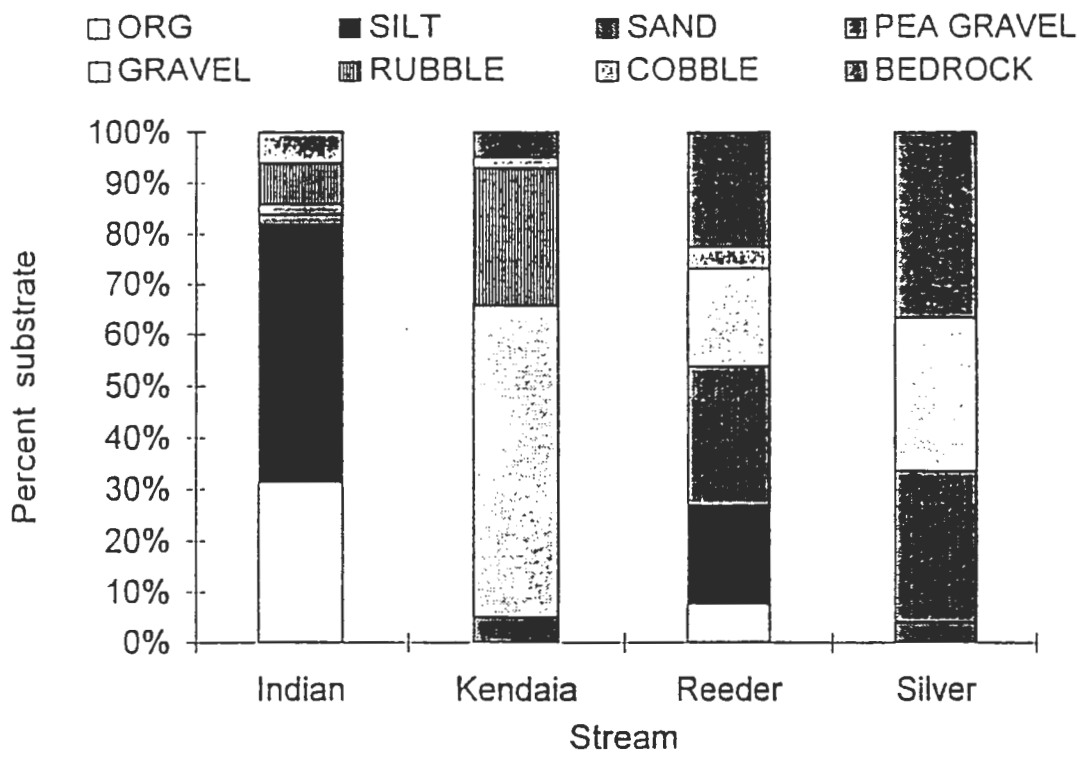


Figure 7. Comparison of percent substrate of four SEDA streams. Organic (org), silt/clay (sil), peagravel (peagrav), gravel (grav), rubble, cobble, bedrock and sand are represented.

Table 2. Summary of habitat and cover percentages by stream. Substrate types were Organic (ORG), silt/clay (SILT), sand (SAN), pea gravel (PEA), gravel (GRV), rubble (RUB), cobble (COB), and bedrock (BRK). Cover types recorded were overhead shade (SHD), submergent and emergent vegetation (VEG), and hard (HRD) cover in the form of large boulders, undercut banks, etc. n = number of sites measured.

NAME	n	% STREAM SUBSTRATE TYPE								% COVER		
		ORG	SILT	SAN	PEA	GRV	RUB	COB	BRK	SHD	VEG	HRD
Indian	48	0.31	0.50	0.02	0.02	0.00	0.08	0.06	0.00	0.21	0.25	0.21
Kendaia	60	0.00	0.00	0.00	0.05	0.60	0.27	0.02	0.05	0.40	0.08	0.05
Reeder	28	0.07	0.18	0.00	0.25	0.18	0.00	0.04	0.21	0.00	0.18	0.00
Silver	27	0.00	0.00	0.04	0.30	0.30	0.00	0.00	0.37	0.44	0.00	0.11

These streams have minimal potential to be managed for increased fishing opportunities due to limited spawning habitat (Figure 8) and free flowing water. Though Indian Creek has the most water and cover, its substrate of organic and silt is not supportive of the spawning needs of many game species. Kendaia Creek has all three types of cover and suitable substrates, but beaver dams have decreased flows. Both Reeder and Silver Creeks are prohibitive of self-sustaining sport fish populations because of poor cover and low flow or flash floods respectively. The primary value and function to these streams is to provide abundant riparian areas for forage fishes for avian and mammal predators, amphibians and other wildlife. Without supplemental fish and flow management a recreational fishery can not exist.

Fishery habitat in the duck ponds exists for largemouth bass, pumpkinseed, bluegill, common carp and others, and reproduction. The shoreline and bottom is silt/clay or sand, macrophytes are abundant and a submerged road provides a gravel substrate. Management activities for the duck ponds to create better cover, water temperature and dissolved oxygen levels would improve over-winter survival of desirable sport fish species.

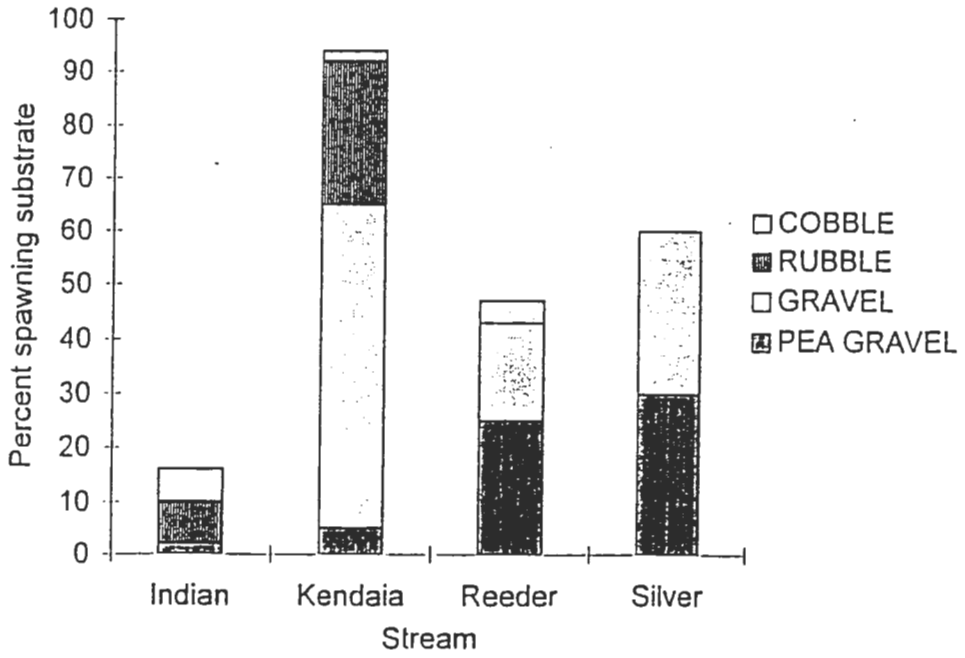


Figure 8. Relative spawning substrate for instream game fishes. Brook trout and smallmouth bass both require peagravel to cobble for redd and nest construction.

FISH AND WILDLIFE SPECIES

C. Wetland Associated Species

During surveys and field work conducted on SEDA land, 33 wetland associated species were observed; 6 amphibian species, 12 fish species, 1 reptile, 3 mammals and 11 bird species (Table 3). Of special interest are the amphibians which NYS has indentified as being of concern due to habitat loss. Osprey and northern harrier are listed as threatened for New York State. And the least bittern is a species of concern for the state.

Wood duck boxes were checked for wood duck occupancy, condition of box and location. Raccoon and opossum were inhabiting three of the boxes. Though historic records showed the boxes were used at high occupancy rates, they are all in a state of disrepair and no ducks were observed to be using the boxes. The boxes need to be relocated at further distances away from each other and have predator guards installed to reduce raccoon predation.

D. Duck Pond Gamefish Species

Fish species identified in the duck ponds included bluegill, common carp, golden shiner, largemouth bass and pumpkinseed. Common carp and largemouth bass were the most abundant and largest in size and weight. Common carp were in better condition than the largemouth bass. Common carp average weight to length ratios were almost three times that of largemouth bass. Largemouth bass were noticeably absent at larger sizes. This may be due to their higher oxygen requirements (Figure 9).

The quality and abundance of common carp versus largemouth bass may be explained by the habitat and water quality previously discussed. Largemouth bass need gravel for reproduction and this is present. Unfortunately, most of the duck pond bottom is unconsolidated. And, too many macrophytes prevent largemouth bass from feeding on smaller prey. Common carp need less oxygen and can withstand higher temperatures than largemouth bass. Their feeding and spawning habits may also perpetuate lower water quality by uprooting plants and disturbing sediments.

Table 3. **Species of amphibians, reptiles, fish, birds and mammals which are associated with wetlands and were identified on SEDA lands.**

amphibians

*american toad - *Bufo americanus*
*bull frog - *Rana catesbeiana*
*leopard frog - *Rana pipiens*
*red-spotted newt - *Notothalmus viridescens*
*spring peeper - *Hyla crucifer*
*wood frog - *Rana sylvatica*

fishes

*banded killifish - *Fundulus daphanus*
*black nose dace - *Rhinicthys atratulus*
*bluegill - *Lepomis macrochirus*
*channel catfish - *Ictalurus punctatus*
*common carp - *Cyprinus carpio*
*common shiner - *Notropis cornutus*
*creek chub - *Semolitus atromaculatus*
*largemouth bass - *Micropterus salmoides*
*long nose dace - *Rhinicthys cataractae*
*spotfin shiner - *Notropis spilopterus*
*white sucker - *Catostomus commersoni*
**cyprinids spp.*
**notropis sp.*
**pimphales sp.*

reptiles

*painted turtle - *Chrysemys picta*

mammals

*beaver - *Castor canadensis*
*muskrat - *Ondatra zibethicus*
*raccoon - *Procyon lotor*

birds

*American bittern - *Botaurus lentiginosus*
*belted kingfisher - *Megaceryle alcyon*
*black duck - *Anas rubripes*
*blue-winged teal duck - *Anas discors*
*bufflehead duck - *Bucephala albeola*
*Canada goose - *Branta canadensis*
*common merganser - *Mergus merganser*
*common snipe - *Capella gallinago*
*great blue heron - *Ardea herodias*
*green-winged teal - *Anas crecca*
*hooded merganser - *Lophodytes cucullatus*
*killdeer - *Charadrius vociferus*
*mallard - *Anas platyrhynchos*
*northern harrier - *Circus cyanus*
*osprey - *Pandion haliaetus*
*red-wing black bird - *Agelaius phoeniceus*
*ring necked duck - *Aythya collaris*
*shoveler duck - *Anas clypeata*
*swamp sparrow - *Melospiza georgiana*
*tree swallow - *Iridoprocne bicolor*
*American widgeon duck - *Anas americana*
*wood duck - *Aix sponsa*

E. Non-Wetlands Associated Species

During surveys and field work conducted on SEDA lands, 41 non-wetland species were observed; 1 reptile, 3 mammals and 37 bird species were found (Table 4). Of special concern are the eastern bluebird which is declining in numbers in New York State.

Only one bluebird nest was found when the bluebird boxes were checked. The condition of the boxes ranged from missing to good. There was a high incidence of the holes being chewed and enlarged. It is important to have the exact size needed for bluebird to prevent other birds from entering and to prevent predation.

F. Recreational Use

Active military, employees and families, or guests thereof are allowed access to SEDA for recreational purposes. NYSDEC fishing and hunting licenses are required. The duck ponds and wetland areas are utilized for waterfowl hunting and limited angling. Fishing take or angler satisfaction has not been determined. During the spring, there was consistent but low-level angling observed. Anecdotal responses from creels were "always one or two out here" and "fish were knocked out by winter-kill". Other wetlands on the post are minimally used for fishing.

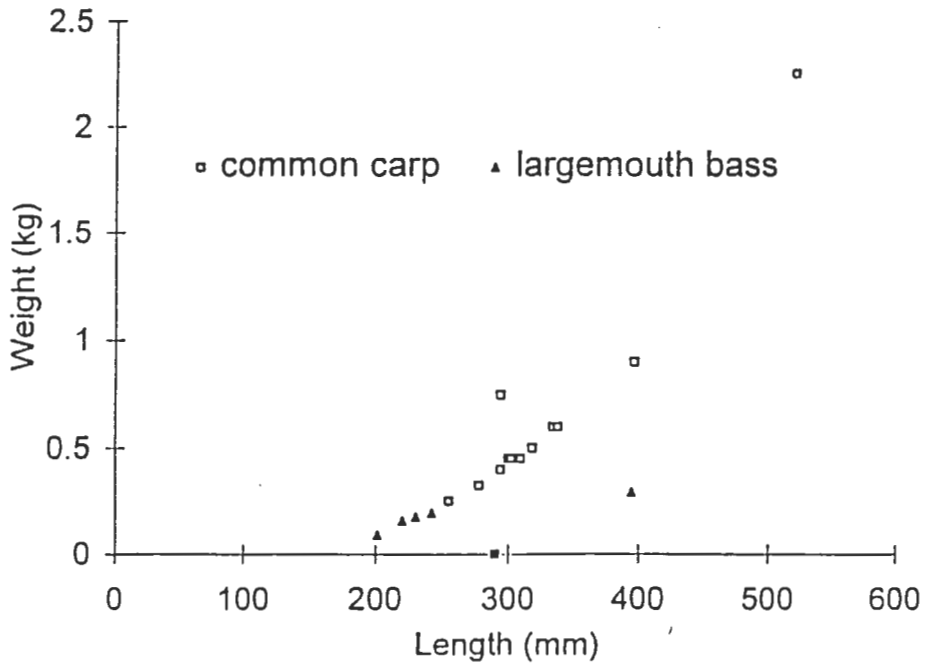


Figure 9. Length (mm) and weight (kg) frequencies of largemouth bass and common carp collected from SEDA duck ponds.

Table 4. Species of amphibians, reptiles, fish, birds and mammals identified on SEDA lands which are not usually associated with wetlands.

reptiles

garter snake - *Thamnophis spp.*

mammals

grey squirrel - *Sciurus carolinensis*
meadow vole - *Microtus pennsylvanicus*
ground hog - *Marmota monax*
white-tail deer - Ocoileus virginianus

birds

American robin -*Tardus migratorius*
barn swallow - *Hirundo rustica*
blue jay - *Cyanocitta cristata*
chipping sparrow - *Spizella passerina*
common flicker - *Colaptes auratus*
cowbird - *Melothrus ater*
eastern bluebird - *Sialia sialis*
eastern meadowlark - *Sturnella magna*
flycatcher spp-
great horned owl - *Bubo virginianus*
mourning dove - *Zenaida macruora*
pheasant - (ringneckedXsechaun hybrid)
redtail hawk - *Buteo jamaicensis*
ruby crowned kinglet - *Regulus calendula*
screech owl - *Strix varia*
European starling - *Turnus vulgaris*
turkey vultures - *Cathartes aura*
white-breasted nuthatch - *Sitta carolinensis*
yellow warbler - *Dendroica petechia*
American kestral - *Falco sparverius*
black-capped chickadee - *Parus atricapillus*
northern cardinal - *Cardinalis cardinalis*
common grackel - *Quiscalus quiscula*
common yellow throat - *Geothlypis trichas*
American crow - *Corvus brachyrhynchos*
eastern phoebe - *Sayornis phoebe*
field sparrow - *Spizella pusilla*
American goldfinch - *Carduelis tristis*
hermit thrush - *Catharus guttatus*
ovenbird - *Seiurus aurocapillus*
red-eyed vireo - *Vireo olivaceus*
ring neck pheasant - *Phasianus colchicus*
rufus-sided towee - *Pipilo erythrophthalmus*
song sparrow - *Melospiza melodia*
tufted titmouse - *Parus bicolor*
wild turkey - *Meleagris gallopavo*
wood thrush - *Hylocichla mustelina*

VII. DISCUSSION / MANAGEMENT RECOMMENDATIONS

This plan recommends management by each habitat complex while addressing fisheries and NAWMP concerns. The species include: yellow perch, smallmouth bass, largemouth bass, bullhead, catfish, crappie, sunfish, mallard duck, blue-winged teal duck, wood duck, black duck, widgeon duck, bufflehead duck, goldeneye duck, common merganser, Canada goose, and nongame migratory/wetland species. Requirements of select gamefish, NAWMP, and non-game migratory birds are presented in Appendix 1. The recommendations are actions which will allow SEDA to manage for balanced communities and human recreation. If SEDA wishes an outside source such as the Service to implement any of these management activities, a separate contract and work plan will be developed.

A. Manage duck ponds for improved reproduction, growth and migration areas for resident fish, osprey, waterfowl, and other wildlife through reduction of eutrophication symptoms and habitat enhancement. The duck ponds are shallow man-made impoundments which experience summer algae blooms, oxygen depletion over the winter or summer, and an overabundance of macrophytes due to eutrophication. Low oxygen levels can stress fish and cause fish kills. Algae blooms decrease oxygen and are not aesthetic. Macrophyte overabundance may create stunting of forage fishes because the larger predators are unable to reach them and the available food is partitioned out among more fish. Management options are reducing nutrient loading and decreasing light reaching the bottom, which will also aid in managing macrophytes. It is possible to manipulate oxygen levels by aeration through mechanical means, decreasing nutrient loading and thus biological oxygen demand (BOD), and decreasing temperatures so that more oxygen is dissolved. To achieve this bio-manipulation, dilution/flushing, manual removal, water shade, lake protection and chemicals have been used.

For a permanent solution, the source of these nutrients must be determined and corrected. It is possible that the overload is from the sewage treatment. (See following recommendation).

To provide immediate benefits for both the avian and fish communities, the pond would benefit from excavation. Any renovations should be accomplished before the osprey return to nest in the spring. A deeper hole near the water control structure would allow for deeper, cooler waters which should reduce both summer and winter oxygen stresses on fish. The hole should

be at least 2 m in depth and 100 square meters in surface area, the organic fill could be spread over the meadow. Increasing overhanging vegetation at the shoreline would add cover habitat. Increased survival will result in increased diet items for the osprey. During an extended drawdown for dredging, the soil will be oxygenated which increases decomposition of the organic layer. Attention to timing and duration of these activities is needed to minimize affects on the benthic layer. An earlier schedule will force fish to pick deeper areas so that nests or fry will not be desiccated. After dredging is completed, stocking of appropriate fish communities will be necessary. For this area, suggested species include centrarchids, and percids.

Additional habitat for nesting and feeding could be attained by providing dense nesting cover and feeding areas for ground nesting birds adjacent to the ponds. Dense nesting cover consists of tall stiff-stemmed grasses. These areas can be encouraged by seeding with grasses such as switch-grass and discing, or burning the low successional meadows on 2-3 year rotations. This rotation prevents woody plants from invading the herbaceous cover.

Beaver activity at the duck pond should be left alone. At the southern area of the duck ponds, they are providing added diversity for this wetland habitat. Preventative plans could be developed to install beaver tubes if flooding of the roads becomes a problem.

B. Evaluate the effect of the water treatment marsh on fish and wildlife reproduction by monitoring water quality, soil contaminants and contaminant levels in resident wildlife. The sewage treatment marsh is linked by overland flow to the duck ponds. It is used for filtration of secondary sewage. The marsh may not be effective as the tertiary treatment if nutrient overload is occurring at the duck ponds. Water quality of contaminants and sediment output should be monitored. Analysis for chemical levels in amphibian and waterfowl eggs and ducklings may be warranted if contaminant levels are not satisfactory, and the possibility of fish and wildlife health impairments were evident by elevated levels of external deformities. Because of their mobility, an analysis of adult waterfowl would not determine the source of contamination.

C. Protect habitat utilized as amphibian breeding areas. Protection from disturbance and conservation is necessary because of the scarcity of this habitat type. There is opportunity to have additional areas for amphibian refugia. A shallow wetland (< 1 m deep 'pond') south of

the 'burn off area' has spotted newt and american toad breeding in large numbers. Because of its shallow depth, it warms quickly in early spring (April-May) when amphibians are breeding. The shallow pond is devoid of fish which prey on eggs, and it has a shallow ditch leading to a forested area which provides cover for adult amphibians moving to their terrestrial habitat. This area should be undisturbed and human activity minimized during the spring. This area should be protected from herbicide and pesticide spraying and the stormwater runoff. A possible interpretive sign could be designed to illustrate the 'textbook' amphibian wetland.

There are 2-3 other ponds located throughout the post which serve multiple purposes due to juxtaposition with larger wetlands. They provide cover for breeding pairs of wood duck, feeding for wading birds, possible amphibian reproduction and/or fishing opportunities. The presence of fish should be investigated. Where fish are not present, they should not be introduced in order to promote amphibian breeding success.

The area south of epsilon igloos (mostly restricted to the east of Silver Creek) is a large complex of wetland and upland habitat. With this habitat diversity, quantity of plant and wildlife species also increase. Numerous vernal pools are available for amphibian and other wildlife benefits. Vernal pools are unique and an increasingly rare type of wetlands. This large upland/wetland mix area is unique on the post. It is important to preserve these area types because many have been filled.

D. Management for NAWP goals of increased waterfowl and nongame migratory birds.

Waterfowl populations have declined because wetlands have been degraded by agriculture, urban development, industry, pollution, and some water control forestry practices. The decrease in habitat caused by the combination of stressors has been determined as the major cause of declining waterfowl populations by NAWMP. Decline of nongame migratory birds is also associated with loss of nesting, migration and wintering habitat.

SEDA, because of its diverse wetlands, has valuable wetland and upland habitat for both breeding and migrating populations. Many waterfowl species may be encouraged by maintenance of the wetlands and surrounding grasslands. Often beaver improve habitat for nesting, feeding and migration by providing diverse wetland habitat types. The post may want to supplement areas by planting native warm season grasses mixed with clover. Specific

formed green tree palustrine areas provide ideal habitat for black duck nesting, wading bird nesting and feeding. If a supplemented fishery is desired, water quality and available flow will need to be improved. Habitat in terms of cover and substrate is adequate to optimal. See Appendix 1 for appropriate species to introduce if post's outdoors recreation management objectives concur.

I. Develop an advance protocol plan for control of infrastructure flooding by beaver activity, through integrated beaver tubes, beaver deterrents and possible trapping. Wetlands have increased on SEDA land due to beaver activity; however, these increased wetlands benefit fish and wildlife species differently. Though most wildlife diversity is increased, open stream fish habitat is compromised. The beaver can benefit many wildlife species' habitats by creating the diversity of wetlands. The long-term wildlife use decreases after a pond becomes abandoned for more than 4-5 years. Both A/B and C/D beaver dams are in advanced stages and beavers will probably move out of the area. At this point, to actively retain waterfowl productivity, a complete drawdown should be considered to aerate the soils and encourage new growth of emergent vegetation. Old beaver ponds may be left and possibly used for fishing opportunity. The dams will, however, eventually breach if abandoned. The Indian Creek beaver dam is increasing the marsh and flooded forest area, but reduces stream flow and at times covers the road. Unless numbers increase to nuisance levels, it is recommended that the beaver be managed by low-intensity maintenance. It is the intention to <u>not</u> manage beavers, unless their activities flood roads and impair other post operations.

J. Develop an advance protocol plan for control of exotic plant invaders, especially for purple loosestrife. Two major invasive exotic wetland plant species which displaces native species are *phragmites* and purple loosestrife. Their ability to displace native plant species is detrimental because diversity is lost at all levels. Phragmites was the only species observed on post, but purple loosestrife is abundant in the county. The best management approach is prevention. Identification of this plant should be taught to managers who should immediately remove it on a plant by plant basis. If this plant encroaches on a wetland, more involved actions will be necessary in the future. These will include water-level manipulation, herbicides, and possible applications of an insect control.

K. Monitor and evaluate the success of management activities. After the completion of initial bird and aquatic surveys, populations should be monitored to assess the progress of management objectives: enhancing fishing opportunities and increasing breeding populations of waterfowl and non-migratory birds through habitat improvements and protection. It will be necessary to compare wetlands succession, water quality, fisheries, amphibian, waterfowl/ non-game species on 2-5 year rotations. Comparisons at the population level should include: the abundance and trends of fishes -game and forage, black duck, wood duck, bluebird, and amphibian populations.

VIII. UNIT WORK SUMMARY

A. Formulate Baseline

HABITAT

- Evaluate status of wetlands - **completed Spring/Summer 1994.**
- Evaluate and delineate specific wetlands when land use plans change.

SPECIES

- Conduct stream and duck pond fisheries assessment for game and non-game species - **completed Spring/Summer 1994.**
- Conduct 5-8 dawn and dusk bird counts in diverse habitat - **completed Spring 1994.**
- Conduct a threatened/endangered species survey - **planned for 1996.**
- Conduct a complete herpetological inventory due to NYSDEC concern of declining amphibian populations - **planned as part of t/e survey 1996.**
- Map and identify all SEDA wood duck nesting boxes - **inventoried Summer 1994.**
- Map and identify all SEDA eastern blue bird nesting boxes - **inventoried Summer 1994.**
- Other - Update ongoing upland bird and mammal species lists during duck and other migrating bird censuses.
- Additional possibilities include an invertebrate survey to determine available fish and waterfowl forage. A qualitative analysis will be less expensive in terms of time and effort.

B. Implement According to Objectives

HABITAT

- Evaluate the status of the post's wetlands inventory every 5 to 10 years.
- Conduct an assessment of source of nutrients loading, possible sewage treatment wastewater and remedy sources.
- Drain or dredge duck pond - oxygenate soils and increase depth, decrease light.
  - → Plan/design channel and islands.
  - → Permitting process through Army Corps of Engineers and NYSDEC.
  - → Drawdown and dredge channel and deep holes.
  - → Seed islands and meadows to the northwest with native grasses. May need a 3-5 year mowing/burn/discing schedule to keep at a low succession stage.
  - → Fill ponds and restock with desired game fishes.
  - → Minimize disturbances during migration and nesting periods (April - Oct).

SPECIES

- Conduct annual migration surveys once a week from March 25 - April 30, and September 26 - October 31, to monitor waterfowl use.
- Maintain wood duck boxes annually (fall to early spring) to nesting. Winter may be optimal because boxes can be accessed on ice.
  - → Install predator guards under all nest boxes to reduce predation attempts.
  - → Record data on nest box variables which may affect nest box use. This will allow SEDA to determine which are under-utilized or where additional ones should be erected.
  - → Check and maintain all boxes once a year, at a minimum, after nesting (fall - early spring). Hatching information may be collected simultaneously with cleaning and maintenance.
- Maintain and clean eastern blue bird nest boxes, annually, in late summer or fall.
  - → Record data on nest box variables which may affect nest box use. This will allow SEDA to determine which are under-utilized or where additional ones should be erected.
  - → Check and maintain all boxes once a year, at a minimum, after nesting (fall - early spring). Hatching information may be collected simultaneously with cleaning and maintenance.
- Assess annual population dynamics of duck pond fish species. Knowing growth, reproduction and mortality rates will aid in determining management.
- Investigate possible sites for installation of interpretive trails.
- Plan and construct interpretive stations (e.g. toad pond and duck pond complex).
- Install drop box for creel surveys at duck ponds.
- Assess species diversity of streams on a 3-5 year rotation.
- Monitor stream populations annually, if supplemental recreational fisheries are to be developed.
- Evaluate lane cutting in northern harrier habitat and possibly reduce fire lanes. Reduce all disturbances during nesting periods of northern harrier, bittern species (least and american).
- Beaver management
  - → Survey beaver sites yearly, in the fall. Distinguish between active and non-active sites to obtain an accurate rate and distribution of colonies.

- → Maintain current beaver tubes.
- → Use water level control tubes to control undesirable water levels.
- → Work cooperatively with NYSDEC and the Service to establish cost of nuisance beaver and benefits of habitat improved.
- → Consider trapping as it is the only currently accepted method of removing surplus beaver. NYSDEC regulations apply to all trappers and trapping organizations.
- → Develop a beaver plan of action for Silver and possibly Reeder Creeks.

▸ Develop an exotic plant species management plan.

C. Monitor/evaluate success

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X. APPENDICES

A. Limiting Factors for Select Fish and Wildlife Species

1. Fish species requirements

Brook trout, *Salvelinus fontinalis,* have the most restrictive habitat needs of the fishes discussed here. Optimal streams are clear, cold, with a 1:1 pool riffle ration, with well vegetated stream banks and abundant cover (instream cover $\geq$ 15% and 50-75% mid-day shade). Optimal lacusterine habitat is clear, cold, and oligotrophic. They will spawn in streams or ponds with groundwater upwellings at 4.5-10° C. Suitable pHs are 3.5-9.8 and dissolved oxygens should be at least 50% saturation at 12-15° C.

Channel catfish, *Ictalurus punctatus,* in lacusterine systems prefer warm temperatures, high productivity, and abundant cover. As they mature, their diet progresses from plankton, insects, detritus, crayfish to fish. Boulders or debris in deep-water for over-winter cover is needed. Optimal spawning temperature is 21° C. Growth temperatures are 26-29° C. Dissolved oxygen below 5 mg/l will stress catfish. Fry use sand and mud edges for cover, <u>not</u> macrophytes because of centrarchid predation.

Yellow perch, *Perca flavescens,* are popular for eating and are often used as a forage species as well as angling. Their preferred spawning habitat is in deeper tributaries, yet they will spawn over deep springs. Temperature ranges should be 7-13° C. Habitat requirements are moderate amounts of macrophytes (>20% of area) for cover and spawning habitat in clear waters. Vegetation (1.3.7 m deep) in slow moving water (<5 cm/s) is used for spawning habitat. Gravel will be used if vegetation is unavailable. Winter temperatures must be a minimum of 10° C for maturation. Rising waters in the summer give more inundated terrestrial vegetation thus increasing young-of-the-year survival. Mid-summer temperatures of 17-25° C are optimum. Water quality minimums are 5 mg/L O_2 and pH's of 6.5-8.5 .

Largemouth bass, *Micropterus salmoides*, are popular as a tournament fish in impoundments. They mature at 3-4 years. Spawning temperatures are 16-22° C . Anything but silt will be used by largemouth bass yet gravel is preferred at depths .3 to .9 m. Lakes that are with 25% shallow vegetation (less than 6 m and 25% submergent) and have holes 30-40% deeper than 6 m for over-wintering are prime habitat. Greater than 40-60% cover of the pools reduces the prey availability. Water quality preferences are pHs of 5-10.

White crappie, *Pomoxis annularis*, mature in 1-3 years and do best in lakes or streams greater than 2.02 ha. Spawning temperatures range from 16-20° C. Males guard nests made on clay, gravel or sand near filamentous algae or inundated habitat/vegetation. Winter and summer requirements are similar to largemouth bass. Mid-summer temperatures of 17-30° C are optimum. Water quality minimums are 5 mg/l dissolved oxygen (O_2) and pHs should be around neutral (6.5-8.5). White crappie are more tolerant of turbid waters than black crappie.

Smallmouth bass, *Micropterus dolomieu*, have the best populations in mesotrophic riverine systems. Adults reach spawning size in 3+ years (~20-56 cm). They will adapt to reservoirs and lakes. They prefer cooler temperatures than the largemouth bass for spawning; the temperatures should be around 16° C. Spawning males guard nests on a substrate of gravel beds with slow moving water, usually located near a velocity refuge/cover large boulder or log. Mid-summer temperatures of 25° C are optimum. Habitat/vegetation requirements for young-of-the-year include macrophytes or cobble for protective cover. Water quality should be 6 ppm O_2 and pH of 7.9-8.1.

Black bullhead, *Ictalurus melas*, reach desirable angling sizes but can become stunted because of density dependent factors. Then they are utilized mostly as forage for wading birds. Spawning temperatures are 20° C. Suitable habitat includes weedy areas with 50% fines and depths of 0.5-1.5 m. They especially frequent backwaters with $\geq$ 20 cover. In lakes more cover ($\geq$ 25% littoral areas) is necessary. Clear waters increase their growth rates but muddy water increases their survival. Bullhead are the most tolerant of poorer water quality levels; O_2 have been recorded as low as 3.0 mg/L in 18° C, and pH's may range from 3.4-7.7 without severe mortality occurring.

Bluegill, *Lepomis macrochirus*, mature in 1-2 years. These fish are popular with young anglers but are utilized mostly as a forage fish. Spawning temperatures are 17-31° C. They survive in a range of temperatures (10-35° C), but the optimum range is optimal 22-27° C. Habitat/vegetation requirements are $\geq$ 20% of littoral zone in a lake with cover in form of habitat/vegetation requirements, logs, and brush. Stunting can occur with excessive cover when the bluegill is not vulnerable to predators. Substrate may be anything, but prefer sand or fine gravel. Water quality preferences are pHs of 6-8.5.

2. Waterfowl requirements

The wood duck, *Aix sponsa*, prefers red maple, american elm, american sycamore or american beech for natural cavity nesting. Human-made nesting boxes are also good for encouraging these ducks to reproduce. Height of nests may be up to 18.3 m. At least a 0.2 km buffer around all wetlands without logging is needed so that ducklings have cover to reach the water. Food items include coleoptera and diptera water shield.

The black duck's, *Anas rubripes,* optimal habitat for nests are flooded green timber areas. They nest on the ground usually at the water's edge often near a break in vegetation. Nest baskets are not recommended because of the high mallard populations which may hybridize. A 50:50 mix of open/emergent and shrub/scrub wetlands are recommended for habitat. Preferred food items include mollusca and mayflies, odonata, isopods, sedge, spike rush, pond lily, burr reed and sedge arrow head.

The common merganser, *Mergus merganser*, nests near relatively cool, clear medium gradient streams. They need good visibility to locate prey and nest in cavities or nest boxes.

The blue-winged teal, *Anas discors*, need upland fields to reproduce similar to northern harrier feeding grounds. They nest in meadows, pastures, dry sedge, hayfields, or along the edges of paths, roads or railroad tracks under a concealing canopy of vegetation (20-61 cm). Location is usually within 91.4 m of water. Food items include gastropoda and spike rush.

Management for the mallard duck, *Anas playrhynchos,* is not recommended. The NAWMP doesn't encourage management for mallard in New York because of the species' propensity to hybridize with black duck.

The American widgeon, *Anas americana*, is not usually associated with small ponds or temporary ponds. Larger bodies of water with abundant submerged vegetation and open shorelines are preferred.

The Common goldeneye, *Bucephala clangula*, is not known to breed outside of the Adirondacks or Lake Champlain regions. Flooded woodlands and beaver ponds with northern hardwoods adjacent to large marshes are preferred. Cavities 5.5-6.1 m above land or 1.5 m above water are used.

3. Non-Game Migratory Birds

The American bittern, *Botaurus lentiginosus*, have a diet of mostly amphibians. Nests are typically in wet marshes but can be on dry land. Materials used may include cattail, cordgrass, bulrush or sedge. They prefer to nest and feed in dense stands of cattails and bulrushes (10-30/cm) adjacent to open water. Shrub-scrub and woods also provide visual barriers.

The least bittern, *Ixobrychus exilis,* is classified as a species of concern by the state of New York. Their requirements are similar to the American bittern. Because they prefer more inconspicuous locations, larger areas of undisturbed marshes are desired.

Northern harrier, *Circus cyanus*, are threatened in the state of New York. They require open habitat, fallow fields of wet meadows, and shrub uplands for feeding and cover. Hayfields and grasslands are utilized for nesting.

Osprey, *Pandion haliaetus,* are threatened in New York. They feed primarily on fish. They need large snags or platforms. Habitat is usually large areas of undeveloped land for their nests. These raptors utilize manmade platforms when suitable snags are unavailable.

The eastern bluebird, *Sisalia sialis,* is a species of concern in New York State. It prefers habitats of open woodlands and meadows. Edge habitat is important. Farmlands and orchards are often areas utilized for nesting. They nest in cavities and boxes. Care must be taken in design to prevent starling and house sparrow use which often displace them. Diet items include invertebrates and small fruits.

4. Other Mammals and/or Non-Wetland Species

Beaver, *Castor canadensis*, do a good job of enhancing their own environments. Areas of young saplings which may be flooded with dam construction are chosen and are good habitat for waterfowl and wading birds because of their high productivity of macro-invertebrates and amphibians.

Muskrat, *Ondatra zibethicus,* management should be similar to beaver. Unless a nuisance occurs, do not actively manage their populations. Their numbers will naturally fluctuate. Feeding and lodge building activities can create openings in emergent wetlands for waterfowl and wading bird use.

B. Migration Data Sheet

Date:
Observer:

SPECIES	TRANSECTS								TOTAL
	1	2	3	4	5	6	7	8	

C. Nest Box Data Sheet

Box: Date erected:
Location: Direction:
Tree species: Height:

Wetland habitat (cover > 30% wetland)

System: lacusterine riverine Class: open water Aquatic bed
palusterine other___ emergent scrub-shrub
Beaver influence?_____ forested other_____

Location of box attachment: shoreline Overwater inland other_____

General comments:_____
_____
_____

D. Waterfowl Brood Survey Data Sheet

Box number: Location:

Date checked	Comments

E. Waterfowl Brood Survey Data Sheet

Observers: Date:
Plot number: Start time:
Survey method:
Survey type: initial follow-up End time:
Weather conditions: Water conditions: High low normal
Plot type: wetland aquatic upland meadow forest
***do not include obvious migrant individuals

	Mallard	Black Duck	Hybrid/* Mixed Pair	Wood Duck	Canada Goose	Other (Name)	TOTAL
Pairs							
Pairs + Male							
Lone Male							
2 Males							
3 Males							
4 Males							
Lone** Female							
Other # Groups							
TOTAL SEEN							

* indicate drake and hen species for pairs
** indicate if hen is with a brood
***indicate number of birds in each group

F. Fishery Population Assessment Data Sheet

Observers: Date: Weather:
Air temp: Ph: Do: Water temp:
Waterbody: Location:
Site: Collection method/effort:

Species	Length	Weight	Mark	Recapture	Notes:

G. Stream Habitat Data Survey Form

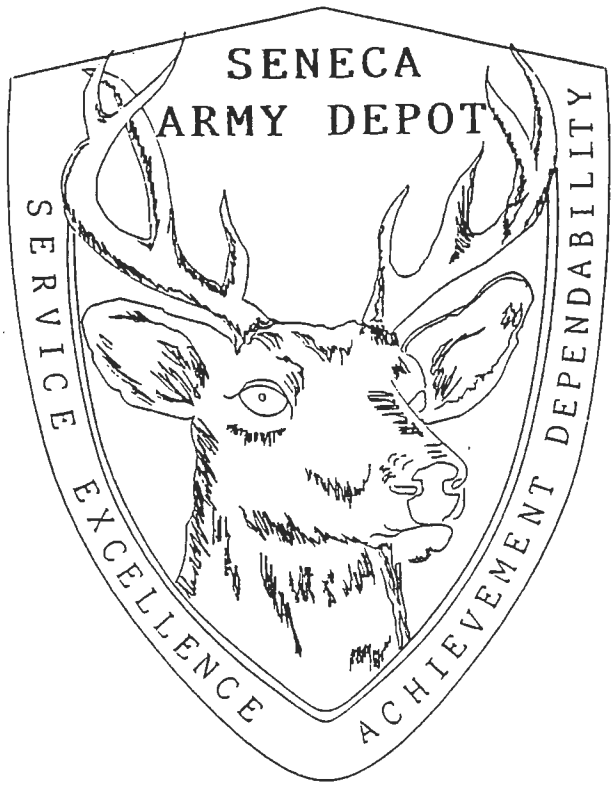
Observers: Weather: Date: Time:
Air temp: Water temp: pH: DO:
Comments:

trans point	width	depth	substr	cover	cover %	comments

APPENDIX

B

Rare Species Survey
Seneca Army Depot Activity
Romulus, New York



September 1996

Prepared by:
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Fish and Wildlife Service
Lower Great Lakes Fishery Resources Office
Amherst, New York

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

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.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

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.

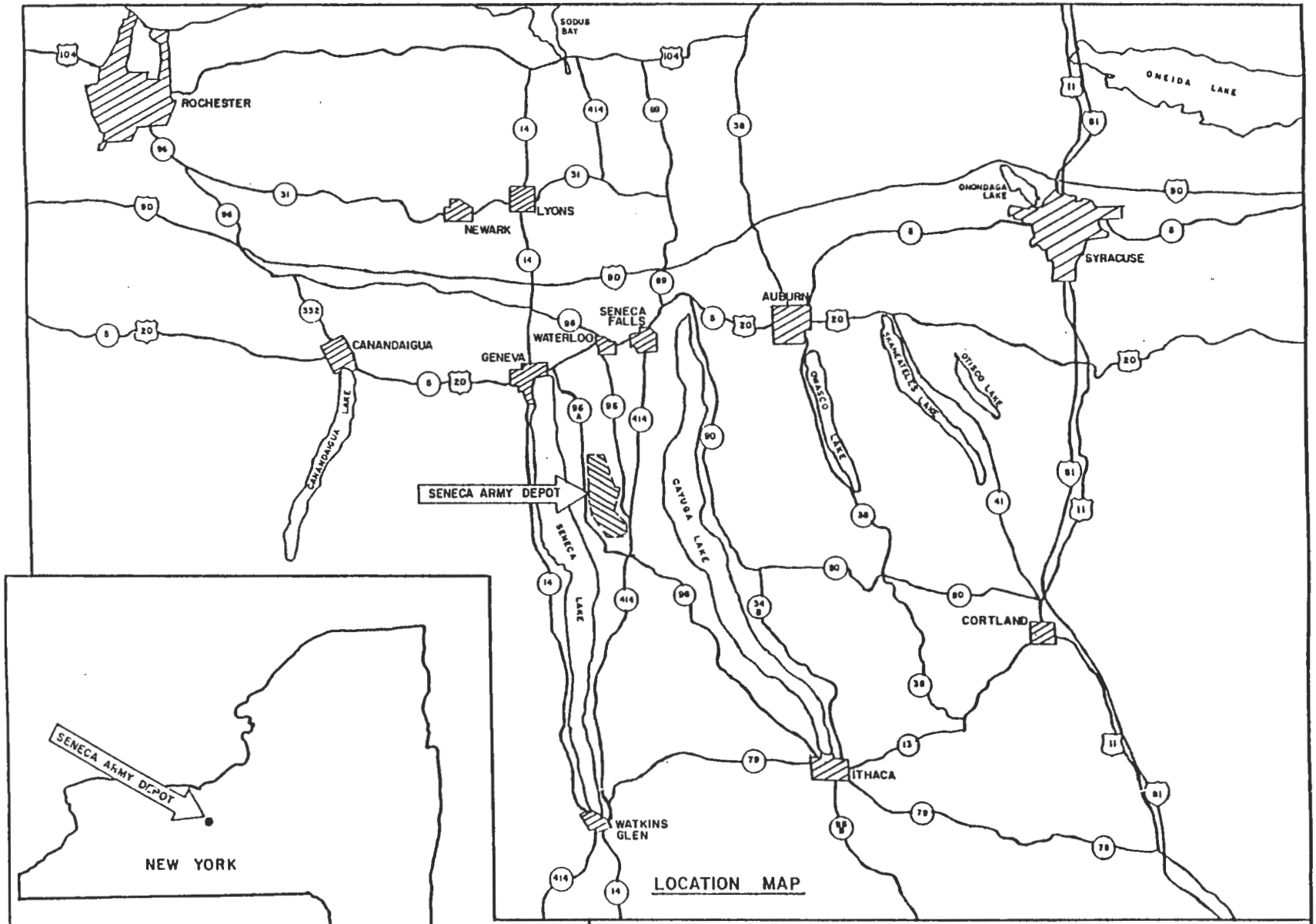
This report describes the results of field surveys that were conducted to determine the presence or absence of rare species and their habitats at SEDA so that future management and development activities on the facility will avoid or minimize adverse impacts to those species. In addition to identifying 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 (SEE PAGE 39).

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.

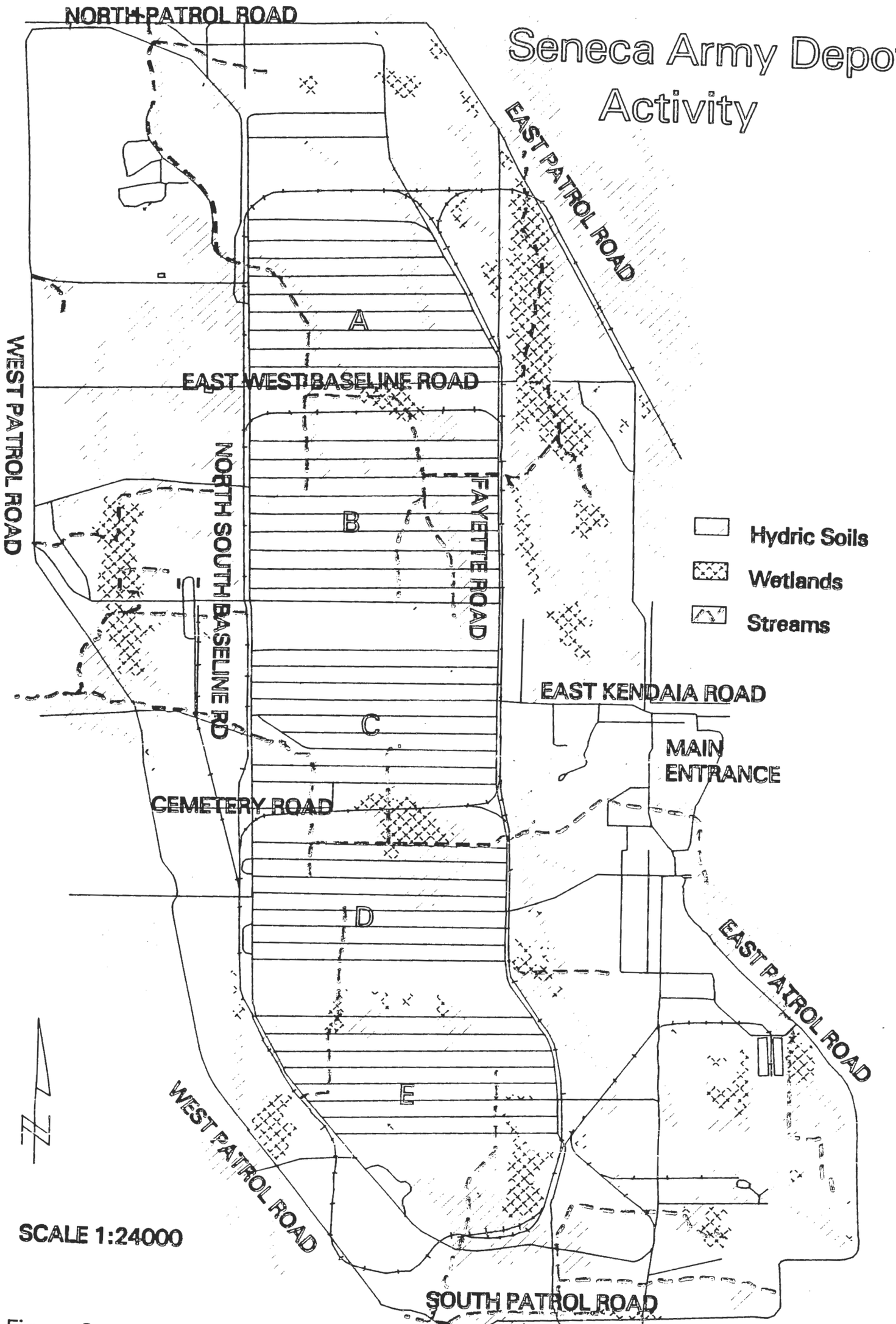


Figure 2. - SEDA wetlands map.

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

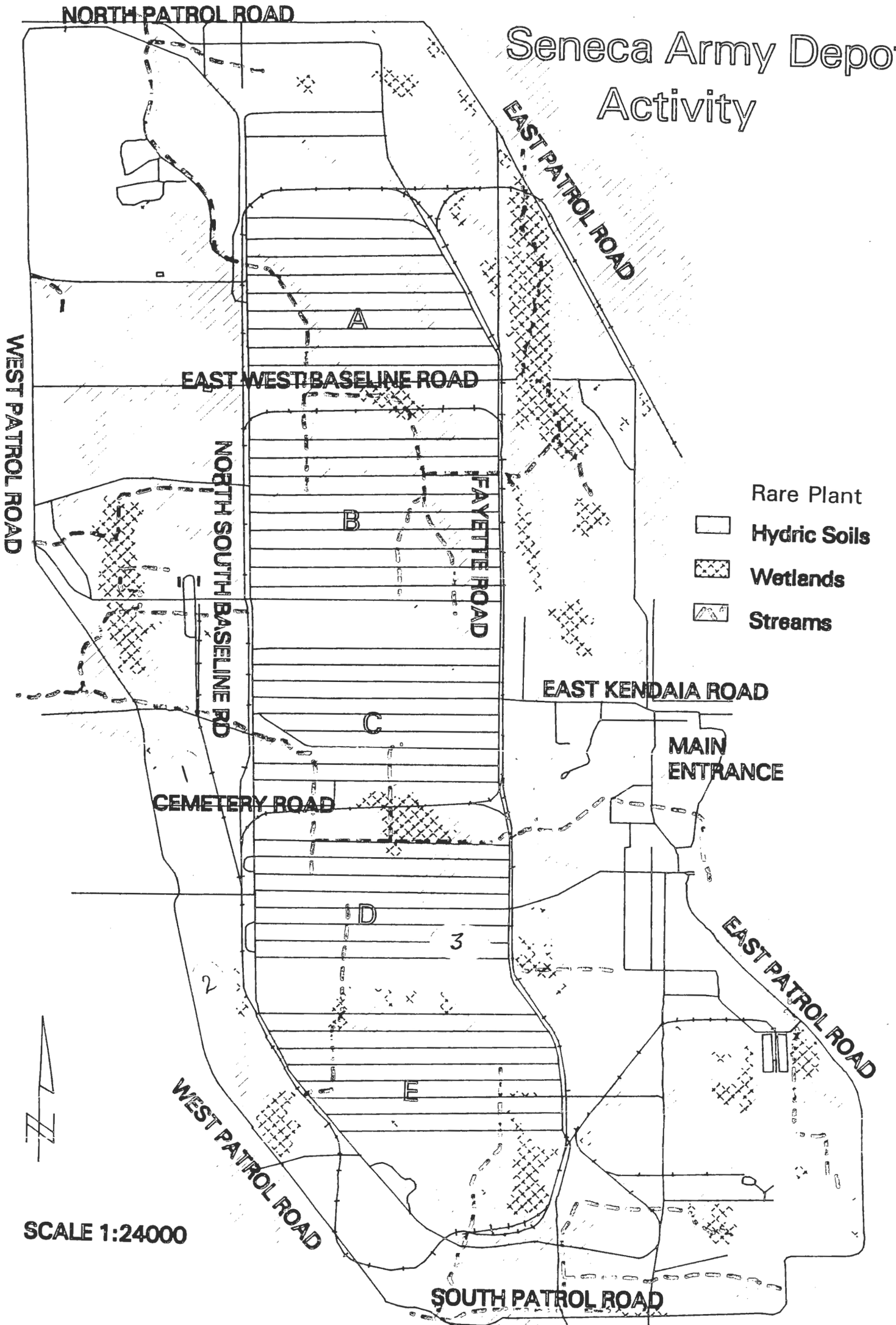


Figure 3. - Locations of rare plants found at SEDA. (#1) Aster schreberi - large leaf aster, (#2) Calamagrost stricta var. inexpansa-northern reedgrass , (#3) Geum virginianum-rough avans

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.

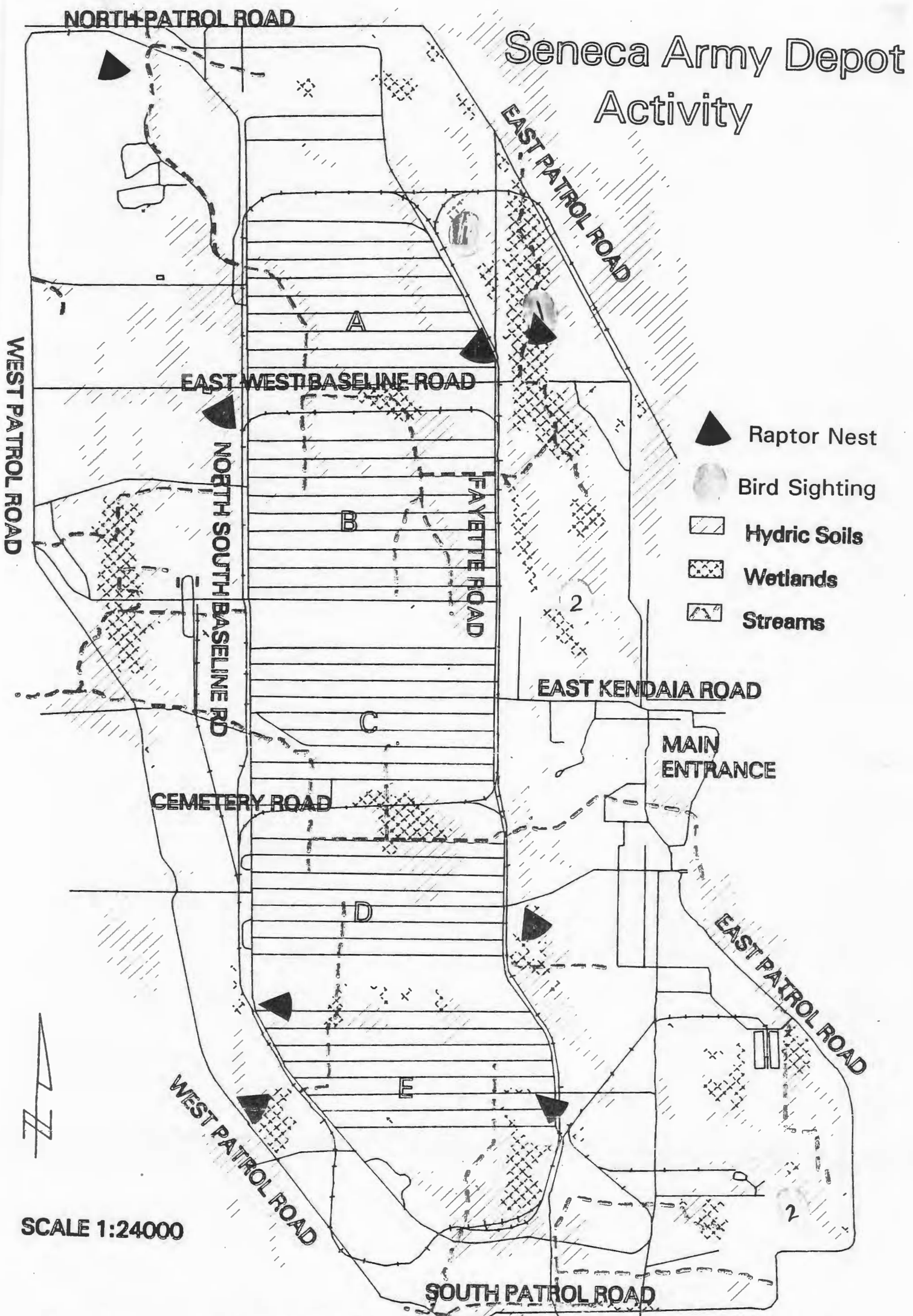


Figure 4. - Locations of rare bird sightings and raptor nests found at SEDA : (#1) osprey (#2) northern harrier

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 specie 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.

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*