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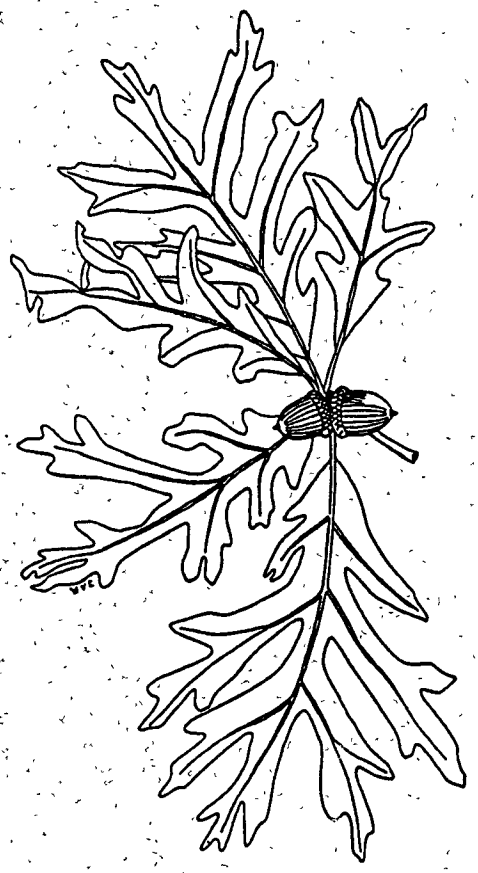
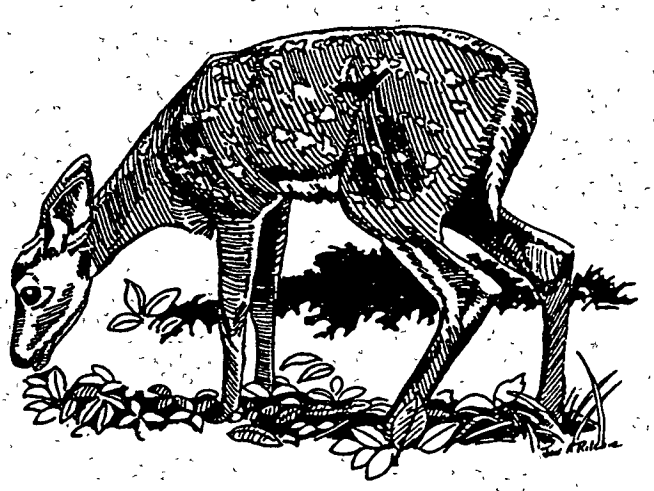
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK.

NATURAL RESOURCES MANAGEMENT PLAN

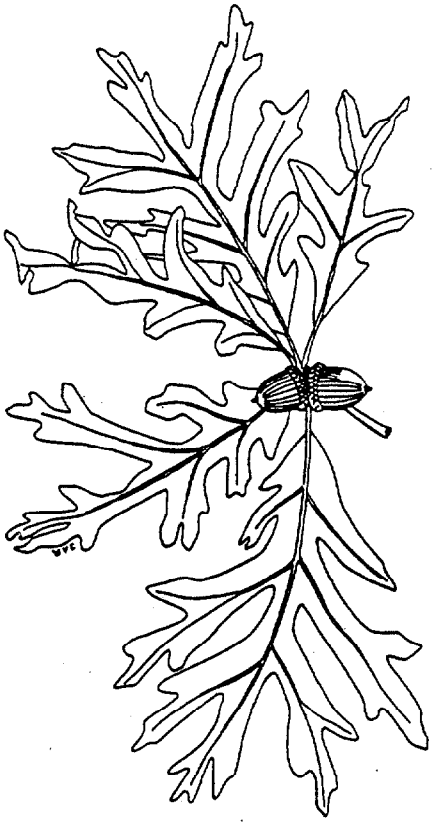


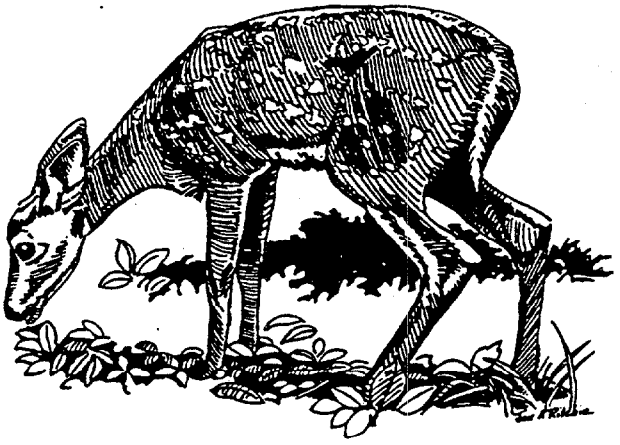


DECEMBER 1989

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT,
CALVERTON, NEW YORK.

NATURAL RESOURCES MANAGEMENT PLAN





MAY 1990

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LAND MANAGEMENT SECTION
NATURAL RESOURCES MANAGEMENT PLAN

NAVAL WEAPONS
INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK

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Approving Officials:

_____ _____
Naval Plant Representative Officer Date

_____ _____
Northern Engineering Field Division Date
Naval Facilities Engineering Command

Date of Annual Review/Update	Name and Title of Reviewer(s):

VOCABULARY

AICUZ	- Air Installation Compatible Use Zone
Calverton	- Naval Weapons Industrial Reserve Plant at Calverton
DOD	- Department of Defense
GAC	- Grumman Aerospace Corporation
GSA	- General Services Administration
M.S.L.	- Mean sea level
NAVAIR	- Naval Air Systems Command
NAVFAC	- Naval Facilities Engineering Command
NAVPRO	- Naval Plant Representative Office
NYSDEC	- New York State Department of Environmental Conservation
NYNHP	- New York Natural Heritage Program
USFWS	- United States Fish and Wildlife Service

NATURAL RESOURCES MANAGEMENT PLAN FOR NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, NEW YORK

LAND MANAGEMENT SECTION

I. INTRODUCTION:

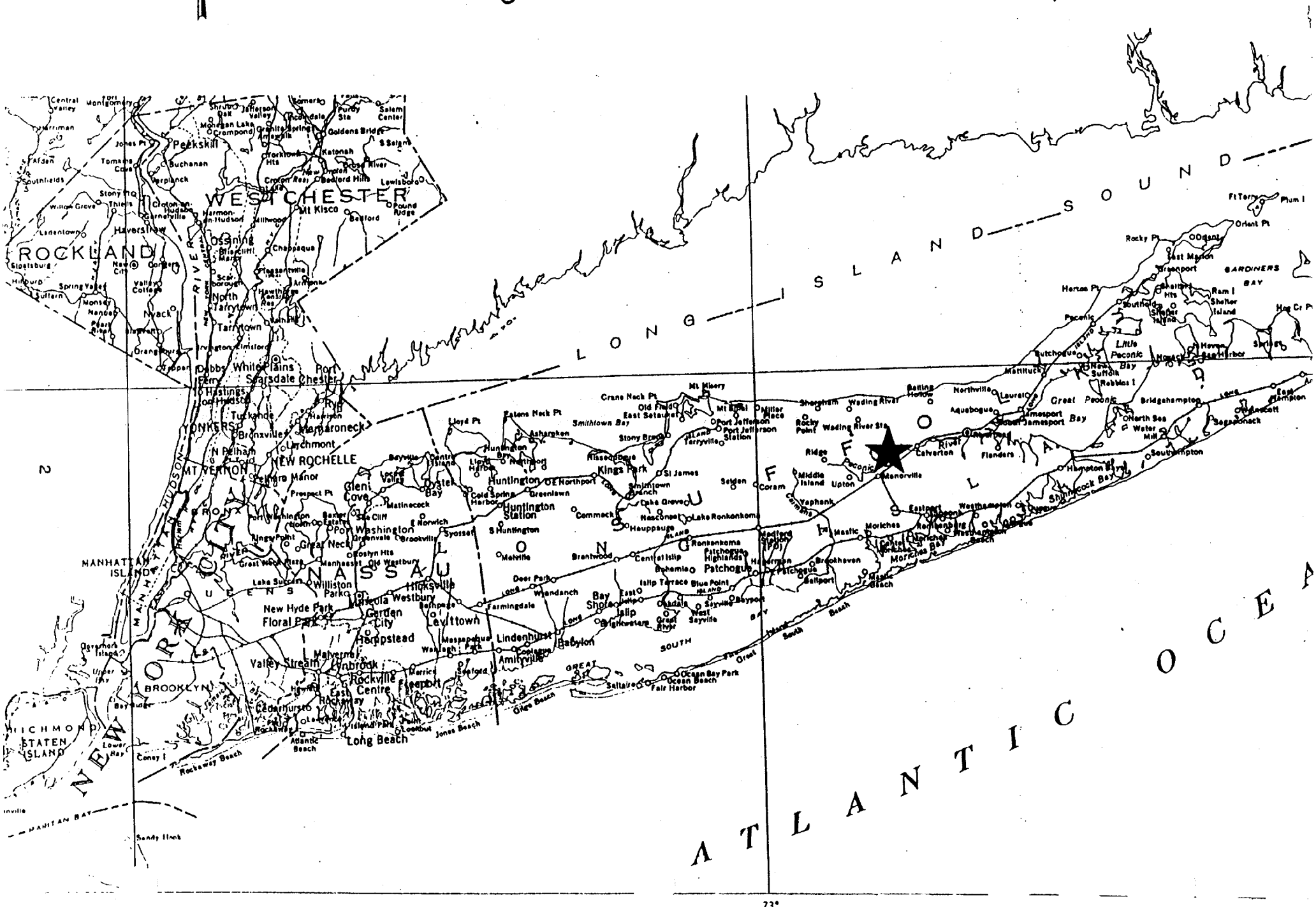
A. Location of Installation

The Naval Weapons Industrial Reserve Plant at Calverton (referred to herein as Calverton) is located in Suffolk County at the eastern end of Long Island about nine miles west of the Village of Riverhead in the state of New York (see Figure 1). The major portion of Calverton lies within the Town of Riverhead, with a significant acreage in the Town of Brookhaven.

1. Physical Setting

The land surrounding the Calverton site is generally sparsely settled, reflecting the existing agricultural economy. There are scattered homes, a few housing developments, substantial rural recreational areas, and occasional businesses and industrial buildings that cater to local needs in the area. Adjacent to Calverton there are three residential subdivisions. Brookhaven National Laboratory, Peconic River County Park (undeveloped), and Brookhaven State Park (undeveloped) are located to the west and north of Calverton. The landscape is mostly broad farm fields, interspersed with large forested areas.

Figure 1. - LOCATION MAP



The terrain is a relatively flat, broad, glacial outwash plain sloping gently to the south. The area to the west and south of Calverton is dominated by the Peconic River and its tributary streams that contain numerous ponds and wetlands. The land south of the river is a minor escarpment, with irregular hills and rough terrain, and comprises a portion of the Ronkonkoma Moraine. This important natural feature is a major aquifer recharge area. Forested ridgelines dominate the view to the south and provide a large area of natural habitat, one of the last on Long Island.

2. Demography

Population growth in the Towns of Riverhead and Brookhaven have been dramatic over the past several years. Statistics for the 1950 to 1980 period show these towns to be among the fastest growing in Suffolk County.

Population histories and projections for both the Towns of Brookhaven and Riverhead indicate continuing growth. The anticipated growth rate for Brookhaven is expected to level off in the future, while the Riverhead growth rate is expected to continue to increase.

Suffolk County planners and the Nassau-Suffolk County Regional Planning Board are currently undertaking a review of the existing socio-economic forecasts for the general study area.

In the Town of Riverhead, suburban development can be expected to spread most rapidly to the north and northeast in communities like Wading River. Although residents of the area are generally opposed to increased urbanization in the locale, there are numerous developments which will spawn additional growth. In addition, there is still construction within two of the three subdivisions adjacent to Calverton. While wholesale residential development is not an immediate prospect in the Air Installation Compatible Use Zone (AICUZ) in the Town of Riverhead, a new proposal for subdivided land has recently been made for an area south of Calverton. In view of Riverhead's small existing population and ample land area, it could become a rapidly growing township.

Within the Town of Brookhaven, the general trend of actual development has been one of dynamic expansion. The Town's recent plan, however, appears to reflect a strong attitude in favor of consolidation and environmental protection in the vicinity of Calverton. In Brookhaven there is a growing willingness to curb random growth and adopt a systematic development procedure to minimize land use conflicts.

B. Purpose of Section

1. Military Mission

Calverton was established to provide necessary facilities for final assembly of military aircraft and the flight acceptance testing of these aircraft. This includes aircraft in production for current military requirements, as well as the flight development testing of new aircraft design. Both require undeveloped areas due to inherent risks involved in these types of programs.

In the case of aircraft production programs, although the design is demonstrated as airworthy, each aircraft is flown for the first time; which entails an increased element of risk, as compared to previously flown aircraft.

In accordance with the Department of Defense and national policy of maintaining a minimum domestic production capability for military mobilization requirements, national survival requires availablity of a minimum industrial base to meet these urgent demands. This minimum industrial base consists of the total of facilities owned by private industry and the government that will be available for emergency production. Calverton has been determined to be a necessary element toward fulfillment of a part of this national need. Facility design includes an airfield, with all supporting facilities to fulfill this mission.

Grumman Aerospace Corporation (GAC), the sole source supplier of some models of military aircraft with identified mobilization requirements of the Department of Defense, requires utilization of Calverton in order to meet these requirements.

2. Land Use and Its Capabilities

Calverton covers 6,060 acres. Of this, 2,923 acres are leased to the GAC and dedicated to the Calverton mission. Within the GAC lease area there are two concrete runways, assembly hangers, testing facilities, support services, and administration buildings (see Figure 2).

Surrounding the 2,923 acre GAC lease area are three buffer zones obtained and retained to prevent incompatible encroachment of the GAC operation. These buffer zones (3137 acres) are a major part of the Calverton AICUZ. The AICUZ footprint defines the desired accident-clear zones, high-noise zones, and imaginary conical surfaces for air traffic into and out of the GAC airfield.

All buffer zone lands, in addition to serving the airfield, protect the community from effects of noise and the potential for accident. These lands are also used for various agricultural, fish, wildlife, recreation, and educational activities consistant with the environmental and natural resource priorities of the region.

The buffer zones to the southwest and southeast (2,527 acres), are predominantly forested. They are available for public recreational use covered under a cooperative agreement with the New York State Department of Environmental Conservation (NYSDEC). NYSDEC manages hunting, fishing, trapping, and dog trials on the buffer zones. The Naval Plant Representative Office (NAVPRO) also allows military reserve units and the boy scouts to use the property by issuing licenses to these organizations at no fee.

Figure 2

See Back of Report

Existing land use at Calverton is fully compatible with Calverton mission and the command is dedicated to utilizing the land to its highest and best use consistent with environmental and economic objectives.

The entire Calverton acreage is situated over the prime water aquifer for Long Island. The area contains a number of ponds and wetlands and has the Peconic River flowing through the southeast buffer zone. The Peconic River is protected by the New York State Wild, Scenic, and Recreational River System Act.

General Services Administration's (GSA) land use surveys in 1972, 1980, and 1985 resulted in recommendations to retain the current land holdings.

3. Integrated Management of Natural Resoures

Navy lands shall be managed under the principles of multiple-use and sustained yield, using proven scientific methods and an interdisciplinary approach. Each level of command must ensure that effective natural resources management is an identifiable and accountable function of management. Program implementation will require coordination, and interfacing of responsibilities, by pollution abatement, pest management, master planning, environmental planning, land management, and morale/welfare/recreation functions.

Natural resources management produces benefits for the Department of the Navy and supports the military mission by:

Reducing grounds maintenance costs and producing income to pay for program costs. Land areas managed for commercial forest product production, or outleased for agricultural uses, do not require operation and management funded maintenance. Income generated from the sale of timber and from outleasing and hunting fees is used to pay for natural resources program administration costs and many land improvement projects.

Reducing the potential for collisions between birds and aircraft on Naval airfields. Scientifically managing the land adjacent to runways to make it less attractive for certain birds and animals identified as hazardous to aircraft saves millions of dollars in jet engine foreign object damage repair costs.

Avoiding unnecessary conflicts between mission requirements and natural resources legal mandates. Identification of protected resources such as threatened/endangered species and wetland areas allows planning of mission support requirements to avoid possible conflicts. If a conflict cannot be avoided, it is advantageous to address it at the earliest stage of planning.

Demonstrating to the public that the Navy is taking care of invaluable land, water, and wildlife resources. The advantages to an installation of a good land steward image cannot be overstated. Conscientious natural resources management is a major element in earning this image.

Enhancing the quality of life for Navy personnel. Scientifically managing natural resources increases the aesthetic appeal of an installation environment and develops opportunities for outdoor recreation such as hunting, fishing, hiking, and nature study.

C. History of Installation

Grumman Aircraft Engineering Corporation (now Grumman Aerospace Corporation) started flight assembly and flight testing at its Bethpage, New York facility in 1939. By 1950, residential and commercial growth in the Bethpage vicinity began to approach the fence line around the facility. This encroachment, combined with the need for longer runways for new jet aircraft and the noise levels associated with these aircraft led to the conclusion that a new location had to be found for assembly and flight testing. The Calverton site was recommended and subsequently proposed by GAC to the Navy. Further studies by Naval Air Systems Command (NAVAIR) and Naval Facilities Engineering Command (NAVFAC) confirmed the site selection, and the Navy began acquisition of approximately 4,000 acres of land that had been primarily utilized for agriculture. Ground was broken in 1952, and the facility was operational in 1954.

Of the total 4,000 acres, approximately 3,000 were fenced and leased to GAC. Concern over the short buffer zones in relation to the development flight test nature of the facility, led to Congressional approval in 1958 for the acquisition of an additional 3,000 acres.

Today, projections of future growth indicate that the same type of encroachment which occurred at Bethpage during the 1940's and 1950's is expected to occur around the Calverton facility during the next two decades.

D. Present Land Use Management

1. Area Leased to Grumman Aerospace Corporation

Under terms of a lease agreement between the United States of America, Naval Air Systems Command and Grumman Aerospace Corporation (Contract #N00019-84--L-0075) 2,923 acres are leased to GAC. This is the fenced area which is shown in Figure 2, page 6. In addition, the lease includes a strip of land, 125 feet wide along the portion of the rail spur located outside the fence and east of Connecticut Avenue. The lease also includes Facility #182, which is a 69,000 Volt Switching and Metering Station. With exception of the portion outside the fence described above, all other lands are not leased to GAC. These lands are the buffer zones and are under the accountability of the NAVPRO.

2. Terms of the Facility Lease Agreement

The current lease covers a five-year term which began in April, 1984, with options to renew for two additional five-year terms. The Government reserved the right to terminate the lease under certain conditions of national defense need, for cause, or to sell the facilities. GAC also has some termination rights. The facilities can be used for all general industrial purposes and for authorized commercial work, which requires payment of rent. The Government may, with consent and concurrence of GAC, make such uses of the facilities as may become advantageous to the Government. In addition to the requirement to perform all normal day-to-day maintenance tasks, the lease

carries an obligation to perform all normal long-term maintenance (in the amount of $2.3 million annually) to assure continuation of the use of the facilities without obsolescence or deterioration to the facility, its utilities, and supporting systems.

3. GAC Owned or Leased Facilities in Vicinity

To supplement existing space limitations of Calverton and because of Congressional prohibition of contractor-funded leasehold improvements or construction of permanent contractor-owned facilities on Government property, GACO has resorted to off-site facilities for permanent or long-term needs.

4. Buffer Zones

The buffer zones, which are situated on an extension of the centerlines of the runways, results in three discrete sections totaling about 3,137 acres. These zones are referred to as the north (N), southeast (SE) and southwest (SW) buffer zones, which corresponds to their location with respect to the facility proper (see Figure 2, page 6).

Most of the former northwest buffer zone, which was forested, was transferred to the Veteran's Administration for a national cemetery on December of 1977. The Navy still owns 140 acres of the original zone. This land is included in the present north buffer zone. The cemetery has been determined to be a compatible land use.

The north buffer zone (610 acres), contains agricultural land which is outleased to local farmers, and commercial forest land. The Federal Aviation Administration maintains a Visual Omnidirection Range Tactical Air Control (VORTAC) station in this zone. The VORTAC serves as an aid to general aviation traffic.

The southwest and southeast buffer zones to the (2,527 acres) are predominantly forested. They are available for public recreational use covered under a cooperative agreement with the NYSDEC. The NYSDEC manages hunting, fishing, and canoeing on the buffer zones. The NAVPRO also allows military reserve units, dog trainers, and the boy scouts to use the property by issuing licenses to these organizations at no fee.

5. Agricultural Outleases and Licenses

There are four agricultural outleases to local farmers (411 acres). Outleases are issued for one-year periods with options for four additional annual extensions. At the end of each five-year period, the availability of the farmland is re-advertised for competitive bidding for the next leasing period. All leases are advertised and executed by the Real Estate Division of Northern Division, Naval Facilities Engineering Command, Philadelphia. NAVPRO maintains on-site surveillance, coordination, and inspection functions. The leases cover only the tillable or agriculturally useful portion of the land. These lands have been outleased for twenty years and are expected to continue to be outleased.

A listing of these leases, easements, and other outgrants is provided in Table 1.

6. Cooperative Fish and Wildlife Agreement

In 1965, the Navy entered into a Cooperative Agreement with the New York State Department of Environmental Conservation, Division of Fish and Wildlife, for public recreational use of most of the buffer zone land for hunting, fishing, trapping, dog training, dog field trials, and other uses under a permit issued under authority of Public Law 85-337 and 86-797. With the exception

TABLE 1: AGRICULTURAL LEASES, EASEMENTS, AND OTHER OUTGRANTS

EASEMENTS AND OTHER OUTGRANTS

Easement #	To	Purpose	Expiration	Acreage	Remarks
NOY(R)-58521	Harry Henry	Access road to land-locked property	In Perpetuity	.74	Easement for access eastward from Schultz Road thru SW buffer
NF(R)-828	NY State	Long Island Expressway Route 495 right of way	In Perpetuity	42.38	Easement thru SE buffer
NF(R)-27326	Wading River Fire Dept.	Fire fighting training		1.5	License for use of interior section of NE buffer
NF(R)-36771	Federal Aviation Admin.	For VORTAC (naviagational aid) station		0.22	Use Agreement in NW buffer
	Power Co. (Long Island Lighting Company)	Increased right of way for high voltage power lines	In Perpetuity		Easement thru SE Buffer (formal documentation pending)

AGRICULTURAL OUTLEASES

Parcel	Lease/Licenses #	Lessee	Acres	Remarks Location
D-1 D-2	N62472-79-RP00431	Howard Lewin	28.5	NE Buffer Zone
B-1 B-2	N62472--79-RP00492	Elmer H. and Roger J. Zeh	88.0	NW Buffer Zone
A	NF (R)-27125	Frank Rychlinski	44.7	Includes lease buildings 259 thru 270 inclusive SE buffer zone
C-1 C-2	NF (R)-36792	Howard Lewin	249.8	NE Buffer Zone

of lands outleased to local farmers, all buffer zone land is covered under the terms of the Cooperative Agreement. The NYSDEC issues a permit under the system, which controls access to the buffer zone land.

A nominal user fee is charged for parking, the revenue from which is used for the continued development and improvement of the fish and wildlife resources on these areas. Under the agreement, NYSDEC prepares a ten-year plan which identifies development and wildlife habitat improvement to be undertaken in different sections of the buffer zones. This plan is prepared to be compatible with the Navy's Forest Resource Management Plan. The plan can be changed or terminated by the parties to the agreement. Under the plan, clearings have been created in the forested areas to establish food and cover plots for wildlife as part of the habitat improvement plan.

Recently, the agreement was changed to authorize the use of off-road vehicles (trail bikes) in the south end of the SE buffer zone. The use was first approved on a one-year trial. At the end of the trial year the use area was inspected for environmental impacts. A determination was made that the level of impact was acceptable, when combined with restoration projects voluntarily undertaken by the users. The use is in conformance to Executive Order 11644 as amended by 11989. NYSDEC and NAVPRO will periodically inspect the areas of use for impacts, and adjust the use in accordance with conditions found.

Heavy use of the buffer zones for fishing and hunting occurs in the spring and fall. The heaviest use is during hunting season, which usually runs from October to February. It includes various seasons for waterfowl, pheasant, quail, grouse, rabbit, squirrel, deer, and woodcock. The deer season is divided into an archery and shotgun season.

NYSDEC has issued woodcutting permits to the public for cutting of selected trees for firewood to facilitate development of the clearings for wildlife foodplots and as salvage for other operations. Fishing for pickerel, largemouth bass, and panfish is done in the Peconic River and the ponds of the SW buffer zone on a permit basis.

Scheduling of NAVPRO authorized buffer zone uses are coordinated with NYSDEC so that conflicts do not occur.

7. Locally Issued Licenses

The NAVPRO has authority to issue real property licenses for use by the Department of the Navy Real Property, subject to certain conditions. These licenses are for uses of the buffer zones and are in areas covered under the Cooperative Agreement with NYSDEC. One of the limitations on NAVPRO authority is that a license cannot be issued where payment of cash is involved. This authorization is, therefore, limited to uses by governmental agencies, civic, or charitable organizations where the waiver of a fee is in accordance with established procedures.

The NAVPRO has experienced an increased use of the buffer zones for Department of Defense (DOD) training purposes by the United States Navy, the Marine Corps Reserve Units, and the New York Army National Guard. These units, in the past, have had to travel upstate, or to out of state locations in order to undertake their weekend training exercises. As these units are composed of local area citizens, the availability of an outdoor training area nearby, reduces travel costs and conserves gasoline and diesel fuel. For example, prior to having access to the buffer zone, the New York Army National Guard had to travel four and one-half hours (120 miles) each way to Fort Dix in New Jersey.

The buffer zone locations for training have been selected in accordance with AICUZ criteria, NYSDEC scheduled buffer zone uses, concern for effects of such use on nearby communities, and environmental considerations. Attempts by these DOD units to use regional parklands for their training needs have been unsuccessful, as the concerned park managers have a recreational mission to fulfill, which they have been unwilling to compromise in order to accomodate the DOD uses.

The NAVPRO has supported buffer zone uses by DOD units as appropriate use of DOD lands, as long as they are compatible with the environment and the mission of Calverton.

8. Forest Resources Management Plan

It is the policy of the Department of the Navy (NAVFACINST 11015.9A) that all facilities having the potential for commercial timber production shall have programs for the conservation and management of forest resources. Forest resource management includes timber management and forest administration, reforestation, timber stand improvement, access road construction and maintenance, and fire protection.

The Natural Resources Branch of the Northern Division, NAVFAC prepared a long-term Forest Resource Management Plan for Calverton (Section 3 of this Plan) in 1987 with the cooperation of Rutgers University. It also prepares annual increments to the plan for tasks such as timber stand improvement and planting of seedlings for reforestation. Timber stands suitable for harvest are advertised for bids for sale of these forest products.

II. LAND RESOURCES DESCRIPTION/INVENTORY

A. Climate 1/

The climate of Suffolk County is humid-continental. Weather systems that influence this area generally originate over the continental mainland and are modified by the Atlantic Ocean. The ocean extends the frost free period, reduces the extremes in temperature, and is responsible for relatively heavy precipitation in the winter.

Table 2 provides data on temperature, precipitation, relative humidity, and snowfall, as recorded at the Riverhead Research Station, New York City and Medford.

1. Temperature

The mean annual temperature is 52.2 degrees Fahrenheit (F) with the mean winter temperature of 32.7°F and the mean summer temperature of 71.3°F. The highest temperature was 100°F and the lowest was -14°F.

2. Precipitation

Average annual precipitation is 45.32 inches (lowest annual 32.27 inches - highest 58.07 inches). Mean precipitation during the growing season, May - September, is 17.29 inches.

1/ "Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1951-80 - New York", Climatography of the U.S., No. 81, National Oceanic and Atmospheric Administration, Asheville, NC, 1982.

"Freeze/Frost Data", Climatography of the U.S., No. 20, Supplement No. 1, National Oceanic and Atmospheric Administration, Asheville, NC, 1988.

"The Climate of New York State", by R.A. Mordoff.

"Precipitation in New York State", by B.E. Dethier, Cornell University Agricultural Experimental Station, New York State College of Agriculture, Ithaca, NY, Bul. 1009, 1966.

"Soil Survey of Suffolk County New York", USDA, Soil Conservation Service, 1975.

TABLE 2: TEMPERATURE, PRECIPITATION, RELATIVE HUMIDITY, AND SNOWFALL

STATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
TEMPERATURE NORMALS (DEG F) (1951-1980)													
RIVERHEAD RESEARCH	MAX	37.9	39.0	46.7	58.5	69.5	78.1	82.8	81.5	74.8	64.6	53.4	42.4
	MIN	23.9	24.6	31.4	39.3	48.8	58.1	63.8	63.5	57.3	47.1	38.0	28.3
	MEAN	30.9	31.8	39.1	48.9	59.2	68.1	73.3	72.5	66.1	55.9	45.7	35.4
PRECIPITATION NORMALS (INCHES) (1951-1980)													
RIVERHEAD RESEARCH		4.07	3.63	4.28	3.74	3.53	2.90	3.20	4.17	3.60	3.56	4.18	4.46
RELATIVE HUMIDITY (56 years)													
NEW YORK	7:30 a.m.	72	70	70	68	70	74	76	79	79	76	74	73
	1:30 p.m.	61	58	55	53	54	58	58	60	60	57	60	60
MEAN MONTHLY SNOWFALL (INCHES) (21 years)													
MEDFORD		21.0	6.9	8.4	5.0	1.1	0	0	0	0	0.1	0.3	6.6

3. Relative humidity

The mean annual relative humidity in the New York City area at 7:30 a.m. is about 72 percent and drops to 58 percent at 1:30 p.m. The highest annual mean humidity is about 79 percent (7:30 a.m.) occurring in August and September and the lowest humidity occurring in April (68 percent). See Table 2 for more detail.

4. Snowfall

Snowfall amounts to 28.4 inches annually. Table 2 provides more detail on snowfall.

5. Frosts

In the vicinity of Calverton there are approximately 199 frost-free days, at the 50 percent probability level. The last killing frost (32°F) normally occurs about April 15 and the first killing frost normally occurs about November 1 (50 percent probability level). Table 3 provides more detail on freeze/frost occurrences.

The cumulative growing-degree days (based on 50° F daily mean temperature) for the freeze-free crop season is about 2600.

6. Wind

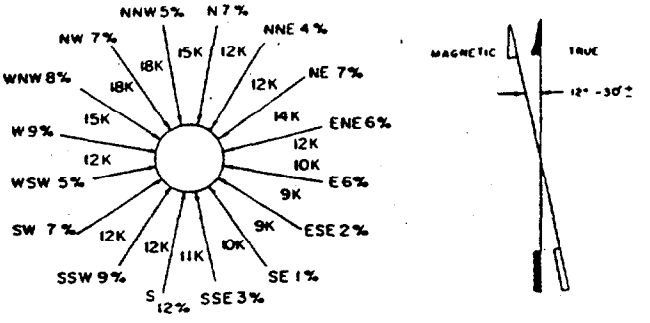
The prevailing winds in the New York City area during the summer (June - August) are from the south, they switch to the north in September and for the remainder of the year they are from the northeast according to weather bureau statistics. On the other hand, data gathered by the Navy at Calverton in 1962 and displayed as percentages on the "Wind Rose" in Figure 3, shows that wind direction was more varied but heaviest from the south.

TABLE 3: FREEZE/FROST OCCURRENCE DATA

STATE AND STATION NAME	Threshold Temperature (Degrees F.)	SPRING (DATE) PROBABILITY LEVEL *			FALL (DATE) PROBABILITY LEVEL *			FREEZE FREE PERIOD PROBABILITY LEVEL *			FREEZE/FROST PROBABILITY*
		90%	50%	10%	10%	50%	90%	10%	50%	90%	
Riverhead Research	36	APR 16	APR 27	MAY 08	OCT 07	OCT 19	NOV 01	192	175	158	37
	32	APR 05	APR 15	APR 26	OCT 20	NOV 01	NOV 12	214	199	184	28
	28	MAR 18	MAR 31	APR 14	OCT 29	NOV 15	DEC 01	251	227	204	18

* Indicates that the probability of occurrence of threshold temperature.

FIGURE 3: WIND DIRECTION



NOTE

1. ALL WIND DIRECTIONS REFER TO TRUE NORTH.
2. 4% INDICATES PERCENTAGE OF TIME BETWEEN 1-1-62 AND 12-31-62 THAT WIND BLEW FROM DIRECTION NOTED.
3. 13 K INDICATES AVERAGE VELOCITY OF WIND IN KNOTS DURING PERIOD OF 1-1-62 TO 12-31-62.

B. Soils

1. Soil Survey Information

Information on the soils at Calverton can be found in the Suffolk County Soil Survey (a copy is attached as Appendix A). The soil survey includes a description of the soils, location on aerial photographs, and a discussion of the suitability, limitations, and management of the soils for specified uses.

In preparing the soil survey report, soil scientists observed the steepness, length, and shape of the slopes, general pattern of drainage, and the kinds of crops and/or native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of naturally developed layers or horizons in a soil. The profile extends from the surface down into the unconsolidated parent material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by biologic activity.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically.

During field mapping, soil scientists walked the landscape and located and identified the significant natural bodies of the soil in the survey area. The boundaries of these bodies were delineated on aerial photographs and identified as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and streams, all of which help in locating soil boundaries accurately.

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several closely associated soils. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects and merge into one another resulting in gradual changes of characteristics. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and characteristics similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. Some inclusions, however, have properties and behavior divergent enough to affect use or require different management. However, they generally occupy small areas that cannot be delineated on the soil maps because of the scale used in mapping. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements.

Interpretative information for many uses of soil is contained in the Soil Survey of Suffolk County, Appendix A. Engineering properties of soils are also described.

Interpretations enable the user to select soil areas most suitable for a particular use, and to predict the degree and kind of problems most likely to be encountered. They are also useful in determining the kind and amount of on-site investigations necessary, thereby permitting needed soil investigations at minimum costs. Table 4 lists the interpretive information that can be found in the "Soil Survey of Suffolk County".

The user is cautioned that the interpretations are based on the typical soil in each soil phase. At any given location, the actual conditions may differ from the information presented because of the inclusion of other soils which are impractical to map separately at the scale of mapping used. Soils are normally investigated to a depth of five feet and the interpretations are most reliable to this five foot depth. On-site investigations are needed for areas where the proposed soil use involves heavy loads, deep excavations, or high costs. The interpretations are based on the soils in their natural state. They may be different for disturbed areas affected by cut or fill operations.

2. Major Soil Associations

Two soil associations occur on the Calverton property; the Haven-Riverhead association which occurs generally north of the Swan Pond/River Road and the Plymouth-Carver association which occurs south of the road. See Figure 4, Soil Association Map.

TABLE 4: SOIL INTERPRETATION INFORMATION AVAILABLE IN THE SUFFOLK COUNTY SOIL SURVEY REPORT (Page 1 of 2)

The following list shows a brief description of the content of the Soil Survey Report for Suffolk County dated April 1975. Refer to the Soil Survey, Appendix A for additional information:

Soil descriptions

Capability groups for most kinds of field crops

Estimated yields for:
- Potatoes, cauliflower, sweet corn, cabbage

Woodland suitability groups:
- Potential productivity:
  - Indicator species
  - Site index
- Factors affecting management:
  - Erosion hazard
  - Equipment limitation
  - Seedling mortality
  - Plant competition for hardwoods and conifers
  - Windthrow hazard
  - Species suitability for planting and management

Wildlife habitat elements and classes of wildlife
- Grain and seed crops
- Grasses and legumes
- Wild herbaceous upland plants
- Hardwoods
- Conifers
- Wetland food and cover plants
- Shallow diked impoundments
- Shallow excavated impoundments
- Openland wildlife
- Woodland wildlife
- Wetland wildlife

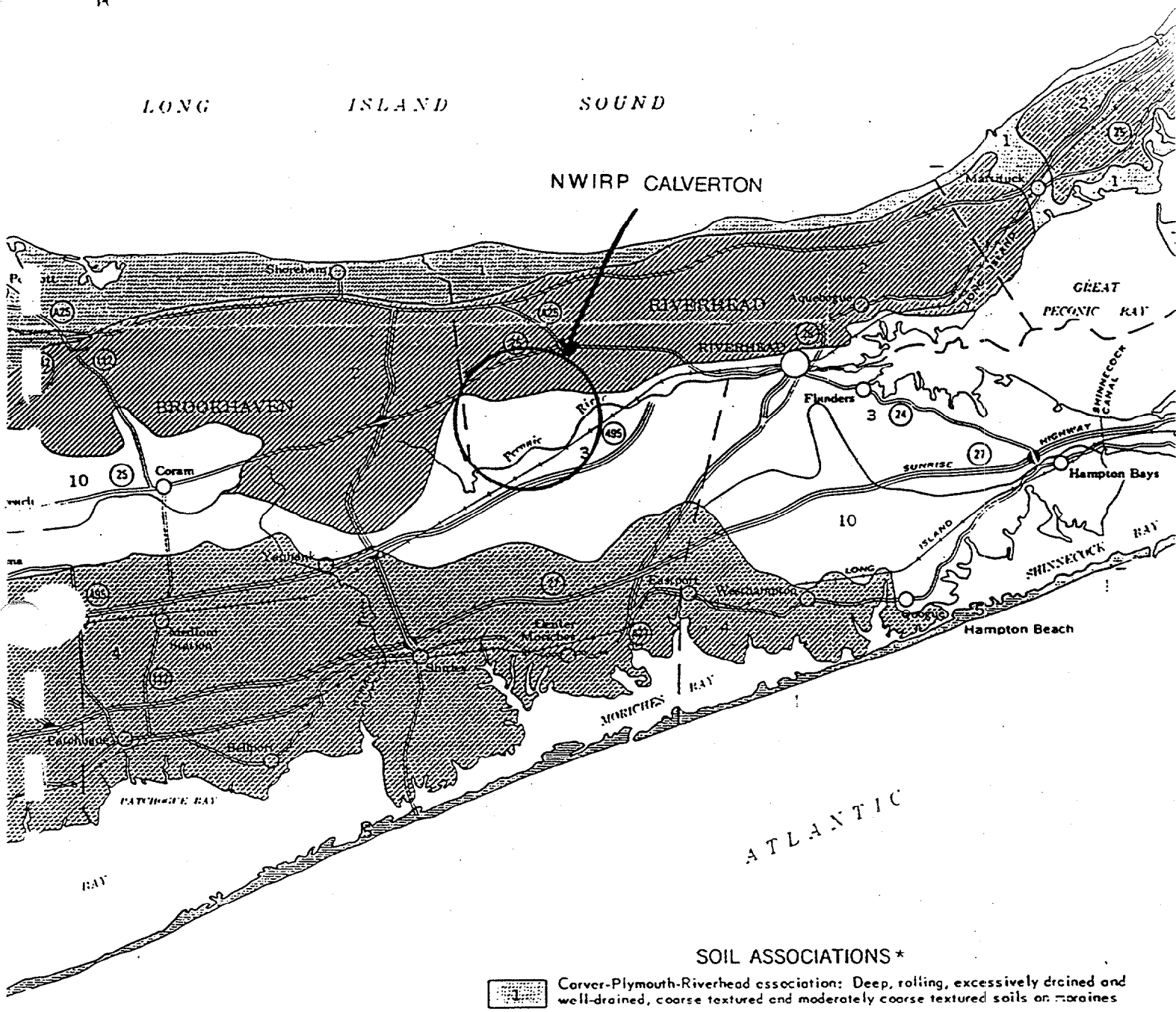
Engineering test data and properties (partial list by depth)
- Maximum dry density
- Optimum moisture
- Inplace moisture density
- Inplace dry density
- Linear shrinkage
- Reaction (pH)
- Organic matter content
- Percolation
- Mechanical analyses
- Liquid limit
- Plasticity index
- American Association of State Highway Officials (AASHO) and Unified Soil Classification System (USCS) designation
- Depth to seasonal water table
- Texture
- Permeability
- Available moisture capacity

TABLE 4: SOIL INTERPRETATION INFORMATION AVAILABLE IN THE SUFFOLK COUNTY SOIL SURVEY REPORT (Page 2 of 2) CONTINUED

Interpretations of engineering properties for:
- Topsoil
- Granular material
- Fill material
- Highway location
- Embankment foundation
- Foundations for low buildings
- Farm pond reservoir and embankments
- Agricultural drainage
- Irrigation
- Diversions
- Waterways

Limitation of soils for town and county planning (recreation)
- Sewage disposal fields
- Homesites
- Lawn landscaping and golf fairways
- Pipeline locations
- Sanitary landfill
- Camp areas
- Paths and trails
- Picnic grounds and extensive play areas
- Athletic fields and intensive play areas

Figure 4. - SOIL ASSOCIATION MAP



Scale 1:253,440

1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS *

1 — Carver-Plymouth-Riverhead association: Deep, rolling, excessively drained and well-drained, coarse textured and moderately coarse textured soils on moraines

2 — Haven-Riverhead association: Deep, nearly level to gently sloping, well-drained, medium-textured and moderately coarse textured soils on outwash plains

3 — Plymouth-Carver association, rolling and hilly: Deep, excessively drained, coarse-textured soils on moraines

4 — Riverhead-Plymouth-Carver association: Deep, nearly level to gently sloping, well-drained and excessively drained, moderately coarse textured and coarse textured soils on the southern outwash plain

10 — Plymouth-Carver association, nearly level and undulating: Deep, excessively drained, coarse-textured soils on outwash plains

* Texture refers to surface layer in major soils of each association.

The Haven-Riverhead Association is characterized by deep, nearly level to gently sloping, well-drained, medium-textured and moderately coarse textured soils that occur on outwash plains. The association is nearly level and has short gentle slopes along shallow drainageways. Some areas are pitted by steep-sided kettle holes. Slopes range from 1 to 12 percent. Haven soils make up about 40 percent of the association and Riverhead soils make up about 30 percent. Haven and Riverhead soils are together across most landforms; however, Haven soils are most extensive at slightly higher elevations and at greater distances from the drainageways.

Haven soils are deep, well drained, and medium textured. Their surface layer is loam, and their subsoil is loam or silt loam. The substratum is sand and gravel. Depth to the substratum rages from about 18 to 36 inches.

Riverhead soils are deep, well drained, and moderately coarse textured. Their surface layer and subsoil are sandy loam. In many places, however, the lower part of the subsoil is loamy sand. The substratum is sand and gravel. Depth to the substratum ranges from about 22 to 36 inches.

These soils are predominantly gently sloping to nearly level. They have moderate to high available moisture capacities. Crops respond well to applications of lime and fertilizer. These factors make this association one of the best farming areas in the county.

Most areas of this association have been cleared. From the Brookhaven-Riverhead town line eastward, the soils in this association make up the largest area of farmland in the county, and they are used extensively for potatoes and other vegetables.

Because of good drainage, and the ease of excavation, this association has excellent potential for housing developments and similar uses. In places where the soils have a high water table or have steep slopes, limitations are more severe for most nonfarm uses.

The Plymouth-Carver association is rolling and hilly. It contains deep, excessively drained, coarse-textured soils that occur on the Ronkonkoma moraine. These soils are characteristically steep sloping. Slopes range from 8 to 35 percent. Plymouth loamy sand soils make up about 45 percent of the association, and Carver and Plymouth sands make up about 30 percent.

Plymouth soils are deep and excessively drained. The substratum is sand and gravel. Depth to the substratum ranges from 20 to 36 inches. Plymouth soils have a surface layer and subsoil of sand or loamy sand.

Carver soils are similar to Plymouth soils, but they have a distinctive gray or light-gray subsurface layer that is lacking in Plymouth soils. Carver soils are deep and excessively drained. Their surface layer and subsoil are sand. The substratum is sand and gravel. Depth to the substratum ranges from 16 to 32 inches.

Carver and Plymouth sands generally are the steeper soils on ridgetops and the lower part of slopes. The more gently sloping Plymouth loamy sand soils are mainly on the intervening areas. Areas along the crests of some ridges have a large amount of gravel on the surface. These gravelly areas generally are very small, and they are scattered throughout the association.

The soils of this association have a characteristically poor cover of scrub oak, white oak, and pitch pine. Only a small part of this association has ever been farmed, and many of these areas have been allowed to revert to brush. This association provides one of the better sources of gravel in the county.

3. Soil Series Descriptions

Refer to "Soil Survey Report of Suffolk County," (Appendix A).

4. Engineering Soil Specifications

Refer to "Soil Survey Report of Suffolk County," (Appendix A).

5. Special Problems/Management

a. Hydric Soils (high water table)

There are four soils that occur on Calverton that are considered to be hydric soils. These are Atsion, Berryland, Muck, and Wareham soils.

Hydric soils are those soils that are saturated, flooded, or ponded long enough during the growing season to produce low oxygen conditions that are detrimental to most plants, but favor hydrophytic plants (aquatics). These soils in their undrained condition are usually classified as wetlands. See Figure 5, Problem Soils Map, for location of these soils.

b. Plymouth Soil Problems

Plymouth soils are coarse textured, excessively drained, rapidly permeable, and droughty. They are also highly erodible. Natural fertility and organic matter content is low to very low. These factors make Plymouth soils poor for most crops commonly grown in the county. Steep slopes on much of the area and difficulty of establishing and maintaining lawns and landscape plantings for the above reasons severely limit these soils for housing developments or similar nonfarm uses. Rapid movement of water and wastes from cesspools and septic tanks along with pesticides, fertilizers, and other chemicals may contaminate ground water supplies beneath these rapidly permeable soils. On the other hand these soils are excellent recharge areas for ground water supplies. If exposed for agriculture or development, the Plymouth soils are easily eroded by both wind and water. See Figure 5, Problem Soils Map, for location of these soils.

c. Carver Soil Problems

Carver soils are similar to Plymouth soils in that they are coarse textured, excessively drained, droughty, and rapidly permeable. They are, however, not as erodible as Plymouth soils. See Figure 5, Problem Soils Map, for location of these soils.

Figure 5

See Back of Report

d. Riverhead and Haven Soil Problems

Riverhead and Haven are productive soils and are used extensively for agriculture and development, even though natural fertility is low, they are strongly acid and highly erodible. Long bare slopes as flat as two per cent are subject to sheet erosion caused by rain. On three percent or steeper/slopes sheet erosion often turns into rill erosion causing greater soil loss in the range of ten tons or more per acre. Conservation measures must be used to prevent erosion. See Figure 5, Problem Soils Map, for location of these soils.

C. Landforms

1. Types

Calverton is located in the Atlantic Costal Plain Physiographic Province. The land has been altered by the activity of four major glacial stages. The youngest, the Wisconsin, produced Long Island Sound and most of the topographic features of Suffolk County as it is known today.

The northern portion of Calverton above Swan Pond/River Road is an outwash plain. Below this road are the remnants of the Ronkonkoma moraine.

The land of Calverton generally slopes from the north to the south with the lowest area along the Peconic River. Elevations range from 100 feet above mean sea level (M.S.L.) in the northeast buffer zone to a low of about 30 feet M.S.L. on the Peconic River near the Village of Calverton. South of the Peconic River, in the southeast buffer zone, the ground raises again in the moraine to an elevation of about 220 feet M.S.L.

As mentioned previously, the moraine contains a large amount of excessively well drained soils. Here the slopes are quite steep. There are no distinguishable streams as water infiltrates very fast. The vegetation in the southeast buffer zone is dominantly scrub oak and pitch pine. The tops of a number of ridges contain exposed gravel and sand with little ground cover.

The Soil Survey of Suffolk County, Appendix A, contains a section on the geology, physiography, and drainage of Suffolk County.

2. Maps

a. Topographic map

Figure 6 is a topographic map of Calverton. The major natural drainage ways and the landforms described above are evident on the map.

b. Flooding

The 100-year frequency flood plain, as defined by the U.S. Department of Housing and Urban Development, has been delineated for the Peconic River. For the most part, flooding is limited to a narrow band along the river and its major tributaries because the topography raises fairly rapidly. The flood plain is delineated around the Swan Pond tributary as far upstream as McKay Lake, along Linus Pond, upstream to Preston's Pond, along Jones Pond, Grassy Pond, Sandy Pond, Peasy's Pond, and upstream to Horn Pond. Figure 7 shows the boundary of the 100-year frequency flood plain.

D. Water

1. Available Sources

Water is available from different sources; streams, lakes, ponds, wetlands, and as ground water. The U.S. Fish and Wildlife Service's classification system of wetlands and deepwater habitat, which is discussed in Item c., "Wetlands and Deepwater Habitat", includes streams, lakes, ponds, and tidal areas as well as wetlands. On Calverton most of the bodies of water are a combination of a pond and wetland, because of their shallow nature and greatly fluctuating water levels.

a. Streams

There are only a few permanent streams in Suffolk County. Because of the porous soils, much of the rainfall infiltrates directly into the groundwater table with little runoff. Some natural drainage areas have no outlets.

Figure 6 and 7

See Back of Book

The watershed to the main portion of Calverton originates one to one and one-half miles north of State Highway 25. Surface water generally moves in a southerly direction towards the Peconic River. Water from heavy storms moves along the bottom of depressions but gradually infiltates.

The Peconic River is the largest stream in the county. It originates in the Brookhaven National Laboratory property west of Calverton, flows easterly across the southeast buffer zone, and empties into Great Peconic Bay near Riverhead. A small perennial tributary originates between the two runways west of the building complex on Calverton, flows south along the main entrance through McKay Lake and Swan Pond through a series of old cranberry bogs, then into the Peconic River. A second stream originates near North Pond at the southwest end of the west runway, then flows through Preston's Pond and Forest Pond, into Linus Pond, then into the Peconic River. A third perennial tributary which originates northwest of Calverton in Lake Panamoka, flows south across the southwest buffer zone through a series of small ponds; Sandy Pond, Grassy Pond, and Jones Pond; then into the Peconic River (see topographic map Figure 6, page 32).

The Peconic River and these tributaries in particular, are classified as a "Scenic River" under the New York Wild, Scenic, and Recreational River System Act. Accordingly there are restrictions on certain kinds of activities and developments within the defined river corridor. Figure 8 delineates the Peconic River Scenic River Corridor. Appendix B is the New York State Wild, Scenic, and Recreational River System Regulations.

The Peconic River is not on the National List of Wild, Scenic, and Recreational Rivers.

b. Lakes and Ponds

On Calverton there are 16 ponds/wetlands, which range in size from about one-quarter acre to ten acres in size. Six are on the main Base and ten are in the southwest buffer zone. The largest pond, which is entirely on Navy property, is McKay Lake which is about ten acres in size. While Grassy

Figure 8

See Back of Report

Pond is larger, 12 acres in size, only about three acres of it are on Navy property. All of the ponds are shallow, less than six feet in depth, and occasionally dry up during years of low rainfall. McKay Lake is deeper as a result of being impounded at some time in the past, and it does not dry up.

c. Wetlands and Deepwater Habitat

During the past two decades, awareness of the value of wetlands has greatly increased in both the private and public sectors. Wetland protection laws are now common in most states and the public need to preserve important wetland functions is clear. The many values of wetlands, such as flood control, ground and surface water purification, sediment control, and fish and wildlife habitat are being recognized for their contribution to public health and welfare. Acknowledgement of wetland values is an important first step in wetland protection.

Proper identification of wetlands will allow the Navy to comply with department policies, Presidential Executive Order 1190, Protection of Wetlands 33 U.S.C. 1344, Clean Waters Act, and with state and other federal laws.

NYSDEC regulates all freshwater wetlands in New York that are 12.4 acres in size or larger and valuable wetlands that are smaller than 12.4 acres, such as those containing threatened or endangered species. A permit is needed to modify any of the wetlands. Of the 25 wetlands on Calverton, 18 are NYSDEC regulated wetlands (see Table 5).

Several of the NYSDEC regulated wetlands include two or more closely associated wetlands that are seperately numbered in Table 5.

In general terms, wetlands are lands where saturation with water is the dominant factor affecting the types of plant and animal communities living in the soil and on its surface. The feature most wetlands share is soil or substrate that is at least periodically saturated with or covered by water. These soils are hydric soils.

TABLE 5. WETLAND AND DEEPWATER HABITATS (Acres and Classification)1/

MAP NO 2/	NYSDEC REGULATED WETLAND3/	NYSDEC REGULATED WETLAND DESIGNATION	NYSDEC CLASSIF-ICATION 4/	USF&WS UNIT OR SUBUNIT CLASS-IFICATION 5/	AREA SUBTOTAL (ACRES)	TOTAL AREA (ACRES)
1	-	-		PEM	0.2	0.2
2	Yes	W-16	I	POWZ	1.2	4.0
				PFO/SS1B	2.8	-
3	Yes	W-16	I	POWZ	0.8	0.8
4	Yes	W-27	II	POWZ	2.2	2.2
5	Yes	W-28	II	POWZ	1.8	1.8
6	Yes	R-5	I	POWZ	0.4	0.4
7	-	-		POWZ	0.1	0.1
8	Yes	R-5	I	POWZ	1.2	6.0
				PFO/SS1E	3.2	-
9	Yes	R-5	I	POWHh	10.0	10.0
				(PAB2)	(1.6)	-
10	-	-		POWZ	0.4	0.4
11	Yes	W-24	IV	POWZ	0.8	0.8
12	Yes	W-25	I	POWZ	0.2	0.2
13	Yes	W-26	I	PEMF	1.2	1.2
14	-	-		PEM	0.2	0.2
15	Yes	R-5	I	POWH	0.2	41.8
				POWZ	17.4	-
				PEM5C	0.8	-
				PEM5F	4.4	-
				PFO1/SSE	6.0	-
				PSS1E	0.2	-
				PFO1	12.8	-
16	-	-		PFO1	0.2	0.2
17	Yes	W-4	I	POWZ	1.6	1.6
18	Yes	R-5	I	POWZ	10.2	48.9
				PSS1/EM5E	13.2	-
				PFO1	25.5	-
19	Yes	R-5	I	PFO1E	68.0	126.0
				PFO1/4E	15.6	-
				PSS1E	23.0	-
				PSS1/EM5E	7.6	-
				PEM/OWF	9.0	-
				POWZ	1.2	-
				L1OWHh 6/	1.6	1.6
20	Yes	R-5	I	PFO1E	1.6	1.6
21	Yes	R-55	III	PFO/SS1E	0.2	0.2
22	Yes	R-55	III	PFO/SS1E	0.2	0.2
23	-	-		PFO/SS1E	0.1	0.1
24	-	-		PFO/SS1E	0.1	0.1
25	Yes	R-7	III	PFO/SS1E	0.2	0.2
						250.8

1/ From U.S. Fish and Wildlife Service Wetland Maps, 1 Gateway Center, Suite 700, N Corners, MA 01258, modified to coincide with hydric soil boundaries, random field checks and discussion with NYSDEC biologists.

2/ Numbers relate to location in Figure 9 - Location of Wetlands and Deepwater Habi

3/ A NYSDEC permit is needed to modify any regulated wetland.

4/ Class I regulated wetlands are most beneficial, Class IV the least.

5/ "Classification of Wetlands and Deepwater Habitats of the United States", U.S. F and Wildlife Service, Washington, DC 20240, FWS/OBS-79/31, December 1979.

P - Palustrine (upland) System
- OW - Openwater
- AB - Aquatic Bed.....2 - Submerged vascular plants
- EM - Emergent.....5 - Narrow-leaved presistent plants
- SS - Scrub/Shrub.....1 - Broad-leaved deciduous plants
- FO - Forested.....1 - Broad-leaved deciduous plants
  - 4 - Needle-leaved evergreen plants

L - Lacustrine (Lake) System.....1 - Limnetic

Modifying Terms - Water Regime.....B - Saturated
- C - Seasonally flooded
- E - Seasonally flooded/saturated
- F - Semipermanently flooded
- H - Permanently flooded
- Z - Intermittently exposed/permanent

-Special Modifiers.....h - Impounded

6/ Contains deepwater habitat.

Wetlands and deepwater habitats are defined separately because traditionally the term wetland has not included deep permanent water; however, both must be considered in an ecological approach to classification.

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Under the USFWS classification system wetlands must have at least one of the following three attributes: 1) at last periodically, the land supports predominantly hydrophytes, 2) the substrate is predominantly undrained hydric soil, or 3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The NYSDEC mapped wetlands during the 1970's throughout the state by vegetative cover type using aerial photographs. In the 1980's, the U.S. Fish and Wildlife Service (USFWS), as part of a nationwide inventory, also utilized aerial photographs to map both wetlands and deepwater habitats. The USFWS National Wetland Inventory (NWI) was done in more detail than the NYSDEC inventory. They included information on water regime and other wetland modifiers, along with vegetation, using their hierarchical classification system, "Classification of Wetlands and Deepwater Habitats of the United States" by L.M. Cowardin, et. al., December 1979.

The Navy is currently investigating the use of a high altitude aerial photographic technique to develop standardized wetland mapping at each Naval installation. If adopted, the proposed method would provide the following benefits: 1) improved scale (1 in. = 200 feet) from other mapping techniques, 2) could make other methods obsolete, 3) improved resolution and accuracy of wetland delineation, 4) comprehensive wetland mapping could be available, 5) product would have standardized use and applicability throughout the Navy, 6) to keep costs down, product could be acquired through cost sharing. While this method would not obviate the pin-pointed accuracy of ground truthing, it would

identify reasonable proximity of wetlands that would facilitate planners, engineers, and natural resources databases. Details regarding this method of wetland delineation are expected to be provided for use to all installations by early 1990. Once available, the technique will be evaluated for its use and applicability at NWIRP to supplement or supercede existing known data on wetland resources.

Twenty-five wetlands, wetland complexes, and deepwater habitats which total 251 acres have been identified on Calverton property. These range in size from 0.1 acre to 126 acres. The largest is a wetland complex associated with the Peconic River. The location of the wetlands and deepwater habitats are shown in Figure 9. The acreage and classification is shown in Table 5 using the USFWS classification system.

Wetland mapping was done in the office utilizing aerial photos. Random ground truthing was done to varify the habitat types identified. Soils, on the other hand, were mapped by physically investigating the land. Because areas of less than three acres could not be delineated on soil maps, not all wetlands will show as hydric soils. Some wetlands may be on soil inclusions. Discrepancies between the two maps have been resolved for the most part.

The term wetland, according to the USFWS classification system, includes a variety of areas that fall into one of five categories: 1) areas with hydrophytes (water loving plants) and hydric soils, such as those commonly known as marshes, swamps, and bogs; 2) areas without hydrophytes but with hydric soils - for example, flats where drastic fluctuation in water level, wave action, turbidity, or high concentration of salts may prevent the growth of hydrophytes; 3) areas with hydrophytes but nonhydric soils, such as margins or impoundments or excavations where hydrophytes have become established but hydric soils have not yet developed; 4) areas without soils but with hydrophytes such as the seaweed-covered portions of rocky shores; and 5) wetlands without soil and without hydrophytes, such as gravel beaches or rocky shores without vegetation.

Figure 9

See Back of Report

Attached as Appendix C is the list of "Wetland Plants of New York - List G-1 - Common Wetland Plants of Long Island with Species of the Same and Adjacent Indicators Status Grouped - by Common Name". This will be helpful in identifying wetlands and their boundaries by vegetation. Soil Scientists and others trained in soils can delineate wetland boundaries in the field from changes in soil characteristics if more precise boundaries are needed than those shown on the wetland map and associated hydric soil (wetland) boundaries shown on the soils map.

Deepwater habitats are permanently flooded lands lying below the deepwater boundary of wetlands. Deepwater habitats include environments where surface water is permanent and often deep, so that water, rather than air, is the principal medium within which the dominant organisms live, whether or not they are attached to the substrate. As in wetlands, the dominant plants are hydrophytes; however, the substrates are considered nonsoil because the water is too deep to support emergent vegetation.

The boundary between wetland and deepwater habitat in the Marine and Estuarine Systems coincides with the elevation of the extreme low water of spring tide; permanently flooded areas are considered deepwater habitats in these systems. The boundary between wetland and deepwater habitat in the Riverine, Lacustrine, and Palustrine Systems lies at a depth of 2 meters (6.6 feet). However, if emergents, shrubs, or trees grow beyond this depth at any time, their deepwater edge is the boundary. The 2 meter lower limit for inland wetlands was selected because it represents the maximum depth to which emergent plants normally grow.

The majority of the wetlands on Calverton are forested, upland type Palustrine wetlands that have a saturated or seasonally saturated water regime. The second largest type are open water wetlands that have an intermittently exposed permanent water regime and occasionally dry up. There is only one Laustrine (lake) type deepwater type habitat. This is a portion of the Peconic River that is impounded west of the Village of Calverton.

The central portion of the Peconic River is actually a Riverine type deepwater habitat, however, the area it occupies is too narrow to delineate on the wetland maps. The shoreline wetlands along the river are actually Palustrine wetlands.

McKay Lake is not deep enough to be classified as deepwater habitat.

The USFWS wetland and deepwater classification system is described in more detail in Appendix D to help interpret the wetland map and tables and for individual field evaluation of wetlands.

d. Groundwater[1]/

The groundwater reservoir of Suffolk County is comprised of three water bearing units known as aquifers. These units, in decending order from the land surface, are the upper glacial aquifer, the Magothy aquifer, and the Lloyd aquifer. Each aquifer has distinct characteristics that, together with other hydrogeologic features such as clay layers and surrounding salt water bodies, control the flow of water through the system.

A groundwater divide cuts across the lower portion of Calverton (see Figure 10, Groundwater Divide). Thus most of the water that infiltrates the soil in the fenced portion of Calverton and in the northeast buffer zone moves northward towards Long Island Sound. Groundwater in the lower portion of Calverton, the southwest and southeast buffer zones, moves towards the Peconic River.

The water table at Calverton is at an elevation of between 40 and 50 feet above mean sea level, being deeper towards the west (see Figure 11, Approximate Water Table Elevations - 1979 And Test Well Locations).

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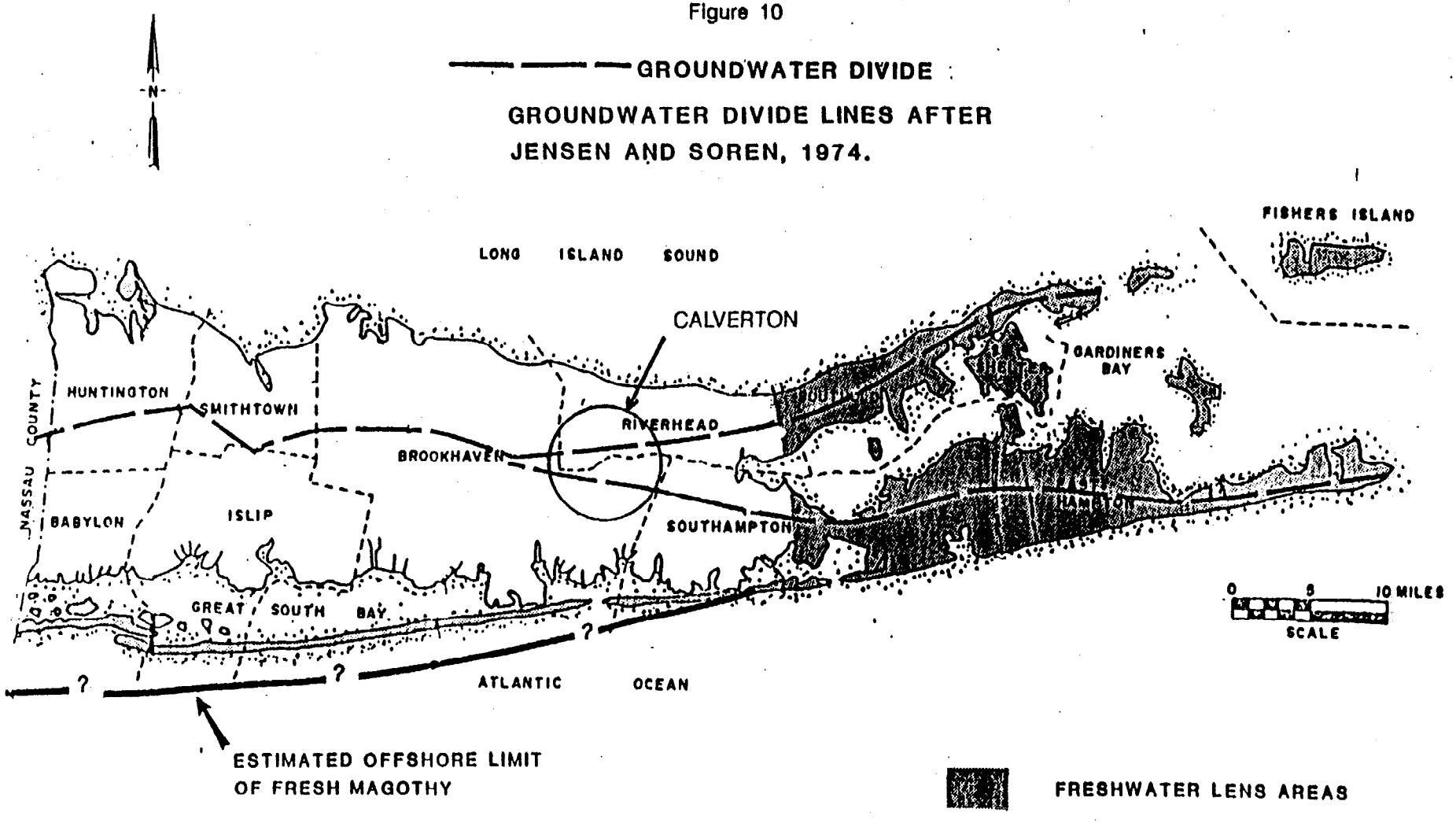
[1]/ Suffolk County Comprehensive Water Resources Management Plan, Vol. 1 and 11, January 1987. Prepared by Div. of Environmental Health, SCDHS, Drirka and Bartilucci Consulting Engineers, Syosset, NY, 11791

Figure 10



FRESHWATER LENS AREAS

NOTE: IN ALL OTHER AREAS, FRESH GROUNDWATER FOUND DOWN TO BEDROCK

Source: SUFFOLK COUNTY COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN SUFFOLK COUNTY DEPARTMENT OF HEALTH SERVICES, HAUPPAUGE, NY. JANUARY 1987

Figure 11

See Back of Report

2. Quality

a. Streams, Lakes, and Ponds

NYSDEC has classified the Peconic River, Duck Pond, Sandy Pond, and Grassy Pond as "B" waters. "Best usage of these waters" is for "primary contact recreation and all other uses (including fishing) except as a source of water supply for drinking, culinary, or food processing purposes".[1]

While the quality of the water in the Peconic River and the larger ponds is suitable to support fish, the volume, in terms of depth, is the main limiting factor to support a sustainable fishery. The ponds and wetlands of the area are a result of the water table intersecting the land surface. Thus, as the water table fluctuates due to lack of rainfall, evaporation, etc., water levels drop in the ponds, sometimes to the point of nearly drying up. Only the deeper ponds like Grassy Pond, Jones Pond, Linus Pond, Forest Pond, Preston's Pond, and McKay Lake retain permanent water during most years and can maintain a population of fish. During drought years, only McKay Lake and a small area of Preston's Pond retain water. The Peconic River is also deep enough to maintain a population of fish. It does not dry up completely.

b. Wetlands and Deepwater Habitat

Wetlands on Long Island are predominantly seasonally flooded. Generally they are at least saturated or temporarily ponded in the spring and perhaps again in the fall, thus providing resting areas for migrating waterfowl and marsh and shore birds. They also provide courtship and brood habitat for waterfowl and other species of wildlife. NYSDEC classifies their regulated wetlands according to their beneficial value, from Class I (most beneficial) to Class IV (least beneficial). These can be considered quality ratings. (See Appendix E - "Part 664 (NYSDEC) Classification of Freshwater Wetlands".) Classification is determined by the characteristics of the wetland. Of the 18 regulated wetlands on Calverton, there are 12 wetlands that are Class I, two

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[1] Classifications and Standards Governing the Quality and Purity of Waters of New York (Parts 700-703, Title 6, Official Compilation of Code, Rules, and Regulations), NYSDEC, Albany, NY 12233.

that are Class II, three that are Class III, and one that is Class IV. See Table 5 (page 37) for the NYSDEC list of regulated wetlands and their classification. Several of the wetlands are Class I because of the presence of threatened or endangered species which will be discussed in another section.

c. Groundwater[1]/

Data from public, private, and special private wells were used to map the extent of groundwater contamination in Suffolk County. The study indicated that human activities have degraded significant portions of the shallow aquifer on Long Island.

Dense residential development has contributed nitrates from pets, septic systems, and fertilizers, and organic solvents from consumer products such as septic system cleaners. Western Suffolk County has seen the greatest impact. Commercial/industrial facilities throughout the county have added organic chemicals from effluents and leaking gasoline storage tanks, while agricultural activities at the east end have introduced fertilizer nitrates, and pesticides such as aldicarb and carbofuran.

Two wells used in the county survey of groundwater contamination are located on Calverton. Well # 51591 is located 25 feet north of Swan Pond Road and 318 feet west of River Road. It is about 1500 feet southeast of the Calverton's waste treatment plant. Well # 51592 is located 179 feet south of the intersection of Schultz Road and Wading River Road. These are located on the map in Figure 11.

Analysis of water from well #51591 taken between 1981 and 1987 showed some low concentrations of nitrates and ammonia which generally indicates a nearness to septic system waste according to Suffolk County Health Department personnel. Tests also revealed that concentrations of 1,1 dichloroethylene and 1,1,1 tricloroethylene were up consistantly above the acceptable level of five

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[1]/ Suffolk County Comprehensive Water Resources Management Plan, Vol. 1 and 11, Suffolk County Dept. of Health Services, Hauppauge, New York. January 1987. Prepared by Div. of Environmental Health, SCDHS, Dvirka and Bartilucci Consulting Engineers, Syosset, NY 11791

parts per billion. These could be from waste treatment facilities, septic systems, and/or industrial solvents according to Suffolk County Health Department personnel.

Water from well #51592 tested very good with only a very low concentration of nitrates.

E. Vegetation

Vegetation is separated into three categories, based on the amount of maintenance required for the intended use. The categories are: 1) improved vegetation or grounds, 2) semi-improved vegetation, and 3) unimproved vegetation (see Table 6). Figure 12 shows the areas of the installation that are managed under each category. The acreage figures for each category which appears in the text were obtained by using an acreage grid on Figure 12 and the wetland map. Table 6 is a summary of the vegetation categories by acres with a breakdown for the fenced area and buffer zones. Each category is described and characterized in the following:

TABLE 6: Summary of Vegetative Categories (Acres)1/

Vegetative Category	Fenced Area	Buffer Zones N	SW	SE	Sub-total
Improved	67	-	-	-	**67**
Semi-improved					**965**
Grassland	789	-	-	-	(789)
Wildlife food and cover plantings	-	5	169	2	(176)
Unimproved					**4536**
Forestland	1563	239	566	1500	(3868)2/
Water/wetlands	28	Trace	93	130	(251)
Open grassland/Power lines, etc.	-		3	4	(7)
Agricultural Fields	-	366	-	45	(411)
Buildings, roads, park areas, fire lanes, etc.	477	-	4	11	**492**
Total	2923	610	835	1692	**6060**

1/ The acre figures are approximate as they were determined by use of grid on various maps.
2/ The Forest Management Plan shows 4239 acres of forest. Wooded wetlands and tree and shrub type wildlife food and cover plantings account for the 371 additional acres.

Figure 12

See Back of Report

1. Improved Vegetation or Grounds

Vegetation or land in this category is managed and maintained at the highest level of intensity of the three categories. Intense management is necessary to meet the designed use criteria, protect the natural environment, and ensure a pleasing appearance that harmonizes with the natural landscape. Examples of this category include lawns, landscape plantings, flower beds, foundation plantings around buildings, athletic fields, picnic areas, etc.

a. Acreage

There are 67 acres of improved vegetation on Calverton.

b. Plant Species and Characteristics

In general the lawns around the main buildings are composed of Kentucky bluegrass (*Poa pratensis*), red fescue (*Festuca rubra*), and such weeds as crabgrass (*Digitaria sanguinalis*), and quackgrass (*Agropyron repens*). The remaining improved vegetation contains the above species along with some tall fescue (*Festuca arundinacea*), redtop (*Agrostis gigantea*), panicgrasses (*Panicum spp.*), and orchardgrass (*Dactylis glomerata*).

Foundation plantings and ornimental shrubs include such species as juniper (*Juniperus spp.*), yew (*Taxus spp.*) rhododendron (*Rhododendron spp.*), redosier dogwood (*Cornus stolonifera*), burning bush (*Euonymus alata*), and hawthorn (*Crataegus spp.*).

Tree species include pin oak (*Quercus palustrus*), basswood (*Tilia americana*), flowering dogwood (*Cornus florida*), flowering cherry (*Prunus spp.*), and blue spruce (*Picea pungens*).

c. Conditions

The lawns, foundation plantings, trees, and shrubs in the immediate vicinity of most of the buildings, particularly the main office building and cafeteria, were in excellent condition in the fall of 1988. The fertilization, irrigation, and mowing program has resulted in a quality sod and an attractive landscape. The remaining lawns were in good condition.

d. Problems and Needs

There are a number of small alcoves and inside corners of buildings where the gang mowers cannot manuver. Areas such as these can be planted to shrubs and/or low maintenance ground cover plants such as periwinkle, that does not require mowing.

The area adjacent to the main entrance road where engine cocoons were stored, is unsightly and does not blend with the natural surroundings. It could easily be replanted with plant materials with NAVFAC funding.

There is a possibility that employees and guests may be bitten by ticks that transmit Lyme Disease as they walk through improved vegetation.

Fertilizers are applied at general rates rather than based on a soil test.

2. Semi-improved Vegetation

Land in this category is maintained at a lesser degree of intensity than improved vegetation, but at a level that will meet the intended use, enhance natural beauty, ensure conservation of the natural resources, and reduce the vegetation fire hazard. Examples of semi-improved vegetation includes the "clear zones" that are required along the runways, compass calibration area, radar fields, the electronic counter measure test range, and wildlife food and cover plantings.

a. Acreage

There are a total of 965 acres of semi-improved vegetation on Calverton. Within the main portion of Calverton there are 789 acres of managed grassland and within the buffer zones there are 176 acres of managed wildlife food and cover (see Table 6).

b. Plant Species and Characteristics

The vegetation in the clear zone along the runway and similar areas are dominantly broomgrass (Andropogon virginicus), tall and hard fescue (Festuca spp.), hawkweed (Hieracium spp.), plantain (Plantago spp.) and several annuals such as ragweed (Ambrosia artemisiifolia), lambsquarters (Chenopodium spp.), three awn (Aristida sp.), and crabgrass (Digitaria sp.).

In the field trial area (northeast portion of the southwest buffer zone) and the developed clearings within the forest, pheasant habitat has been developed with extensive cover plantings of switchgrass (Panicum virgatum) and shrubs such as autumn olive (Elaeagnus umbellata). Food plots are planted to such annual crops as sorghum (Sorghum vulgare).

c. Conditions

The vegetation in the clear zone along the runway varies from dense tall fescue sod on approximately 15-25% of the area to bare ground which covers approximately 10% of the area. The majority of the area, however, is sparce to moderately dense broomgrass and other perennial and annual plants. The vegetation is generally in fair to good condition as is most of the semi-improved vegetation. There is adequate vegetation to protect the sites from severe wind and water erosion and create an aesthetically pleasing area.

d. Problems and Needs

The varied density of vegetation along the runways provides habitat for a wider variety of songbirds than would be present if there was a monoculture of dense tall fescue.

The bare ground along the runways is providing habitat for nesting of killdeer, (Charadrius vociferus vociferus), which is a songbird. Several of these birds have been the object of air strikes with aircraft taking off or landing.

3. Unimproved Vegetation

Land in this category is predominantly forested and is maintained to enhance natural beauty and conserve natural resources. Little if any maintenance is required. Protecting it from fire is the primary maintenance activity. Also, included in this category are agricultural fields, wetlands, ponds, and lakes. While such management practices as timber stand improvement may be applied to forest land as infrequently as once in 5 to 10 years or more, the land is still considered unimproved. Annual, semiannual or once in three to four years maintenance operations would qualify land as semi-improved.

a. Acreage by Vegetation Type

In total there are approximately 4536 acres of unimproved vegetation. There are about 3868 acres of forestland[1/], 251 acres of water/wetlands, and about seven acres of open grassland under power lines, etc. and 411 acres of agricultural outleased fields. Table 6 shows a breakdown for each buffer zone, as well as the fenced area.

b. Vegetation Species Composition and Characteristics[2/]

Calverton is within the Pine Barrens phytogeographic region of Long Island. All upland plant communities are floristically related to the

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1/ The Forest Management Plan shows 4239 acres of Forest. Wooded wetlands and tree and shrub type wildlife food and cover plantings account for the 371 additional acres.

2/ Source: "Rare Plants and Animals of the NWIRP Calverton, Long Island, New York", NY Natural Heritage Program, Division of Fish and Wildlife, Dept. of Envt. Cons., Wildlife Resources Center, Delmar, New York, Dec. 1987.

pitch pine-oak dominated woodlands. There are lesser amounts of upland hardwoods, planted acres of spruce, (Picea spp.), pine (Pinus spp.), larch (Larix spp.), and locust (Gleditsia spp.) as well as water and wetlands.

Refer to the Forest Management Plan in Section 2 for acreage data by covertype.

The vegetation on the agricultural outlease fields varies depending on the crops grown. The primary crops are potatoes and corn. Intensive management of the cropland minimizes the presence of weeds.

The general vegetation on Calverton can be divided into the following generalized types, ranging from the driest uplands to permanent standing water.

Pitch Pine-Shrub Oak Woodlands - Situated on dry sites, the pitch pine scrub oak woodlands are dominated by pitch pine (Pinus rigida), scrub oak (Quercus ilicifolia), and resprouts of black oak (Quercus velutina), and scarlet oak (Quercus coccinea). These woodlands are maintained by frequent fires which suppress the scarlet and black oak growth and increase the dominance of scrub oak. Black huckleberry (Gaylussacia baccata) and late lowbush blueberry (Vaccinium vacillans) are usually abundant at these sites. Concentrations of the coastal barrens buckmoth (Hemileuca maia maia), a "special concern" insect, are greatest in this plant community. There are scattered, small examples of this plant community within the Calverton fence and along Toppings Path in the southeast buffer zone site.

Pitch Pine-Oak Woodlands - The dominant vegetation type in upland sites, pitch pine-oak woodlands occur in areas which burn occasionally. The canopy is usually nearly closed and dominated by pitch pine, black oak, scarlet oak, white oak (Quercus alba) and black cherry (Prunus serotina). Understory vegetation is dominated by Ericaceous species. Scrub oak dominance is reduced by shading effects between fires. Most of the woodlands within the Calverton fence and in the upland sections near Linus Pond, Jones Pond, and Grassy Pond fall within this plant community.

Oak-Pine Woodlands - In many upland areas near buildings, fires have been successfully suppressed, reducing pitch pine dominance and increasing the dominance of tree oak species and exotic species that are not dependant on periodic fires. These woods are dominated by white oak, black oak, black locust (Robinia pseudoacacia), and black cherry. Understory vegetation is often dominated catbriar (Smilax spp.), poison ivy (Rhus radicans), Japanese honeysuckle (Lonicera japonicus) and Virginia creeper (Parthenocissus quinquifolia). Examples of this plant community are located near Calverton buildings and at scattered locations throughout the area within the fence.

Successional Pine Barrens Grassland - In mowed sites and along roads, native grass species are often dominant with herbaceous species found throughout sunny areas of the coastal pine barrens. These grasslands are dominated by little bluestem (Andropogon scoparius), spike grass (Danthonia spicata), and switchgrass (Panicum virgatum). Dominant herbs include asters (Aster spp.), false indigo (Baptisia tinctoria), goldenrod (Solidago spp.), and sweet fern (Comptonia peregrina). Diversity in this community ranges from very low in areas that are frequently mowed, such as the runway aprons of the site, to very high at less frequently disturbed woodland edges and along pine barrens sand roads.

Red Maple-Pitch Pine Woodlands - In most lowlying areas between dry pine barrens and permanent wetlands, is a band of woods dominated by red maple (Acer rubrum), pitch pine, and sourgum (Nyssa sylvatica) with an understory of sweet pepperbush (Clethra alnifolia), swamp azalea (Rhododendron viscosum), and inkberry (Ilex glabra). This is the habitat where mountain bellwort (Uvularia puberula), an endangered species, is found. Good examples of this habitat are located at the northern ends of Linus and Jones Ponds, and around Kents Pond.

Coastal Plain Pond Shores (water/wetlands) - In New York (found only in central and eastern Long Island) the coastal plain pond shore community occurs in shallow topographic depressions that are wet in years with high rainfall and dry in years with low rainfall. Fluctuating water levels maintain these sites in the earliest stages of succession. An unusual

assemblage of annual species and short-lived perennials occur in this community. Many are restricted only to this community. These species include short-beaked bald rush (Psilocarya nitens), long-beaked baldrush (Psilocarya scirpoides), coppery St. John's wort (Hypericum denticulatum), and rose pink (Coreopsis rosea). The Navy property occupies a large part of the greatest concentration of this pond/wetland type in New York. Best occurrences include Sandy Pond, Third Pond, and Linus Pond.

Coastal Plain Poor Fen - In sections of the river with permanent standing, slow-moving water, sedge and cattail marshes form with a low density assembly of shrubs and stunted trees. This community is currently known from only three sites on Long Island, and is dominated by narrow-leaf cattail (Typha angustifolia), a sedge (Carex lasiocarpa), Walter's sedge (Carex walteriana), and a group of low shrubs and trees including bayberry (Myrica gale), swamp azalea, red maple, and rose species (Rosa spp.). The only occurrence on Navy property is east of Kents Pond.

Pine Barren Shrub Swamp (Brush wetlands) - In stable areas along pine barrens rivers, organic mats form from sedge, grass, and cattail build up. After this organic material consolidates, larger shrub thickets form which are dominated by red maple, sweet pepperbush, rose species, and blueberry (Vaccinum corymbosum). The best occurrence of this community is located west of Jones Pond.

Coastal Plain Pond (water/wetlands) - In pine barrens areas with open standing water and no regular flow, coastal plain pond vegetation occurs. Some of these ponds have organic accumulations on their bottoms while others have sandy bottoms. Emergent and submerged species are dominant. No trees or shrubs are present. This community is dominated by arrowhead (Sagittaria spp.), a rush (Juncus militaris), bladderworts (Utricularia spp.), and spikerushes (Eleocharis spp.). This is the habitat in which knotted spikerush (Eleocharis equisetoides) and quill-leaved arrowhead (Sagittaria teres) are found. Best occurrences of this community are Jones Pond, Kents Pond, and Linus Pond.

Open Water River Channel - In sections of the Peconic River with moderate to high flow, vegetation is dominated by emergent,submerged, and floating species, including duckweed (Lemna minor), starwort (Callitriche spp.), arrowheads, and pondweeds (Potamogeton spp.). The Peconic River section south of the River Road is the only site of this community on Navy property.

c. Condition

The quality of most of the forests are only "fair", based on species composition, although the trees themselves appear to be healthy. As a result of previous fires and/or droughty and low fertility soil conditions, the forests are dominated by scrub oak (Quercus ilicifolia) and pitch pine (Pinus rigida) which are fire and drought tolerant species. These species will not mature to saw timber size. At best they may produce poles or provide firewood. Of the approximated 4000 acres of forest, only about 700 acres are classed as "pole timber". The remaining acres contain smaller size trees.

There is little or no reproduction of forest tree species particularly in the fenced area due to heavy browsing by deer.

d. Problems and Needs

While the oak trees produce mast (nuts), that is food for gray squirrels (Sciurus carolinensis), deer (Odocoileus virginianus), and wood ducks (Aix sponsa), most of the trees will never be large enough to have dens and cavities for squirrels, wood ducks, raccoons (Procyon lotor), and other wildlife.

Forest species composition is not diverse, therefore, wildlife are limited to the use of only a few food producing species.

The deer population outside the fenced portion, and throughout Long Island, is maintained in balance with the carrying capacity of the land by hunting and incidental car/deer highway accidents. Within the fenced area (outside the runway deer exclosure) the deer population is above the carrying

capacity and not controlled. This leads to over browsing of food species, prevents regeneration of browse species, and sets up a potential starvation situation. The high population of deer, in addition to the other animals which also carry deer ticks, may lead to a higher incidence of Lyme Disease.

The covered dump in the northeast corner of the fenced portion of the base has a steep, actively eroding bank, with a large active gully that is depositing sediment in wetland No. 2 (see figure 9). The "flat" portion of the fill is devoid of vegetation. The erosion should be controlled and the entire area revegetated.

The "covered dump" is one of several sites identified in a Navy Initial Assessment Study (IAS) for further study in a Remedial Investigation and Feasability Study (RI/FS). This site should not be touched until the RI/FS) is completed and a determination made on how to restore the area. If and when this comes about, it may be completed using DERA funds.

Along the north perimeter road, adjacent to New York Route 25, piles of soil have been pushed up for no apparent reason. In addition along the south perimeter road small infiltration areas have been created at frequent intervals to trap water that runs off the road. Excavated material is pushed into piles, which are unsightly and do not blend with the natural surroundings.

During the smoothing and grading of the perimeter road, graded material is left windrowed along the edge of the road instead of being uniformly spread back across the road or used to crown the road.

The oak trees that were clear cut along the east and west side of the road that parallels the east runway taxi lane, have regrown to about six to ten feet in height. If the objective of the original clear cut was low vegetation, the area needs to be recut and the stumps treated, along with planned maintenance.

In unimproved vegetation, employees, guests, hunters, fishermen, and recreationists have the highest possibility of being bitten by ticks that potentially harbor Lyme Disease as compared to their chances in improved vegetation.

Due to the natural succession (i.e. growth of trees and shrubs) encroaching on roads and the increased size of firetrucks, some fire truck roads and crash recovery roads are too narrow for easy access.

Illegal dumping on Navy property, particularly in the Southeast and Southwest buffer zones, is becoming a growing problem as on all open land on Long Island. Local land fills are closing, and tipping fees are approaching $40.00/ton for clean household waste. All hazardous wastes must be carted off Long Island. A serious problem is developing. Unscrupulous enterprises dump their hazardous waste on open land. In 1988, 90 cubic yards of construction debris was dumped on Navy land by carters and general contractors. The Navy is currently trying to reduce access to its property in a joint effort with the NYSDEC. The job of reducing access must be expanded. Apprehending and indicting violators must be given a higher priority by NYSDEC, the Navy, and local enforcement agencies.

There are a number of hunter parking areas and places on interior roads that contain soft sand where there is a high likelihood of vehicles becoming stuck.

There are a number of large holes on roads and entrance roads to parking areas that pond water during rains. These keep getting larger and deeper as people drive through them when they are ponded.

F. Fish

1. Existing Conditions

On the Navy property there are seven ponds/wetlands, one pond/lake, and the Peconic River, that according to NYSDEC's fish survey records (1938-1984), are known to support a fishery. An eighth pond/wetland, Forest Pond, presumably contains fish, as it is located between and connected with two ponds with a known fishery.

McKay Lake and the Peconic River are the only permanent water bodies. McKay Lake, is about ten acres in size. It is deeper than any of the other bodies of water because it has been diked in the past, thus it does not "go dry" when the water table drops. The other seven ponds/wetlands are shallow, semi-permanent, and watertable fed, with the exception of Preston's Pond, "go dry" occasionally during drought years. A small pocket of water normally remains in Preston's Pond in dry years.

The seven pond/wetlands that support a known fishery are North Pond, Preston's Pond, Third Pond, Linus Pond, Sandy Pond, Grassy Pond, and Jones Pond. These pond/wetlands are connected by tributaries to the Peconic River. While the fishery in these pond/wetlands is eliminated in dry years, the fishery is replaced naturally with fish from the Peconic River. Restocking is accomplished when heavy rains provide sufficient runoff, or flood waters from the river backup to connect the ponds with the river, enabling fish to swim from the river to the ponds.

The Peconic River contains a good quality fishery composed of largemouth bass (*Micropterus salmoides*), chain pickerel (*Esox niger*), yellow perch (*Perca flavescens*), brown bullheads (*Ictalurus nebulosus*), golden shiners (*Notemigonus crysoleucas*), pumpkinseed (*Lepomis gibbosus*), bluegills (*Lepomis macrochirus*), banded sunfish (*Enneacanthus obesus*), tessellated darters (*Etheostoma olmstedi*), swamp darters (*Etheostoma fusiforme*), and creek chubs (*Semotilus atromaculatus*).

The dominant sport fish, in the river, are bass, pickerel, and bullheads. The largest pickerel noted in the NYSDEC fishery survey of the river was 275 mm or about 11 inches. Regardless of these size fish NYSDEC personnel report fishermen with excellent catches of bass and pickerel downstream of Calverton. Legal size pickerel presently are 15 inches, bass are 12 inches, and any size bullheads are legal.

Of the eight ponds and McKay Lake mentioned above, Sandy Pond, Third Pond, and Linus Pond contain the largest number of species of fish. In addition to the species found in the river, NYSDEC records show that redfin pickerel (Esox americanus americanus) occur in both Sandy Pond and Grassy Pond. Information on size of fish is not available for all the ponds so the quality of the fishery cannot be judged.

McKay Lake contains an excellent quality fishery composed of largemouth bass, bluegills, and pumpkinseeds. NYSDEC fish surveys recorded largemouth bass as large as 488 mm, (19 1/4 inches), bluegills 281 mm, (11 inches), and pumpkinseed to 242 mm, (9 1/2 inches) in size. These bluegills are exceptionally large as they normally range from six to nine inches in size.

As a result of interviews with a number of people at Calverton, there appears to be little fishing in McKay Lake. During the Spring of 1989, fishing has increased by Navy and GAC personnel. The large size fish in the Lake may be attributed in part to the fact that in the past NYSDEC has seined and removed small fish from the Lake for stocking in other waters.

The record size bluegill caught by a fisherman in New York according to NYSDEC records is two pounds four ounces. While there is no way to accurately estimate the weight of the 11 inch bluegills that occur in McKay Lake, it is safe to say that the lake contains "trophy" size bluegills.

In addition to the pond/wetlands discussed above, there are a number of additional pond/wetlands on Navy property. Some of these may contain fish, however due to the shallow nature and small size, any fishery is insignificant.

2. Problems and Needs

With the exception of McKay Lake it is virtually impossible to manage the fishery in any of the pond/wetlands because of their shallowness combined with the fluctuating watertable. These bodies of water would need to be deepened to maintain a manageable and sustained fishery. NYSDEC personnel reported that most of the pond/wetlands "dried up" or were nearly dry in 1981 and again in 1988.

A large bed of submerged aquatic plants is present in the Lake. It is desirable to keep the Lake nearly weed free to reduce hiding places for small bluegills so it will be easier for bass to feed on the bluegills and thus keep their population under control.

NYSDEC Regional Fisheries Manager's correspondence indicates that in some past years the bass population in McKay Lake was stunted. Angling pressure could have removed some of the fish and provided recreation rather than the NYSDEC removal of the fish by seining.

G. Wildlife

1. Existing Conditions

The Navy property is dominated with woodland wildlife species. There is a relatively good population of white-tailed deer and low natural populations of ring-necked pheasants (*Phasianus colchicus torquatus*), bobwhite quail (*Cloinus virginianus*), cottontail rabbits, (*Sylvilaqus floridanus*), woodchucks (*Marmota monax*), gray squirrels, raccoon, red fox (*Vulpes fulva*), opossum (*Didelphise virginiana*), and weasel (*Mustela erminea*). There is a variety of songbirds. A more complete list of wildlife (vertebrate forms) should be contained in the Wildlife Management Plan (Section 2). Appendix F contains a list of breeding songbirds of the Calverton area.

Associated with the wetlands, ponds, streams, and the river are a variety of marsh and shorebirds, migrating waterfowl, Canadian geese (Branta canadensis), woodcock (Philohela minor), muskrats (Ondatra zibethica), and mink (Mustela vison). Of the migrating waterfowl, a few black ducks (Anas rubripes), and wood duck remain throughout the summer to nest and raise their young.

There is a fair size flock of Canadian geese that reside on or near McKay throughout the year. These geese have not caused a BASH problem to date.

There are a number of state listed threatened, endangered, or special concern species of wildlife that occur on Calverton. These will be discussed under "Threatened, Endangered, and Rare Species".

2. Problems and Needs

There is a general lack of diversity in the types of cover on the Navy property, particularly in the buffer zones, and a lack of a variety of plant species in each cover type for all species of wildlife.

The primary deer foods are grasses, oak (mast and browse) and lowbush blueberry (browse). There are few legumes and browse species are minimal.

There is a lack of grass nesting cover and annual food plants for pheasants.

There is a lack of grass nesting cover for ducks adjacent to wetlands. Most of the vegetation around the wetlands is trees and shrubs.

Deer can be a hazzard for aircraft taking off and landing. Most deer have been excluded from the runway area by an electric deer fence which was constructed 500 feet from the runways along the west, north, and east sides extending south to the perimeter fence. Most of the deer were driven out of the "deer enclosure area". Concentrated deer use in the area between the electric fence and the peripheral fence. According to NYSDEC wildlife biologists, and

as evidenced by little forest regeneration and a browse line on existing vegetation, the deer population is above the carrying capacity of the land. This is having a negative impact on the ecosystem by preventing species that are preferred browse from regenerating and allowing less desirable species to regenerate. Overpopulation also places stress on the deer themselves.

Songbirds that nest and or feed along the runways can potentially collide with aircraft which are taking off and landing.

In droughty years when many wetlands "go dry", nesting ducks must take their young on a long dangerous journey overland to find permanent water.

H. Threatened, Endangered, and Rare Species 1/

1. Background and Study

In 1986 and 1987 a study was undertaken by the staff of the New York Natural Heritage Program (NYNHP) to review and determine the status of endangered, threatened, vulnerable, and rare species on Calverton. The study includes a compilation of information on historical and recently reported localties of rare plants and animals. During 1986 and 1987 the staff conducted field surveys of the former sites to determine the current status of the rarities, and surveys of new potential habitats were undertaken to identify previously unknown occurrences.

1/ Source: "Rare Plants and Animals of the NWIRP, Calverton, Long Island, New York", New York Natural Heritage Program, Div. of Fish and Wildlife, Department Environmental Conservation, Wildlife Resources Center, Delmar, NY, Dec. 1987. In 1989 the NYS Environmental Conservation Law was revised to include a list of threatened, endangered, rare, and exploitably vulnerable plants. This replaces the NYS Museum list of rare plants. In this Natural Resources Plan, the Conservation Law status was used instead of the NYS Museum ranking which was in the above Natural Heritage publication.

The U.S. Endangered Species Act (hereafter referred to as the Federal list), protects listed plant and animal species from import, export, interstate commerce or sale. Additional Federal laws protect migratory birds and marine mammals. No species or habitat of federally listed species were identified on Calverton, however, migrating species such as the bald eagle may occasionally move through the area.

The New York State Environmental Conservation Law protects threatened, endangered, rare, and exploitably vulnerable plant species against removal without the landowners permission. The penalty is $25.00 per violation (per plant). These are the more showy plants which are vulnerable to picking by wildflower enthusiasts and commercial collectors. No attempt was made to inventory the exploitably vulnerable plants on this list.

The NYNHP "Rare Plant Status List"(Clemants 1987) and the New York State Environmental Conservation Law contain ranked listings of rare vascular plants in New York State. These lists are very similar. Only the Environmental Conservation Law affords plants any legal protection.

The NYNHP ranking system uses two scales to measure relative rarity. Each species is assigned a global and a state rank. The global rank reflects the rarity of the species throughout the world and the state rank reflects the rarity within New York State. Both ranks are usually based on the number of known populations. Intraspecific taxa are also assigned a taxon rank to reflect the infraspecific taxon's rank throughout the world. The Heritage plant ranking criteria and plant legal status according to New York State Conservation Law are enumerated in Tables 7 and 8, as they are referred to in later tables for species that occur on Calverton.

Animal protection in New York State is complicated by a variety of legislative actions protecting different taxonomic groups.

TABLE 7: NEW YORK STATE PLANT LEGAL STATUS

The following catagories are defined in regulation 6 of New York Conservation Rules and Regulations part 193.3 (amendment pending) and apply to New York JState Environmental Conservation Law section 9-1503.

E = Endangered Species: listed species are those with
1) 5 or fewer extant sites, or
2) fewer than 1,000 individuals, or
3) restricted to fewer than 4 U.S.G.S. 7 1/2 minute topographical maps, or
4) species listed as endangered by the U.S. Department of Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened; listed species are those with
1) 6 to fewer than 20 extant sites, or
2) 1,000 to fewer than 3,000 individuals, or
3) restricted to not less than 4 or more than 7 U.S.G.S. 7 1/2 minute topographical maps, or
4) listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11

R = Rare: listed species have
1) 20 to 35 extant sites, or
2) 3,000 to 5,000 individuals statewide.

V = Exploitably vulnerable: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked. (The attached list does not contain a complete list of the species in this category.

New York State's Environmental Conservation Law protects some species by listing them on New York's Endangered, Threatened, and Special Concern Species List. Species listed as endangered or threatened are protected against taking, importation, transportation, possession or sale. Special concern species usually have no legal protection unless they fall into those taxa protected by another piece of federal or state legislation. A summary of New York State Animal Protection Status definitions are presented in Table 9.

The NYNHP Rare Animal Status List is a ranked listing of rare animals in New York State. Like its plant counterpart, the Heritage animal list incorporates current data on the number of known occurrences into its ranking system and is updated periodically. The ranking system is the same as that described for plants in Table 8. Unless protected by state or federal legislation, the species on this list have no legal protection.

TABLE 8: NEW YORK STATE NATURAL HERITAGE PROGRAM RANKS AND DEFINITIONS

GLOBAL RANK

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences, or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.
G2 = Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.
G3 = Either very rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.
G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GH = Historically known, with the expectation that it might be rediscovered.
GX = Species believed extinct.
GU = Status unknown.

STATE RANK

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 = Apparently secure in New York State.
S5 = Demonstrably secure in New York State.
SH = Historically known from New York State, but not seen in the past 15 years.
SX = Apparently extirpated from New York State.
SE = Exotic, not native to New York State.
SR = State Report only, no verified specimens known from New York State.
SU = Status in New York State is unknown.

TAXON RANK

The T-ranks are defined the same way the Global ranks are but the T-rank only refers to the rarity of the subspecific taxon not the rarity of the species as a whole.

A "Q" indicates a question exists whether or not the taxon is a good taxonomic entity.

A "?" indicates a question exists about the rank.

TABLE 9: NEW YORK STATE ANIMAL PROTECTION STATUS

Categories of endangered and threatened species are defined in New York State Environmental Conservation Law, section 11-0535. Protected, unprotected, and game species are defined in Environmental Conservation Law, section 11-0103.

E = Endangered Species: any species which meets one of the following criteria:
1) Any native species in imminent danger of extirpation or extinction in New York.
2) Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened Species: any species which meet one of the following criteria:
1) Any native species likely to become an endangered species within the foreseeable future in New York.
2) Any species listed as threatened by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

SC= Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law Section 11-0535 (Endangered and Threatened Species).

P = Protected wildlife: wild game, protected wild birds, and endangered species of wildlife as defined in the environmental conservation law.

U = Unprotected: the species may be taken at any time without limit; however a license to take may be required.

G = Game: any of a variety of big game or small game species as stated in the environmental conservation law; many normally have an open season for at least part of the year, and are protected at other times.

From the preceding discussion of rare plants and animals in New York State, there are differing opinions as to which species are truly rare. Since one purpose of the 1986-87 NYNHP study on Calverton was to review and determine the status of rarities, it was necessary to develop a working list of species to be considered for study at Calverton. The working list consisted of a combination of species from several lists including: all Suffolk County, New York State federally listed endangered and threatened species; all Suffolk County, New York State federally listed candidate species; all Suffolk County,New York State listed endangered, threatened, and special concern species; and all Suffolk County Heritage listed species with state ranks of SH, S1, S2, or S3.

It became obvious early in the NYNHP study on Calverton that this working list would need constant revision. During the course of the two year study, species were added to both the Federal and State lists. Heritage ranks were revised to reflect new data so that some species originally deemed rare enough to be ranked S3 turned out to be common after several field seasons. Early field surveys made it clear that there was no suitable habitat on Calverton for certain species on the original working list. Field surveys took into account these revisions. The data presented in the remaining sections of this report represent the status of species that would be deemed "rare" using the combined lists as they exist today.

The first phase of the NYNHP survey was to gather existing data on rare plants and animals from the study area. Collections at the New York State Museum, the New York Botanical Garden, the Brooklyn Botanical Garden, Cornell University and the American Museum of Natural History were searched for specimens collected from the Calverton area. Pertinent literature was reviewed for historical observations of rare plants and animals. The files of the New York State Department of Environmental Conservation Endangered Species, Significant Habitat and Nongame Units were reviewed for pertinent information. Data from the NYNHP and other existing inventories based on field surveys (such as the New York State Breeding Bird Atlas) were gathered. Individuals with knowledge of Long Island flora and fauna were also consulted. A list of rare plants and animals and their former locations was compiled from these sources.

Aerial photographs, soil, geology, and topographic maps were reviewed to identify potential habitats for new occurrences of rare plants and animals.

Field surveys by NYNHP staff were conducted during the spring, summer, and fall of 1986 and 1987. Efforts were made to provide additional documentation fromearlier records and to identify new occurrences of rare plants and animals. Data were recorded on NYNHP site survey summaries, special plant or special animal forms, and element occurrence records.

All existing occurrences of rare plants and animals for which precise locational information was available were mapped on the standard United States Geological Survey 7.5 minute topographic maps.

2. Existing Conditions

Twenty-nine rare plant species have historical records from the vicinity of Calverton. Of these, 17 have been confirmed since 1984. No Federally listed or candidate plant species have historical or extant records from the study area.

Nineteen rare animals have been recorded historically from the study area. Of these, seven have been confirmed on Navy property. Four additional songbirds have been confirmed in the vicinity of Calverton during recent breeding bird atlas surveys and habitat does occur on Navy property. None of the recent records represent Federally listed species or candidate species. These results are summarized in Tables 10 and 11.

Some existing records could not be confirmed. There are at least three reasons why populations might not be documented. First, the original locational information is sometimes imprecise. For example, a typical herbarium label might have given only "Wading River" as a site name. Bird Atlas records indicate one only the "atlas block" in which a species has been observed. Under these circumstances it is possible that the species never really occurred on Calverton property. A second possibility is that the species was there at one time but has since been extirpated. A third alternative is that the species is still present but was overlooked during the field survey. Some animal species, because of their secretive behavior, are very difficult to inventory. Certain pond shore plants may only be observed in a low water year.

Figure 13 shows the "Location of Confirmed Threatened, Endangered, Rare, and Special Concern Plants and Animals". Each species found on a particular topographic map is listed in numerical order by dot number on the map. The species confirmed at each location and shown on Figure 13 are listed in Table 12. Different map symbols were used to denote the degree of precision with which each occurrence was mapped.

Figure 13

See Back of Report

TABLE 10: NEW YORK STATE LISTED THREATENED, ENDANGERED, AND SPECIAL CONCERN PLANTS REPORTED FOR THE RARE PLANTS ON CALVERTON AREA[1]/

Species Scientific Names	Common Name	Hist. Records	Sites> 1970	NYNHP Rank[2]/		NYS Status[3]/	Presence Confirmed on Calverton
AGALINUS VIRGATA	PINE-BARRENS GERARDIA	1	0	G3G4	S2	R	--
ARTHUSA BULBOSA	SWAMP PINK	3	0	G4	S2	R	--
ASTER CONCOLOR	SILVERY ASTER	2	0	G4?	S1	E	--
BOTRYCHIUM ONEIDENSE	BLUNT-LOBED GRAPE FERN	1	0	G3G5Q	S1S3	--	--
CAREX BULLATA	BUTTON SEDGE	1	0	G5	S1	T	--
CAREX HORMATHODES	SEDGE	2	0	G3G4	S1	R	--
COREOPSIS ROSEA	ROSE COREOPSIS	1	4	G3	S3	R	Yes
DESMODIUM GLABELLUM	TALL TICK-CLOVER	1	0	G5	S1	T	--
DESMODIUM LAEVIGATUM	SMOOTH TICK-CLOVER	1	0	G5	SH	--	--
ELEOCHARIS EQUISETOIDES	KNOTTED SPIKERUSH	1	2	G4	S2	T	Yes
ELEOCHARIS TRICOSTATA	THREE-RIBBED SPIKERUSH	1	0	G3G4	S2	T	--
HYPERICUM DENTICULATUM	CUPPERY ST. JOHNS-WORT	0	1	G5	S1	E	Yes
LACHNANTHES CAROLINIANA	CAROLINA REDROOT	3	0	G4	S1	T	--
LECHEA TENUIFOLIA	SLENDER PINWEED	0	1	G5	S2	R	Yes
LISTERA AUSTRALIS	SOUTHERN TWAYBLADE	1	0	G4	S2	R	--
LOBELIA NUTTALLII	NUTTALL'S LOBELIA	0	5	G4G5	S3	R	Yes
LUDWIGIA SPHAEROCARPA	LUDWIGIA	1	4	G5	S3	R	Yes
PROSPERPINACA PECTINATA	COMB-LEAVED MERMAID-WEED	1	3	G5	S2	R	Yes
PSILOCARYA NITENS	SHORT-BEAKED BALD-RUSH	0	4	G3	S2	R	Yes
PSILOCARYA SCIRPOIDES	LONG-BEAKED BALD-RUSH	0	3	G4	S3	R	Yes
RHYNCHOSPORA INUNDATA	DROWNED HORNED RUSH	3	0	G3G4	S1	E	--
SAGITTARIA TERES	QUILL-LEAF ARROWHEAD	1	1	G3	S1	E	Yes
SCLERIA RETICULARIS VAR RETICULARIS	RETICULATED NUTRUSH	0	2	G4TU	S3	R	Yes
UTRICULARIA BIFLORA	TWO-FLOWERED BLADDERWORT	1	3?	G5	S1	R	Yes
UTRICULARIA FIBROSA	FIBROUS BLADDERWORT	3	3?	G4G5	S2	R	Yes
UTRICULARIA GEMINISCAPA	HIDDENFRUIT BLADDERWORT	2	1	G4G5	5253	R	Yes
UTRICULARIA JUNCEA	RUSH BLADDERWORT	0	3	G5	S2	R	Yes
UTRICULARIA RADIATA	SMALL FLOATING BLADDERWORT	1	4	G4	S2	R	Yes
UVULARIA PUBERULA	MOUNTAIN BELLWORT	1	2	G5	S1	E	Yes

1/ Rare Plants and Animals of NWIRP Calverton, Long Island, NY, Dec. 1987, New York Natural Heritage Program, Wildlife Resources Center, Delmar, NY 12054.
2/ See Table 8 for description of symbols used.
3/ See Table 7 for description of sumbols used.

TABLE 11: NEW YORK STATE LISTED THREATENED, ENDANGERED, RARE AND SPECIAL CONCERN ANIMALS REPORTED FOR THE CALVERTON AREA[1]/

Species Scientific Names	Common Name	Hist. Records	Sites> 1970	NYNHP Rank[2]/		NYS Status[3]/	Presence Confirmed on Calverton
ACRIS CREPITANS	NORTHERN CRICKET FROG	1	0	G5	S1	T	--
AMBYSTOMA MACULATUM	SPOTTED SALAMANDER	0	1	G5	S5	SC U	Yes
AMBYSTOMA TIGRINUM	TIGER SALAMANDER	1	8	G5	S2	E	Yes
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW	many	5	G4	S4	SC P	Yes
CATOCALA HERODIAS GERHARDI	PINE BARRENS UNDERWING MOTH	2	1	G3T3	S2S3	U	Yes
CHORDEILES MINOR	COMMON NIGHTHAWK	2	0	G5	S4	SC P	--
EMPIDONAX VIRESCENS	ACADIAN FLYCATCHER	many	1	G5	S3	P	--?[4]/
ENNEACANTHUS OBESUS	SPOTTED SALAMANDER	0	2	G5	S5	U SC	Yes
HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	1	3	G4T2T3	S2	SC U	Yes
HETERODON PLATYRHINOS	EASTERN HOGNOSE SNAKE	1	0	G5	S4	SC U	--
ICTERIA VIRENS	YELLOW-BREASTED CHAT	many	1	G5	S3	P	--?[4]/
KINOSTERNON SUBRUBRUM	EASTERN MUD TURTLE	3	0	G5	S1	T	--
LOXIA CURVIROSTRA	RED CROSSBILL	0	1	G5	S3	P	--?[4]/
POOECETES GRAMINEUS	VESPER SPARROW	many	3	G5	S5	SC P	--?[4]/
RANA SPHENOCEPHALA	SOUTHERN LEOPARD FROG	1	0	G5	S3	SC G	--
SCAPHIOPUS HOLBROOKII	EASTERN SPADEFOOT	1	0	G5	S3	U	--
SIALIA SIALIS	EASTERN BLUEBIRD	many	4	G5	S5	SC P	Yes
SPEYERIA IDALIA	REGAL FRITILLARY	1	0	G3	S1	U	--
SYLVILAGUS TRANSITIONALIS	NEW ENGLAND COTTONTAIL	0	0	G4	S3	SC G	--

1/ Rare Plants and Animals of NWIRP Calverton, Long Island, NY, Dec. 1987, New York Natural Heritage Program, Wildlife Resources Center, Delmar, NY 12054.
2/ See Table 8 for description of symbols used.
3/ See Table 9 for description of symbols used.
4/ Confirmed in the vicinity of Calverton during Breeding Bird Atlas Survey but not not confirmed by 1986-1987 field survey. Habitat does exist on Navy property.

TABLE 12: LIST OF CONFIRMED THREATENED, ENDANGERED, RARE, AND SPECIAL CONCERN PLANT AND ANIMAL SPECIES OCCURRENCES SHOWN IN FIGURE 13[1]/ (Page 1 of 3)

MAP DOT NUMBER	SCIENTIFIC NAME	COMMON NAME	TYPE 2/	HABITAT QUALITY RANK 3/
2	**(Landfill Site Wetland/Pond)**			
2	AMBYSTOMA MACULATUM	SPOTTED SALAMANDER	A	A
2	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	B
2	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	P	BC
6	**(Prestons Pond Meadow)**			
6	SIALIA SIALIS	EASTERN BLUEBIRD	A	C
6	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	I	D
7	**(Toppings Path Woodland - West Central)**			
7	CATOCALA HERODIAS GERHARDI	PINE BARRENS UNDERWIND MOTH	I	B
8	**(Toppings Path Road Woodland - Central)**			
8	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	I	D
14	**(Toppings Path Road Woodland-Southwest Corner)**			
14	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	I	C
20	**(Linus Pond - North End)**			
20	ENNEACANTHUS OBESUS	BANDED SUNFISH	F	BC
20	LUDWIGIA SPHAEROCARPA	LUDWIGIA	P	A
20	PSILOCARYA NITENS	SHORT-BEAKED BALD-RUSH	P	C
20	PSILOCARYA SCIRPOIDES	LONG-BEAKED BALD-RUSH	P	C
20	UTRICULARIA JUNCEA	RUSH BLADDERWORT	P	B
20	UVULARIA PUBERULA	MOUNTAIN BELLWORT	P	BC
20A	**(Linus Pond - Moist Woodland North End)**			
20A	UVULARIA PUBERULA	MOUNTAIN BELLWORT	P	BC
21	**(Sandpit Ponds)**			
21	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	B
21	COREOPSIS ROSEA	ROSE COREOPSIS	P	B
21	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	I	B
21	PROSERPINACA PECTINATA	COMB-LEAVED MERMAID-WEED	P	BC
21	UTRICULARIA RADIATA	SMALL FLOATING BLADDERWORT	P	B
21A	**(Sandpit Ponds Woodland)**			
21A	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	I	B

1/ Rare Plants and Animals of NWIRP Calverton, Long Island, NY, Dec. 1987, New York Natural Heritage Program Wildlife Resources Center, Delmar, NY 12054.
2/ P=Plant, I=Insect, F=Fish, A=Amphibian, B=Bird
3/ "A" is excellent quality habitat through "D" which is low quality.

TABLE 12: LIST OF CONFIRMED THREATENED, ENDANGERED, RARE, AND SPECIAL CONCERN PLANT AND ANIMAL SPECIES OCCURRENCES SHOWN IN FIGURE 13 (Page 2 of 3)

MAP DOT NUMBER	SCIENTIFIC NAME	COMMON NAME	TYPE	HABITAT QUALITY RANK
23	**(Sand Pond - West)**			
23	ELEOCHARIS EQUISETOIDES	KNOTTED SPIKERUSH	P	A
23	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	P	C
23	LUDWIGIA SPHAEROCARPA	LUDWIGIA	P	C
23	SAGITTARIA TERES	QUILL-LEAF ARROWHEAD	P	AB
23	UTRICULARIA FIBROSA	FIBROUS BLADDERWORT	P	B
23	UTRICULARIA BIFLORA	TWO-FLOWERED BLADDERWORT	P	B
23	UTRICULARIA JUNCEA	RUSH BLADDERWORT	P	C
26	**(Grassy Pond)**			
26	ENNEACANTHUS OBESUS	BANDED SUNFISH	F	C
26	LUDWIGIA SPHAEROCARPA	LUDWIGIA	P	C
30	**(Third Pond - Calverton)**			
30	COREOPSIS ROSEA	ROSE COREOPSIS	P	A
30	HYPERICUM DENTICULATUM	COPPERY ST. JOHN'S WORT	P	AB
30	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	P	B
30	PROSERPINACA PECTINATA	COMB-LEAVED MERMAID-WEED	P	A
30	PSILOCARYA NITENS	SHORT-BEAKED BALD-RUSH	P	B
30	SCLERIA RETICULARIS VAR. RETICULARIS	RETICULATED NUTRUSH	P	A
30	UTRICULARIA RADIATA	SMALL FLOATING BLADDERWORT	P	A
32	**(Jones Pond - Southend)**			
32	LUDWIGIA SPHAEROCARPA	LUDWIGIA	P	AB
32	PSILOCARYA SCIRPOIDES	LONG-BEAKED BALD-RUSH	P	B
33	**(Twin Ponds - West)**			
33	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	A
33	UTRICULARIA BIFLORA	TWO-FLOWERED BLADDERWORT	P	B
33	UTRICULARIA GEMINISCAPA	HIDDENFRUIT BLADDERWORT	P	B
34	**(Twin Ponds - East)**			
34	ELEOCHARIS EQUISETOIDES	KNOTTED SPIKERUSH	P	B
34	UTRICULARIA JUNCEA	RUSH BLADDERWORT	P	BC

TABLE 12: LIST OF CONFIRMED THREATENED, ENDANGERED, RARE, AND SPECIAL CONCERN PLANT AND ANIMAL OCCURRENCES SHOWN IN FIGURE 13 (Page 3 of 3)

MAP DOT NUMBER	SCIENTIFIC NAME	COMMON NAME	TYPE	HABITAT QUALITY RANK
35	**(Open Field East of Line Road Adjacent to Swan Pond Road)**			
35	AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW	B	B
54	**(Bald Hill Ponds)**			
54	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	C
88	**(Forest Pond)**			
88	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	C
88	COREOPSIS ROSEA	ROSE COREOPSIS	P	C
88	PSILOCARYA NITENS	SHORT-BEAKED BALD-RUSH	P	CD
88	PROSERPINACA PECTINATA	COMB-LEAVED MERMAID-WEED	P	C
88	UTHRICULARIA RADIATA	SMALL FLOATING BLADDERWORT	P	B
130	**(Preston's Pond)**			
130	UTRICULARIA RADIATA	SMALL FLOATING BLADDERWORT	P	A
250	**(Wetland - Northwest Portion of Base)**			
250	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	P	C
250	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	C
252	**(North Pond)**			
252	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	A
252	COREOPSIS ROSEA	ROSE COREOPSIS	P	BC
252	LOBELIA NUTTALLII	NUTTALL'S LOBELIA	P	BC
261	**(Runway Ponds)**			
261	AMBYSTOMA TIGRINUM	TIGER SALAMANDER	A	B
292	**(Sandy Pond (West) - West Shore) — MAY NOT BE ON NAVY PROPERTY**			
292	PSILOCARYA NITENS	SHORT-BEAKED BALD-RUSH	P	A
292	PSILOCARYA SCIRPOIDES	LONG-BEAKED BALD-RUSH	P	A
292	SCLERIA RETICULARIS VAR. RETICULARIS	RETICULATED NUTRUSH	P	A
298	**(Open Area Along Northwest Access Road)**			
298	LECHEA TENUIFOLIA	SLENDER PINWEED	P	C
300	**(Moist Woodland North and West of Jones Pond to Kents Pond and Twin Ponds)**			
300	UVULARIA PUBERULA	MOUNTAIN BELLWORT	P	AB
301	**(Woodland-West Portion of Base)**			
301	HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	I	B

The circles on Figure 13 indicates that the exact location of a species is known to occur under the dot. In sites with multiple species occurrences, the dot number will correspond to several species. The dot numbers are not consecutive because there are additional rare species on each topographic map, that may occur outside the Calverton boundary. In general, historic records that were not confirmed during the field surveys, and recent records lacking precise locational information, are not mapped on the topographic maps.

Several rare plants were found on the west shore of Sandy Pond. These may or may not be on Navy property depending on the exact location of the property line.

Each species found during the field surveys, or with historical or recent records that could be traced to Calverton property, is treated in a "species account sheet". These are included in Appendix G, "Threatened, Endangered, Rare, and Special Concern Plant and Animal Species Account Sheets". Included in these are the current rarity rank of the species based on the NYNHP global and state ranks, the current federal status if any, and the occurrence of the species on other New York State lists including the New York State Museum Rare Plant List and the New York State Endangered, Threatened, and Special Concern Species List. Taxonomic notes, relative rarity, descriptions of each species, information on its habitat and ecology, and distributional information is also given. Information on threats to the population and management recommendations are included for all confirmed species or species with reliable records dated later than 1980.

The "species account sheets" also list historical records from museums and older literature sources. More recent records from about 1980 that were not confirmed in the field surveys, are also included. In cases where precise locational information is not available, the best available location data are provided. For bird atlas blocks, these data take the form of New York Transverse Mercator coordinates, which corresponds to the blue tick marks found along the margins on United States Geological Survey USGS 7.5 minute topographic maps.

3. Problems and Needs

a. The invasion of hardwoods and pines into open tall grass fields will gradually eliminate the habitat for bluebirds and grasshopper sparrows and will eliminate slender pinweed.

b. Trampling by people, and crushing by off-road vehicles (ORV) is detrimental to and may eliminate many sensitive plants like rose coreopsis, coppery St. John's-wort, Nuttall's lobelia, comb-leaved mermaid-weed, short-beaked bald-rush, and reticulated nutrush.

c. The application of herbicides on or near sites with "rare" plants may eliminate them by direct contact, as a result of drift or the leaching into waters containing the plants. All plants are susceptable to this form of destruction, particularly long-beaked bald-rush, quill-leaf arrowhead, and the bladderworts.

d. Suppression of all fires within the habitat of the Pine Barrens and the Coastal Barrens underwing buckmoth is detrimental to these insects, as occassional burns are required to perpetuate its habitat.

e. Spraying of Pine Barrens and Coastal Barrens underwing buckmoth habitat for gypsy moth may elimate all the moths.

f. Destruction of habitat by construction equipment, development, draining, or dredging of pond/wetlands can eliminate a species inhabiting the site.

g. Clearing, and the construction of roads or barriers between ponds/wetlands and upland woodland can reduce or prevent spotted and tiger salamander from reaching their breeding grounds and adversely effect the species.

h. Stocking fish in ponds used by spotted and tiger salamanders can adversely effect the species since some fish eat salamander eggs.

i. The NYNHP survey of birds was not as thorough as desired, particularly in the fenced portion of the Base.

III. MANAGEMENT PRACTICES AND MAINTENANCE PROCEDURES

A. Objectives

Wise use of natural resources is essential to the continued strength of our nation. Our natural heritage provides the foundation upon which the defense of freedom rests. The Navy is committed to conserving and managing soil, water, forest, fish, wildlife, and outdoor recreational resources. The Navy's primary purposes in managing these natural resources are to support our national defense mission, maximize multiple land use benefits, and fulfill land stewardship responsibilities required by applicable Laws, Executive Orders, and Department of Defense Directives.[1]

The following are the objectives for the use and management of the land and associated natural resources at Calverton:

1. Use the land to accomplish the Military Mission as stated in the Introduction, item B, 1.

2. Encourage public use of Navy property outside the fenced area for hunting, fishing, canoeing, nature study, and general recreation to the maximum extent that is compatable with the Navy mission and use.

3. Diversify the landscape and utilize the natural resources to the maximum extent feasible while at the same time perpetuating quality resources on a sustained yield basis in an easthetic manner.

4. Perpetuate quality natural resources on a sustained yield basis by reducing point source and non point source pollution to acceptable levels and by applying appropriate forest and wildlife management practices.

5. Within the runway deer exclosure manage against deer and other wildlife that have potential to interfere with aircraft flights.

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[1] Real Estate and Natural Resources Procedural Manual, U.S. Department of the Navy, Navy Facilities Engineering Command, Vol. II, May 1987.

6. Enhance the quality of life for Navy personnel.

7. Reduce grounds maintenance costs and produce income to pay for program costs.

8. Reduce potential for collisions between birds and animals and aircraft on Navy airfield.

9. Avoid unnecessary conflicts between mission requirements and natural resource legal mandates.

10. Demonstrate to the public that the Navy is taking care of invaluable land, water and wildlife resources.

B. Management Analysis

The following is an analysis of the general potential for the management of Calverton's natural resources to achieve the objectives stated above. Site specific recommendations are contained in item C which follows.

1. Landscape

In general, the landscape is being managed adequately. There are a few additional opportunities to advance the objectives.

a. Identified Opportunities:

The former engine cocoon storage area can be screened with vegetation and the portion that will not be used in the future can be seeded or it could be reforested with NAVFAC forestry funds.

Road grading and shaping techniques can be improved to create better drainage, eliminate erosion, and eliminate berms along the road.

Areas exposed by construction operations, etc. can be seeded with either temporary or permanent seedings depending on the anticipated duration of exposure.

Trees can be planted to provide shade where employees can enjoy their lunches outdoors.

Any new interior roads and/or fire breaks may be curved to prevent long straight visual lines and thus improve the aesthetics on approval of NAVPRO.

To reduce bird/aircraft collision potential, continue to maintain clear zone along runways in vegetation eight to ten inches tall.

Reduce mowing operations of clear zone from five times per year to an as needed basis to keep out hardwood invasion and keep vegetation under ten inches high.

Plant alcoves and inside corners around buildings to low maintenance plants.

b. Proposed Landscape Maintenance.

Refer to the Grounds Maintenance Manual for appropriate species, plant establishment techniques, irrigation, nutrient application, pest management, mowing and pruning recommendations.

2. Agriculture

Over the past several years, there has been a downward trend of agricultural acreage in Suffolk county. The Command has no interest in dedicating land inside the fence for agricultural use. The only viable agricultural use would come from sod farmers or vinters. Sod farming has environmental constraints and wine grape vineyards require lease terms in excess to what the Navy traditionally enters into. Additionally, the security aspects of this concept would prevent its implementation.

Currently much of the open land outside the fenced area that has suitable soils for agricultural use is in the agricultural outlease program. There are several other areas that could be used for agriculture. These are

the fields on the east and west sides of the Line Road just south of Swan Pond Road (42 acres), the large open areas east of Wading River Road between Swan Pond Road and Manor Road (112 acres), and the northeast most field adjacent to Fresh Pond Road in the northeast buffer zone (29 acres). (See Figure 14.) These areas have previously been used for agricultural outlease, but are now used for wildlife habitat.

Soil erosion can be kept to acceptable levels if leasees follow a conservation plan using such conservation practices as conservation cropping systems, sod waterways, diversions, etc. The kind and number of practices required in a field depends on drainage area, crops grown, sequence of crops, etc.

The chances of contaminating ground water will be reduced if approved pesticides are used only for specific problems, at recommended rates, at the proper time and only when essential. Petroleum products, such as gasoline and oil must be used in a safe and prudent manor to avoid spills, expecially near well heads. Disposal of drain oil, solvents, etc. must be according to current, acceptable techniques, not allowing these materials to potentially contaminate surface or subsurface water sources.

3. Fire Protection

It appears that it would be desirable to have more firebreaks and/or access roads for fire fighting in the southeast buffer zone. These will provide access for recreationists create sites for wildlife food and cover, and create units that can be managed with controlled burns for "rare" species.

4. Erosion Control

Erosion control on agricultural land was discussed in item number 2 above. On other areas, proper surface water management and the seeding of exposed soil will control erosion in most instances. Intensively used areas may require special erosion control practices in conjunction with road drainage patterns, etc.

Figure 14

See Back of Report

5. Noxious Weed Control

New York's noxious weed law does not list any plants, specifically. Therefore, there are no plants on the property that are classed as noxious weeds by the state. There are grasses and herbaceous plants, such as poison ivy, that grow where they are not wanted, such as in lawns, flower beds, around shrubs, trees, etc. that are called "weeds". These can be controled at specific sites where they interfere with intended use and management.

6. Fish

Because of fluctuating water levels in all the pond/wetlands there is little opportunity to manage existing fisheries except in McKay Lake. The shallow pond/wetlands could be deepened to create suitable habitat for fish. All of these pond/wetlands contain one or more state listed threatened, endangered, rare, or special concern species of plant or animal, therefore, deepening is not a feasible alternative.

7. Wildlife

Wildlife habitat can be improved both inside the fenced area and in the buffer zone. There is opportunity to manage grass/legume areas to improve grazing for deer and rabbits and provide better nesting cover for pheasants, quail, and songbirds. Wildlife shrubs and annual grains can be planted to provide more diversified food for pheasants, quail, and songbirds.

Within the fenced portion, habitat improvement is not recommended for several reasons. With the large deer population, plantings to increase the food supply are not likely to be successful because they would be grazed off before they could become established. Plantings would perpetuate and potentially increase the size of the deer herd and therefore are not recommended within the fenced area. Improvement of bird habitat would increase the likelihood of bird/aircraft collisions.

Geese could be discouraged from using McKay Lake by erecting a low fence near the water line and/or by placing a plastic strip or a wire grid over the lake, however, the displaced geese may fly from place to place looking for a new home and create a goose BASH problem that does not presently exist.

Within the buffer zones, habitat improvement described above is recommended and feasible.

Any project that would improve the deer habitat and reduce the risk of bird and aircraft strikes should and will be undertaken with resources available from co-op user fees.

8. Threatened and Endangered Species

Threatened, endangered, rare, and special concern species of plants and animals and their habitats can be protected by establishing a "natural resource area" around their habitat. Within these areas, including a buffer zone, there would be no development or use of pesticides, and public use would not be encouraged. In no case should the public be informed of the location of any of these species or their habitats.

9. Forestry

Follow recommendations in the Forest Management Plan which is contained in Section 3.

C. Site-Specific Management Guidelines

The following are site specific alternatives and recommendations for the management of natural resources to overcome the problems and needs stated above and to meet the natural resource objectives.

Figure 15 shows the location of the site specific recommendations by letter and number which correspond to the following items:

(Example: L=landscape recommendation, L-1=screen cocoon storage area at this site.)

Figure 15

See Back of Report

1. Landscape (L).

When planting is to be undertaken consideration should be given to using low maintenance trees, shrubs, perennial flowers etc., and the use of native and drought tolerant species. Refer to the Grounds Maintenance Manual for adapted species and typical planting procedures.

L-1. Reforest or plant to grass the portion of the former cocoon storage area that will not be used in the future. The site may need to be stripped of compacted gravel and/or scarified and topsoil added prior to planting.

L-2. Identify and plant alcoves and inside corners of buildings to low maintenance ground cover such as myrtle (Vinca minor), Pachysandra (Pachysandra procumbens) and English Ivy (Parthenocissus tricuspidata). An example of these sites is the narrow dead end alcove between building G-19 (engine and wing storage building) and the temporary engineer's building. Place plants 12 to 14 inches apart.

L-3. Approach the appropriate party to level or remove piles of dirt along north and south perimeter road and seed.

L-4. The following alternatives apply to the runway clear zone and other semi-improved vegetation. Any one or all of the following can be applied.

a. Mow existing vegetation on an as needed basis or at least once in three years. Mow to six to eight inches in height. The existing moderate to light sod with some bare areas provides habitat for such birds as quail, killdeer, and the grasshopper and vesper sparrows, the latter two being state species of "Special Concern".

b. Lime and fertilize in accordance with an approved soil test to thicken existing stands of grass, which will help exclude hardwood plant invasion and reduce bird resting areas.

c. Reseed bare areas as needed and develop a monoculture of tall fescue which has an effective leaf height of eight to ten inches. This will reduce the amount of mowing needed. It will probably eliminate nesting cover for killdeer, as well as the grasshopper, and vesper sparrow, however, it will remain green throughout most years and thus will be less of a fire hazard. Tall fescue will provide better grazing for deer than the present vegetation.

d. Clear Zone - Develop a monoculture of tall fescue in the first 200 to 300 feet along the runways to discourage most species of birds. Manage existing vegetation on remaining area.

L-5. This triangular area does not need to be maintained as grass as it is not a part of the required clear zone. Stop mowing. Allow natural succession to develop hardwood trees and shrub type cover.

L-6. Maintain tower sight path with controlled burns.

L-7. The following recommendations apply to the dumping of refuse in all buffer zones.

a. Develop a working agreement with a local groups to patrol and police the area similar to the program "adopt-a-lot".

b. Develop an agreement with the town to abandon and/or close Toppings Path to through traffic and to place gates across the road at the last house on the north end and at Hot Water Street. Admit users through returnable keys and parking permits. Rotate locks frequently.

2. Water (W).

W-1. Water in McKay Lake should be tested once or twice a year and monitored for nutrient content which may come from turf maintenance or the goose population.

3. Agriculture (A).

A-1. If more agricultural land is needed, these fields can be brought into production. Conservation plans need to be developed and applied for any new land that is brought into production.

4. Fire Protection

Firebreaks and crash rescue access roads that are refurbished or newly constructed can be left bare and disked periodically to maintain a fallow condition; or they can be seeded to tall fescue that will remain green most of the year. Slopes with potential for erosion should be seeded. Areas seeded to tall fescue should be mowed once or twice a year to prevent the build up of combustible material. The tall fescue will provide grazing for deer and rabbits and nesting cover for songbirds.

The firebreaks and roads will provide controlled access for recreationists.

5. Noxious Weed Control.

There are no noxious weeds on Calverton. Poison ivy can be controlled with herbicides where it is a problem. Other weeds can be controlled mechanically or with herbicides as appropriate.

6. Erosion Control (E).

All exposed soil area should be seeded with temporary seedings during construction and permanent seedings after each job is finished. Refer to Grounds Maintenance Manual for appropriate seedings. Adequate surface water management practices should also be installed as needed to protect the site.

E-1. When reconstruction is necessary, regrade the perimeter road within the fenced area to create a crowned surface using material from the edge of the road.

E-2. This old land fill site is under study by the Navy for future environmental stabilization. If the Navy Initial Assessment study (IAS) does not show a need to modify the old landfill site the following recommendations can be used to stabilize the area. This site lies about 2000 feet southeast of the intersection of Route 25 and 25A at the end of Sand Road. Presently a gully about six feet deep is eroding and approaching the access road at this site. Also, minor gullies are forming along a 25 foot high side slope of fill, which is on a 1 1/2 to 1 grade. This side slope forms a 400 foot boundary between the wetlands and the plateau on top of the landfill.

The large gully should be stabilized by filling it in with soil, gravel, or rock, and constructing a riprap or rubble lined waterway as shown in Figure 16. The waterway will point straight down the slope. Since riprap is not often readily available on Long Island, concrete rubble may be used in its place. The rock sizes given in the construction notes on figure 16 are the minimum needed for stability. However, larger rubble may be used if the voids between pieces are chinked in with smaller pieces and the surface is left no rougher than the surface created with eight inch diameter rock.

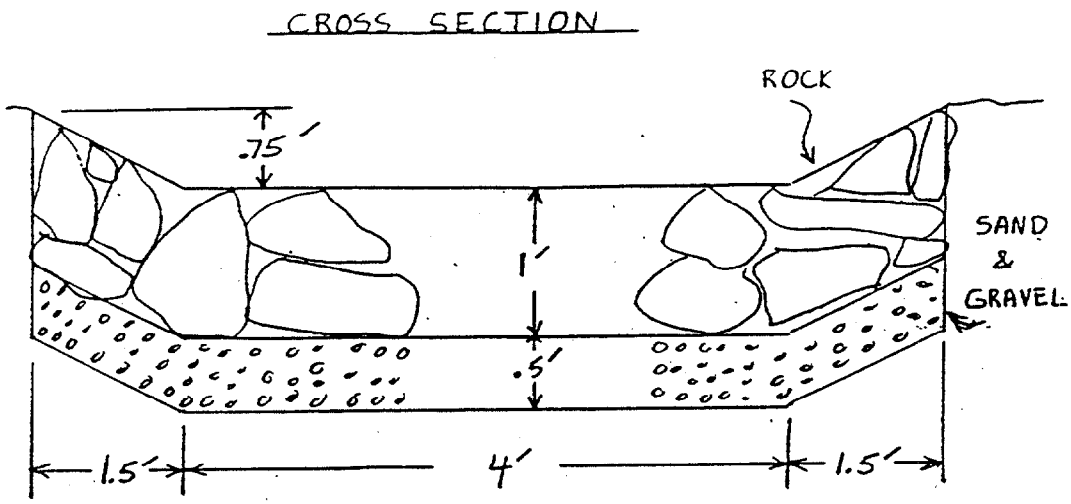
To prevent erosion on the rest of the embankment, construct a grassed diversion channel, Figure 17, at the top of the embankment to convey runoff to the rock lined waterway. Install the diversion after the rock lined waterway is constructed.

The diversion shall be covered with six inches of topsoil to aid the establishment of grass. Contact the United States Department of Agriculture, Soil Conservation Service, at Riverhead, for assistance in designing and constructing this diversion.

Seed all exposed soil areas.

E-3. Several hunter parking areas, internal service and hunter access roads have problems with vehicles getting stuck in either very wet conditions or very dry conditions. The wet areas can be stabilized by grading and/or relocating them, so that they are not in depressed areas where water will pond. Both the wet and dry problem areas should be underlayed with a geotextile

FIGURE 16: ROCK OR RUBBLE LINED WATERWAY



CONSTRUCTION NOTES

1. Fill gully with earth and/or rock compacting to density of surrounding soil. Grade surface to subgrade shown above.

2. Line waterway with materials shown above.

3. Use well graded sand and gravel with at least 50 percent by weight greater than 1/2 inch diameter.

4. Ideal rock/rubble gradation is average rock diameter equals 8 inches. Maximum diameter equals 12 inches. Larger rock or rubble may be used. In any case all voids shall be chinked to prevent erosion of sand and gravel. Adjacent rocks shall not be higher than 4 inches or each other. Avoid using round rock.

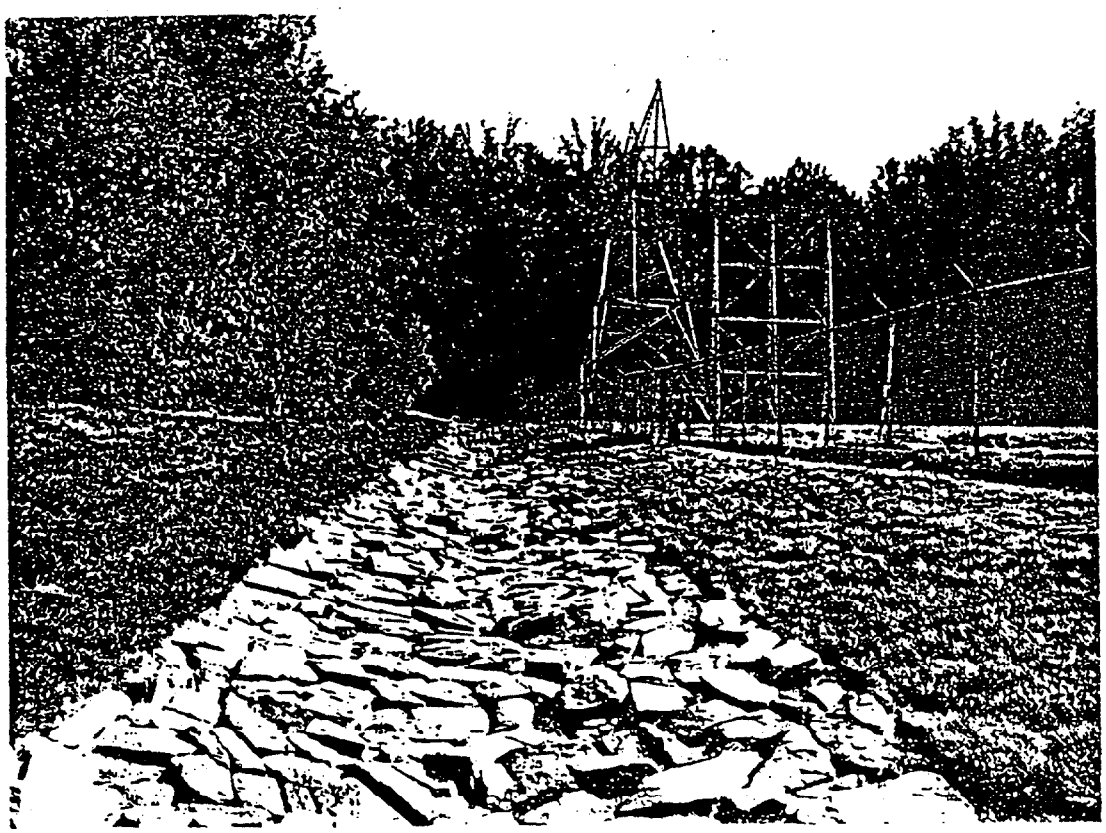
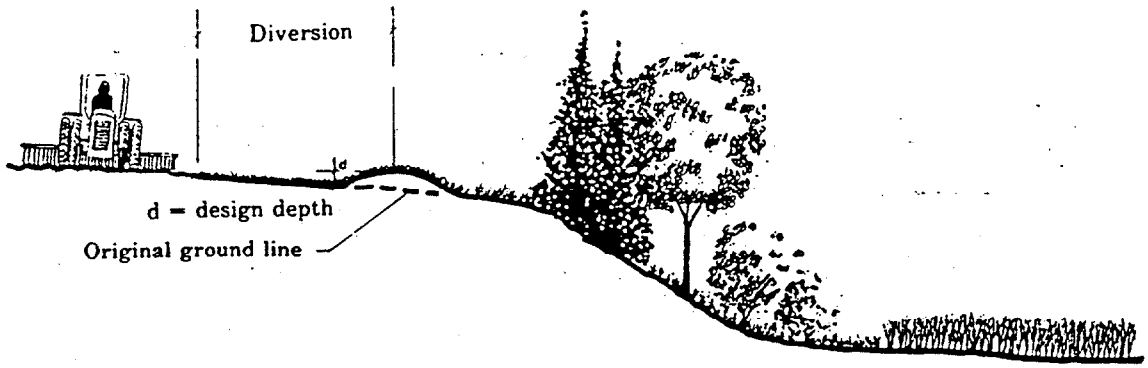
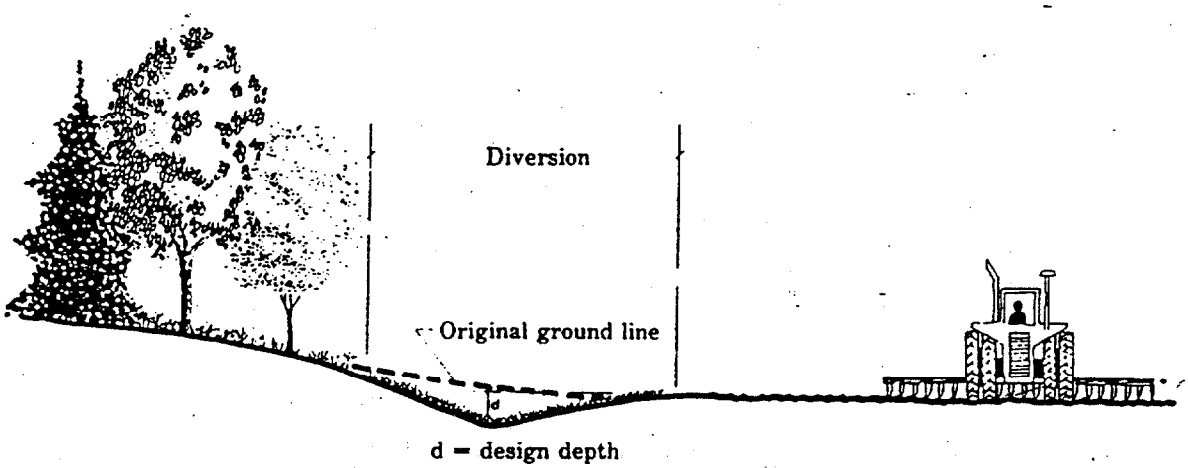


FIGURE 17. DIVERSIONS



Ridge diversion.



Channel diversion.

fabric and covered with seven inches of well graded gravel. Appendix I contains "Installation Guidelines for Using Geotextile Fabric Under Gravel Roads and Parking Areas". If the fabric is not sewn together, seams should be overlapped three feet. Since these parking areas will be exposed to light duty traffic, vibrating the gravel aggregate with a vibratory roller should not be necessary. For the soils most likely to be encountered on the base, use a geotextile equivalent to or better than Trevira Spunbond 1135™ (see Appendix I). Performance of this item will be subject to availability of NAVFAC funding.

E-4. Agricultural leased land erosion.

There is extensive sheet and rill type water erosion on the agricultural leased land along with several small gullies. Since normal potato tillage operations fill the rills and gulleys in every year, the gullies do not become very large. Nevertheless, soil is being lost every year. These sites can be stabilized with the use of proper conservation crop rotations, grassed diversions, and grassed waterways (See Figure 18) that are spelled out in conservation plans that were prepared for each parcel currently being farmed.

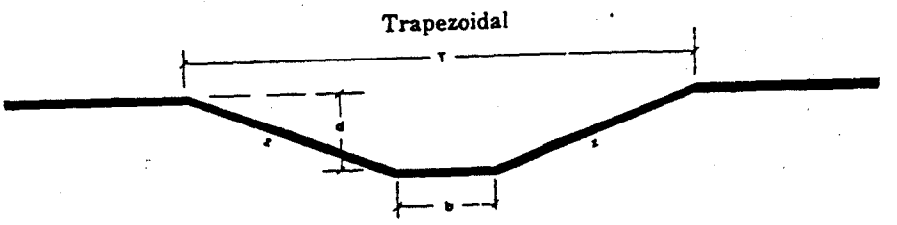
A copy of the conservation plan for each agricultural outlease parcel is included as Appendix J.

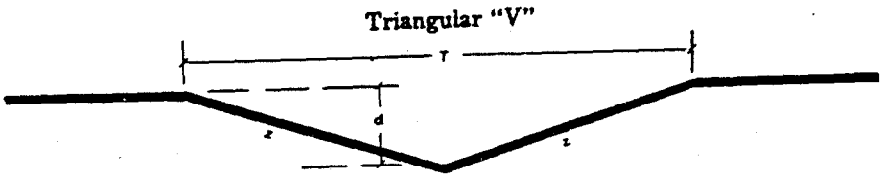
7. Fish (F). The following will be further amplified in the Fish and Wildlife Section (Section 2).

F-1. Fish from McKay Lake should be tested for contamination if analysis of water shows contamination.

F-2. The quality of fish in McKay Lake should be advertised among base employees and they should be encouraged to fish in the Lake after the fish are tested, if there are no high levels of contamination.

FIGURE 18. GRASS WATERWAYS





F-3. Cornell University is currently developing a bass-bluegill fishpond management evaluation program. When completed, this program could be applied to McKay Lake. Through information provided by fishermen on their catches, regulations can be developed on number and size of fish that can safely be removed to maintain a balanced fish population.

In 1992 contact Mr. David M. Green, Cornell University, Biological Field Station, Shackleton Point Road, Bridgeport, New York 13030, phone (315)633-9243 for information and status of their bass-bluegill pond management program.

F-4. Continue to permit NYSDEC, under the guidance of their Regional Fisheries Manager, to maintain a balanced fish population by removing small bass and bluegills from McKay Lake for stocking of other ponds.

F-5. Manage submerged aquatic plants in McKay Lake so that they do not occupy over 25% of the total surface area. No submerged weeds are optimum. Monitor submerged aquatic plants and initiate mechanical control such as smothering with Texel™ or Aquascreen™ as necessary. See Appendix K, "Mechanical Control of Aquatic Weeds: A Guide for Lakeshore Owners, Lake Associations, Municipalities, and Individual Pond Owners," NYSDEC, Albany, New York, May 1983.

8. Wildlife (WL)

Follow the Wildlife Management Plan which is contained in Section 2. Any funding required for performance of recommended item shall be through cooperative agreement and supported mutually by NAVFAC and NYSDEC.

WL-1. Control deer within fenced portion of the base in accordance with the approved Deer Herd Management Plan.

WL-2. Secondary access roads and trails can be seeded to grass and/or legume deer grazing species in areas where there is adequate sunlight penetration. Where roads are shaded, they can be "daylighted" by cutting back the trees along the edges of the road. Daylight only portions of roads and trails leaving trees close to the roads in other areas to maintain an aesthetically pleasing environment.

WL-3. Establish pheasant food and cover plots along the railroad and power line clearing east of Connecticut Avenue and along the east-west access road, which extends east from Connecticut Avenue near the canoe access site. Refer to Wildlife Management Plan for species and planting rates.

WL-4. Maintain area in tall grass cover for nesting bluebirds and other songbirds by mowing once every three years or when hardwoods start to appear. Construct and erect bluebird nest boxes as described in Appendix L.

WL-5. Allow area to develop to hardwoods through natural succession with no maintenance.

9. Threatened and Endangered Species.

T-1. As a minimum, establish a "Ecological Reserve Area" (ERA) around the habitat of all state listed threatened, endangered, and rare species of plants and animals in Tables 10 and 11 that occur on Calverton. Apply recommended natural resource area protection guidelines outlined in Table 13 to the habitat of the species listed as "T-1" under "Protection Alternatives".

T-2. Extend ERA's to include state listed special concern species. Apply guidelines, outlined in Table 13 to the habitat of species listed as "T-2" under "protection alternative".

T-3. Extend ERA's to include species of plants and animals that are state ranked by the Natural Heritage Program as S1, S2, or S3 (less than 100 occurrances in New York), but are not state listed as threatened, endangered, rare, or special concern species. Apply guidelines outlined in Table 13 to the habitat of species listed as "T-3" under "protection alternative".

TABLE 13. NATURAL RESOURCE AREA PROTECTION GUIDELINES (Page 1 of 3)

Species: Scientific Name	Species: Common Name	Protection Alternative[1]/	Habitat	Location[2]/	Recommended Protection Area and Management
PLANT					
COREOPSIS ROSEA	ROSE COREOPSIS	T-1	Pond shore margins, standing water, wet depression, damp sand, gravel, or peat.	21,30,88,252	Protect habitat and a 50 to 100 foot buffer zone. This area would be protected from destruction and further development. Within the area, recreation would not be encouraged. Use of off-road vehicles, hunting, trapping, and other heavy use activities would be prohibited, however, casual walking through the area would not be prohibited. There would be no ground spraying of herbicides within 1000 feet.
ELEOCHARIS EQUISETOIDES	KNOTTED SPIKERUSH	T-1	Aquatic, shallow water to 18 inches deep.	23,34	
HYPERICUM DENTICULATUM	COPPERY ST. JOHNS-WORT	T-1	Shores, swamps, ditches, or pine barrens-in sandy or argillaceous soil.	30	
LECHEA TENUIFOLIA	SLENDER PINWEED	T-1	Open woods, pine barrens, and fields, sandy or rocky soil.	298	
LOBELIA NUTTALLII	NUTTALL'S LOBELIA	T-1	Pond margins, salt meadows, swamps, wet meadows and roadsides - damp or dry sand or argillaceous soils.	23,30,250,252	
LUDWIGIA SPHAEROCARPA	LUDWIGIA	T-1	Ponds, swamps, pond shores - shallow to deep water - sandy or peaty pond margins.	20,23,26,32	
PROSPERPINACA PECTINATA	COMB-LEAVED MERMAID-WEED	T-1	Acid pond, swamps, and depressions - shallow water, pools, or occasionally stranded on pond margins - sand, mud, or peat.	21,30,88	
PSILOCARYA NITENS	SHORT-BEAKED BALD-RUSH	T-1	Ponds-grass on wet sandy margins, peat, and in shallow water.	20,30,292	
PSILOCARYA SCIRPOIDES	LONG-BEAKED BALD-RUSH	T-1	Swamps, marshes, ponds - on dandy, peaty shores and in shallow water.	20,32,292	
SAGITTARIA TERES	QUILL-LEAF ARROWHEAD	T-1	Pond and swamp margins and shores and in shallow water to 2 feet deep-predominantly acidic soil and occassionally mud.	23	
SCLERIA RETICULARIS	RETICULATED NUTRUSH	T-3	Pond shores, swamps, bogs, and depressions - on sandy soil.	30,292	
UTRICULARIA BIFLORA	TWO-FLOWERED BLADDERWORT	T-3	Ponds, swamps, shallow pools, and depressions - growing submerged or on the margin on sand or mud soils, top leaves may be floating on surface.	33	Protect pond/wetland from destruction and introduction of grass carp. No ground application of herbicides within 1000 feet. Duck hunting, dog trials, boating, etc. are permitted uses.
UTRICULARIA FIBROSA	FIBROUS BLADDERWORT	T-1		23	

1/ See text page 97.

2/ See Figure 13 for location.

TABLE 13. NATURAL RESOURCE AREA PROTECTION GUIDELINES (Page 2 of 3)

Species: Scientific Name	Common Name	Protection Alternatives[1]	Habitat	Location[2]	Recommended Protection Area and Management
BIRDS					
AMMODRAMUS SAVANNARUM	GRASSHOPPER SPARROW	T-2	Nests on ground well-concealed by vegetation, in prairies, old fields and pastures; eggs laid May to July.	35[3]	Protect habitat and a buffer zone of 300 feet. Prevent disturbance during nesting season. Prevent invasion of hardwoods by mowing or controlled burning. Mow grasslands only as needed, preferably in mid July.
POOECETES GRAMINEUS	VESPER SPARROW	T-2	Nests on ground in grass and under shrubs in similar areas as Grasshopper Sparrow, only prefers shorter grasses; eggs laid from May to August.	3	
SIALIA SIALIS	EASTERN BLUEBIRD	T-2	Inhabits edge between forest and open fields, open woodlands and semi-open fields with scattered trees; nests in cavities of trees.	6	Protect habitat and a buffer zone of 300 feet. Prevent disturbance during nesting season. Prevent invasion of hardwoods by mowing or controlled burning. Mow grasslands only as needed, preferably in mid July. Erect nest boxes as per instructions in Appendix G.
EMPIDONAX VIRESCENS	ACADIAN FLYCATCHER	T-3	Found in humid deciduous woods, shallow ravines, river swamps, and lowlands; nests in trees.	3	Protect habitat and a buffer zone of 300 feet. Prevent disturbance during nesting season.
ICTERIA VIRENS	YELLOW-BREASTED CHAT	T-3	Nests in deciduous woodlands usually in saplings and undergrowth thickets near the ground.	3	
LOXIA CURVIROSTRA	RED CROSSBILL	T-3	Prefers coniferous, mixed coniferous/deciduous forests or pine/oak habitat.	3	

1/ See text page 97.

2/ See Figure 13 for location.

3/ Further studies are needed to locate habitat of the grasshopper and vesper sparrows, Acadian flycatcher, yellow-breasted chat, and the red crossbill.

TABLE 13. NATURAL RESOURCE AREA PROTECTION GUIDELINES (Page 3 of 3)

Species Scientific Name	Common Name	Protection Alternatives[1]/	Habitat	Location[2]/	Recommended Protection Area and Management
INSECT					
CATOCALA HERODIAS GERHARDI	PINE BARRENS UNDERWING MOTH	T-3	Pitch pine/scrub oak barrens, blackjack oak or shale barrens and dry ridge tops - a good colonizer.	7	Protect identified habitat and a 1000 foot buffer zone from destruction and fire supression. Work with entomologist from NYS DEC Natural Heritage Program to develop a habitat management plan using controlled burns.
HEMILEUCA MAIA MAIA	COASTAL BARRENS BUCKMOTH	T-2		6,8,14,21,301	
FISH					
ENNEACANTHUS OBESUS	BANDED SUNFISH	T-3	Sluggish, acidic, heavily vegetated waters, headwater, tributaries, and boggy brooks	26	Protect destruction of pond/wetland and the introduction of grass carp. Fishing, trapping, dog trials, etc. are permitted.
INVERTEBRATES					
AMBYSTOMA MARNTATUNS	SPOTTED SALAMANDER	T-2	Deciduous hardwoods with ponds, slow stream or vernal ponds that provide breeding habitat. Migrates several hundred meters to breeding ponds. Adults wander far from breeding ponds. Spotted Salamander travel shorter distances than Tiger Salamander.	2	Protect 50 to 100% of hardwoods that surround or are connected with the pond/wetland for a distance of 500 to 1000 feet. Mowed grass, parking areas, etc. are not habitat and may be barriers to movement. No further development of facilities. No off-road vehicles at any time. Restrict use of the area for dog trials and other activities between March 1 and April 15.
AMBYSTOMA TIGRINUM	TIGER SALAMANDER	T-1		2,21,33,54,88 252,261	

1/ See text page 97.

2/ See Figure 13 for location.

D. Long-Range Schedule of Action

The above "site-specific management guidelines" are strictly guidelines to help achieve the stated objectives. Many are alternatives. The Department of the Navy, with concurrence of Grumman officials as appropriate, must translate these into a long range schedule of action. In the following, the guidelines have been grouped into three categories of suggested priority: high, medium, and low. It is recommended that the high priority category items be implemented by 1 October 1993 and the medium priority items considered for implementation by 1 October 1998. All the others which will not be listed are low priority, many of which may not be implemented. Implemented projects will be funded by NAVFAC Natural Resources Budget or an approved third party.

1. High Priority Guidelines (not in order of importance).

W-1. Test water in McKay Lake for nutrients.

L-7. Eliminate dumping of refuse along Navy land adjacent Toppings Path.

E-4. Implement conservation plans on agricultural outlease lands.

F-1. Test fish from McKay Lake for contamination.

F-5. Manage aquatic plants in McKay Lake.

WL-1. Control deer population within Grumman outlease fenced area.

T-1. Establish Ecological Reserve Area around habitat of state listed threatened, endangered, and rare species of plants and animals.

2. Medium Priority Guidelines (not in order of importance).

L-1. Reforest cocoon storage area.

L-2. Identify and plant low maintenance plant materials in the alcoves and inside corners of buildings.

L-4. Reduce amount of mowing of Runway Clear Zone and other semi-improved vegetation.

L-5. Discontinue mowing triangular area at south end of west runway.

L-6. Manage regenerating oak in tower sight path.

E-3. Improve recreational parking areas and internal access roads.

T-2. Extend Ecological Reserve Areas to include special concern species.

E. Further Studies and Evaluations.

Several surveys of recreation facility needs and/or desires are needed in order to develop facilities that will be used.

A survey of Navy and Grumman employees at Calverton is needed to determine what recreational facilities are desired, and would be used during lunch hour.

A second survey of Navy personnel and families within 30 miles of Calverton is needed to determine the type of facilities they would use if developed on Calverton property.

Similarly, a survey of the general public and local organizations in the Riverhead area is needed to determine desired recreation facilities. In addition, an evaluation of existing competing or similar facilities is necessary to determine if they are over used and thus reinforce the need expressed by the public.

The Natural Heritage Program staff made an indepth study of the plants, animals, and invertebrates on Calverton. Due to the difficulty of moving around within the fenced area to study bird habitat and to do night time surveys of insect habitat, there is inadequate data on the habitat of the vesper sparrow, grasshopper sparrow, Acadian flycatcher, yellow-breasted chat, red crossbill, common nighthawk, and the moths. Existing bird habitat should be identified, particularly along the runways in the clear zone, to determine which alternative is best for managing the grasses in that area to reduce interference of birds with aircraft, yet preserve the habitat of the species of special concern.

LONG RANGE WILDLIFE

MANAGEMENT PLAN

1985 - 1994

U. S. NAVAL RESERVE INDUTRIAL WEAPONS PLANT
CALVERTON, LONG ISLAND, NEW YORK

PREPARED BY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
REGION I

PREPARED BY: David Riehlman

David E. Riehlman
Senior Wildlife Biologist

APPROVED BY: Harold W. Knoch

Harold W. Knoch
Regional Wildlife Manager

LONG RANGE WILDLIFE MANAGEMENT PLAN
1985-1994
U.S. NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, LONG ISLAND, N.Y.

Introduction and Purpose:

This management plan is an update of the 1975-1984 Long Range Wildlife Management Plan which replaced the initial 1966-1975 L.R.M.P. for this area. It outlines plans for continued management of the Buffer Zone portion of the U.S. Naval Weapons Industrial Reserve Plant located in Calverton, Long Island, New York.

This management plan is developed as directed by the Cooperative Agreement for these lands signed by the Fish and Wildlife Service, the Third Naval District, and the New York State Department of Environmental Conservation (DEC). The cooperative agreement provides for the protection, development, management, and utilization of the fish and wildlife resources of the area and further states that the area shall remain open for public hunting, fishing, trapping, and other wildlife related uses. The cooperative agreement was developed under authority found in U.S. Public Law 85-337 and 86-797, and New York State Fish and Wildlife Law Sections 11-0303 and 11-0501.

The primary purpose of this management plan is to outline activities aimed at providing and enhancing the continued use of this area for public hunting, fishing, trapping, and related activities through the development of existing and potential fish and wildlife resources. Public use will be encouraged to the maximum extent compatible with the use of the area for Navy

purposes and so long as it does not jeopardize the integrity of the resource. Activities will be controlled through a system of access permits and designated parking areas or other regulations as deemed appropriate. This system will be aimed at ensuring the quality and safety of the recreation provided.

Management activities will concentrate on locations and species which will provide maximum return in the form of public recreation. Wildlife management will generally be directed at maintaining or increasing habitat diversity and where desirable improving the habitat elements for key species. The desired result of management is to achieve a favorable combination of early to late stage habitat types which will in turn provide the habitat required for a wide variety of wildlife species. Without proposed management, old field, grassland and brushland habitat, and their associated wildlife species will be lost through natural succession processes.

The area has been separated into three compartments[1], and numerous stands for the purposes of forest management. These units will also be used for wildlife management planning. Each compartment will be managed for the species and activities for which it is best suited.

The activities and/or game species on which management emphasis will be directed for each compartment follows:

[1]Note that 900 acres of what was referred to as Compartment I in the first two plans has become Calverton National Cemetery and thus has been eliminated from this and future wildlife management plans. The remainder of this compartment (139 acres) has been added to what was formerly Compartment II. Former Compartments II, III and IV have been renumbered as I, II, and III.

Compartment I

Hunting - Pheasant, quail, rabbit, squirrel and deer.

Trapping - Raccoon, and fox.

Compartment II

Hunting - Pheasant, quail, rabbit, squirrel, deer, and waterfowl.

Field trials and dog training.

Trapping - Muskrat, raccoon, and fox.

Fishing - Largemouth bass and pickerel.

Compartment III

- North of the Long Island Expressway.

  Hunting - Pheasant, quail, rabbit, squirrel, deer and waterfowl.

  Trapping - Muskrat, raccoon, and fox.

  Fishing - Largemouth bass, and pickerel.

- South of the Long Island Expressway.

  Hunting - Deer.

Limited, localized or seasonal opportunities also exist for the following:

Hunting - Grouse, woodcock, crow, fox, and raccoon.

Trapping - Opossum, weasel, and mink (Comp. II and III only).

Fishing - Compartment II and III only - Brown bullhead, yellow perch, and other panfish.

Pheasants are routinely stocked on the area throughout the open season to supplement recreation provided by wild populations and management to increase the holding capability of the land and to otherwise facilitate this program will be an important consideration.

Special management consideration will also be given to any endangered or threatened species and their habitats that are identified on the area; such as the Tiger salamander breeding ponds in Compartment II.

The management activities instituted for the direct benefit of key species listed will generally enhance the outdoor recreational experience for all users by benefiting a variety of species.

Goals:

Management activities undertaken will be carried out according to the attached plan and work schedule, time, manpower, and funds permitting.

The goals and techniques to be utilized follows:

A. Maintain or increase habitat diversity -

1. Create openings within wooded stands.
2. Maintain early successional stages in abandoned fields and other open areas through cutting, mowing, or burning.
3. Plant shrubs, grasses, legumes, and annual grains.

B. Maintain or improve habitat for key species -

1. Plant grasses as forage for rabbits and deer and nest and brood cover for quail and other species.
2. Plant annual grains as food for quail, pheasant, and other seed eaters.
3. Plant fruit bearing shrubs as food for quail, pheasant, and other species.
4. Create brush piles as cover for rabbits and other species.
5. Maintain sites to facilitate stocking, hold over, and survival of pheasants.
6. Protect and maintain Tiger salamander breeding habitat.
7. Place woodduck nest boxes in appropriate locations.
8. Place bluebird nest boxes in appropriate locations.
9. Place squirrel nest boxes in appropriate locations.

C. Maintain or improve access to the property -

1. Maintain interior roads and trails by removal of invading woody vegetation.
2. Maintain a favorable distribution of parking sites for dispersal of users around the property.
3. Maintain systems for equitably distributing the available recreational opportunity.

D. Maintain conditions or facilities necessary for special uses -

1. Maintain sufficient open old field and pond area suitable for field trials and dog training in Compartment II.
2. Provide canoe launching site to minimize degradation of the river banks in Compartment III.
3. Minimize unauthorized motorcycle use throughout the property by restricting activity to designated trails in Compartment III.
4. Maintain fishing access sites or other special use designated areas as warranted.

Summary:

The Buffer Zone lands of the U.S. Naval Weapons Industrial Reserve Plant will be managed in such a manner that the following goals will be achieved.

- The land will be made to support the highest possible populations of fish and wildlife species for recreational use.
- The area will be developed with access in mind and in such a way that the greatest number of recreation days can be provided to the public.
- Quality will not be disregarded and replaced by quantity in determining the use and management of the area.

WORK PROPOSED BY COMPARTMENT AND STAND

COMPARTMENT I

Stand No.	Acres	Type and Size Class	Proposals
1	76	Oak-Pine in mixture with saplings and young poles	Create and maintain limited number of wildlife clearings where soils, slope, time and funds permit.
2	9	Open area surrounded by pine saplings in mixture with young poles	Maintain desired successional stages at 6-8 year intervals. Establish food or cover plantings.
3	174	Oak-Pine poletimber	Create and maintain limited number of wildlife clearings where soils, slopes, time and funds permit.
4	14	Open	Maintain desired successional stages at 6-8 year intervals, except where forestry plantings exist.
5	7	Spruce-Pine seedlings	No treatment during period.
6	2	Pine young poles	No treatment during period.
7	5	Oak poletimber	No treatment during period.
8	6	Emergency landing safety strip	Maintain open area with food and cover plantings. Invading oak or pine to be removed at 6-8 year intervals.
9	16	Pine young poles	No treatment during period.
10	8	Pine saplings in mixture with young poles	No treatment during period.
11	26	Oak-Pine saplings in mixture with young poles	No treatment during period.

COMPARTMENT I (cont.)

Stand No.	Acres	Type and Size Class	Proposals
12	7	Spruce-Pine seedlings and saplings	No treatment during period.
13	3	Open area surrounded by seedlings and saplings	No treatment during period.
14	24	Oak young poles	No treatment during period.
15	7	Oak saplings in mixture with young poles	No treatment during period.
O	51	Old Field	Maintain desired successional stages. Leave hedgerows and patches of woody vegetation where advantageous.

COMPARTMENT II

Stand No.	Acres	Type and Size Class	Proposals
1	4	Pine-Oak poletimber	No treatment during period.
2	14	Spruce-Pine seedlings and saplings	No treatment during period.
3	41	Mixed Hardwood-Pine poletimber	No treatment during period.
4	27	Pine-Oak poletimber	Create and maintain limited number of wildlife clearings where soil, slope, time and funds permit.
5	4	Larch saplings	No treatment during period.
6	8	Open area surrounded by pine saplings	Maintain open area and desired successional stages at 6-8 year intervals.
7	33	Oak-Pine poletimber	Maintain existing wildlife clearings.
8	21	Oak-Pine young poles	Maintain existing wildlife clearings.
9	6	Open area surrounded by pine saplings	Maintain open area and desired successional stages at 6-8 year intervals; establish and maintain wildlife plantings.
10	7	Pine saplings	No treatment during period.
11	22	Oak-Pine young poles	No treatment during period.
12	3	Pine saplings	No treatment during period.
13	35	Oak-Pine poletimber	Maintain existing wildlife clearings.
14	37	Mixed Hardwood-Pine poletimber	Maintain existing wildlife clearings.

COMPARTMENT II (cont.)

Stand No.	Acres	Type and Size Class	Proposal
15	184	Pine-Oak poletimber	Create and maintain limited number of wildlife clearings where soils, slope, time, and funds permit.
16	17	Oak-Pine young poles	Maintain existing wildlife clearings.
17	2	Pine poletimber	No treatment during period.
18	107	Oak poletimber	Create and maintain limited number of wildlife clearings where soils, slope, time and funds permit.
19	13	Emergency landing safety strip	Maintain open area with food and cover plantings. Invading oak or pine to be removed at 6-8 year intervals.
20	4	Open area surrounded by seedlings and saplings	Maintain open area and desired successional stages at 6-8 year intervals. Stabilize embankments to prevent siltation of ponds.
21	31	Oak-Pine poletimber	Maintain existing wildlife clearings.
22	4	Wildlife clearing	Maintain opening with food and cover plantings.
W	52	Water/wetlands	Maintain wood duck nesting boxes.
O	104	Open/Old Field Areas	Maintain desired successional stages. Establish and maintain wildlife plantings. Create hedgerows.
O	26	Open/Old Field Areas	No treatment during period.
O	10	Open/Old Field Areas	Maintain desired successional stages. Create hedgerows and maintain wildlife plantings.

COMPARTMENT III - NORTH OF LONG ISLAND EXPRESSWAY

Stand No.	Acres	Type and Size Class	Proposals
1	6	Oak-Pine poletimber	No treatment during period.
2	2	Spruce-Pine saplings	No treatment during period.
3	7	Pine-Oak poletimber	No treatment during period.
4	6	Open area surrounded by Oak-Pine poletimber	No treatment during period.
5	61	Mixed Hardwood-Pine poletimber	No treatment during period.
6	11	Oak young poles	No treatment during period.
7	10	Oak poletimber	No treatment during period.
8	10	Open	No treatment during period.
9	13	Open	No treatment during period.
10	52	Oak-Pole poletimber	Create limited number of wildlife clearings where soils, slope, time and funds permit.
11	3	Brush-Marsh	No treatment during period.
12	65	Pine-Oak young poles	Create limited number of wildlife clearings where soils, slope, time and funds permit.
13	20	Oak-Pine poletimber	No treatment during period.
14	3	Brush-Marsh	No treatment during period.
15	62	Oak-Pine poletimber	Create limited number of wildlife clearings where soils, slope, time, and funds permit.

COMPARTMENT III - NORTH OF L.I.E. (cont.)

Stand No.	Acres	Type and Size Class	Proposals
16	4	Pine poletimber	No treatment during period.
17	2	Pine poletimber	No treatment during period.
18	5	Emergency landing safety strip	Maintain open areas with food and cover plantings. Invading oak or pine to be removed at 5 year intervals.
19	135	Oak-Pine saplings in mixture with young poles	Create limited number of wildlife clearings where soil, slope, time and funds permit.
20	20	Open area surrounded by young pine poles	Maintain opening and desired successional stages.
21	2	Locust saplings	No treatment during period.
22	5	Pine poletimber	No treatment during period.
W	28	Water and Wetlands	Maintain wood duck nesting boxes.

COMPARTMENT III - SOUTH OF LONG ISLAND EXPRESSWAY

Stand No.	Acres	Type and Size Class	Proposals
24	17	Oak-Pine saplings in mixture with young poles	No treatment during period.
25	80	Pine poletimber	No treatment during period.
26	4	Pine poletimber	No treatment during period.
27	618	Oak-Pine saplings in mixture with young pole-timber	No treatment during period.
28	203	Pine poletimber	No treatment during period.
29	130	Pine poletimber	No treatment during period.
30	10	Pine young poles	No treatment during period.
31	20	Hardwood poletimber	No treatment during period.

WORK SCHEDULE

Annually or periodically recurring administrative or maintanence functions constitute a large portion of the work load. These tasks follow:

1. Administer and supervise public use of the area, including daily operation of the permit station from November 1 through mid-January.

2. Maintain and post all property and restricted area boundaries.

3. Maintain wildlife clearings. Following initial clearing, sites are planted to desired food or cover species, or maintained in a chosencovertype or successional stage.

4. Maintenance of early successful stages in abandoned agricultural fields and other open areas.

5. General property maintenance, such as litter clean up, maintaining parking sites, fences or gates, interior roads, and trails.

6. Patrols and enforcement to be provided by the NYSDEC Division of Law Enforcement.

The following is an outline of specific projects or practices to be initiated by compartment and stand.

1985

Comp. I

Remove invading woody vegetation from Stand 8.

Comp. II

Remove invading woody vegetation from the southern portion of the abandoned field east of Wading River - Manorville Road and establish wildlife plantings.

Comp. III

No new work scheduled.

1986

Comp. I

Remove invading woody vegetation in Stands 2 and 4, and establish wildlife plantings in Stand 4.

1986

Comp. II

Remove invading woody vegegation from the northern portion of the abandoned field east of Wading River-Manorville Road. Hedgerows or islands of woody vegetation to be left. Establish wildlife plantings.

Remove invading woody vegetation from Stand 19.

Maintain openings in Stand 9 and establish wildlife plantings.

Comp. III

Remove invading woody vegetation from Stand 18, south of Mill Road and establish wildlife plantings.

1987

Comp. I

No new work scheduled.

Comp. II

No new work scheduled.

Comp. III

Remove invading woody vegetation from Stand 18, north of Mill Road and establish wildlife plantings.

Create wildlife clearings in Stands 10 and 12, and establish wildlife plantings.

1988

Comp. I

No new work scheduled.

Comp. II

Create wildlife clearings in Stand 15 and 18, east of Schultz Road and Stand 4, and establish wildlife plantings.

Comp. III

No new work scheduled.

1989

Comp. I

No new work scheduled.

Comp. II

No new work scheduled.

Comp. III

Create wildlife clearings in Stands 15 and 19, north of Mill Road and establish wildlife plantings.

1990

Comp. I

No new work scheduled.

Comp. II

No new work scheduled.

Comp. III

Create wildlife clearings in Stands 15 and 19, south of Mill Road and establish wildlife plantings.

1991

Comp. I

No new work scheduled.

Comp. II

Create wildlife clearings in Stand 15 and 18, west of Schultz Road and establish wildlife plantings.

Comp. III

No new work scheduled.

1992

Comp. I

Create wildlife clearings in Stands 1 and 3 and establish wildlife plantings.

1992

Comp. II

Remove invading woody vegetation from the souther portion of the abandoned field east of Wading River-Manorville Road.

Comp. III

No new work scheduled.

1993

Comp. I

Remove invading woody vegetation from Stand 4.

Comp. II

Remove invading woody vegetation from the northern portion of the abandoned field east of Wading River-Manorville Road and Stands 9 and 19.

Comp. III

Remove invading woody vegetation from Stand 18, south of Mill Road.

1994

Comp. I

No new work scheduled.

Comp. II

No new work scheduled.

Comp. III

Remove invading woody vegetation from Stand 19, north of Mill Road.

OUTDOOR RECREATION
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NATURAL RESOURCES MANAGEMENT PLAN FOR
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK

OUTDOOR RECREATION SECTION

I. INTRODUCTION:

Recreation facilities at Calverton for Navy and Grumman employees fall into four categories: 1) facilities for use during the lunch hour, 2) facilities for use after work such as for league play, 3) facilities for Navy and Grumman families, (in buffer zones only) and 4) facilities for the general public (in buffer zones only). During the lunch hour Navy and Grumman employees could eat their lunches outdoors at picnic tables, play horseshoes, volleyball, Frisbee™, touch football, etc., fish, ride bicycles, hike, workout on a physical fitness course, etc.

Facilities for families might be for activities like picnicking and camping. General public facilities could be developed for such activities as canoeing, nature study, field archery, hunting, trapping, horseback riding, and fishing as well as rifle, skeet, and trap shooting ranges.

Navy funds cannot be used to develop recreation facilities for the sole use of government contractor employees.

II. EXISTING CONDITIONS

Currently there are a few scattered picnic tables, a flat field that is used for general play, three softball fields, and a "park" with a train, toilets, and a picnic shelter that is used for organized employee picnics. In addition, there is a Navy pistol range which is only used by local law enforcement agencies.

Hunting, fishing, trapping, training dogs, and conducting field trials are permissible on designated portions of Navy property under a permit system operated by NYSDEC, Division of Fish and Wildlife. Fishing is permitted in Sandy Pond, Grassy Pond, Jones Pond, Linus Pond, Third Pond, Forest Pond, Preston's Pond, and in the Peconic River. NYSDEC maintains about 32 parking areas on Navy property which recreationists are directed to use.

Canoeing, which requires no DEC use permit, has been increasing in the past few years, with canoeing trips starting at Connecticut Avenue in the SE buffer zone, and then proceeding downstream to the east.

Appendix H contains NYSDEC's public use information sheet and mapswhich explains the rules for use of the area and it shows the areas open to public use and parking areas. Fees described therein may vary from year to year.

Publicly owned recreational facilities on Long Island are among the best in the nation. Jones Beach, Robert Moses Beach, and Smithpoint Park on the south shore being prime examples. Sunken Meadow State Park on the north shore is another first class facility. State parks at Montauk and Orient (east end) provide family camping as well as water sport activities. Each of the towns in both counties have publicly owned parks, beaches, golf courses, bridal paths, marinas, boat launch ramps, swimming pools, etc. for residents use. With the exception of facilities at Montauk Point and Orient Point, all others are within 30 miles of Bethpage and are no more than 1/2 hour from any of the homes of NAVPRO personnel.

Two miles west of Calverton are three public recreation facilities, the first is Pine Tree Nature Preserve which is operated by the Suffolk County Parkland Department. Nearby is Firemen's Memorial Park which contains two ballfields, a race track, a concession stand, and picnic tables. Adjacent to the Firemen's Memorial Park is the Brookhaven Shooting Range with ranges for rifles, pistols, archery, trap, and skeet.

Within ten miles of Calverton there are four county parks and one state park that provide facilities for such activities as picnicking, swimming, camping, and fishing. In addition, there is an undeveloped county park along Calverton's west side and a nearby undeveloped state park.

III. PROBLEMS AND NEEDS

1. The potential for contracting Lyme Disease from ticks which live in grass and wooded areas may deter the use of many facilities.

2. The current picnic tables and play areas are not readily accessible to all employees as the facilities are at some distance from many buildings where employees work thus making it impractical for many to use them during lunch.

3. No survey has been made of the Navy employees to determine what recreation facilities they would like to have, and would use. A similar survey needs to be conducted of Navy families living within reasonable traveling distance of Calverton.

4. A survey of existing public facilities and facility needs and desires should be conducted to determine what public facilities, if any, should be developed on Navy property.

IV. MANAGEMENT ANALYSIS

Picnic facilities can be easily developed at several locations at or near areas of employee concentration for use during the lunch hour. There are potential sites for tennis courts, volleyball, and trap and/or skeet shooting.

There are suitable sites for developing public facilities for field archery, nature study, an additional canoe access site, trap and/or skeet shooting, horseback riding, etc.

Family camping and picnicking facilities are generally developed around an attractant, such as a pond, lake, or stream. In some instances if the demand is great and facilities are lacking, a swimming pool or extensive amusement activities for children will suffice as an attractant.

The pond/wetlands are not desirable attractants because they go dry,and the threatened, endangered, rare and special concern species at each site would be damaged or eliminated by development of recreation facilities. The Peconic River is not a suitable attractant because of the dense wetland shrubs, and herbaceous vegetation that grows along the banks and extends into the water.

McKay Lake is an attractive body of water around which limited family picnicking and/or camping facilities could be developed.

Another alternative for family picnicking and/or camping facilities would be associated with the existing "park" which already has restrooms, a pavilion, and a train. A railroad theme could be developed with additional tracks and hand cars and/or pedal cars. The addition of a swimming pool and various playground equipment, a Frisbee™ golf course, kickball-pinball, etc. would be desirable.

The threat of exposure to deer ticks and Lyme Disease may be reduced by extensive use of stonedust, concrete and/or asphalt under and around picnic tables, campsites, and similar facilities with wide connecting paths.

Outdoor conservation education/nature study areas, require a variety of habitat or ecosystems to develop a quality facility. There are two areas that offer a wide variety of study conditions. One is the agricultural lease property (parcel A) in the southeast buffer with its agricultural fields, upland hardwoods, and wetlands. Across Swan Pond Road there is the Peconic River, its wetlands, and the old blueberry fields. The existing buildings could serve as an interpretive center and workshop area. The Swan Pond Road through the center of the area is a drawback. The second site is around the Preston's Pond, Forest Pond, and Linus Pond areas with its wetlands, open fields, and pine and oak forest.

V. SITE-SPECIFIC MANAGEMENT GUIDELINES

The following are site specific alternatives and recommendations for the management of natural resources to overcome the problems and needs stated above and to meet the natural resource objectives.

Figure 15 shows the location of the site specific recommendations by letter and number which correspond to the following items:

(Example: L=landscape recommendation, L-1=screen cocoon storage area at this site.)

Currently there is no potential for natural resource based outdoor recreation within the Grumman outlease area due to military mission security requirements. Outdoor recreation opportunities in the buffer zones is considered fully developed with the exception of the following items. Development of these facilities could be funded by NAVFAC natural resources funds with assistance rendered by NYSDEC or by an approved bonified third party.

Other than improving existing recreation facilities, which are outlined in items R1 - R4, further development should be based on an expressed need of the Navy and/or Grumman employees and/or their families and/or the general public. Items R5 - R15 below are guidelines to show potential sites for different types of facilities should they need to be developed.

The Suffolk County Health Department should be consulted prior to developing family picnic areas, campgrounds, and other family/public recreation areas.

R-1. Develop concrete, asphalt, and/or stonedust paths and trails to connect recreation facilities and components of facilities so recreationists can walk on non-vegetated areas and thus reduce the likelihood of encountering deer ticks and associated Lyme Disease. Areas within facilities can also be covered with stonedust, etc.

R-2. Through cooperation with the Government contractor develop additional picnic facilities for use during lunch hour by placing one or more picnic tables on concrete or stonedust pads in shaded area near buildings with a concentration of Navy, civilian and/or contractor employees. Plant shade trees where no suitable shade exists or construct small picnic shelters.

R-3A. Improve the canoe boat launch site at Connecticut Avenue. Presently this canoe launch site consists of a sand ramp. Since there is no appreciable amount of runoff flowing over this ramp, erosion is not a problem. Recreationists using the site should have no great difficulty in walking up and down this ramp; the degree of difficulty is similar to walking on wet beach sand. However, if it is desired to improve trafficability here, the ramp could be improved by making a path 12 feet wide and lining it with a geotextile fabric and six inches of well graded sand and gravel as described in Appendix H. Use a geotextile equivalent to, or better than Trevira Spun Bond 1120™. The small peninsula immediately upstream of the ramp could be planted with low growing nonspreading shrubs to help protect the bank. Plant three silky dogwood, Cornus amomum, spaced three feet apart about one and one-half feet from the edge of the bank.

There is already a stable parking surface along the east side of Connecticut Avenue with room for about ten cars parked end-to-end along the road. The area is not wide enough for cars to park perpendicular to the road. Diagonal parking could be encouraged in order to park more cars by placing several six inch by six inch by eight feet pressure treated timbers on diagonals across the parking lot every third bay. Concrete wheel stops measuring approximately four inches by six inches by five foot long can also be used. With diagonal parking there would be room for about 18 cars.

Stairs and/or a firm gravel path is needed from the parking area to the launch site. Also, the area between and beside the railroad tracks needs to be filled and leveled to reduce the chances of recreationists tripping over the tracks.

Boat launching sites and water access parking areas may be constructed within the designated recreational river boundary by obtaining a Wild Scenic and Recreational River System Permit issued by the NYSDEC, Division of Lands and Forests. Appendix B contains the Regulation for Administration and Management of the Wild Scenic and Recreational River System in New York State.

R-3B. In lieu of developing R-3A, an alternative canoe launching site with limited parking can be developed along the next road downstream of Connecticut Avenue. With a minimal amount of clearing and the addition of some gravel, a launch site could be developed. To the south of the river a short distance, there is an area of upland along the east side of the road, about 25 to 30 feet wide, that could be developed to park two to three cars without placing fill in a wetland.

R-4. Inform employees that there is good fishing in McKay Lake. To encourage fishing, a stonedust path should be developed around all or a portion of the lake in addition to a parking area and perhaps a cartop launch site for canoes and small rowboats.

R-5. Horseshoe pits can be developed adjacent to lunch picnic sites along with volleyball and general play fields.

R-6. A general play area for touch football, Frisbee™, etc. should be a minimum of 100 feet by 200 feet, smooth and grassed along with a volleyball area of about 40 feet by 70 feet for a 30 by 60 feet court. The volleyball court should be of stonedust, asphalt, or similar non-vegetated material with an affixed net. Shaded picnic tables could be nearby for lunch spectators.

R-7. Bicycle trails can be developed to take advangage of existing roads and paths. They should be marked on the ground and on a map for users. The surface should be smooth and firm and made of concrete, asphalt or stonedust (very fine gravel). Bicycle racks could be provided, to which recreationists may lock and leave bicycles.

R-8. A physical fitness course can be developed by laying out a course along existing roads and bicycle paths with the installation of workout stations. This trail should start and finish at a place where there are lockers and showers.

R-9. An area suitable for developing a ballfield that would be large enough for official softball leagues with a 300 foot foul line will require an area about 400 foot square to accommodate cars, backstops, etc. The orientation of the field should be generally north/south with the axis about 20° east of north.

R-10. A standard 18 target field archery course with targets from 10 feet to 80 yards will require seven to ten, or more, acres of varied topography and field conditions. The more variety the better. The boundaries of this area would need to be posted to reduce the chances of someone walking into a shooting lane. A parking area would be needed. The facility could be maintained by a local organization. This use will be allowed subject to approval of a bonified third party to be responsible for this development.

R-11. A trap or skeet range would require an area about 320 yards wide by 600 yards long (960 feet by 1800 feet) that could be "isolated" to prevent anyone from walking into the range. The axis should be about 20° east of north. A parking area would be needed. This use will be allowed subject to approval of a bonified third party to be responsible for this development.

R-12A. A family picnic facility can be developed adjacent to McKay Lake with a road, parking area, toilets, drinking water, shade tree planting, picnic shelter, children's playground, and a swimming beach if water quality is adequate. Floodlights would be desirable.

A tree and shrub screen would be desirable along the north side of Swan Pond Road.

If open to the public, the fence could be moved to exclude the facility from the security area.

R-12B. In lieu of developing R-12A, a family picnic facility could be developed at the Recreation Park, where toilets and drinking water are presently available. The road and parking area would need to be improved, and play equipment for children and adults installed. Floodlights would be desirable.

If open to the public the fence could be moved to exclude the facility from the security area.

R-13. A small overnight, vacation type, campground for Navy personnel and their families could be developed at either McKay Lake or at the recreation park and not conflict with a family picnic area. At McKay Lake campsites can be developed in the forest east of the road as well as along the lake. A supply of drinking water would be essential. The fence could be moved in either case to exclude the facility from the security area.

R-14. An outdoor conservation education or nature study area can be developed at one of the two locations. Development would involve an access road, parking area, renovation, or construction of an interpretive building, trails, bridges, walkways, trail markers, and interpretive materials. This use will be allowed subject to approval of a bonified third party to be responsible for this development.

R-15. Horseback riding trails can be developed in the SE buffer zone. An assembly area with parking for trucks and trailers would be needed along with trail markers and a display of the trail system. Drinking water for the horses and restroom facilities for the riders would be desirable. All-terrain vehicles should not be allowed to use horse trails. Recreationists could use the trails for hiking. This use will be allowed subject to approval of a bonified third party to be responsible for this development.

R-16. Hiking trails can be developed in the SE buffer zone. Trail markers, a parking area and display of the trail system would be needed. Horses and all-terrain vehicles should not be allowed to use hiking trails.

VI. LONG-RANGE SCHEDULE OF ACTION

The above "site-specific management guidelines" are strictly guidelines to help achieve the stated objectives. Many are alternatives. The Department of the Navy, with concurrence of Grumman officials as appropriate, must translate these into a long range schedule of action. In the following, the guidelines have been grouped into three categories of suggested priority: high, medium, and low. It is recommended that the high priority category items be implemented by 1 October 1993 and the medium priority items considered for implementation by 1 October 1998. All the others which will not be listed are low priority, many of which may not be implemented. Implemented projects will be funded by NAVFAC Natural Resources Budget or an approved third party.

A. High Priority Guidelines

R-1. Install concrete, asphalt, and/or stonedust on paths, trails, and areas between recreation facility components.

B. Medium Priority Guidelines

R-3A. Improve Connecticut Avenue canoe launching site and parking area.

Appendix A Missing From Original

DEC

PUBLICATION

Division of Lands and Forests

PART 666
Regulation for Administration and Management of the Wild, Scenic and Recreational Rivers System in New York State Excepting the Adirondack Park

Statutory Authority:
Environmental Conservation Law
Article 15, Title 27

Effective Date:
March 26, 1986

New York State/Department of Environmental Conservation

PART 666

REGULATION FOR ADMINISTRATION AND MANAGEMENT

OF THE

WILD, SCENIC AND RECREATIONAL RIVERS SYSTEM

IN NEW YORK STATE

Excepting the Adirondack Park

Statutory Authority: Environmental Conservation Law
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Effective Date: March 26, 1986

PART 666

REGULATION FOR ADMINISTRATION AND MANAGEMENT OF THE WILD, SCENIC AND RECREATIONAL RIVERS SYSTEM IN NEW YORK STATE

Excepting the Adirondack Park

(Statutory authority: Environmental Conservation Law, Article 15, Title 27)

Section

666.1 Purposes and policies of the Act.
666.2 Purpose and application of this Part.
666.3 Definitions.
666.4 Classes of rivers and management objectives for river areas.
666.5 Local government implementation.
666.6 River area management plans.
666.7 Boundaries of river areas.
666.8 Regulatory structure of this Part.
666.9 Existing land uses.
666.10 Permit application and review procedures.
666.11 Permit issuance standards.
666.12 Variances from the regulations.
666.13 Joint jurisdictional proceedings.
666.14 Other laws and regulations.
666.15 Emergency exemptions.
666.16 Access to private lands.
666.17 Penalties and enforcement.
666.18 Preservation of natural flow.
666.19 Wild rivers - Land uses or development for which a rivers system permit is not required.
666.20 Wild rivers - Land uses or development requiring a rivers system permit.
666.21 Scenic rivers - Land uses or development for which a rivers system permit is not required.
666.22 Scenic rivers - Land uses or development requiring a rivers system permit.
666.23 Recreational rivers - Land uses or development for which a rivers permit is not required.
666.24 Recreational rivers - Land uses or development requiring a rivers system permit.
666.25 Structures; restrictions and standards.
666.26 Roads, trails, bridges, and motorized access; restrictions and standards.
666.27 Water quality; restrictions and standards.
666.28 Disposal of refuse and human waste; restrictions and standards.
666.29 Signs; restrictions and standards.
666.30 Public utility uses; restrictions and standards.
666.31 Forest management and vegetative cutting; restrictions and standards.

PART 666

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Section 666.1. Purposes and policies of the Act.

The purpose of the Wild, Scenic and Recreational Rivers System Act is to institute a state wild, scenic and recreational rivers system within New York. Many rivers of the state, and their immediate environs, possess outstanding natural, scenic, ecological, recreational, aesthetic, botanical, geological, hydrological, fish and wildlife, historical, cultural, archaeological and scientific values. Improvident development and use of these rivers and their immediate environs will deprive present and future generations of the benefit and enjoyment of these unique and valuable resources. It is the policy of the state as set forth in the Wild, Scenic and Recreational Rivers System Act (Title 27 of Article 15 of the Environmental Conservation Law) hereafter termed "the Act", that designated rivers of the state and their immediate environs possessing the aforementioned characteristics shall be preserved in a free-flowing condition and shall be protected for the benefit and enjoyment of present and future generations.

666.2. Purpose and application of this Part.

(a) The purpose of this Part is to implement the Act by establishing statewide regulations for the management, protection, enhancement and control of land use and development in river areas on all designated wild, scenic and recreational rivers in New York State, except for land in river areas within the Adirondack Park. Land use and development of private land in river areas within the Adirondack Park are subject to the provisions of Part 577 of Title 9 of the Official Compilation of Codes, Rules and Regulations of the State of New York (9 NYCRR Part 577).

(b) It is the further purpose of this Part to provide for the protection and enhancement of the interests of landowners in the enjoyment and use of their properties in designated river areas and to help to insure that recreation and other uses are consistent with the intent of the Act.

(c) The regulations set forth in this Part may be complemented by the promulgation of regulations for individual river areas. Such regulations shall be consistent with the Act and no less restrictive than this Part and shall address the specific management issues that are relevant to individual river areas.

(d) It is a purpose of this Part to encourage the participation of local governments in the management planning process necessary to achieve the goals of the Act. It is a further purpose of this Part to authorize and encourage administration by local governments of those provisions of this Part that are within their respective jurisdictions, in place of the Department's administration of such provisions, when such local governments are legally, technically and financially capable of administering such provisions in a manner consistent with the provisions of the Act and this Part.

(e) In its administration and enforcement of this Part, the Department shall give primary emphasis to the protection and enhancement of the natural, scenic, ecological, recreational, aesthetic, botanical, geological, hydrological, fish and wildlife, historical, cultural, archaeological and scientific features of designated rivers and river areas.

666.3. Definitions.

As used in this Part, the following words and terms shall have the meaning ascribed to them and shall apply for purposes of administering the Act in addition to any other words and terms defined in Section 15-2703 of the Act.

(a) "Accessory structure" means any structure located on the same premises and incidental and subordinate to the main structure, including a guest cottage not for rent or hire that is incidental and subordinate to and associated with a private dwelling.

(b) "Accessory use" means any use of a structure, lot or portion thereof that is customarily incidental and subordinate to and does not change the character of the principal use of the structure or lot

(c) "Act" means the Wild, Scenic and Recreational Rivers System Act as set forth in Title 27 of Article 15 of the Environmental Conservation Law or any successor provision of law.

(d) "Agricultural use" means any management of any land for the production of agricultural products including crops; field crops; fruits; vegetables; horticultural specialties; livestock and livestock products; including the sale of products grown or raised directly on such land, and the construction, alteration or maintenance of fences, agricultural roads, agricultural drainage systems and farm ponds, but not including land used for the processing of any agricultural product.

(e) "Agricultural use structure" means any barn, stable, shed, silo, garage, fruit and vegetable stand or other building or structure directly and customarily associated with agricultural use.

(f) "Basal area" means the sum of the cross-sectional areas of specified or total vegetation within a given area measured at four and one-half (4.5) feet (breast height) above ground.

(g) "Boat launching site" means a site for the launching of boats and which may or may not contain a ramp for trailered boats or attendant parking facilities.

(h) "Clearcutting" means any cutting of trees one inch or more in diameter measured at breast height which results in a residual density of trees of less than thirty (30) square feet of basal area per acre.

(i) "Clustering" means the varying of the area and shoreline frontage requirements for structures within a specific tract of land from the area and shoreline frontage requirements of a local zoning ordinance, for the purpose of preserving the natural and scenic qualities of the land in accordance with the provisions of Section 281 of the Town Law, Section 7-738 of the Village Law and Article 37 of the General City Law.

(j) "Commercial sign directory" means any structure, frame or other support which contains two (2) or more signs as that term is used in this Part.

(k) "Commercial use" means any use involving the offer for sale or rental, sale, rental or distribution of goods, services or commodities or the provision of recreation facilities or activities for a fee, but not including the manufacturing of goods or commodities.

(l) "Commissioner" means the Commissioner of the Department of Environmental Conservation, his successors to office and any agency which may succeed to the duties of such office.

(m) "Cultural feature" means any building, structure, historic district, area, site or object, including an underground or underwater site, of significance in the history, architecture, archaeology or culture of this state, its communities or the nation.

(n) "Department" means the Department of Environmental Conservation or any agency or body which may succeed to the duties of such office.

(o) "Development" means any activity which materially affects the existing condition, use or appearance of any land, structure or improvement including any grading, road construction, installation of utilities or other improvements or any other development preparatory or incidental to any such activity, or the subdividing of land as defined in this Part, by any person

(p) "Forest management" means forestry practices, including harvesting of a forest woodland or plantation or other types of cuttings planned as part of a deliberate forest management program and the construction, alteration or maintenance of forest management roads, skidways, logging landings and fences, and related research and educational activities.

(q) "Forest management road" means any dirt or other unimproved road, including skidways, and used solely for forest management purposes

(r) "Forestry management structure" means any structure directly and customarily associated with forest management.

(s) "Free-flowing" means existing or flowing in natural condition without impoundment, diversion, straightening, or other modification of the waterway except for stream improvement structures for fishery management purposes.

(t) "Improvement" means any change in or addition to land, including but not limited to grading, filling, excavating or adding banks, fences, dikes, ditches, pipelines, poles, electrical conduits, roads, streets, curbs, gutters, sidewalks, driveways, parking lots or spaces.

(u) "Land" means the earth, on or below the surface of the ground, including all natural resources.

(v) "Land use" means any use or appearance of land or a structure, including the particular nature, scale, extent, density and intensity of the use.

(w) "Local government" means any county, city, town or village.

(x) "Logging landing" means an area where harvested trees are assembled for further processing or are loaded for transportation.

(y) "Major public utility use" means: any electric power transmission or distribution line and associated equipment with a rating of more than fifteen (15) kilovolts and which is one (1) mile or more in length; any telephone inter-exchange or trunk cable or feeder cable which is one (1) mile or more in length; any telephone distribution facility containing twenty-five (25) or more pairs of wire and designed to service a new residential subdivision; any television, cable television, radio, telephone and other communication transmission tower; any pipe, conduit or other appurtenance used for the transmission of gas, oil or other fuel which is one (1) mile or more in length; or any electric substation, generating facility or maintenance buildings. Also see subdivision (nn) of this section.

(z) "Mobile home" means any self-contained dwelling unit designed to be transported on its own wheels or those of another vehicle and which may contain the same water supply, sewage disposal and electric systems as immobile housing. A dwelling unit that is constructed in sections and transported to and assembled on the site and fixed to a permanent foundation is not a mobile home.

(aa) "Motor vehicle" means a device for transport incorporating a motor or an engine of any type for propulsion and with wheels, tracks, skids, skis, propeller, air cushion or other contrivance for traveling on or over land or water or through water, other than a motorized vessel as defined in this Part.

(bb) "Motorized equipment" means any machine or device powered or driven by an internal combustion engine of any type.

(cc) "Motorized vessel" means any boat or craft driven or powered by an internal combustion engine of any type.

(dd) "Multiple family dwelling" means any detached building of three or more dwelling units.

(ee) "Open area" shall mean that area of the subdivision not occupied by dwelling units, garages, carports, storage buildings or other such structures but including patios, parking areas, driveways, roadways, sidewalks, developed recreation areas, artificially landscaped areas and other similarly developed open spaces.

(ff) "Open space recreation use" means any recreation use particularly oriented to and utilizing the outdoor character of an area including necessary trails. "Motorized open space recreation use" means any open space recreation use which utilizes a motor vehicle or motorized vessel and "non-motorized

open space recreation use" means any other open space recreation use.

(gg) "Person" means any individual, corporation, partnership, joint venture, association, organization, government or any agency or political subdivision thereof, or any other entity.

(hh) "Principal building" means any one of the following: private dwelling; mobile home; tourist cabin or similar structure for rent or hire involving three hundred (300) or more square feet; and any other structure which exceeds twelve hundred fifty (1250) square feet. In addition, each motel unit or similar tourist accommodation unit attached to a similar unit by a party wall, each accommodation unit of a tourist home or similar structure, and each tourist cabin or similar structure for rent or hire involving less than three hundred (300) square feet of floor space, will constitute one-tenth (1/10) of a principal building. An accessory structure will not be considered a principal building. In addition, all agricultural use structures and private dwellings or mobile homes occupied by a farmer of land or members of their respective immediate families, will together constitute a single principal building.

(ii) "Private dwelling" means any detached building containing one or two dwelling units, not including a mobile home.

(jj) "Private road" means any road other than a forest management road or a public road.

(kk) "Public road" means any road over which the public has a right of way.

(ll) "Public utility use" means any electric power transmission or distribution line; any telephone or television trunk or feeder cable or distribution line; any pipe or conduit for the transmission of gas, oil, or other fuels; any water or sewage system pipe or conduit; any television, radio, telephone or other communication transmission tower or receiving device or facility; and any appurtenant facilities whether or not such use is subject to review under Articles VII or VIII of the Public Service Law. Also see subdivision (aa) this section.

(mm) "Refuse" means anything thrown away or rejected as worthless or useless, including but not limited to trash, rubbish, garbage and human wastes.

(nn) "River" means a flowing body of water or a section or portion thereof, including streams, creeks, runs, kills, rills, branches or lakes, which has been designated in the Act, including any tributary thereto expressly included in the designation.

(oo) "River area" means the river and the land area in its immediate environs bounded as established by the Commissioner pursuant to section 15-2711 of the Act. Upon designation and until boundaries are established by the Commissioner, the river area shall be that area within one half mile of each bank of the river.

(pp) "River area management plan" means a plan for the management of a river area or areas as described in Section 666.6 of this Part.

(qq) "River bank" means the water level reached by the mean annual flood.

(rr) "Road" means any highway, hard-surfaced road, improved or dirt road.

(ss) "Scientific features" means any special physical or natural attributes in the designated river area that are verified by scientific investigation.

(tt) "Sign" means any inscribed surface, pattern or artificial lighting, pictorial, symbolic, ornamental or emblematic structure, barrier, fluttering apparatus or other visually communicative or expressive device that is visible from an out-of-doors position and is used to advertise or call the public's attention to any business, activity, object, service or place, give directions or to bear any other kind of message. The term "sign" shall not include any traffic control device; any sign placed for less than three months to advertise any event sponsored by a civic, religious, fraternal group or similar not-for-profit organization; to advertise the sale of any merchandise on a temporary basis from a residence; to address any candidate or question which is the subject of a public election or any political issue; to advertise the availability of the premises or some portion thereof for sale or lease; or any patriotic flag or banner not used to advertise a commercial use.

(uu) "State agency" means any department, bureau, commission, board or other agency of the State, including any public benefit corporation, any member of which is appointed by the governor.

(vv) "Stream improvement structure for fishery management purposes" means any structure made of naturally occurring materials which are designed solely for fishery management purposes and which do not materially alter the natural character of the waterway. Examples include fish barrier dams, fish passage structures, minor diking, cribbing, bank stabilization and stream deflectors and other structures or improvements.

(ww) "Structure" means any object, other than a traffic control device, which is constructed, installed, or placed on land to facilitate land use, and includes such examples as buildings, mobile homes, sheds, tanks, outdoor lighting, bridges, water access parking areas, fences and poles and any fixtures, additions and alterations thereto and, unless placed for a period of less than six months, trailers, travel trailers, campers, or tents

(xx) "Subdividing of land" or "subdivision" means any active, effective, or proposed division of land into lots, parcels or sites, whether contiguous or not, for the purpose of any form of separate ownership or occupancy as part of a common scheme (including grading, road construction, installation of utilities or other improvements or any other land use and development preparatory or incidental to any such division) by any person or by any other person controlled by, under common control with or controlling such person or by any group or person acting in concert as part of a common scheme or plan. Sub-

division of land shall include any map, plat or other plan of the division of land, whether or not previously filed. Subdivision of land shall not include the division of land resulting from bona fide devise, inheritance or gift.

(yy) "Trail" means a marked and maintained path or way four feet or less in width, and located and designed to provide for reasonable access in a manner causing the least effect on the local environment.

(zz) "Water access parking area" means a site for the parking of not more than ten vehicles with foot trail access to the water and which does not contain a ramp for trailered boats.

666.4. Classes of rivers and management objectives for river areas.

The system consist of three classes of rivers as designated under Section 15-2711 of the Act.

(a) Wild rivers are generally five (5) miles or more in length, free of diversions and impoundments, and accessible only by water, foot or horse trail. Their river areas are primitive and undeveloped in nature. In general the minimum distance from the river to a public road or a private road open to the public is one-half mile. Management of wild river areas shall be directed to the perpetuation of their wild condition.

(b) Scenic rivers are generally free of diversions or impoundments with limited road access. Their river areas are essentially primitive and undeveloped or are used for agriculture forest management and other dispersed human activities which do not in themselves substantially constrain public use and enjoyment of these rivers and their shores. Management of scenic river areas shall be directed to preserving and restoring their natural scenic qualities.

(c) Recreational rivers are generally readily accessible, and may have a significant amount of development in their river areas and may have been impounded or diverted in the past. Management of recreational river areas shall be directed to preserving and restoring their natural, scenic and recreational qualities.

666.5. Local government implementation.

(a) The Department shall encourage participation by local government and interested persons and organizations in the development of studies, reports and plans for rivers designated for study or administration under the Act and also encourage their participation in the planning process necessary to achieve the goals of the Act.

(b) Pursuant to Section 3-0301(2)(p) of the Environmental Conservation Law, the Commissioner may delegate to a local government or a group of local governments its powers, functions, and responsibilities, except review and determination of any application for a permit from a state agency, for adminis-

tration of designated river areas as it deems proper upon determining that such local government or group of local governments has adequate legal authority, expertise, staff, funding and such other capabilities as the Commissioner may prescribe as being necessary to fully carry out such powers, functions and responsibilities in place of the Department and in a manner consistent with the Act. Such delegation of the Department's authority shall be set forth specifically in a binding agreement between the Department and the participating local government or governments. Such delegation shall be governed in all respect by the provisions of Section 3-0301(2)(p) of the Environmental Conservation Law and is subject to revocation, in whole or in part and after proper notice, upon a finding by the Department that the agreement has not been implemented according to its terms or in accordance with the purpose and policies of the Act. A city, village or town shall have the first opportunity to accept a delegation of the authority of this Part. If a city, town or village declines or is denied such delegation by the commissioner, a county may assume such authority.

(c) A local government or group of local governments may utilize any legal device or combination of devices for controlling land use and development and the subdividing of land in conjunction with the authority delegated by the Department pursuant to the Act and this Part that is consistent with the purpose of the Act and this Part and that is authorized by applicable state enabling laws. The Department shall encourage each local government or group of local governments exercising any authority delegated by the Department under this section to adopt those land use and development control devices that are best suited to the situation.

(d) In its administration and enforcement of this Part, the responsible local government or group of local governments shall give primary emphasis to features listed in subdivision 666.2(e) of this Part.

666.6. River area management plans.

(a) River area management plans shall be prepared in accordance with the provisions of this section. Such plans are subject to approval, approval with modification or disapproval by the Commissioner.

(b) A river area management plan for a particular river area may be prepared by the Department, by an affected local government or group of affected governments or by any person or entity acting in cooperation with any affected local government or governments or this Department. In the event that such plans are not prepared by the Department, those local governments, persons or other entities engaged in such activity shall be approved by the Department, shall act in an advisory capacity to it, and shall coordinate and cooperate fully with the Department. The Department shall provide such guidance and assistance as may

be required to insure that the proposed river area management plan is sufficient.

(c) A river area management plan not prepared by the Department and submitted to the Commissioner for final approval shall be reviewed by the Department within a reasonable period of time from its submission and acted upon pursuant to Part 617 of this Title.

(d) The Department shall not approve or disapprove any proposed river area management plan until it holds a public hearing on the plan. Such hearing shall be held in or near the river area, and shall be publicized by notice in a newspaper of general circulation in the river area at least fifteen and not more than thirty days in advance of the hearing.

(e) Upon the Department's approval of a river area management plan notice of such plan shall be published in the Environmental Notice Bulletin and a newspaper of general circulation in the vicinity of the river area. Concurrently, the Commissioner may amend, as provided in Section 666.7, the boundaries of the river area previously adopted.

(f) Regulations for administration of the specific river area that are called for in the plan shall be expeditiously promulgated by the Commissioner. The Commissioner shall mail individual notices at least thirty days in advance of a hearing concerning any river-specific regulations to all owners of record on the most recently completed real property tax roll of property within the river area. Failure of any person to receive such notice shall not invalidate any such regulations.

(g) A river area management plan shall:

(1) Be consistent with the purposes, policies and provisions of the Act.

(2) Contain a clear description and delineation in narrative and graphic form (maps and photographs) of: the significant natural, cultural and aesthetic resources and features of the river area; existing land and water uses; land ownership; and existing land and water use controls and management devices and programs.

(3) Set forth a detailed program plan to address existing and potential issues, problems and needs which impact, or may impact, resources and features of the river area which have been identified as being important to be protected and preserved, including recommended federal, state, local and private actions to enhance resources and features within the proposed river boundaries. The enhancement may include the restoration of resources negatively impacted by previous or existing land use and development.

(4) Set forth land and water management goals, objectives, and the specific policies, standards and management guidelines to implement a definitive long range program of protection, preservation and compatible public uses.

(5) Set forth specific regulations for those elements of the plan that require such regulations, including standards

and restrictions that will govern the use of land and water resources.

(6) Specify the means for making revisions in the river area management plan.

(7) Set forth river area boundaries which may already have been established by the Commissioner.

(8) Provide for the continuing involvement of the affected and interested public in the development, implementation and administration of the plan.

(h) The Department shall review each approved river management plan at least once every five years to determine whether it has been implemented according to its terms or requires revision. In so doing, the Department shall solicit public comment on the plan and will hold one or more public meetings for this purpose.

666.7. Boundaries of river areas.

(a) Boundaries shall be established subject to the finding of the Commissioner that they are consistent with the purposes and policies of the Act and facilitate the management objectives thereof. Boundaries shall be delineated and established to include within the river area those natural and cultural features whose protection and preservation are necessary to accomplish the purposes of the Act. Such features may include: scenic areas; natural, scientific and cultural features; flood plains and wetlands; significant fish and wildlife habitats; watershed and hydrological aquifer features, ecologically important areas and river-related outdoor recreational facilities. In delineating a river area boundary, consideration may be given to the existence of property boundaries or regulatory boundaries. Boundaries may not exceed a width of one-half mile from each bank of the river.

(b) Boundaries shall be established by the Commissioner following a public hearing held in or near the river area after a river has been included in the system. The Commissioner shall mail individual notices at least thirty days in advance of the hearing to all owners of record on the most recently completed real property tax roll of property within or immediately adjoining the proposed boundary. Failure of any person to receive such notice shall not invalidate the boundary subsequently established.

(c) Upon establishment of the boundary the Commissioner shall file a map and narrative description of same with the clerk of each county in which the designated portion of the river is located. The Commissioner shall also notify affected local governments and state agencies of same and provide them with a map and narrative description of the boundary. A notice of establishment of the boundary shall be placed in the Environmental Notice Bulletin and a map and narrative description of the boundary shall be provided to interested parties upon request.

(d) Boundaries may be established or amended independently or concurrent with the process of adopting a river management

plan and any complementary regulations for an individual designated river, as provided by Section 666.6 of this Part.

(e) Upon the designation of a river in the system and until boundaries for the river are established, the provisions of this Part shall be applicable within one-half mile from each bank of the river.

(f) Unless otherwise specified, the boundaries of river areas described as a uniform distance from a river bank shall themselves wind and turn as the river does. All distances from a river shall be measured horizontally from the bank of the river.

(g) The Commissioner may amend the boundaries of any river area after a public hearing, at the initiative of the Department or as may be requested by any other person, if in the judgment of the Commissioner such amendment would further the purposes and policies of the Act and more aptly facilitate the management objectives thereof. Notice of the hearing shall be provided in the same manner as when boundaries are established originally.

(h) Upon request by any landowner, tenant, mortgagee, contract vendee or optionee or other person having a legal interest in a given property the Department shall determine the terminal points of the river area or classified sections thereof and the bank at relevant points along the river involved.

666.8. Regulatory structure of this Part.

(a) All new land use or development in a river area must be undertaken in compliance with the standards listed in this Part, except through the granting of a variance as provided in Section 666.12.

(b) No person shall:

(1) Undertake a new land use or development in a river area which is not under this Part.

(2) Undertake a new land use or development in a river area which is allowed only pursuant to a rivers system permit except in accordance with such a rivers system permit issued prior to undertaking the land use or development.

(c) A person may undertake a new land use or development allowed without a rivers system permit without obtaining such a permit.

666.9. Existing Land Uses.

(a) Land uses which are lawfully existing on the date upon which this Part first takes effect in a given river area may continue in the same manner and in the same location without a rivers system permit.

(b) Land uses lawfully existing shall mean:

(1) in the case of the subdividing of land, the conditional or preliminary approval of such plat pursuant to Section 276 of the Town Law, Section 7-728 of the Village Law or Section 32 of the General City Law; provided however, that final plat

approval is granted within six months of preliminary plat approval; or

(2) in the case of the review of a site plan not involving the subdividing of land, the approval by the appropriate body or office of a city, town or village of the site plan; or

(3) in those cases not covered by paragraph (1) or (2) of this subdivision, the issuance of a building permit or other authorization for the commencement of the activities or development for which such permit or authorization was issued; or

(4) in the case of local government jurisdictions which do not require such permits or authorizations or for land uses which do not require any government approval, the actual and substantial lawful commencement of the land use or development.

(c) Structures or improvements which are lawfully existing may be maintained, rehabilitated, restored, replaced or rebuilt on the same scale and in the same location. Any alteration or expansion of an existing use, structure or improvement is new land use or development and must comply with the restrictions and standards contained in this Part.

(d) Any lawfully existing land use which is discontinued for one year following the effective date of this Part in a given river area, shall thereafter be a new land use or development and be subject to the permit requirements and standards of this Part.

(e) Any lawfully existing lot may be developed for land uses or developments allowed in the river area notwithstanding that the lot may not satisfy the minimum lot area or shoreline frontage widths specified in Section 25 of this Part. All contiguous parcels held in actual or effective common ownership on the date upon which this Part first takes effect in a given river area shall be deemed a single lot.

666.10 Permit Application and review procedures.

(a) The procedures and schedules for applications for rivers system permits are governed by Article 70 (Uniform Procedures Act) of the Environmental Conservation Law "ECL" and its implementing regulations contained in Parts 621 and 624 of this Title. Review procedures are also governed by Article 8 (State Environmental Quality Review Act) of the ECL and its implementing regulations contained in Part 617 of this Title.

(b) All activities within designated rivers and river areas which require permits pursuant to this Part are Type I actions as that term is employed in Part 617.

(c) Reviews and determination of any permit application from a state agency shall be conducted by the commissioner, and shall not be delegated to any local government.

666.11 Permit issuance standards.

Before a river system permit is issued, it must first be determined that:

(a) The proposed land use or development is consistent wit the purposes and policies of the Act and with the provisions of this Part.

(b) The resources specified in Section 666.2(e) of this Part will be protected and the proposed activity will not have a undue adverse environmental impact.

(c) No reasonable alternative exists for locating the proposed activity outside of the designated river area.

(d) Actions proposed to be undertaken by state agencies ar designed to preserve, protect or enhance the conditions of desig nated rivers for which they were designated.

666.12 Variances from the regulations.

(a) No variance may authorize any development or improvement prohibited by the Act. The Department, upon receipt of a written request made in conjunction with a permit application pursuant to this Part, may vary or modify any provision of this part relating to allowable land uses or development and standard for such land uses or development so long as it is the minimum variance necessary and only if the provision:

(1) would cause an undue hardship for the applicant; or,

(2) in the case of minimum lot areas required by section 666.25 of this Part, would cause practical difficulty fo the applicant; or,

(3) in the case of applicants which are state agencie or municipal corporations, would be as environmentally protectiv to the river values identified in section 666.2(e) of this Part and would fulfill a public health, safety or welfare function.

(b) A variance request shall be submitted to the Regional Permit Administrator of the Department in writing and in such form and manner as the Department may deem pertinent for proper review. Minimally, each request shall contain a description of the property and the basis for the request.

(c) The Department shall hold a public hearing on any variance request when there are specific objections made to such request or when the Department recommends that the variance not be granted. The public hearings shall be conducted in accordanc with Parts 621 and 624 of this Title when conducted by the Department.

(d) If the administration of the program has been delegate to a local government, variance and permit applications shall be directed to such local government. When a variance hearing is conducted by a local government, it shall be conducted in accordance with the procedures specified in the delegation of authority under this Part.

666.13 Joint jurisdictional proceedings.

The Commissioner may, in accord with Parts 617, 621 and 624 of this Title and by mutual agreement with any other federal,

state or local body having jurisdiction over the subject matter of an application for a rivers system permit, provide for joint processing, including notices and hearings, of any such application.

666.14 Other laws and regulations.

No provisions of this Part shall relieve any person from the obligation to comply in all respects with the provisions of any other federal, state or local law or regulation, including but not limited to acquisition of any other required permit or approval.

666.15 Emergency exemptions.

(a) The provisions of this section shall apply to any actual and ongoing emergency land use necessary to alleviate any imminent or actual danger to human life or limb or to property or to the environment. Such emergency land use, which may be undertaken without a rivers system permit, shall be limited to the minimum extent necessary to alleviate the imminent or actual danger.

(b) Any person undertaking an emergency land use or development which would require a permit or be prohibited by this Part absent the emergency shall notify the Commissioner by telephoning the appropriate regional office of the Department as soon as possible and providing written notice no later than forty-eight hours after discovering such emergency.

(c) The Department reserves the right to limit, by oral or written communication, the nature, scope and extent of any proposed emergency land use or development.

(d) Upon notice from the Department that circumstances do not constitute an emergency or that such an emergency has ended, any person conducting or proposing to conduct the emergency land use or development shall cease immediately. If any alteration of the river area has occured, the river area shall be immediately restored to its prior condition to the maximum extent practicable.

666.16 Access to private lands.

Neither the Act nor this Part shall be construed to create or to confer upon any person any right of access, or of ingress and egress, over, upon or to any private lands, water or bodies of water that are within a designated river area.

666.17 Penalties and enforcement.

Any person who violates the Act, this Part or any order issued by the Department pursuant to the Act or to such regulations may be liable for all penalties and other remedies provided for in the Environmental Conservation Law. Such

penalties and remedies may be in addition to any other penalty o remedy available under any other law.

666.18. Preservation of natural flow.

(a) Dams and similar structures.

(1) No dam or other structure or improvement impeding or altering the natural flow of water or free-flowing condition of the river shall be constructed upon any river segment which has been included in the state wild, scenic and recreational rivers system.

(2) New Construction or new operation of hydropower facilities on wild rivers is prohibited.

(3) The Department may approve permits and certifications for new construction or new operation of hydroelectric generation facilities at existing dams on scenic and recreational rivers provided that:

(i) in the operational mode of any proposed facility, outflow equals inflow and the reservoir level is not affected by project operation and does not alter the natural free-flowing character of the river;

(ii) the proposed facility does not provide for diversion of the river above or below the existing dam;

(iii) any required ancillary facilities, such as access roads and transmission lines, conform with the requirements of the Act, this Part and other applicable state laws and regulations; and

(iv) such dams are not on lands in the Forest Preserve, State Nature and Historic Preserve Trust, in state parks or in state reforestation, multiple use, unique, or wildlife management areas. Existing dams are those dams which are i existence when a river is designated in the system and are capable of impounding water in a manner and at a level consisten with the design of the structure as it existed on the date upon which the river was designated in the system.

(b) Natural flow.

(1) The natural flow of water in wild rivers shall be maintained and there shall be no new diversions thereof or withdrawals therefrom.

(2) Permit application reviews of proposed groundwate withdrawals which are located in the watershed of the river area and are regulated pursuant to Article 15, Title 15 of the Environmental Conservation Law shall include consideration of th effect of the proposed activity on streamflow and associated water table levels. Permits for groundwater withdrawals shall not be issued if it is determined that such withdrawals would result in significant lowering of the water table or reduction o streamflow.

(3) Any water releases made in the watershed from a new water-impounding structure or changes in releases from an existing water impounding structure shall be conducted in a manner that will insure the protection, perpetuation and

enhancement of riverine biota and the natural, scenic and recreational values of the designated river.

(4) All water related or water dependent land uses or developments, consumptive or otherwise, which are located in or upstream of a designated river segment, and which affect all or part of the flow in the designated river, will be required:

(i) to operate in a run-of-river mode, or

(ii) to maintain a specified minimum downstream flow that will provide appropriate protection to the affected downstream segments. Any person operating such a project is required to apply for a permit to operate the project according to a schedule of releases approved by the Department.

666.19 Wild rivers-Land uses or development for which a rivers system permit is not required.

In wild river areas, the following new land uses or development are allowed without a rivers system permit:

(a) Forest management, excluding forest management roads, and other vegetative cutting beyond one hundred (100) feet from the river bank other than that undertaken in conjunction with those activities requiring a rivers permit.

(b) Development of forest management roads, including necessary bridges, beyond one hundred fifty (150) feet of the bank of the designated river.

(c) The use and operation of motor vehicles or motorized equipment only for forest management purposes.

(d) Non-motorized open space recreation uses.

666.20 Wild rivers--Land uses or development requiring a rivers system permit.

In wild river areas, the following new land uses or development may be allowed pursuant to a rivers system permit:

(a) clearcutting of areas exceeding twenty-five (25) acres. Clear cut areas of eight (8) acres or more will be aggregated for purposes of computing the twenty-five (25) acre threshold when such areas are separated by less than three hundred (300) feet at any point by an intervening area with an average basal area of at least sixty (60) square feet per acre of trees one inch or more in diameter at breast height.

(b) any alteration of the existing pattern of releases from an existing water-impounding structure.

(c) any land use or development not otherwise requiring a rivers permit but for which a variance is requested pursuant to Section 666.12.

666.21 Scenic rivers--Land uses or development for which a rivers system permit is not required.

In scenic river areas, the following new land uses or development are allowed without a rivers system permit:

(a) Any new land use or development allowed in a wild river area without a permit.
(b) Agricultural uses.
(c) Agricultural use structures.
(d) Forest management and vegetative cutting other than activities requiring a rivers system permit.
(e) Forest management structures.
(f) Game preserves and private parks.
(g) Lean-tos having less than two hundred (200) square feet of floor space.
(h) Non-motorized open space recreation uses, including associated bridges other than bridges over the designated river.
(i) Public utility uses which:
(1) are subject to review pursuant to Article VII or VIII of the Public Service Law, or
(2) do not constitute major public utility uses, do not cross the designated river and are proposed to be located more than five hundred (500) feet beyond the river bank.
(j) Use of motorized vehicles or motorized equipment required for any allowable use in scenic river areas.
(k) Structures located 500 feet or more from the bank of of the river, other than structures requiring a permit as provide by Section 666.22 of this Part.
(l) Accessory uses and structures, except boathouses or docks, for any authorized land use or development.

666.22 Scenic rivers--Land uses or development requiring a rivers system permit.

In scenic river areas, the following new land uses or development may be allowed pursuant to a rivers system permit:
(a) Any new land use or development which may be allowed in a wild river area pursuant to a rivers system permit.
(b) The harvesting, cutting, culling, removal, thinning or other disturbance of vegetation, other than annual agricultural crops, inside or within one hundred (100) feet of the river bank for the purpose of clearing the river or its tributaries of debris or for undertaking other allowable land uses or development.
(c) Public or private roads.
(d) Private dwellings.
(e) Structures otherwise allowed without a permit and proposed to be located less than 500 feet beyond the bank of the river.
(f) Lean-tos involving two hundred (200) square feet or more of floor space.
(g) Individual mobile homes.
(h) Docks, boat launching sites, and water access parking areas.
(i) Public utility uses not subject to Article VII or VIII of the Public Service Law which:
(1) are major public utility uses; or

(2) are proposed to cross the river, or be located inside of or within five hundred (500) feet of the river bank.

(j) Subdividing of land.

(k) Stream improvement structures for fishery management purposes.

(l) Activities that require a permit pursuant to Title 5 of Article 15 (Protection of Waters) of the Environmental Conservation Law or that would require such permit if the river or stream in question were regulated by said Title.

(m) Bridges over a designated river for public roads or non-motorized open space recreation uses.

(n) Signs and commercial sign directories.

(o) Private water supply wells.

(p) Private sewage disposal systems.

(q) Water withdrawals from the river.

(r) Any land use or development not otherwise requiring a rivers permit but for which a variance is requested pursuant to section 666.12.

666.23 Recreational rivers--Land uses or development for which a rivers system permit is not required.

In recreational river areas, all new land uses or development which are allowed in scenic river areas without a rivers system permit are allowed without a rivers system permit.

666.24 Recreational rivers-Land uses or development requiring a rivers system permit.

In recreational river areas, the following new land uses or development may be allowed pursuant to a rivers system permit:

(a) Any land uses or development which may be allowed in scenic river areas pursuant to a rivers system permit.

(b) Boathouses used for boat storage or shelterage only.

(c) Railroads and appurtenant facilities.

(d) Commercial uses limited to retail or rental facilities directly associated with river area recreational uses with 10,000 square feet or less of floor space and compatible with the natural and scenic qualities of a designated recreational river area.

(e) Multiple family dwellings.

(f) Industrial uses limited to light manufacturing or warehousing on a site served by transportation facilities essential to such uses and compatible with existing uses on adjacent and nearby sites.

(g) Conversions of existing principal buildings which are associated with resort hotels, rental cottages and group camps to residential use, notwithstanding the fact that such principal buildings, as converted, may not conform to the building setback, lot width, lot area or density regulations of section 666.25 of this Part.

(h) Transient lodging facilities including campgrounds.

(i) Public parks and beaches.

(j) Any land use or development not otherwise requiring a rivers permit but for which a variance is requested pursuant to section 666.12.

666.25 Structures; restrictions and standards.

In scenic and recreational river areas,

(a) New structures other than fences, lean-tos, docks, bridges, water access parking areas, boat launching sites, and agricultural-use structures shall be constructed beyond either:

(1) the limit of the 100-year floodplain level of the river as determined by the Department pursuant to Part 500 of this Title; or

(2) (i) in scenic river areas, two hundred fifty (250) feet from the river bank; or

(ii) in recreational river areas, one hundred fifty (150) feet from the river bank, whichever distance is greater.

(b) Permanent agricultural use structures shall be constructed beyond one hundred (100) feet from the river bank.

(c) New structures constructed within 500 feet of the bank of the river except fences, lean-tos, docks, bridges, water access parking areas, boat launching sites, and agricultural-use structures shall be screened by vegetation or topographic features as viewed from the river.

(d) No new structure shall exceed thirty-four feet in height as measured from the lowest point of grade elevation of the structure to the highest point of the structure, except utility poles as specified in Section 666.30 of this Part or agricultural silos.

(e) Any new dock, boat launching site, or water access parking area shall be so designed and developed so as to minimiz its intrusion, if any, into the river, and shall not impede its natural flow.

(f) A new principal building shall be developed:

(1) in scenic river areas, on a lot which is at least four (4) acres in area and which, if the lot fronts on the designated river or a designated tributary thereof, has a shoreline frontage of at least three hundred (300) feet; or

(2) in recreational river areas, on a lot which is at least two (2) acres in area and which, if the lot fronts on the designated river or a designated tributary thereof, has a shoreline frontage of at least two hundred (200) feet.

(g) A new multiple family dwelling must be developed in a maximum ratio of one living unit per acre.

(h) Clustering shall be encouraged and may be allowed by rivers system permit in order to maintain undeveloped and undisturbed open areas. When clustering is permitted, the minimum cumulative acreage and density and, when applicable, shoreline lot width, of subdivisions (f) and (g) of this section shall be satisfied for the parcel as a whole. In addition, in

scenic river areas, not less than forty (40) percent, or in recreational river areas, not less than thirty (30) percent, of the open area of the subdivision shall be retained in an undisturbed condition during and after development.

(i) New structures shall be designed and developed in such a manner as to prevent significant erosion or direct runoff to the river.

666.26 Roads, trails, bridges, and motorized access; restrictions and standards.

(a) In scenic river areas:

(1) A new or extended public road or a new or extended private road open to the public, and any bridges necessary thereto, may be constructed only to provide access for the public to the shoreline of a portion of a scenic river area that is at least two (2) land-miles from the nearest existing public access within the scenic river area, as measured along the river and on the same side of the river as the portions in question. Except for that portion of a public road which provides access to a river, all such new or extended roads shall be constructed no closer than five hundred (500) feet from the river bank.

(2) If there is no vehicle access to a new or existing water-dependent residential or agricultural land use or development within a scenic river area, a new private road may be allowed if it is not open to the general public, is located at all points at least as far from the river as the land use or development to which it will provide access, and is not located inside or within one hundred (100) feet of the river bank.

(3) Any new public or private road, or trail for non-motorized open space recreation uses, shall be located, designed and constructed to minimize its visibility from the river, to minimize alteration of the natural environment, to avoid undue adverse environmental impacts, and shall be documented as being reasonable and necessary and shall have its uses effectively restricted to those specified by the person undertaking such activity. Any bridges associated with such road or trail over the designated river shall be designed so as to not interfere with the recreational use of the river.

(4) Any bridge associated with a new trail shall be constructed, to the extent feasible, of naturally occurring materials.

(b) In recreational river areas:

(1) All restrictions and standards established by paragraphs (3) and (4) of subdivision (a) of this section, pertaining to scenic river areas, shall apply.

(2) Consistent with paragraph (b)(1), all roads, bridges and motorized access customarily associated with allowable uses in recreational river areas shall be allowed inside or within five hundred (500) feet of the river bank only as such uses are necessary for access to or for crossing the designated river.

(3) If there is no vehicle access to a new or existing land use or development within a recreational river area, a new private road may be developed only if it is not open to the general public, is located at all points at least as far from the river as the land use or development to which it will provide access, and is not located inside or within one hundred (100) feet of the river bank.

(4) If there is no vehicle access to a new or existing commercial land use or development dependent upon river access within a recreational river area, a new private road providing access to the river may be developed only if it is located at all points at least as far from the river as the land use or development to which it will provide access, and is not located inside or within one hundred (100) feet of the river bank, except for a single point of access to the river.

666.27 Water quality; restrictions and standards.

(a) In wild river areas:

(1) new discharges of any substance are prohibited; and

(2) Upon its designation as a wild river under the Act, the water quality classification of the river shall be evaluated by the Department and consideration shall be given to reclassifying the river to Class N pursuant to 6 NYCRR Part 609 if this is not the present classification. If a Class N classification is not applicable, the most restrictive classification appropriate, considering future uses of the river, shall be applied.

(b) In scenic and recreational river areas:

(1) Any new direct discharge of any substance into a river shall be consistent with applicable water quality standards assigned by the Department pursuant to Parts 701 and 702 of this Title.

(2) Upon its designation under the Act, the water quality classification for a river shall be evaluated by the Department and a consideration given to reclassification to the most restrictive classification appropriate, considering future uses of the river and river area which are allowable.

666.28 Disposal of refuse and human waste; restrictions and standards.

No person shall deposit refuse of any nature in a river area except in temporary containers specifically intended for storage of such refuse until collection from its point of generation.

666.29 Signs; restrictions and standards.

(a) Public safety or regulatory signs may be developed by any authorized state or local government agency or public utility, where such signs are otherwise allowed by law, provided

that no such sign shall exceed six (6) square feet in size or ten (10) feet in height.

(b) Any person, with the permission of the landowner, may develop a posting sign pursuant to and in conformity with Sections 11-2109 and 11-2111 of the Environmental Conservation Law, provided that no such sign shall exceed three (3) square feet in size or ten (10) feet in height.

(c) Any person with the permission of the landowner may develop such informational and directional signs as are necessary to the continuance of any existing use, including any residential structure, provided that such sign not exceed one (1) square foot in size or ten (10) feet in height.

(d) In scenic and recreational river areas, other new signs shall:

(1) be at least five hundred (500) feet beyond the river bank;

(2) be no larger than three (3) square feet in scenic river areas, or ten (10) square feet in recreational river areas;

(3) neither contain nor be lighted by any flashing or intermittent lights; and

(4) in scenic river areas, be located only upon the property with which the subject of the sign is associated.

(e) New off-premises signs located along primary state highways shall be in compliance with regulations adopted by the state Department of Transportation and set forth in Part 150 of Title 17 of NYCRR.

666.30 Public utility uses; restrictions and standards.

(a) River crossings by public utility uses shall be:

(1) located only where the impacts on the scenic qualities of the river area, as seen from other parts of the river area, are minimized; and

(2) limited in number and location, to the extent feasible, to those points along a river where crossings are now made, or in conjunction with bridges, but in no case shall they be more frequent than once every two (2) miles, as measured along the course of the river.

(b) A river area public utility use shall be so located, designed and constructed as to avoid undue adverse environmental impacts and to minimize visibility from the river and from other parts of the river area.

(c) no pole erected for any public utility use, other than those utility uses under the jurisdiction of Article VII or Article VIII of the Public Service Law, shall exceed forty (40) feet in height.

666.31 Forest management and vegetative cutting: restrictions and standards.

(a) In wild river areas,

(1) Between one hundred (100) feet from the river ban and the boundary of the river area, forestry management practice must adhere to the following standards:

(i) trees must be felled, where possible, so top land away from streams;

(ii) logging debris must be removed from streams immediately;

(iii) tributary crossings may be no closer than three hundred (300) feet apart and must be at right angles to th stream channel;

(iv) tributary crossings are prohibited where stream bank slopes exceed ten (10) percent or the stream bottom is not composed substantially of rock;

(v) skidding or winching of logs or trees in or along the axis of tributary channels is prohibited;

(vi) log landings must be located on well-drainec sites two hundred (200) feet or more from the river bank and on slopes of less than ten (10) percent;

(vii) road grades may exceed thirty (30) percent for no more than one hundred fifty (150) feet;

(viii) clearcuttings must leave a fifty (50) foo uncut strip along streams, ponds and wetlands and must be conducted under a harvesting plan approved by the Department;

(ix) all roads including skidways must be regraded after logging is completed, and diversion devices must be installed during construction of roads on slopes exceeding te (10) percent in such a way that water is diverted from the road and is not discharged directly into the designated river or its tributaries;

(x) any debris resulting from forest management must, if such debris consists of hardwoods, be lopped so that no such debris is piled higher than four (4) feet above ground leve or, if such debris consists of conifers, lopped so that all limb are removed up to a point where the tree trunk has a diameter no exceeding three (3) inches;

(xi) no forest management road shall be developec within one hundred fifty (150) feet of the bank of the river; an

(xii) forest management roads shall be located s as to minimize their visibility from the river.

(2) The skidding or winching of logs or trees across wild rivers is prohibited.

(3) Logging equipment shall not be stored within the banks of the river or abandoned within the river area.

(b) In scenic and recreational river areas,

(1) All restrictions and standards established for wild river areas shall apply in all respects, except as specifie below in paragraphs 2, 3 and 4 of this subdivision.

(2) No forest management roads shall be allowed inside or within one hundred fifty (150) feet of the river bank, except those forest management roads necessary for crossing the designated river and developed pursuant to a rivers system permit.

(3) The harvesting, cutting, culling, removal or

thinning of vegetation inside or within one hundred (100) feet of the bank of the river and which is allowed with a rivers system permit shall be undertaken in a manner so as to cause no significant adverse environmental impact, preserve the stability of the river bank and minimize erosion and direct runoff to the river.

(4) Such cutting may be performed for the purpose of creating a view of a river only in recreational river areas and only in association with a residential structure, and shall maintain screening of the structure as viewed from the river.

WETLAND PLANTS OF NEW YORK

LIST - G1

COMMON WETLAND PLANTS OF LONG ISLAND N.Y., WITH SPECIES OF THE SAME AND ADJACENT WETNESS INDICATOR STATUS GROUPED - BY COMMON NAME

APPENDIX C

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE
FEDERAL BLDG. RM 771 SYRACUSE, N.Y. 13260

JUNE 1989

NATIONAL FOOD SECURITY ACT MANUAL
APPENDIX N.Y. - 518.01

INTRODUCTION

This list is a refinement of the "National List Of Plant Species That Occur In Wetlands : New York" to more specifically meet New York conditions. It was refined by Robert E Myers, Biologist, Soil Conservation Service, Syracuse, N.Y., Steven E.Clemants, Botanist, New York Natural Heritage Program, Delmar, N.Y., Dr. Mildred Faust, Botanist, and Professor Emeritus, N.Y.S.College Of Environmental Science And Forestry, Syracuse, N.Y. and C. Barre Hellquist, Botanist, North Adams State College, North Adams, Mass.

This list of plants does not include upland plants. All plants identified in the field that are not on the Master List Of All Wetland Plants Of New York are presumed to be upland plants. Plants identified in the field that do not occur on the lists of Commom Wetland Plants Of New York are likely to be upland plants, however there is a slight chance that they could be a "rare" plant or a plant that is "not common" to the region.

The State has been seperated into two geographic areas to more accurately show the distribution of plants. Each statewide list of wetland plants designates the geographic areas where the plants normally occur. Seperate lists are available for each of the geographic areas.

The geographic range of plants indicated for "Upstate" New York includes the entire State from the central part of Westchester and Rockland counties northward.

The geographic range of plants indicated for the "Long Island" area of New York includes Suffolk and Nassau counties, the New York City counties and the northern half of Westchester and Rockland counties. In the latter counties thtere may be an overlap of species from both the "Upstate" and "Long Island" lists of plants.

Soil Conservation Service
U.S. Department of Agriculture
Federal Bldg. Rm. 771, Syracuse, N.Y. 13260

LEGEND FOR "WETLAND PLANTS OF NEW YORK"

SCIENTIFIC NAME - Nomenclature follows the "National List Of Scientific Plant Names ",US Dept. Agr., Soil Conservation Service, Vol 1 and 2, 1982. (SCS-TP-159)

WET IND (Wetness Indicator)- Species are classified by their requirement for wetland conditions.

OBL - "Obligate" species are always found in wetlands. They occur there more than 99 percent of the time.

FACW- "Facultative Wetland" species are usually found in wetlands with a frequency of 67 to 99 percent of the time.

FAC - "Facultative" species are sometimes found in wetlands, with a 34 to 66 percent frequency.

FACU- "Facultative Upland" species are seldom found in wetlands, 1 to 33 percent frequency.

UP - "Upland" species are normally found in nonwetlands but may be found in wetlands less than one percent of the time. fluctuates.

A plus sign (+) indicates the species tends to grow in slightly wetter conditions.

A negative sign (-) indicates a tendency for the species to grow in slightly dryer conditions.

DIST LI (Distribution - Long Island)

The geographic range of plants indicted for the Long Island area of New York includes Suffolk and Nassau counties, the New York City counties and the southern half of Westchester and Rockland counties. In the latter counties there may be an overlap of species from both the "upstate" and "Long Island" lists of plants.

C = "Common"- The plants are common throught the range.

NC = "Not common"- The plants occur throughout the range but are few in number. It is not likely that they will be encounted in the field very frequently. These plants have been eliminated from the lists of "Common Wetland Plants".

- = "Does Not Occur"- The plants do not naturally occur within this range.

R = "Rare"- Plants recorded 35 or fewer times within the State. They may be "threatened" or "endangered" species. These plants have been eliminated from the lists of "Common Wetland Plants".

EXT= "Extirpated"- Plants have probably been eliminated from the State. These plants have been eliminated from the lists of "Common Wetland Plants".

DIST UPS (Distribution Upstate)

The geographic range of plants indicated for "Upstate" New York includes the entire State from the central part of Westchester and Rockland counties northward. In these two counties there may be an overlap of species from both the "Upstate" and "Long Island" list of plants.

C = "Common"- The plants are common throughout the range.

NC = "Not Common"- The plants occur throughout the range but are few in number. It is not likely they will be encountered in the field very frequently.

- = "Does Not Occur"- The plants do not occur naturally within this range.

R = "Rare"- Plants recorded 35 or fewer times within the State. They may be "threatened" or "endangered" species.

EXT= "Extirpated"- Plants have probably been eliminated from the State.

UPS COMB IND (Upstate Combined Wetness Indicator) and
LI COMB IND (Long Island Combined Wetnesss Indicator)

$ All species of the genus marked with the symbol "$" have the same wetness indicator. Therefore identification of plants to the species level is not necessary.

% Where all the species of a particular genus occuring in New York had ADJACENT wetness indicators, a combined wetness indicator was calculated for the genus. This eliminates the need to identify some plants to the species level. Adjacent indicators are; OBL-FACW, FACW-FAC, etc. The resulting indicator value is the average of the individual values.

In several instances it was possible to combine ADJACENT wetness indicator groups when one to three individual species were outside the normal group span. Those species outside the group are marked with "ID" requiring individual identification while the others within the genus were grouped.

* For those genus noted with an asterisk (*) a combined wetness indicator was calculated for COMPLIMENTARY wetness indicators. Complimentary indicators combine three adjacent indicators,ie. OBL-FACW-FAC; FACW-FAC-FACU; and FAC-FACU-UP. If only two species existed at opposite ends of the group, they were not combined.

UPS IND NO (Upstate Indicator Number) and
LI IND NO (Long Island Indicator Number)

For purposes of conducting wetland transects a value is assigned to each wetness indicator: OBL=1, FACW=2, FAC=3. FACU=4, UP=5. Three tenths (0.3) of a point is subtracted from the value for plants that grow in slightly wetter conditions as indicated by a plus (+) and 0.3 is added for plants that grow in slightly dryer conditions as indicated by a negative sign (-). The wetness indicator number for the species that were grouped, as described above under "combined wetness indicator", is the average of the individual species indicator values.

HABIT

A plant species characteristics, type, and/or growth form is described by one or more of the following symbols; (Example: PITS means a perennial, introduced, treelike shrub.

A	=	Annual	P	=	Perennial
B	=	Biennial	+	=	Parasitic
C	=	Clubmoss	S	=	Shrub
E	=	Emergent	-	=	Saprophytic
F	=	Forb	Z	=	Submerged
/	=	Floating	$	=	Succulent
F3	=	Fern	T	=	Tree
G	=	Grass	V	=	Vine
GL	=	Grasslike	W	=	Woody
H	=	Partly woody	WV	=	Woody vine
HS	=	Half shrub	Z\	=	Submerged and/or floating
I	=	Introduced			

USDA SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK 13260

61 - COMMON WETLAND PLANTS OF LONG ISLAND NEW YORK, WITH SPECIES OF THE SAME AND ADJACENT WETNESS INDICATOR STATUS GROUPED - By Common Name

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
ADDER'S MOUTH SPP %	MALAXIS SPP %		C	%FAC	2.0	PNF	
ADDER'S-TONGUE	OPHIOGLOSSUM VULGATUM	FACW	C			PNF	
AGRIMONY SPP %	AGRIMONIA SPP %		C	%FACU	4.0	PNF	
ALDER SPP #	ALNUS SPP #		C	#OBL	1.4	NST	
ALDER,SMOOTH	ALNUS SERRULATA	OBL	C	/	/	NT	
ALDER,SPECKLED	ALNUS RUGOSA	FACW+	C	/	/	NT	ALNUS INCANA
ALEXANDERS,GOLDEN SPP $	ZIZIA SPP $		C	$FAC	3.0	PNF	
ALUMROOT	HEUCHERA AMERICANA	FACU-	C			PNF	
AMERICAN SEA ROCKET	CAKILE EDENTULA	FACU	C			ANMF	CAKILE HARPERI
ANEMONE,CANADA	ANEMONE CANADENSIS	FACW	C			PNF	
ANEMONE-3 UPLAND SPP	ANEMONE-3 UPLAND SPP	UP	C			PNF	
ANGELICA,PURPLESTEM	ANGELICA ATROPURPUREA	OBL	C			PNF	
ANGELICA-1 UPLAND SP	ANGELICA-1 UPLAND SP	UP	C			PNF	
ARROW-WOOD	VIBURNUM DENTATUM	FAC	C			NS	VIBURNUM RECOGNITUM
ARROWGRASS SPP $	TRIGLOCHIN SPP $		C	$OBL	1.0	PNGL	
ARROWHEAD SPP $	SAGITTARIA SPP $		C	$OBL	1.0	PNEF	
ARTICHOKE,JERUSALEM	HELIANTHUS TUBEROSUS	FAC	C			PNF	
ARUM,ARROW	PELTANDRA VIRGINICA	OBL	C			PNEF	PELTANDRA THARPII
ARUM,WATER	CALLA PALUSTRIS	OBL	C			PNEF	
ASH,BLACK	FRAXINUS NIGRA	FACW	C			NT	
ASH,GREEN	FRAXINUS PENNSYLVANICA	FACW	C			NT	
ASH,WHITE	FRAXINUS AMERICANA	FACU	C			NT	
ASPEN,BIGTOOTH	POPULUS GRANDIDENTATA	FACU-	C			NT	
ASPEN,QUAKING	POPULUS TREMULA	FACU	C			IT	POPULUS TREMULOIDES
ASTER,ANNUAL SALTMARSH	ASTER SUBULATUS	OBL	C			ANF	ASTER EXILIS
ASTER,BOG	ASTER NEMORALIS	FACW+	C			PNF	
ASTER,BUSH	ASTER DUMOSUS	FAC	C			PNF	
ASTER,FLATTOP WHITE	ASTER UMBELLATUS	FACW	C			PNF	
ASTER,NEW ENGLAND	ASTER NOVAE-ANGLIAE	FACW-	C			PNF	
ASTER,NEW YORK	ASTER NOVI-BELGII	FACW+	C			PNF	ASTER JUNCEUS
ASTER,PURPLE-STEMMED(SWAMP)	ASTER PUNICEUS	OBL	C			PNF	
ASTER,SLENDER SALTMARSH	ASTER TENUIFOLIUS	OBL	C			PNF	
ASTER,WHITE WREATH	ASTER ERICOIDES	FACU	C			PNF	
ASTER-MANY UPLAND SPP	ASTER-MANY UPLAND SPP	UP	C			PNF	
AVENS,WHITE	GEUM CANADENSE	FACU	C			PNF	
AVENS,YELLOW	GEUM ALEPPICUM	FAC	C			PNF	
AVENS-7 UPLAND SPP	GEUM-7 UPLAND SPP	UP	C			PNF	
AZALIA,EARLY	RHODODENDRON PRINOPHYLLUM	FAC	C			NS	
AZALIA,PINK(PINXTER-FLOWER)	RHODODENDRON PERICLYMENOIDES	FAC	C			NS	RHODODENDRON NUDIFLORUM
AZALIA,SWAMP	RHODODENDRON VISCOSUM	OBL	C			NS	
AZALIA-1 UPLAND SP	RHODODENDRON-1 UPLAND SP	UP	C			NS	
BARBERRY SPP %	BERBERIS SPP %		C	%FACU-	4.5	IS	
BARLEY,FOXTAIL(SQUIRREL-TAIL)	HORDEUM JUBATUM	FAC	C			PNG	
BARTONIA SPP %	BARTONIA SPP %		C	%FACW+	1.5	ANF	
BASSWOOD,AMERICAN	TILIA MERICANA	FACU	C			NT	
BAYBERRY,NORTHERN	MYRICA PENSYLVANICA	FAC	C			NS	
BEAKED-RUSH SPP $	RHYNCHOSPORA SPP $		C	$OBL	1.0	PNGL	
BEARD-TONGUE,FOXGLOVE	PENSTEMON DIGITALIS	FAC	C	/	/	PNF	
BEARD-TONGUE,PALE	PENSTEMON PALLIDUS	FACU	C	/	/	PNF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
BEARDGRASS,BROOM	SCHIZACHYRIUM SCOPARIUM	FACU-	C			PNG	
BEARDTONGUE SPP *	PENSTEMON SPP *		C	*FACU	4.0	PNF	
BEDSTRAW(CLEAVERS)	GALIUM APARINE	FACU	C			ANF	
BEDSTRAW,BLUNTLEAF	GALIUM OBTUSUM	FACW+	C			PNF	
BEDSTRAW,DYE	GALIUM TINCTORIUM	OBL	C			PNF	
BEDSTRAW,ROUGH	GALIUM ASPRELLUM	OBL	C			PNF	
BEDSTRAW,SMALL	GALIUM TRIFIDUM	FACW+	C			PNF	
BEDSTRAW,SWEET-SCENTED	GALIUM TRIFLORUM	FACU	C			PNF	
BEDSTRAW-5 UPLAND SPP	GALIUM-5 UPLAND SPP	UP	C			PNF	
BEECH,AMERICAN	FAGUS GRANDIFOLIA	FACU	C			NT	
BEGGARTICKS,DEVILS	BIDENS FRONDOSA	FACW	C			ANF	BIDENS VULGATA
BEGGARTICKS,LEAFYBRACT	BIDENS COMOSA	FACW	C			ANF	BIDENS TRIPARTITA
BEGGARTICKS,NODDING	BIDENS CERNUA	OBL	C			AIF	
BEGGARTICKS,SMALL	BIDENS DISCOIDEA	FACW	C			ANF	
BEGGARTICKS,SWAMP	BIDENS CONNATA	FACW+	C			ANF	
BEGGARTICKS-5 UPLAND SPP	BIDENS-5 UPLAND SPP	UP	C			OBL	
BELLFLOWER-1 UPLAND SP	CAMPANULA-1 UPLAND SP	UP	C			PNF	
BELLWORT SPP %	UVULARIA SPP %		C	%FACU-	4.4	PNF	
BENTGRASS,AUTUMN	AGROSTIS PERENNANS	FACU	C			PNG	
BENTGRASS,CARPET OR CREEPING	AGROSTIS STOLONIFERA	FACW	C			PNG	
BENTGRASS-2 UPLAND SPP	AGROSTIS-2 UPLAND SPP	UP	C			PNG	
BINDWEED,BLACK	POLYGONUM CONVOLVULUS	FACU	C			AIF	
BINDWEED-1 UPLAND SP	CALYSTEGIA-1 UPLAND SP	UP	C			PIF	
BIRCH SPP*	BETULA SPP*		C	*FAC-	3.2	NT	
BIRCH,BLACK	BETULA LENTA	FACU	C	/	/	NT	
BIRCH,GRAY	BETULA POPULIFOLIA	FAC	C	/	/	NT	
BIRCH,PAPER	BETULA PAPYRIFERA	FACU	C	/	/	NT	BETULA KENAICA
BIRCH,RIVER	BETULA NIGRA	FACW	C	/	/	NT	
BIRCH,YELLOW	BETULA ALLEGHANIENSIS	FAC	C	/	/	NT	
BITTERCRESS,PENNSYLVANIA	CARDAMINE PENSYLVANICA	OBL	C			ANF	
BITTERCRESS,SMALL-FLOWERED	CARDAMINE PARVIFLORA	FACU	C			AIF	CARDAMINE ARENICOLA
BITTERCRESS-2 UPLAND SPP	CARDAMINE-2 UPLAND SPP	UP	C			PNF	
BLACK HAW	VIBURNUM PRUNIFOLIUM	FACU	C			NS	
BLACK-EYED-SUSAN	RUDBECKIA HIRTA	FACU-	C			BPNF	RUDEBECKIA SEROTINA
BLACK-GUM	NYSSA SYLVATICA	FAC	C			NT	
BLACKBERRY SPP %	RUBUS SPP %		C	%UP+	4.7	NS	
BLADDERFERN SPP %	CYSTOPTERIS SPP %		C	%FAC-	4.0	PNF3	
BLADDERNUT,AMERICAN	STAPHLEA TRIFOLIA	FAC	C			NST	
BLADDERWORT SPP $	UTRICULARIA SPP $		C	$OBL	1.0	PNZ/	
BLUE-EYED GRASS,EASTERN	SISYRINCHIUM ATLANTICUM	FACW	C	/	/	PNF	
BLUE-EYED GRASS,SAND	SISYRINCHIUM ARENICOLA	FACU	C	/	/	PNF	
BLUE-EYED GRASS,STOUT	SISYRINCHIUM ANGUSTIFOLIUM	FACU-	C	/	/	PNF	
BLUE-EYED GRASS,WHITE	SISYRINCHIUM ALBIDUM	FACU	C	/	/	PNF	
BLUE-EYED-GRASS SPP *	SISYRINCHIUM SPP *		C	*FAC	3.1	PNF	
BLUEBERRY,HIGHBUSH	VACCINIUM CORYMBOSUM	FACW-	C			NS	V.CAESARIENSE ,V.MARIANUM
BLUEBERRY,LOW BUSH	VACCINIUM ANGUSTIFOLIUM	FACU-	C			NS	
BLUEBERRY-1 UPLAND SP	VACCINIUM-1 UPLAND SP	UP	C			NS	
BLUEGRASS,ANNUAL	POA ANNUA	FACU	C			AIG	
BLUEGRASS,CANADA	POA COMPRESSA	FACU	C			PIG	
BLUEGRASS,FOWL	POA PALUSTRIS	FACW	C			PNG	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
BLUEGRASS,KENTUCKY	POA PRATENSIS	FACU	C			PNG	
BLUEGRASS,ROUGH	POA TRIVIALIS	FACW	C			PIG	
BLUEGRASS-3 UPLAND SPP	POA-3 UPLAND SPP	UP	C			PNG	
BLUESTEM,BIG	ANDROPOGON GERARDII	FAC	C	/	/	PNG	
BOG-RUSH	CLADIUM MARISCOIDES	OBL	C			PNEGL	
BONESET	EUPATORIUM PERFOLIATUM	FACW+	C			PNF	
BONESET,ROUND-LEAF	EUPATORIUM ROTUNDIFOLIUM	FAC-	C			PNF	
BONESET-5 UPLAND SPP	EUPATORIUM-5 UPLAND SPP	UP	C			PNF	
BOUNCING BET	SAPONARIA OFFICINALIS	FACU-	C			PIF	
BRISTLEGRASS SPP -* (MILLET OR FOXTAIL)	SETARIA SPP *		C	*FACU+	3.6	PNG	
BRISTLEGRASS,BUR	SETARIA VERTICILLATA	FAC	C	/	/	AIG	
BRISTLEGRASS,KNOT ROOT	SETARIA GENICULATA	FAC	C	/	/	PNG	
BROME,JAPANESE	BROMUS JAPONICUS	FACU-	C			AIG	
BROME-2 UPLAND SPP	VULPIA-2 UPLAND SPP	UP	C			AIG	
BROME-6 UPLAND SPP	BROMUS-6 UPLAND SPP	UP	C			PNG	
BROOKLINE,AMERICAN	VERONICA AMERICANA	OBL	C			PNE$F	
BROOMSEDGE	ANDROPOGON VIRGINICUS	FACU	C	/	/	PNG	
BROOMSEDGE,BUNCH	ANDROPOGON GLOMERATUS	FACW+	C	/	/	PNG	
BROOMSEDGE/BLUESTEM SPP*	ANDROPOGON SPP*		C	*FAC+	2.9	PNG	
BUCKBEAN	MENYANTHES TRIFOLIATA	OBL	C			PNEF	
BUCKTHORN-1 UPLAND SP	RHAMNUS-1 UPLAND SP	FAC	C			IS	
BUCKWHEAT,CLIMBING FALSE	POLYGONUM SCANDENS	FAC	C			PNV	POLYGONUM CRISTATUM
BULRUSH SPP %	SCIRPUS SPP %		C	%OBL	1.1	PNEGL	
BURNET,CANADIAN	SANGUISORB CANADENSIS	FACW+	C			PNF	
BURNET-1 UPLAND SP	SANGUISORBA-1 UPLAND SP	UP	C			PNF	
BURREED SPP $	SPARGANIUM SPP $		C	OBL	1.0	PNEF	
BUTTERCUP,BRISTLY	RANUNCULUS HISPIDUUS	FAC	C			PNF	
BUTTERCUP,CELERYLEAF	RANUNCULUS SCELERATUS	OBL	C			APNEF	
BUTTERCUP,COMMON TALL	RANUNCULUS ACRIS	FAC+	C			PIF	
BUTTERCUP,CREEPING	RANUNCULUS REPENS	FAC	C			PIF	
BUTTERCUP,EARLY TUFTED	RANUNCULUS FASCICULARIS	FACU	C			PNF	
BUTTERCUP,HOOKED	RANUNCULUS RECURVATUS	FAC+	C			PNF	
BUTTERCUP,PENNSYLVANIA	RANUNCULUS PENSYLVANICUS	OBL	C			APNEF	
BUTTERCUP,SUBALPINE	RANUNCULUS ABORTIVUS	FACW-	C			BPNF	
BUTTERCUP-3 UPLND SPP	RANUNCULUS-3 UPLAND SPP	UP	C			PNF	
BUTTERNUT AND WALNUT SPP $	JUGLANS SPP $		C	$FACU+	3.8	NT	
BUTTONBUSH	CEPHALANTHUS OCCIDENTALIS	OBL	C			NS	
CANARYGRASS	PHALARIS CANARIENSIS	FACU	C			AIG	
CANARYGRASS,REED	PHALARIS ARUNDINACEA	FACW+	C			PNG	
CARDINALFLOWER	LOBELIA CARDINALIS	FACW+	C			PNF	LOBELIA SPLENDENS
CARPETWEED	MOLLUGO VERTICILLATA	FAC	C			ANF	MOLLUGO BERTERIANA
CATNIP	NEPETA CATARIA	FACU	C			PIF	
CATTAIL SPP $	TYPHA SPP $		C	$OBL	1.0	PNEF	
CEDAR,NORTHERN WHITE	THUJA OCCIDENTALIS	FACW	C			NT	
CEDAR,RED AND JUNIPER SPP %	JUNIPERUS SPP %		C	%FACU-	4.5	NST	
CELERY,WILD	VALLISNERIA AMERICANA	OBL	C			PIZ	
CHAIN-FERN SPP %	WOODWARDIA SPP %		C	%OBL-	1.4	PNF3	
CHERRY SPP %	PRUNUS SPP %		C	%FACU-	4.6	NST	
CHICKWEED SPP *	CERASTIUM SPP *		C	*FACU	4.0	AIF	
CHICKWEED, COMMON HOUSE-EARED	CERASTIUM VULGATUM	FACU	C	/	/	PIF	CERASTIUM FONTANUM

COMMON_NAME	SCIENTIFIC_NAME	NET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
CHICKWEED,NODDING	CERASTIUM NUTANS	FAC	C	/	/	ANF	LONGIPEDUNCULATUM,BRACHYPODUM
CHICKWEED-1 UPLAND SP	CERASTIUM-1 UPLAND SP	UP	C	/	/	AIF	
CHOKEBERRY SPP %	ARONIA SPP %		C	%FACU-	2.3	NS	
CICELY SPP $	OSMORHIZA SPP $		C	$FACU-	4.2	PNF	
CINQUEFOIL,ROUGH	POTENTILLA NORVEGICA	FACU	C			ABPNF	
CINQUEFOIL-7 UPLAND SPP	POTENTILLA-7 UPLAND SPP	UP	C			PNF	
CLEARWEED	PILEA PUMILA	FACW	C			ANF	
CLEMATIS(VIRGIN'S-BOWER)	CLEMATIS VIRGINIANA	FAC	C			PNV	CLEMATIS MISSOURIENSIS
CLEMATIS-1 UPLAND SP	CLEMATIS-1 UPLAND SP	UP	C			PNV	
CLOVER SPP %	TRIFOLIUM SPP %		C	%UP+	4.7	PIF	
CLUBMOSS,BOG	LYCOPODIUM INUNDATUM	OBL	C			ANC	
CLUBMOSS,EASTERN TREE	LYCOPODIUM OBSCURUM	FACU	C			PNC	
CLUBMOSS,FOXTAIL	LYCOPODIUM ALOPECUROIDES	FACW+	C			PNC	
CLUBMOSS,N.RUNNING PINE	LYCOPODIUM COMPLANATUM	FACU-	C			PNC	
CLUBMOSS,NORTHERN TREE	LUCOPODIUM DENDROIDEUM	FACU	C			PNC	
CLUBMOSS,SHINING	LYCOPODIUM LUCIDULUM	FACW-	C			PNC	
CLUBMOSS,STAGHORN	LYCOPODIUM CLAVATUM	FAC	C			PNC	
CLUBMOSS,SWAMP	LYCOPODIUM APPRESSUM	FACW+	C			PNC	
CLUBMOSS-2 UPLAND SPP	LYCOPODIUM-2 UPLAND SPP	UP	C			PNC	
COLTSFOOT,COMMON	TUSSILAGO FARFARA	FACU	C			PIF	
COLUMBINE	AQUILEGIA 1 UPLND SPP	UP	C			PNF	
COLUMBINE,WILD	AQUILEGIA CANADENSIS	FAC	C			PNF	
COONTAIL SPP $	CERATOPHYLLUM SPP $		C	$OBL	1.0	PNZ	
CORALROOT-2 UPLAND SPP	CORALLORRHIZA-2 UPLAND SPP	UP	C			PN-F	
CORDGRASS SPP %	SPARTINA SPP %		C	%OBL	1.3	PNEG	
COREOPSIS,ROSE	COREOPSIS ROSEA	FACW	C			PNF	
COTTONGRASS SPP $	ERIOPHORUM SPP $		C	$OBL	1.0	PNGL	
COTTONWOOD,EASTERN	POPULUD DELTOIDES	FAC	C			NT	
COW-WHEAT	MELAMPYRUM LINEARE	FACU	C			AIF	
COWPARSNIP	HERACLEUM LANATUM	FACU-	C			PNF	
CRABGRASS SPP %	DIGITARIA SPP %		C	%UP+	4.8	AIG	
CRANBERRY,LARGE	VACCINIUM MACROCARPON	OBL	C			NS	
CRANBERRY,SMALL	VACCINIUM OXYCOCCOS	OBL	C			NS	
CRESS,SPRING	CARDAMINE BULBOSA	OBL	C			PNF	
CRESS,WINTER SPP %	BARBEREA SPP %		C	%FACU-	4.5	BIF	
CUCUMBER,BUR	SICYOS ANGULATUS	FACU	C			ANF	
CUCUMBER,WILD	ECHINOCYSTIS LOBATA	FAC	C			ANF	MICRAMPELIS LOBATA
CUPHEA,CLAMMY	CUPHEA VISCOSISSIMA	FAC-	C			ANF	
CURRANT,BLACK	RIBES AMERICANUM	FACW	C			NS	
CURRANT-3 UPLAND SPP	RIBES-3 UPLAND SPP	UP	C			NS	
CUTGRASS SPP %	LEERSIA SPP %		C	%FACW+	1.5	PNG	
DANDELION SPP %	TARAXACUM SPP %		C	%UP+	4.7	PIF	
DEERTONGUE	PANICUM CLANDESTINUM	FAC+	C			PNG	DICHANTHELIUM CLAANDESTINUM
DEWBERRY SPP # (ID-SWAMP DEWBERRY)	RUBUS SPP # (ID-R.HISPIDUS)		C	#UP+	#4.8	NS	
DEWBERRY,SWAMP OR PRICKLY-ID	RUBUS HISPIDUS-ID	FACW	C	#	#	NS	
DITCH-STONECROP	PENTHORUM SEDOIDES	OBL	C			PNF	
DOCK,BITTER	RUMEX OBTUSIFOLIUS	FACU+	C			PIF	
DOCK,CURLY	RUMEX CRISPUS	FACU	C			PIF	
DOCK,GREAT WHITE	RUMEX ORBICULATUS	OBL	C			PNEF	
DOCK,SWAMP	RUMEX VERTICILLATUS	OBL	C			PNEF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
DOCK,WILLOW-LEAF(MEXICAN)	RUMEX MEXICANUS	FAC	C			PNF	RUMEX TRIANGULIVALVIS
DOCK-3 UPLAND SPP	RUMEX-3 UPLAND SPP	UP	C			PNEF	
DOGBANE OR INDIANHEMP	APOCYNUM CANNABINUM	FACU	C	/	/	PNF	
DOGBANE OR INDIANHEMP SPP*	APOCYNUM SPP*		C	*FACU-	4.3	PNF	
DOGBANE,PRAIRIE	APOCYNUM SIBIRICUM	PNF	C	/	/	PNF	A.CANNABINUM VAR HYPERICIFOLIUM
DOGBANE-2 UPLAND SPP	APOCYNUM-2 UPLAND SPP	UP	C	/	/	PNF	
DOGFENNEL SPP %	ANTHEMIS SPP %		C	%UP+	4.7	AIF	
DOGWOOD,BUNCHBERRY	CORNUS CANADENSIS	FAC-	C			NS	
DOGWOOD,FLOWERING	CORNUS FLORIDA	FACU-	C			NT	
DOGWOOD,GRAY	CORNUS FOEMINA	FAC	C			NS	RACEMOSA,STRICTA
DOGWOOD,RED-OSIER	CORNUS STOLONIFERA	FACW+	C			NS	CORNUS X CALIFORNICA
DOGWOOD,SILKY	CORNUS AMOMUM	FACW	C			NS	OBLIQUA,PURPUSI
DOGWOOD-2 UPLAND SPP	CORNUS-2 UPLAND SPP	UP	C			NS	
DRAGON-HEAD,FALSE	PHYSOSTEGIA VIRGINIANA	FAC+	C			PNF	P.DENTICULATA,P.SPECIOSA
DROPSEED SPP $	SPOROBOLUS SPP $		C	$FACU	4.1	PNG	
DUCKWEED SPP $	LEMNA SPP $		C	$OBL	1.0	PN/	
DUCKWEED,GIANT	SPIRODELA POLYRHIZA	OBL	C			PN/	
EELGRASS(MARINE)	ZOSTERA MARINA	OBL	C			PNZF	
ELDERBERRY,BLACK	SAMUCUS CANADENSIS	FACW-	C			NS	
ELDERBERRY,RED	SAMBUCUS RACEMOSA	FACU	C			NS	
ELM,AMERICAN	ULMUS AMERICANA	FACW-	C			NT	
ELM,SLIPPERY	ULMUS RUBRA	FAC	C			NT	
EVENING PRIMROSE SPP*	OENOTHERA SPP*		C	*FACU+	4.0	BIF	
EVENING PRIMROSE,COMMON	OENOTHERA BIENNIS	FACU-	C	/	/	BIF	
EVENING PRIMROSE-1 UPLAND SP	OENOTHERA -1 UPLAND SP	UP	C	/	/	BIF	
FERN,BRACKEN	PTERIDIUM AQUILINUM	FACU	C			PNF3	
FERN,BROAD BEECH	THELYPTERIS HEXAGONPTERA	FAC	C			PNF3	PHEGOPTERIS HEXAGONPTERA
FERN,CHRISTMAS	POLYSTICHUM ACROSTICHOIDES	FACU	C			PNF3	POLYSTICHUM ACROSTICHOIDES
FERN,CINNAMON	OSMUNDA CINNAMOMEA	FACW	C			PNEF3	
FERN,INTERRUPTED	OSMUNDA CLAYTONIANA	FAC	C			PNF3	
FERN,MAIDENHAIR	ADIANTUM PEDATUM	FAC-	C			PNF3	
FERN,MARSH	THELYPTERIS THELYPTEROIDES	FACW+	C			PNF3	THELYPTERIS PALUSTRIS
FERN,MASSACHUSETTS(BOG)	THELYPTERIS SIMULATA	FACW	C			PNF3	
FERN,NEW YORK	THELYPTERIS NOVEBORACENSIS	FAC	C			PNF3	
FERN,ROYAL	OSMUNDA REGALIS	OBL	C			PNF3	
FERN,SENSITIVE	ONOCLEA SENSIBILIS	FACW	C			PNF3	
FESCUE SPP %	FESTUCA SPP %		C	%FACU-	4.3	PIG	
FIGWORT SPP %	SCROPHULARIA SPP %		C	%FACU-	4.4	PNF	
FIMBRISTYLIS,SLENDER	FIMBRISTYLIS AUTUMNALIS	FACW+	C			G	
FIREWEED	ERECHTITES HIERACIFOLIA	FACU	C			ANF	
FLAG,SWEET	ACORUS CALAMUS	OBL	C			PIEF	
FLATSEDGE SPP # (ID UPLAND FLATSEDGE)	CYPERUS SPP #(ID C.GRAYII)		C	#FACW	1.9	ANGL	CYPERUS SQUARROSUS
FLATSEDGE-1 UPLAND SP (DRY SAND) ID	CYPERUS-1 UPLAND-(C.GRAYII) ID	UP	C	#	#	PNGL	
FLAX,YELLOW WILD	LINUM VIRGINIANUM	FACU	C			PNF	CATHARTOLINUM VIRGINIANUM
FLEABANE SPP $	ERIGERON SPP $		C	$FACU	4.0	PNF	
FLOATINGHEART,LITTLE	NYMPHOIDES CORDATA	OBL	C			PNZ/	
FLOWER-OF-AN-HOUR-1 UPLAND SP	HIBISCUS-1 UPLAND SP	UP	C			PNEF	
FORGET-ME-NOT,SMALLER	MYOSOTIS LAXA	OBL	C			PNF	
FORGET-ME-NOT,SPRING	MYOSOTIS VERNA	FAC-	C			AIF	
FORGET-ME-NOT,TRUE	MYOSOTIS SCORPIOIDES	OBL	C			PIF	

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FORGET-ME-NOT-3 UPLAND SPP	MYOSOTIS-3 UPLAND SPP	UP	C			PIF	
FOXGLOVE OR GERARDIA SPP %	AGALINIS SPP %		C	%FACW-	2.3	ANF	
FOXTAIL SPP %	ALOPECURUS SPP %		C	%FACW+	1.5	PNG	
FOXTAIL SPP # (BRISTLEGRASS OR MILLET)	SETARIA SPP #		C	#FACU+	3.6	PNG	
FOXTAIL,YELLOW	SETARIA GLAUCA	FAC	C	/	/	AIG	
FOXTAIL-2 UPLAND SPP	SETARIA-2 UPLAND SPP	UP	C	/	/	AIG	
GAMAGRASS,EASTERN	TRIPSACUM DACTYLOIDES	FAC	C			PNG	
GARLCMUSTARD,COMMON	ALLIARIA PETIOLATA	FACU-	C			BIF	
GARLIC,ONION OR LEEK SPP $	ALLIUM SPP $		C	$FACU	4.0	PNF	
GENTIAN,CLOSED	GENTIANA ANDREWSII	FACW	C			PNF	
GENTIAN,FRINGED	GENTIANA CRINITA	OBL	C			ABF	GENTIANOPSIS CRINITA
GENTIAN-1 UPLAND SP	GENTIAN-1 UPLAND SP	UP	C			ABF	
GERANIUM SPP %	GERANIUM SPP %		C	%UP+	4.8	PNF	
GERMANDER,CANADA	TEUCRIUM CANADENSE	FACW-	C			PNEF	
GLASSWORT SPP $	SALICORNIA SPP $		C	$OBL	1.0	ANE$F	
GOLDENROD,BUTTONHEAD	EUTHAMIA TENUIFOLIA	OBL	C			PNF	
GOLDENROD,DOWNY	SOLIDAGO PUBERULA	FACU-	C			PNF	
GOLDENROD,GRASS-LEAVED	EUTHAMIA GRAMINIFOLIA	FAC	C			PNF	SOLIDAGO GRAMINIFOLIA
GOLDENROD,LATE	SOLIDAGO GIGANTEA	FACW	C			PNF	
GOLDENROD,SEASIDE	SOLIDAGO SEMPERVIRENS	FACW	C			PN$F	
GOLDENROD,SWAMP	SOLIDAGO ULIGINOSA	OBL	C			PNF	
GOLDENROD,TALL	SOLIDAGO ALTISSIMA	FACU-	C			PNF	SOLIDAGO CANADENSIS VAR SCABRA
GOLDENROD,TALL HAIRY(WRINKLED)	SOLIDAGO RUGOSA	FAC	C			PNF	
GOLDENROD,WREATH	SOLIDAGO CAESIA	FACU	C			PNF	
GOLDENROD-12 UPLAND SPP	SOLIDAGO-12 UPLAND SPP	UP	C			PNF	
GOOSEBERRY,SMOOTH	RIBES HIRTELLUM	FAC	C			NS	
GOOSEFOOT,OAKLEAF	CHENOPODIUM GLAUCUM	FACW-	C			AIF	
GOOSEFOOT-3 UPLAND SPP	CHENOPODIUM-3 UPLAND SPP	UP	C			ANF	
GOOSEGRASS	ELEUSINE INDICA	FACU-	C			AIG	
GRAPE,FOX	VITIS LABRUSCA	FACU	C			IWV	
GRAPE,FROST	VITIS VULPINA	FAC	C			NWV	
GRAPE,RIVERBANK	VITIS RIPARIA	FACW	C			NWV	
GRAPE-1 UPLAND SP	VITIS-1 UPLND SP	UP	C			NWV	
GRAPEFERN SPP %	BOTRYCHIUM SPP %		C	%FACU	3.5	PNF3	
GRASS-OF-PARNAASSUS,CAROLINA	PARNASSIA GLAUCA	OBL	C			PNF	
GRASS-PINK	CALOPOGON TUBEROSUS	FACW+	C			PNF	CALOPOGON PULCHELLUS
GREENBRIER SPP %	SMILAX SPP %		C	%FAC-	3.3	NSWV	
GROUNDNUT	APIOS AMERICANA	FACW	C			PNF	
GROUNDSEL-TREE	BACCHARIS HALIMIFOLIA	FACW	C			NS	
HACKBERRY,COMMON	CELTIS OCCIDENTALIS	FACU	C			NT	
HAWTHORN(THORNAPPLE) SPP %	CRATEGUS SPP %		C	%UP+	4.7	NTS	
HEDGE-HYSSOP SPP $	GRATIOLA SPP $		C	$OBL	1.0	NF	
HEDGE-NETTLE SPP %	STACHYS SPP %		C	%FACW+	1.8	ANF	
HELLEBORE,FALSE (INDIAN POKE)	VERATRUM VIRIDE	FACW+	C			PNF	
HEMLOCK,EASTERN	TSUGO CANADENSIS	FACU	C			NT	
HEMPWEED,CLIMBING	MIKANIA SCANDENS	FACW+	C			PNV	
HERCULES-CLUB	ARALIA SPINOSA	FAC	C	/	/	NT	
HICKORY SPP#	CARYA SPP#		C	#FACU-	4.5	NT	
HICKORY,BITTERNUT	CARYA CORDIFORMIS	FACU+	C	/	/	NT	
HICKORY,PIGNUT	CARYA GLABRA	FACU-	C	/	/	NT	

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HICKORY,SHAGBARK	CARYA OVATA	FACU-	C	/	/	NT	
HICKORY-2 UPLAND SPP	CARYA-2 UPLAND SPP	UP	C	/	/	NT	
HOG-PEANUT	AMPHICARPAEA BRACTEATA	FAC	C			APNV	
HOLLEY SPP %	ILEX SPP %		C	%FACW+	1.7	NS	
HONEYSUCKLE,JAPANESE	LONICERA JAPONICA	FAC-	C			NWV	
HONEYSUCKLE,TRUMPET	LONICERA SEMPERVIRENS	FACU	C			NWV	
HONEYSUCKLE-4 UPLAND SPP	LONICERA-4 UPLAND SPP	UP	C			NS	
HORNBEAN,AMERICAN	CARPINUS CAROLINIANA	FAC	C			NT	
HORNBEAN,HOP(IRONWOOD)	OSTRYA VIRGINIANA	FACU-	C			NT	
HORSE-BALM	COLLISONIA CANDENSIS	FAC+	C			PNF	
HORSETAIL SPP #	EQUISETUM SPP #		C	#FACW	2.0	PNF	
HORSETAIL, WATER	EPILOBIUM FLUVIATILE	OBL	C	/	/	PNF	
HORSETAIL,FIELD	EQUISETUM ARVENSE	FAC	C	/	/	PNF	
HORSETAIL,SCOURINGRUSH	EQUISETUM HYEMALE	FACW	C	/	/	PNF	
HORSETAIL,SWAMP(WOOD)	EQUISETUM SYLVATICUM	FACW	C	/	/	PNF	
HORSETAIL,WATER	EQUISETUM FLUVIATILE	OBL	C	/	/	PNF	
HUCKLEBERRY SPP %	GAYLUSSACIA SPP %		C	%FAC	3.3	NS	
HYSSOP-1 UPLAND SP	AGASTACHIE 1 UPLAND SP	UP	C			PNF	
INDIAN-PIPE SPP %	MONOTROPA SPP %		C	%UP+	4.7	PN-$F	
IRIS SPP $	IRIS SPP $		C	$OBL	1.0	GL	
IRONWEED,NEW YORK	VERNONIA NOVEBORACENSIS	FACW+	C			PNF	
JACK-IN-THE-PULPIT SPP $	ARISAEMA SPP $		C	$FACW-	2.3	PNF	
JOE-PYE-WEED, EASTERN	EUPATORIUM DUBIUM	FACW-	C			PNF	
JOE-PYE-WEED,(GREEN-STEMMED) SWEET SCENTED	EUPATORIUM PURPUREUM	FAC	C			PNF	EUPATORIADELPHUS PURPUREUS
JOE-PYE-WEED,PURPLE-STEM (TRUMPET WEED)	EUPATORIUM FISTULOSUM	FACW	C			PNF	EUPATORIAADELPHUS FISTULOSUS
JUMP SEED	POLYGONUM VIRGINIANUM	FAC	C			APNF	TOVARA VIRGINIANA
JUNEBERRY,DOWNY OR SHADBUSH	AMELANCHIER ARBOREA	FAC-	C			NT	
JUNEBERRY,LOW	AMELANCHIER SPICATA	FACU	C			NS	AMELANCHIER STOLONIFERA
JUNEBERRY,OBLONGLEAF OR SHADBUSH	AMELANCHIER CANADENSIS	FAC	C			NS	AMELANCHIER NANTUCKETENSIS
JUNEBERRY-2 UPLAND SPP	AMELANCIER-2 UPLAND SPP	UP	C			NS	
JUNIPER AND RED CEDAR SPP %	JUNIPERUS SPP %		C	%FACU-	4.5	NS	
KNAWEL	SCLERANTHUS ANNUS	FACU-	C			AIF	
KNOTWEED,PROSTRATE	POLYGONUM AVICULARE	FACU	C			APIF	
KNOTWEED,SALTMARSH	POLYGONUM RAMOSISSIMUM	FAC	C			ANF	POLYGONUM EXSERTUM, POLYGONUM PR
KNOTWEED,SEABEACH	POLYGONUM GLAUCUM	FACU	C			ANF	
LADIES'-TRESSES SPP %	SPIRANTHES SPP %		C	%FACU-	2.3	PNF	
LADY'S-SLIPPER,PINK(MOCCASSIN FLOWER)	CYPRIPEDIUM ACAULE	FACU	C			PNF	
LADY'S-SLIPPER,SHOWY	CYPRIPEDIUM REGINAE	FACW	C			PNF	
LADY'S-SLIPPER,YELLOW	CYPRIPEDIUM CALCEOLUS	FAC+	C			PNF	
LAMBSQUARTERS	CHENOPODIUM ALBUM	FACU+	C			AIF	
LAUREL,BOG	KALMIA POLIFOLIA	OBL	C			NS	
LAUREL,MOUNTAIN	KALMIA LATIFOLIA	FACU	C			NS	
LAUREL,SHEEP	KALMIA ANGUSTIFOLIA	FAC	C			NS	
LEATHERLEAF	CHAMAEDAPHNE CALYCULATA	OBL	C			NS	
LESPEDEZA(BUSH-CLOVER)-5 UPLAND SPP	LESPEDEZA-5 UPLAND SPP	UP	C			PNF	
LESPEDEZA,NARROW-LEAVED(BUSH-CLOVER)	LESPEDEZA ANGUSTIFOLIA	FAC	C			PNF	
LETTUCE SPP %	LACTUCA SPP %		C	%FACU+	3.8	ABNF	
LILY,CANADA	LILIUM CANADENSE	FAC+	C			PNF	LILIUM MICHIGANENSE, LILIUM SUPE
LILY,TURK'S CAP	LILIUM SUPERBUM	FACW+	C			PNF	
LILY,WOOD	LILIUM PHILADELPHICUM	FACU+	C			PNF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
LILY-1 UPLAND SP	LILIUM-1 UPLAND SP	UP	C			PNF	
LILY-OF-THE-VALLEY,FALSE	MAIANTHEMUM CANADENSE	FAC-	C			PNF	UNIFOLIUM CANADENSE
LITTLE SEA-PINK	SABATIA STELLARIS	FACW+	C			PNF	
LIZARD'S TAIL	SAURURUS CERNUUS	OBL	C			PNEF	
LOBELIA	LOBELIA INFLATA	FACU	C			PNF	
LOBELIA,GREAT (BLUE CARDINAL FLOWER)	LOBELIA SIPHILITICA	FACW+	C			PNF	
LOBELIA,PALESPIKE	LOBELIA SPICATA	FAC-	C			PNF	LOBELIA LEPTOSTACHYS
LOCUST,HONEY	GLEDITSIA TRIACANTHOS	FAC-	C			NT	
LOOSESTRIFE SPP $	LYTHRUM SPP $		C	$FACW+	1.7	PIF	
LOOSESTRIFE SPP %	LYSIMACHIA SPP %		C	%OBL	1.3	PNF	
LOOSESTRIFE,FALSE SPP %	LUDWIGIA SPP %		C	%OBL	1.3	PNEF	
LOUSEWORT(WOOD BETONY)	PEDICULARIS CANADENSIS	FACU	C			PNF	
LOUSEWORT,SWAMP	PEDICULARIS LANCEOLATA	FACW	C			PNF	
LOVEGRASS,CAROLINA	ERAGROSTIS PECTINACEA	FAC	C			ANG	
LOVEGRASS,INDIA	ERAGROSTIS PILOSA	FACU	C			AIG	
LOVEGRASS,STINK	ERAGROSTIS CILIANENSIS	FACU	C			AIG	
LOVEGRASS-2 UPLAND SPP	ERAGROSTIS-2 UPLAND SPP	UP	C			ANS	
LYCHNIS-1 UPLAND SP	LYCHNIS-1 UPLAND SP	UP	C			PIF	
MALE-BERRY	LYONIA LIGUSTRINA	FACW	C			NS	
MANNAGRASS SPP $	GLYCERIA SPP $		C	$OBL	1.0	PNG	
MAPLE,BOX ELDER	ACER NEGUNDO	FAC+	C			NT	
MAPLE,RED	ACER RUBRUM	FAC	C			NT	
MAPLE,SILVER	ACER SACCHARINUM	FACW	C			NT	
MAPLE,SUGAR	ACER SACCHARUM	FACU	C			NT	ACER NIGRUM
MAPLE-3 UPLAND SPP	ACER-3 UPLAND SPP	UP	C			NT	
MARIGOLD,MARSH	CALTHA PALUSTRIS	OBL	C			PNF	CALTHA ASARIFOLIA
MEADOW BEAUTY,COMMON	RHEXIA VIRGINICA	OBL	C			PNF	
MEADOWRUE,EARLY	THALICTRUM DIOICUM	FAC	C			PNF	
MEADOWRUE,TALL	THALICTRUM PUBESCENS	FACW+	C			PNF	
MEADOWRUE-1 UPLAND SP	THALICTRUM-1 UPLAND SP	UP	C			PNF	
MERCURY,THREE-SEEDED	ACALYPHA RHOMBOIDEA	FACU-	C			ANF	
MERMAID-WEED,MARSH	PROSERPINACA PALUSTRIS	OBL	C			PNEZF	
MEXICAN TEA	CHENOPODIUM AMBROSIOIDES	FACU	C			AIF	
MILKWEED,SWAMP	ASCLEPIAS INCARNATA	OBL	C			PNF	
MILKWEED-6 UPLAND SPP	ASCLEPIS-6 UPLAND SPP	UP	C			PNF	
MILKWORT SPP %	POLYGALA SPP %		C	%UP+	4.7	PNF	
MILKWORT,CROSS-LEAVED	POLYGALA CRUCIATA	FACW+	C			ANF	
MILLET SPP # (BRISTLEGRASS OR FOXTAIL)	SETARIA SPP #		C	#FACU+	3.6	PNG	
MILLET,FOXTAIL	SETARIA ITALICA	FACU	C	/	/	AIG	
MILLET,WATER	ECHINOCHLOA WALTERI	FACW+	C	/	/	ANEG	
MILLET,WILD	ECHINOCHLOA MURICATA	FACW+	C	/	/	ANS	ECHINOCHLOA MICROSTACHYA
MILLET,WILD SPP#	ECHINOCHLOA SPP#		C	#FACW-	2.5	ANS	
MILLET,WILD(BARNYARD,GRASS)	ECHINOCHLOA CRUSGALLI	FACU	C	/	/	AIG	ECHINOCHLOA OCCIDENTALIS
MINT SPP $	MENTHA SPP $		C	$FACW+	1.8	PIF	
MOCK-BISHOPWEED	PTILIMNUIM CAPILLACEUM	OBL	C			ANEF	
MONKEY-FLOWER,SQUARE-STEMMED	MIMULUS RINGENS	OBL	C			PNF	
MORNING-GLORY,WILD	CALYSTEGIA SEPIUM	FAC-	C			PIF	CONVOLVULUS SEPIUM
MOUNTAIN-MINT SPP # (ID-HOARY MT.MINT)	PYCNANTHEMUM SPP # (ID- P.INCANUM)		C	#FACW-	2.3	PNF	
MOUNTAIN-MINT,SHORT-TOOTHED	PYCNANTHEMUM MUTICUM	FACW	C			PNF	
MOUNTAIN-MINT,VIRGINIA	PYCNANTHEMUM VIRGINIANUM	FAC	C			PNF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
MOUNTAINHOLLY,COMMON	NEMOPANTHUS MUCRONATUS	OBL	C			NS	
MOUUNTAIN-MINT,HOARY-ID	PYCNANTHEMUM INCANUM-ID	UP	C	#	#	PNF	
MUDWORT,AWLLEAF	LIMOSELLA SUBULATA	OBL	C			ANF	LIMOSELLA AUSTRALIS
MUHLY	MUHLENBERGIA 2 UPLAND SPP	UP	C			PNG	
MUHLY,BOG	MUHLENBERGIA UNIFLORA	OBL	C			PNG	
MUHLY,SATIN-GRASS(MEXICAN)	MUHLENBERGIA MEXICANA	FACW	C			PNG	
MUHLY,WIRESTEM	MUHLENBERGIA FRONDOSA	FAC	C			PNG	
MULBERRY SPP %	MORUS SPP %		C	%FACU-	4.5	NT	
MUSTARD SPP %	SISYMBRIUM SPP %		C	%UP+	4.7	ABIF	
NAIAD SPP $	NAJAS SPP $		C	$OBL	1.0	ANZ	
NANNYBERRY(BLACK HAW)	VIBURNUM LENTAGO	FAC	C			NS	
NETTLE,FALSE	BOEHMERIA CYLINDRICA	FACW+	C			PNF	
NETTLE,GIANT STINGING	LAPORTEA CANADENSIS	FACW	C			PNF	
NETTLE,STINGING	URTICA DIOICA	FACU	C			PIF	
NIGHTSHADE SPP *	SOLANUM SPP *		C	*FACU-	4.4	PNF	
NIGHTSHADE,BITTERSWEET	SOLANUM DULCAMARA	FAC-	C	/	/	PIF	
NIGHTSHADE,BLACK	SOLANUM NIGRUM	FACU-	C	/	/	AIF	
NIGHTSHADE,ENCHANTER'S	CIRCAEA LUTETIANA	FACU	C			PNF	CIRCAEA CANADENSIS
NIGHTSHADE-2 UPLAND SPP	SOLANUM-2 UPLAND SPP	UP	C	/	/	AIF	
NIMBLEWILL	MUHLENBERGIA SCHREBERI	FAC	C			PNG	
NINE-BARK	PHYSOCARPUS OPULIFOLIUS	FACW-	C			NS	OPULASTER OPULIFOLIUS, OPULASTER
NUTRUSH	SCLERIA RETICULARIS	OBL	C			ANGL	
NUTRUSH	SCLERIA TRIGLOMERATA	FAC	C			PNGL	
OAK SPP # (ID-SWAMP WHITE ,BUR AND PIN)	QUERCUS SPP #(ID-BICOLOR MACROCARPA,PALUSTRUS)		C	#UP+	4.8	NT	
OAK,PIN-ID	QUERCUS PALUSTRIS-ID	FACW	C	#	#	NT	
OAK,SWAMP WHITE-ID	QUERCUS BICOLOR-ID	FACW+	C	#	#	NT	
OATGRASS SPP %	DANTHONIA SPP %		C	%UP+	4.7	PNG	
OATGRSS,TALL	ARRENATHERUM ELATIUS	FACU	C			IG	
OLIVE-1 UPLAND SP	ELAEAGNUS-1 UPLAND SP	UP	C			ITS	
OLIVER'S-ROOT	VERONICASTRUM VIRGINICUM	FAC	C			PNF	
ORACH,SEASIDE	ATRIPLEX PATULA	FACW	C			ANF	
ORCHARDGRASS,COMMON	DACTYLIS GLOMERATA	FACU	C			PIG	
ORCHID SPP % LI * UPS	PLATANTHERA SPP % LI * UPS		C	%FACW	1.9	PNF	
PANIC-GRASS	PANICUM COMMUTATUM	FACU+	C			PNG	DICHANTHELIUM COMMUTATUM
PANIC-GRASS	PANICUM DICHOTOMUM	FAC	C			PNG	
PANICGRASS	PANICUM LONGIFOLIUM	OBL	C			PNG	
PANICGRASS,GATTINGER	PANICUM GATTINGERI	FAC	C			ANG	
PANICGRASS,REDTOP	PANICUM RIGIDULUM	FACW+	C			PNG	
PANICGRASS,SMOOTH(FALL PANICUM)	PANICUM DICHOTOMIFLORUM	FACW-	C			ANG	
PANICGRASS,WARTY(PANICUM)	PANICUM VERRUCOSUM	FACW	C			ANG	
PANICGRASS,WOOLLY	PANICUM ACUMINATUM	FAC	C			PNG	DICHANTHELIUM ACUMINATUM
PANICUM,ROUNDSEED	PANICUM SPHAEROCARPON	FACU	C			PNG	DICHANTHELIUM SPHAEROCARPUN
PANICUM,SCRIBNER	PANICUM OLIGOSANTHES	FACU	C			PNG	DICHNTHELIUM OLIGOSANTHES
PARTRIDGE-BERRY	MITCHELLA REPENS	FACU	C			PNF	
PARTRIDGE-PEA SPP %	CASSIA SPP %		C	%FACU	3.7	ANF	
PASPALUM,FRINGELEAF	PASPALUM SETACEUM	FACU+	C			PNG	
PELLITORY,PENNSYLVANIA	PARIETARIA PENSYLVANICA	FACU-	C			ANF	
PENNYWORT,MARSH	HYDROCOTYLE AMERICANA	OBL	C			PIEF	
PEPPER-BUSH,SWEET(SUMMERSWEET)	CLETHRA ALNIFOLIA	FAC+	C			NS	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
PHLOX-3 UPLAND SPP	PHLOX-3 UPLAND SPP	UP	C			PNF	
PICKEREL-WEED	PONTEDERIA CORDATA	OBL	C			PNEF	
PIGMYWEED,COMMON	TILLAEA AQUATICA	OBL	C			AN$F	
PIGWEED	AMARANTHUS RETROFLEXUS	FACU	C			ANF	
PIMPERNAL,FALSE	LINDERNIA ANAGALLIDEA	OBL	C			ANF	LINDERNIA DUBIA
PINE SPP $	PINUS SPP $		C	$FACU	4.0	NT	
PINEAPPLE WEED	MATRICARIA MATRICARIOIDES	FACU	C			ANF	
PIPEWORT SPP $	ERIOCAULON SPP $		C	$OBL	1.0	PIEF	
PITCHERPLANT	SARRACENIA PURPUREA	OBL	C			PNF	
PLANTAIN SPP # (ID HEARTLEAF PLANTAIN on LI)	PLANTAGO SPP #(ID HEARTLEAF PLANTAIN on LI)		C	#UP+	4.7	PNF	
PLANTAIN,HEARTLEAF - ID	PLANTAGO CORDATA - ID	OBL	C	#		PNF	
POGODA,ROSE	POGONIA OPHIOGLOSSOIDES	OBL	C			PNEF	
POGONIA,WHORLED	ISOTRIA VERTICILLATA	FACU	C			PNF	
POISON SUMAC-ID	TOXICODENDREN VERNIX-ID	OBL	C	#	#	NTS	
POISON-IVY SPP # (ID-POISON SUMAC)	TOXICODENDRON SPP # (ID-T.VERNIX)		C	#FAC	#3.0	NVS	
POLKBERRY,COMMON	PHYTOLACCA AMERICANA	FACU+	C			PNF	
PONDWEED SPP $	POTAMOGETON SPP $	OBL	C	$OBL	1.0	PNZ	
PONDWEED,HORNED	ZANNICHELLIA PALUSTRIS	OBL	C			PNZF	
POPLAR,BALSAM	POPULUS BALSAMIFERA	FACW	C			NT	POPULUS TRICOCARPA
PURSLANE	PORTULACA OLERACEA	FAC	C			AN$F	
PYROLA,ROUND-LEAVED(SHINLEAF)	PYROLA ROTUNDIFOLIA	FAC	C			PNF	PYROLIA AMERICANA
PYROLA-2 UPLAND SPP	PYROLA-2 UPLAND SPP	UP	C			PNF	
QUACKGRASS SPP %	AGROPYRON SPP %		C	%FACU-	4.7	PIG	
QUEEN-OF-THE-PRARIE-1 UPLAND SP	FILIPENDULA-1 UPLAND SP	UP	C			PNF	
QUILLWORT SPP $	ISOETES SPP $		C	$OBL	1.0	PZ	
RAGWEED SPP %	AMBROSIA SPP %		C	%FACU+	3.5	ANF	
RAGWORT,GOLDEN	SENECIO AUREUS	FACW	C			PNF	
RAGWORT,ROUND-LEAVED	SENECIO OBOVATUS	FACU-	C			PNF	
RAGWORT-1 UPLAND SP	SENECIO-1 UPLAND SP	UP	C			PNF	
RASPBERRY SPP # (ID-DWARFED RASPBERRY)	RUBUS SPP # (ID-R.PUBESCENS)		C	#UP+	4.7	NS	
RATTLESNAKE-PLANTAIN SPP $	GOODYERA SPP $		C	$FACU-	4.3	PNF	
RATTLESNAKEROOT SPP %	PRENANTHES SPP %		C	%FACU-	4.6	PNF	
REDTOP	AGROSTIS ALBA	FACW	C			PIG	AGROSTIS GIGANTIA
REED,COMMON	PHRAGMITES AUSTRALIS	FACW	C			PNEG	PHRAGMITES COMMUNIS
REEDGRASS SPP%	CALAMAGROSTIS SPP%		C	%FACW+	1.7	PNG	
RICE,WILD	ZIZANIA AQUATICA	OBL	C			ANEG	
ROCKCRESS SPP %	ARABIS SPP %		C	%FACU-	4.5	BNF	
ROSE SPP # (ID-SWAMP)	ROSA SPP # (ID-PALUSTRIS)		C	#FACU-	4.3	NS	
ROSE,SWAMP-ID	ROSA PALUSTRIS-ID	OBL	C	#	#	NS	
ROSEMALLOW,SWAMP	HIBISCUS MOSCHEUTOS	OBL	C			PNEF	CALIFORNICUS,INCANUS,LASIOCARPUS
RUSH SPP *	JUNCUS SPP *		C	*FACW+	1.6	PNGL	
RUSH,ARCTIC	JUNCUS ARCTICUS	OBL	C	/	/	PNGL	
RUSH,BALTIC	JUNCUS BALTICUS	FACW+	C	/	/	PNGL	
RUSH,BAYONET	JUNCUS MILITARIS	OBL	C	/	/	PNGL	
RUSH,BLACKFOOT	JUNCUS GERARDII	FACW+	C	/	/	PNGL	
RUSH,BOG	JUNCUS PELOCARPUS	OBL	C	/	/	PNGL	
RUSH,COMMON(SOFT)	JUNCUS EFFUSUS	FACW+	C	/	/	PNEGL	
RUSH,GRASS	JUNCUS MARGINATUS	FACW	C	/	/	PNGL	
RUSH,GREENE'S	JUNCUS GREENEI	FAC	C	/	/	PNGL	
RUSH,JOINTED	JUNCUS ARTICULATUS	OBL	C	/	/	PNGL	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
RUSH,JOINTED	JUNCUS NODOSUS	OBL	C	/	/	PNGL	
RUSH,MARSH(CANADA)	JUNCUS CANADENSIS	OBL	C	/	/	PNGL	
RUSH,PATH	JUNCUS TENUIS	FAC-	C	/	/	PNGL	JUNCUS DUDLEYI
RUSH,SECUND	JUNCUS SECUNDUS	FACU	C	/	/	PNGL	
RUSH,SEDGE	JUNCUS SCIRPOIDES	FACW	C	/	/	PNGL	
RUSH,TAPERTIP	JUNCUS ACUMINATUS	OBL	C	/	/	PNEGL	
RUSH,TOAD	JUNCUS BUFONIUS	FACW	C	/	/	ANGL	
RUSH,TORREY	JUNCUS TORREYI	FACW	C	/	/	PNGL	
RUUSH,FORKED	JUNCUS DICHOTOMUS	FACW	C	/	/	PNGL	
RYEGRASS,PERENNIAL	LOLIUM PERENNE	FACU-	C			PIG	
SALTMARSH-ELDER	IVA FRUTESCENS	FACW+	C			PNH&F	
SAND WORT-1 UPLAND SPP	ARENARIA-1 UPLAND SPP	UP	C			AIF	
SAND-RUSH	BULBOSTYLIS CAPILLARIS	FACU	C			APNGL	
SANDBEACH-SANDWORT	HONKENYA PEPLOIDES	FACU	C			PNF	
SANDSPURRY,COMMON OR PURPLE	SPERGULARIA RUBRA	FACU+	C			AIF	
SANDSPURRY,SALT-MARSH	SPERGULARIA MARINA	OBL	C			AN&F	
SANDSPURRY-1 UPLAND SP	SPERGULARIA-1 UPLAND SP	UP	C			AIF	
SANDWORT,THYMELEAF	ARENARIA SERPYLLIFOLIA	FAC	C			AIF	
SARSAPARILLA,WILD	ARALIA NUDICALIS	FACU	C	/	/	PNF	
SARSAPARILLA-2 UPLAND SPP	ARLIA-2 UPLAND SPP	UP	C	/	/	NT	
SARSAPARILLA/HERCULESE-CLUB SPP*	ARALIA SPP*		C	*FACU-	4.3	PNF	
SASSAFRAS	SASSAFRAS ALBIDUM	FACU-	C			NT	
SAXIFRAGE,EARLY	SAXIFRAGA VIRGINIENSIS	FAC-	C			PNF	
SAXIFRAGE,GOLDEN	CHRYSOSPLENIUM AMERICANUM	OBL	C			PNF	
SAXIFRAGE,PENNSYLVANIA	SAXIFRAGA PENSYLVANICA	OBL	C			PNF	
SE-LAVENDER,CAROLINA	LIMONIUM CAROLINIANUM	OBL	C			PNF	
SEA-BLITE SPP $ LI	SUAEDA SPP $ LI		C	$OBL	1.0	ANEF	
SEDGE SPP %	CAREX SPP %		C	%FACW+	1.6	PNGL	
SEDGE,THREE-WAY	DULICHIUM ARUNDINACEUM	OBL	C			PNEGL	
SEDGE- SEVERAL UPLANDS SP %	CAREX- SEVERAL UPLAND SP %	UP	C	%UP	5.0	PNGL	
SELFHEAL,COMMON(HEALALL)	PRUNELLA VULGARIS	FACU+	C			PIF	
SHEPHERD'S-PURSE	CAPSELLA BURSA-PASTORIS	FACU	C			AIF	BURSA BURSA-PASTORIS
SKULLCAP SPP %	SCUTELLARIA SPP %		C	%FACW+	1.4	PNF	
SKUNKCABBAGE,COMMON	SYMPLOCARPOS FOETIDUS	OBL	C			PNF	
SMARTWEED(LADY'S THUMB)	POLYGONUM PERSICARIA	FACW	C			AIF	POLYGONUM MINUS
SMARTWEED(PINKWEED)	POLYGONUM PENSYLVANICUM	FACW	C			ANEF	P.BICORNE,P.LONGISTYLUM,P.MEXICA
SMARTWEED(WATERPEPPER)	POLYGONUM HYDROPIPER	OBL	C			AIEF	
SMARTWEED(WATERPEPPER,WILD)	POLYGONUM HYDROPIPEROIDES	OBL	C			PNEF	
SMARTWEED,LARGE WATER	POLYGONUM ROBUSTIUS	OBL	C			PNF	
SMARTWEED,PALE(WILLOW WEED)	POLYGONUM LAPATHIFOLIUM	FACW+	C			ANF	POLYGONUM SCABRUM
SMARTWEED,SWAMP	POLYGONUM SETACEUM	OBL	C			PNEF	
SMARTWEED,TEAR-THUMB,ARROW-LEAVED	POLYGONUM SAGITTATUM	OBL	C			APNF	
SMARTWEED,WATER	POLYGONUM AMPHIBIUM	OBL	C			PNEF	POLYGONUM COCCINEUM
SMARTWEED,WATER	POLYGONUM PUNCTATUM	OBL	C			PNEF	
SMARTWEED-5 UPLAND SPP	POLYGONUM-5 UPLAND SPP	UP	C			APNF	
SNAKEROOT,BLACK	SANICULA GREGARIA	FACU	C			PNF	
SNAKEROOT-3 UPLAND SPP	SANICULA-3 UPLAND SPP	UP	C			PNF	
SNEEZEWEED	HELENIUM AUTUMNALE	FACW+	C			PNF	HELENIUM VIRGINICUM
SOLOMON'S-SEAL SPP %	POLYGONATUM SPP %		C	%FACU-	4.3	PNF	
SOLOMON'S-SEAL,FALSE	SMILACINA RACEMOSA	FACU-	C			PNF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
SOLOMON'S-SEAL-1 UPLAND SP	SMILACINA-1 UPLAND SP	UP	C			PNF	
SORREL,GARDEN	RUMEX ACETOSA	FACU	C			PIF	
SORREL-4 UPLAND SPP	OXALIS-4 UPLAND SPP	UP	C			PIF	
SOW-THISTLE,COMMON	SONCHUS OLERACEUS	FAC	C			AIF	
SOW-THISTLE,PRICKLY	SONCHUS ASPER	FAC	C			AIF	
SOW-THISTLE-1 UPLAND SP	SONCHUS-1 UPLAND SP	UP	C			AIF	
SPATTERDOCK(YELLOW POND LILY)	NUPHAR LUTEUM	OBL	C			PNZ	N.ADVENA,N.MICROPHYLLUM,N.POLYSE
SPEARWORT	RANUNCULUS AMBIGENS	OBL	C			PNEF	
SPEEDWELL,COMMON	VERONICA OFFICINALIS	FACU-	C			PIF	
SPEEDWELL,MARSH	VERONICA SCUTELLATA	OBL	C			PIF	
SPEEDWELL,PURSLANE	VERONICA PERIGRINA	FACU-	C			ANEF	
SPEEDWELL,WATER	VERONICA ANAGALLIS-AQUATICA	OBL	C			BPNEF	
SPEEDWELL-7 UPLAND SPP	VERONICA-7 UPLAND SPP	UP	C			PIF	
SPICEBUSH	LINDERA BENZOIN	FACW-	C			NS	
SPIKEGRASS	DISTICHLIS SPICATA	FACW+	C			PNG	DISTICHLIS STRICTA
SPIKEMOSS,CREEPING(MEADOW)	SELAGINELLA APODA	FACW	C			PNF	
SPIKEMOSS-2 UPLAND SPP	SELAGINELLA-2 UPLAND SPP	UP	C			PNF	
SPIKERUSH SPP %	ELEOCHARIS SPP %		C	%OBL	1.1	PNEGL	
SPIREA SPP %	SPIRAEA SPP %		C	%FACW-	2.5	NS	
SPLEENWORT SPP $	ATHRIUM SPP $		C	$FAC	3.0	PNF3	
SPLEENWORT,EBONY	ASPLENIUM PLATYNEURON	FACU	C			PNF3	
SPLEENWORT-2 UPLAND SPP	ASPLENIUM-2 UPLAND SPP	UP	C			PNF3	
SPRING-BEAUTY SPP $	CLAYTONIA SPP $		C	$FACU	4.0	PNF	
SPURGE SPP %	EUPHORBIA SPP %		C	%UP+	4.9	ANF	
SPURGE,LARGE SPOTTED(EYEBANE)	CHAMAESYCE NATANS	FACU	C			AIF	EUPHORBI NUTANS
ST. JOHNSWORT,CANADA	HYPERICUM MAJUS	FACW	C			ANF	
ST. JOHNSWORT,CANADA	HYPERICUM CANADENSE	FACW	C			ANF	
ST. JOHNSWORT,DENSE	HYPERICUM DENSIFLORUM	FAC+	C			NS	
ST. JOHNSWORT,DWARF	HYPERICUM BOREALE	OBL	C			PNF	HYPERICUM MUTILUM
ST. JOHNSWORT,DWARF	HYPERICUM MUTILUM	FACW+	C			PNF	HYPERICUM BOREALE
ST. JOHNSWORT,PALE	HYPERICUM ELLIPTICUM	OBL	C			PNF	
ST. JOHNSWORT,PURPLE	HYPERICUM VIRGINICUM	OBL	C			PNEF	TRIADINUM VIRGINICUM
ST. JOHNSWORT-12 UPLAND SPP	ASCYRUM-12 UPLAND SPP	UP	C			NF	
ST. JOHNSWORT-5 UPLAND SPP	HYPERICUM-5 UPLAND SPP	UP	C			PNF	
STAGGERBUSH	LYONIA MARIANA	FAC-	C			NS	
STAR-OF-BETHLEHEM	ORNITHOGALUM UMBELLATUM	FACU	C			PIF	
STARFLOWER,AMERICAN	TRIENTALIS BOREALIS	FAC	C			PNF	
STARGRASS	ALETRIS FARINOSA	FAC	C			PNF	
STARGRASS,WATER	HETERANTHERA DUBIA	OBL	C			PNZ/	ZOSTERELLA DUBIA
STARGRASS,YELLOW	HYPOXIS HIRSUTA	FAC	C			PNF	
STARWORT,BOG	STELLARIA ALSINE	FACW+	C			AIF	
STICKSEED	HACKELIA VIRGINIANA	FACU	C			BPNF	
STINKWEED	PLUCHEA CAMPHORATA	FACW	C			APIF	
STITCHWORT,COMMON	STELLARIA GRAMINEA	FACW	C			PNF	
STITCHWORT,LONG-LEAVED	STELLARIA LONGIFOLIA	FACW	C			PNF	
STITCHWORT-1 UPLAND SP	STELLARIA-1 UPLAND SP	UP	C			PNF	
STONECROP-2 UPLAND SPP	SEDUM-2 UPLAND SPP	UP	C			PN$F	
STRAWBERRY SPP %	FRAGARDIA SPP %		C	%UP+	4.7	ANF	
SUNDEW SPP $	DROSERA SPP $		C	$OBL	1.0	PNF	
SUNDROPS	OENOTHERA FRUTICOSA	FAC	C	/	/	PNF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
SUNDROPS,PERENNIAL	OENOTHERA PERENNIS	FAC-	C	/	/	PNF	
SUNFLOWER-3 UPLND SPP	HELIANTHUS-3 UPLAND SPP	UP	C			PNF	
SWEETBELLS	LEUCOTHOE RACEMOSA	FACW	C			NS	
SWEETCLOVER SPP $	MELILOTUS SPP $		C	$FACU-	4.5	ABIF	
SWEETGALE	MYRICA GALE	OBL	C			NS	
SWEETGRASS	HIEROCHLOE ODORATA	FACW	C			PNG	
SWITCHGRASS	PANICUM VIRGATUM	FACU-	C			PNG	
SYCAMORE	PLATANUS OCCIDENTALIS	FACW-	C			NT	
TEABERRY	GAULTHERIA PROCUMBENS	FACU	C			NS	
TEAR-THUMB,ARROWLEAF	POLYGONUM ARIFOLIUM	OBL	C			ANEF	
THISTLE,CANADA	CIRSIUM ARVENSE	FACU	C			PIF	
THISTLE,GIANT	CIRSIUM HORRIDULUM	FACU-	C			ABNF	
THISTLE,RUSSIAN SPP $	SALSOLA SPP $		C	$FACU	4.0	AIF	
THISTLE,SWAMP	CIRSIUM MUTICUM	OBL	C			BNF	
THISTLE-3 UPLND SPP	CIRSIUM-3 UPLAND SPP	UP	C			BNF	
TICKCLOVER,CANADA	DESMODIUM CANADENSE	FAC	C			PNF	
TICKCLOVER-10 UPLAND SPP	DESMODIUM-10 UPLAND SPP	UP	C			PNF	
TICKLEGRASS	AGROSTIS HYEMALIS	FAC	C			PNG	
TICKLEGRASS OR HAIRGRASS	AGROSTIS SCABRA	FAC	C			PNG	
TICKSEED-SUNFLOWER	BIDENS CORONATA	OBL	C			ANF	
TIMOTHY	PHLEUM PRATENSE	FACU	C			PIG	
TOOTHWORT,CUT-LEAF	CARDAMINE CONCATENATA	FACU	C			PNF	
TOUCH-ME-NOT(JEWELWEED) SPP $	IMPATIENS SPP $		C	$FACW	2.0	ANF	
TREFOIL,BIRDSFOOT	LOTUS CORNICULATUS	FACU-	C			PIF	
TRILIUM-3 UPLAND PP	TRILLIUM-3 UPLAND SPP	UP	C			PNF	
TRILLIUM,NODDING	TRILLIUM CERNUM	FACW	C			PNF	
TUMBLEWEED	AMARANTHUS ALBUS	FACU	C			ANF	
TWAYBLADE,BOG	LIPARIS LOESELII	FACW	C			PNF	
TWINFLOWER	LINNAEA BOREALIS	FAC	C			PNHF	
VALERIAN-1 UPLAND SP	VALERIANA-1 UPLAND SP	UP	C			PNG	
VELVETGRASS	HOLCUS LANATUS	FACU	C			PNG	
VENUS' LOOKING-GLASS	TRIODANIS PERFOLIATA	FAC	C			ANF	
VERNALGRASS,SWEET	ANTHOXANTHUM ODORATUM	FACU	C			PIG	
VERVAIN,BLUE	VERBENA HASTATA	FACW+	C			PNF	
VERVAIN,WHITE	VERBENA URTICIFOLIA	FACU	C			APNF	
VERVAIN-1 UPLAND SP	VERBENA-1 UPLAND SP	UP	C			PNF	
VETCH,COMMON	VICIA SATIVA	FACU-	C			AIFV	
VETCHLING,MARSH	LATHYRUS PALUSTRIS	FACW+	C			PNF	
VETCHLING-3 UPLAND SPP	LATHYRUS-3 UPLAND SPP	UP	C			PNF	
VIBURNUM-2 UPLAND SPP	VIBURNUM-2 UPLAND SPP	UP	C			NS	
VICIA-6 UPLAND SPP	VICIA-6 UPLAND SPP	UP	C			AIFV	
VIOLET,AMERICAN DOG	VIOLA CONSPERSA	FACW	C			PNF	
VIOLET,ARROW-LEAVED	VIOLA SAGITTATA	FACW	C			PNF	
VIOLET,COMMON BLUE	VIOLA PAPILONCEA	FAC	C			PNF	VIOLA SORORIA
VIOLET,DOWNY YELLOW	VIOLA PUBESCENS	FACU-	C			PNF	
VIOLET,LANCELEAF	VIOLA LANCEOLATA	OBL	C			PNF	
VIOLET,LECONTE'S	VIOLA AFFINIS	FACW	C			PNF	
VIOLET,MARSH BLUE	VIOLA CUCULLATA	FACW+	C			PNF	
VIOLET,NORTHERN WHITE	VIOLA PALLENS	OBL	C			NF	VIOLA MACLOSKEYI
VIOLET,ROUND-LEAF YELLOW	VIOLA ROTUNDIFOLIA	FAC+	C			PNF	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
VIOLET,SMOOTH YELLOW	VIOLA PENSYLVANICA	FAC	C			PNF	VIOLA PUBESCENS
VIOLET,SWEET WHITE	VIOLA BLANDA	FACW	C			PNF	VIOLA MACLOSKEYI
VIOLET,WOOLY BLUE	VIOLA SORORIA	FAC-	C			PNF	
VIOLET-6 UPLAND SPP	VIOLA-6 UPLAND SPP	UP	C			PNF	
VIRGINIA-CREEPER SPP $	PARTHENOCISSUS SPP $		C	$FACU	4.0	NWV	
WALNUT AND BUTTERNUT SPP $	JUGLANS SPP $		C	$FACU+	3.8	NT	
WATER PIMPERNEL	SAMOLUS PARVIFLORUS	OBL	C			PNF	
WATER SHIELD	BRASENIA SCHREBERI	OBL	C			PNZF	
WATER-CROWFOOT,YELLOW	RANUNCULUS FLABELLARIS	OBL	C			PNEF	
WATER-FERN	AZOLLA FILICULOIDES	OBL	C			PNF	
WATER-HOARHOUND SPP $	LYCOPUS SPP $		C	$OBL	1.0	PNF	
WATERCRESS SPP %	RORIPPA SPP %		C	FACW+	1.5	PIEF	
WATERHEMLOCK SPP $	CICUTA SPP $		C	$OBL	1.0	PNF	
WATERHEMP,SALTMARSH	AMARANTHUS CANNABINUS	OBL	C			PNEF	
WATERHEMP-4 UPLAND SPP	AMARANTHUS 4 UPLAND SPP	UP	C			ANF	
WATERLEAF SPP %	HYDROPHYLLUM SPP %		C	%FACU	4.0	PNF	
WATERLILY,WHITE	NYMPHAEA ODORATA	OBL	C			PNZ/	NYMPHAEA TUBEROSA
WATERMEAL SPP $	WOLFFIA SPP $		C	$OBL	1.0	PN/F	
WATERMILFOIL SPP $	MYRIOPHYLLUM SPP $		C	$OBL	1.0	PNZ	
WATERPARSNIP	SIUM SUAVE	OBL	C			PNEF	
WATERPLANTAIN SPP $	ALISMA SPP $	OBL	C	$OBL	1.0	PNEF	
WATERSTARWORT SPP $	CALLITRICHE SPP $		C	$OBL	1.0	PIZ/	
WATERWEED SPP $	ELODEA SPP $		C	$OBL	1.0	PNZF	
WATERWORT SPP $	ELATINE SPP $		C	$OBL	1.0	ANEF	
WEDGEGRASS,PRAIRIE	SPHENOPHOLIS OBTUSATA	FACW-	C			APNG	
WEDGEGRASS-1 UPLAND SP	SPHENOPHPLIS-1 UPLAND SP	UP	C			PNG	
WHITE-CEDAR,ATLANTIC	CHAMAECYPARIS THYOIDES	OBL	C			NT	
WIDGEONGRASS	RUPPIA MARITIMA	OBL	C			PNZF	
WILDBEAN,TRAILING	STROPHOSTYLES HELVOLA	FACU-	C			ANVF	
WILDRYE,CANADA	ELYMUS CANADENSIS	FACU+	C			PNG	
WILDRYE,HAIRY	ELYMUS VILLOSUS	FACU+	C			PNG	
WILDRYE,RIVERBANK	ELYMUS RIPARIUS	FACW	C			PNG	
WILDRYE,VIRGINIA	ELYMUS VIRGINICUS	FACW-	C			PNG	
WILDRYE-1 UPLAND SP	ELYMUS-1 UPLAND SP	UP	C			G	
WILLOW SPP %	SALIX SPP %		C	%FACW+	1.8	ST	
WILLOW,WATER	DECODON VERTICILLATUS	OBL	C			PNF	
WILLOW-HERB	EPILOBIUM LEPTOPHYLLUM	OBL	C	/	/	PNF	
WILLOW-HERB SPP *	EPILOBIUM SPP *		C	*FACW+	1.5	PNF	
WILLOW-HERB(FIREWEED)	EPILOBIUM ANGUSTIFOLIUM	FAC	C	/	/	PNF	
WILLOW-HERB,HAIRY	EPILOBIUM HIRSUTUM	FACW	C	/	/	PIF	
WILLOW-HERB,MARSH	EPILOBIUM PALUSTRE	OBL	C	/	/	PNF	
WILLOW-HERB,PURPLELEAF	EPILOBIUM COLORATUM	OBL	C	/	/	PNF	
WITCH-HAZEL	HAMAMELIS VIRGINIANA	FAC-	C			NST	HAMAMELIS MACROPHYLLA
WITHE-ROD(WILD RAISIN)	VIBURNUM CASSINOIDES	FACW	C			NS	
WOODFERN SPP *	DRYOPTERIS SPP *		C	*FAC+	2.8	PNF3	
WOODFERN,BOOTT	DRYOPTERIS X BOOTTII	FACW	C	/	/	PNF3	D.CRISTIATA X INTERMEDIA
WOODFERN,CLINTON	DRYOPTERIS CLINTONIANA	FACW+	C	/	/	PNF3	
WOODFERN,COMMON	DRYOPTERIS INTERMEDIA	FACU	C	/	/	PNF3	
WOODFERN,CRESTED	DRYOPTERIS CRISTATA	FACW+	C	/	/	PNEF3	
WOODFERN,GOLDIE	DRYOPTERIS GOLDIANA	FAC+	C	/	/	PNF3	

COMMON_NAME	SCIENTIFIC_NAME	WET_IND	DIST_LI	LI_COMB_IND	LI_IND_NO	HABIT	SYNONYMY
WOODFERN,MARGINAL	DRYOPTERIS MARGINALIS	FACU-	C	/	/	PNF3	
WOODFERN,MOUNTAIN	DRYOPTERIS DILATATA	FAC	C	/	/	PNF3	AUSTRIACA D.CAMPYLOPTERA
WOODFERN,SPINULOSE	DRYOPTERIS SPINULOSA	FAC+	C	/	/	PNF3	DRYOPTERIS CARTHUSIANA
WOODREED SPP $	CINNA SPP $		C	$FACW+	1.8	PNG	
WOODRUSH	LUZULA ECHINATA	FACU	C	/	/	PNGL	
WOODRUSH SPP*	LUZULA SPP*		C	*FACU-	4.2	PNGL	
WOODRUSH,HAIRY	LUZULA ACUMINATA	FAC	C	/	/	PNGL	
WOODRUSH,MANYFLOWER	LUZULA MULTIFLORA	FACU	C	/	/	PNGL	
WOODRUSH-2 UPLAND SPP	LUZULA-2 UPLAND SPP	UP	C	/	/	PIGL	
YAM,WILD	DIOSCOREA VILLOSA	FAC+	C			PNV	D.CAYENENSIS,D.ESCULENTA,D.PANIC
YARROW	ACHILLEA MILLEFOLIUM	FACU	C			PNF	
YELLOW-EYED-GRASS SPP $	XYRIS SPP $		C	$OBL	1.0	PNEF	
YELLOW-POPLAR	LIRIODENDRON TULIPIFERA	FACU	C			NT	
YERBA DE TAJO	ECLIPTA ALBA	FAC	C			ANF	E.PROSTRATA,VERBESINA ALBA
YEW,AMERICAN(GROUND HEMLOCK)	TAXUS CANADENSIS	FAC	C			NS	

APPENDIX D - CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS[1]/

This system is hierarchical and structured around a combination of ecological, biological, hydrological, and substrate characteristics which permit universal use across the United States, its territories and possessions. It consists of five systems: Marine, Estuarine, Riverine, Lacustrine (lake), and Palustrine (swamps, bogs, marshes) and proceeds in a hierarchical manner through subsystem, class, and subclass. It also contains provisions to use water regime, water chemistry, soil, and special modifiers to provide additional levels of detail. Figure 1 is an illustration of the classification system to the class level.

Only those systems, subsystems, classes, water regimes, and special modifiers that relate to wetlands and deepwater habitats at Calverton will be discussed in the following:

Riverine System

Definition. The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: 1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and 2) habitats with water containing ocean-derived salts in excess of 0.5 parts per thousand. A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water".

Limits. The Riverine System is bounded on the landward side by upland, by the channel bank (including natural and man-made levees), or by wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. In braided streams, the system is bounded by the banks forming the outer limits of the depression within which the braiding occurs.

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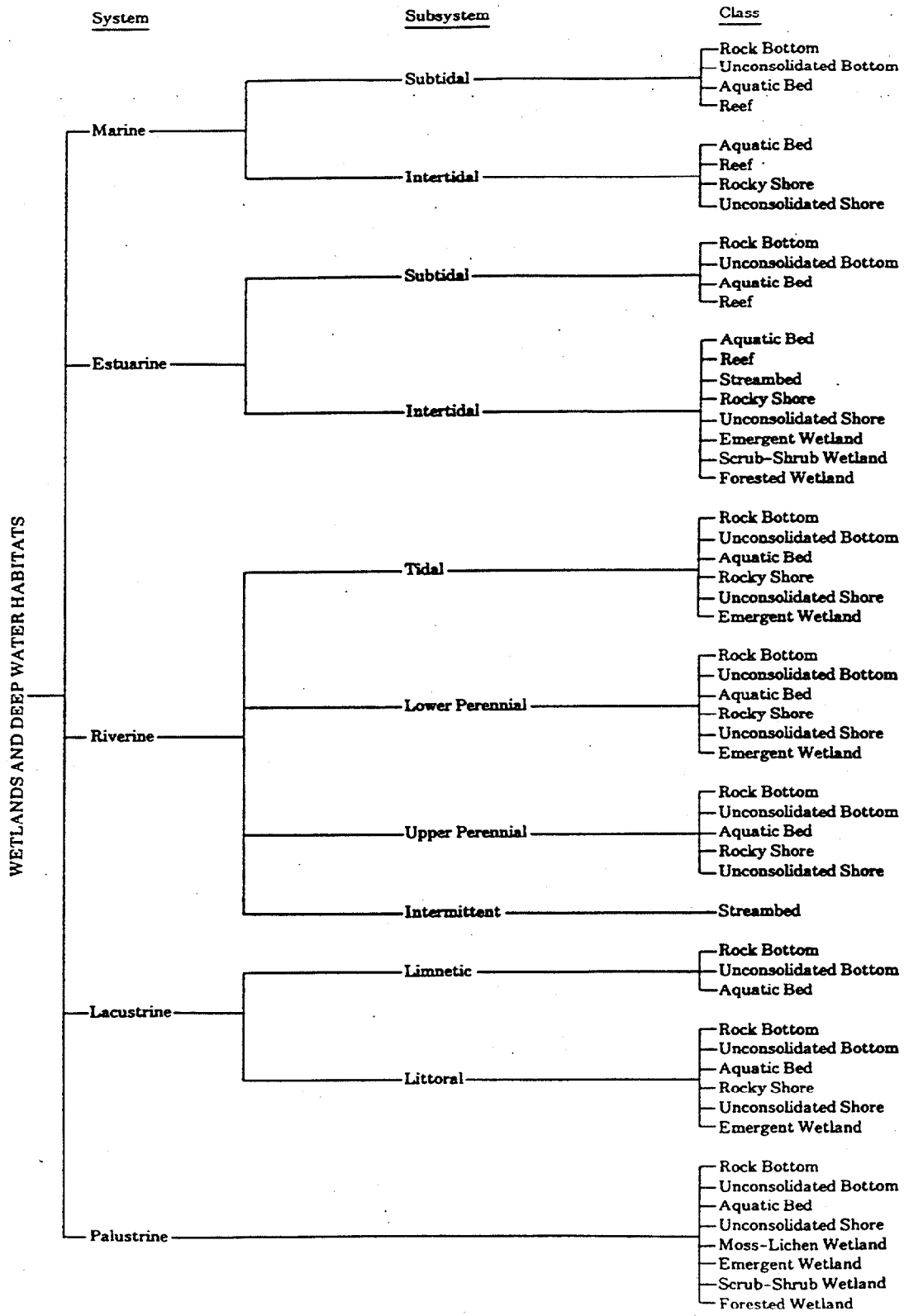
[1]/ Exerts from - "Classification of Wetlands and Deepwater Habitats of the United States" by L.M. Cowardin, et. al. USFWS, Washington, DC, December 1979.

Figure 1: Classification Hierarchy of Wetlands and Deepwater Habitats



Classification hierarchy of wetlands and deepwater habitats, showing systems, subsystems, and classes. The Palustrine System does not include deepwater habitats.

The Riverine System terminates at the downstream end where the concentration of ocean-derived salts in the water exceeds 0.5 parts per thousand during the period of annual average low flow, or where the channel enters a lake. It terminates at the upstream end where tributary streams originate, or where the channel leaves a lake. Springs discharging into a channel are considered part of the Riverine System.

Description. Water is usually, but not always, flowing in the Riverine System. Upland islands or Palustrine wetlands may occur in the channel, but they are not included in the Riverine System. Palustrine Forested Wetlands, Emergent Wetlands, Scrub-Shrub Wetlands, and Moss-Lichen Wetlands may occur adjacent to the Riverine System, often on a floodplain.

Subsystems. The Riverine System is divided into four subsystems: the Tidal, the Lower Perennial, the Upper Perennial, and the Intermittent. Each is defined in terms of water permanence, gradient, water velocity, substrate, and the extent of floodplain development.

Tidal. The gradient is low and water velocity fluctuates under tidal influence. The streambed is mainly mud with occasional patches of sand. Oxygen deficits may sometimes occur and the fauna is similar to that in the Lower Perennial Subsystem. The floodplain is typically well developed.

Upper Perennial. The gradient is high and velocity of the water fast. There is no tidal influence and some water flows through the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation. The fauna is characheristic of running water, and there are few or no planktonic forms. The gradient is high compared with that of the Lower Perennial Subsystem, and there is very little floodplain development.

Lower Perennial. The gradient is low and water velocity is slow. There is no tidal influence, and some water flows throughout the year. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur, the fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.

Intermittent. In this subsystem, the channel contains nontidal flowing water for only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.

Lacustrine System

Definition. The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: 1) situated in a topographic depression or a dammed river channel; 2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and 3) total area exceeds 8 hectare (ha) (20 acres). Similar wetland and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active waveformed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 meter (m) (6.6 feet) at low water. Lacustrine waters may be tidal or nontital, but ocean-derived salinity is always less than 0.5 parts per thousand.

Limits. The Lacustrine System is bounded by upland or by wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. Lacustrine systems formed by damming a river channel are bounded by a contour approximating the normal spillway elevation or normal pool elevation, except where Palustrine wetlands extend lakeward of that boundary. Where a river enters a lake, the extension of the Lacustrine shoreline forms the Riverine-Lacustrine boundary.

Description. The Lacustrine System includes permanently flooded lakes and reservoirs. Typically, there are extensive areas of deep water and there is considerable wave action. Islands of Palustrine wetland may lie within the boundaries of the Lacustrine System.

Subsystems.

Limnetic. All deepwater habitats within the Lacustrine System; many small Lacustrine systems have no Limnetic Subsystem.

Littoral. All wetland habitats in the Lacustrine System. Extends from the shoreward boundary of the system to a depth of 2 m (6.6 feet) below low water or to the maximum extent of nonpersistent emergents, if these grow at depths greater than 2 m.

Palustrine System

Definition. The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: 1) area less than 8 ha (20 acres); 2) active wave-formed or bedrock shoreline features lacking; 3) water depth in the deepest part of basin less than 2 m at low water; and 4) salinity due to ocean-derived salts less than 0.5 parts per thousand.

Limits. The Palustrine System is bounded by upland or by any of the other four systems.

Description. The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie pothole, which are found throughout the United States. It also includes the small, shallow, permanent or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. The erosive forces of wind and water are of minor importance except during severe floods.

The emergent vegetation adjacent to rivers and lakes is often referred to as "the shore zone" or the "zone of emergent vegetation", and is generally considered separately from the river itself. There are often great similarities between wetlands lying adjacent to lakes or rivers and isolated wetlands of the same class in basins without open water.

Emergent Wetland (Palustrine)

Definition. The Emergent Wetland class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed.

Description. In areas like New York with relatively stable climatic conditions, Emergent Wetlands maintain the same appearance year after year. In other areas, such as the prairies of the central United States, violent climatic fluctuations cause them to revert to an open water phase in some years . Emergent Wetlands are found throughout the United States and occur in all systems except the Marine. Emergent Wetlands are known by many names, including marsh, meadow, fen, prairie pothole, and slough. Areas that are dominated by pioneer plants that become established during periods of low water are not Emergent Wetlands and should be classified as Vegetated Unconsolidated Shores or Vegetated Streambeds.

Subclasses and Dominance Types.

Presistent. Presistent Emergent Wetlands are dominated by species that normally remain standing at least until the beginning of the next growing season. This subclass is found only in the Estuarine and Palustrine Systems.

Palustrine Persistent Emergent Wetlands contain a vast array of grasslike plants such as cattails (Typha spp.), bulrushes (Scirpus spp.), sedges (Carex spp.); and true grasses such as reed (Phragmites communis), manna grass (Glyceria spp.), and slough grass (Beckmannia erucaeformis). There is also a variety of broad-leaved persistent emergents such as purple loosestrife (Lythrum salicaria), dock (Rumex spp.), waterwillow (Decodon verticillatus), and many species of smartweeds (Polygonum spp.).

Nonpersistent. Wetlands in this subclass are dominated by plants which fall to the surface of the substrate or below the surface of the water at the end of the growing season so that, at certain seasons of the year, there is no obvious sign of emergent vegetation. For example, wild rice (Zizania aquatica) does not become apparent until midsummer and fall, when it may form dense emergent stands. Nonpersistent emergents also include species such as arrow arum (Peltandra virginica), pickerelweed (Pontederia cordata), and arrowheads (Sagittaria spp.). Movement of ice in Estuarine, Riverine, and Lacustrine systems often removes all traces of emergent vegetation during the winter. Where this occurs, the area should be classified as Nonpersistent Emergent Wetland.

Scrub-Shrub Wetland (Palustrine)

Definition. The class Scrub-Shrub Wetland includes areas dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. All water regimes except subtidal are included.

Description. Scrub-Shrub Wetlands may represent a successional stage leading to Forested Wetland, or they may be relatively stable communities. They occur only in the Estuarine and Palustrine systems, but are one of the most widespread classes in the United States. Scrub-Shrub Wetlands are known by many names, however, the most common is shrub swamp. For practical reasons we have also included forest composed of young trees less than 6 m tall.

Subclasses and Dominance Types

Broad-leaved Deciduous. In the Palustrine System typical dominance types are alders (*Alnus spp.*), willows (*Salix spp.*), buttonbush (*Cephalanthus occidentalis*), redosier dogwood (*Cornus stolonifera*), spirea (*Spirea spp.*), and young trees of species such as red maple (*Acer rubrum*).

Forested Wetland

Definition. The class Forested Wetland is characterized by woody vegetation that is 6 m tall or taller. All water regimes are included except subtidal.

Description. Forested Wetlands are most common in the eastern United States and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains. They occur only in the Palustrine and Estuarine systems and normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer. Forested Wetlands in the Estuarine System, which include the mangrove forests of Florida, Puerto Rico, and the Virgin Islands, are known by such names as swamps, hammocks, heads, and bottoms. These names often occur in combination with species names or plant associations such as cedar swamp or bottomland hardwoods.

Subclasses and Dominance Types

Broad-leaved Deciduous. Domiant trees typical of Broad-leaved Deciduous wetlands, which are represented throughout the United States, are most common in the South and East. Common dominants are species such as red maple, American elm (*Ulmus americana*), red or green and black ash (*Fraxinus pennsylvanica* and *F. nigra*), black gum (*Nyssa sylvatica*), tupelo gum (*N. aquatica*), swamp white oak (*Quercus bicolor*), overcup oak (*Q. lyrata*), and basket oak (*Q. michauxii*). Wetlands in this subclass generally occur on mineral soils or highly decomposed organic soils.

Modifers

To fully describe wetlands and deepwater habitats, one must apply certain modifiers at the class level and at lower levels in the classification hierarchy. The modifiers described below were adapted from existing classifications or were developed specifically for this system.

Water Regime Modifiers

Precise description of hydrologic characteristics requires detailed knowledge of the duration and timing of surface inundation, both yearly and long-term, as well as an understanding of groundwater fluctuations. Because such information is seldom available, the water regimes that, in part, determine characteristics of wetland and deepwater plant and animal communities are described here in only general terms.

Permanently Flooded. Water covers the land surface throughout the year in all years. Vegetation is composed of obligate hydrophytes.

Intermittently Exposed. Surface water is present throughout the year except in years of extreme drought.

Semipermanently Flooded. Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.

Seasonally Flooded. Surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

Saturated. The substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present.

Special Modifiers

Many wetlands and deepwater habitats are man-made, or natural ones have been modified to some degree by the activities of man or beavers. Since the nature of these modifications often greatly influences the character of such habitats, special modifying terms have been included here to emphasize their importance. The following modifiers should be used singly or in combination wherever they apply to wetlands and deepwater habitats.

Excavated

Lies within a basin or channel excavated by man.

Impounded

Created or modified by a barrier or dam which purposefully or unintentionally obstructs the outflow of water. Both man-made dams and beaver dams are included.

Diked

Created or modified by a man-made barrier or dike designed to obstruct the outflow of water.

APPENDIX E - PART 644 - (NYSDEC) CLASSIFICATION OF FRESHWATER WETLANDS

PART 664

FRESHWATER WETLANDS MAPS AND CLASSIFICATION

(Statutory authority: Environmental Conservation Law, §§ 3-0301 and 24-1301)

Sec.
664.1 Applicability
664.2 Definitions
664.3 Purposes and approach
664.4 Classification procedures
664.5 Classification system
664.6 Explanation of classification characteristics
664.7 Freshwater wetlands map maintenance, amendment and adjustment
664.8 Appeals and review
664.9 Effective date

Historical Note

Part (§§ 664.1-664.9) filed May 20, 1980; for effective date see § 664.9.

Section 664.1 Applicability. (a) This Part applies to all wetlands regulated under the Freshwater Wetlands Act, whether regulated by the department or by towns, cities, villages or counties. The department alone shall map and classify wetlands,

regardless of which agency is implementing the act in a particular locality, except that the Adirondack Park Agency shall classify the wetlands within the Adirondack Park.

(b) Where the department is the regulating authority, the wetlands classification system presented in this Part takes effect in the department's freshwater wetlands permit requirements regulations, Part 663 of this Title. In Part 663, standards for the issuance of permits are provided for each of the four wetland classes described in sections 664.5 and 664.6 of this Part.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.2 Definitions. (a) *Act* means the Freshwater Wetlands Act (article 24 and title 23 of article 71 of the Environmental Conservation Law).

(b) *Adjacent area* means those areas of land or water that are outside a wetland and within 100 feet (approximately 30 meters), measured horizontally, of the boundary of the wetland. However, an adjacent area broader than 100 feet (approximately 30 meters) may be established where necessary to protect and preserve the wetland, as set forth in section 664.7 of this Part.

(c) *Boundary of a wetland* means the outer limit of the vegetation specified in paragraphs (a) and (b) of subdivision 1 of section 24-0107 of the act and of the lands and waters specified in paragraphs (c) and (d) of such subdivision.

(d) *Commissioner* means the commissioner of the Department of Environmental Conservation or a duly authorized representative.

(e) *Department* means the Department of Environmental Conservation.

(f) *Freshwater wetland* or *wetland* means lands and waters of the State which meet the definition provided in section 24-0107(1) of the act and have an area of at least 12.4 acres (approximately 5 hectares) or, if smaller, have unusual local importance as determined by the commissioner pursuant to section 24-0301(1) of the act.

(g) *Freshwater wetlands map* or *map* means a final freshwater wetlands map promulgated by the commissioner pursuant to section 24-0301 (5) of the act, or such a map that has been amended or adjusted pursuant to section 664.7 of this Part, on which are indicated the approximate location of the actual boundaries of wetlands.

(h) *Local government* means a village, town, city or county.

(i) *Permit* means the written approval, issued by the commissioner or a local government, where required for the conducting of a regulated activity in a wetland or adjacent area, in accordance with title 7 of the act.

(j) *Person* means any corporation, firm, partnership, association, trust, estate, one or more individuals, or any unit of Federal, State or local government, or any agency or subdivision thereof, including any State department, bureau, commission, board or other agency, public authority or public benefit corporation.

(k) *Pollution* means the presence in the environment of human-induced conditions or contaminants in quanitities or characteristics which are or may be injurious to human, plant or animal life or to property.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.3 Purposes and approach. (a) *Public policy*. It is the public policy of the State, as set forth in the Freshwater Wetlands Act, to preserve, protect and conserve freshwater wetlands and the benefits derived therefrom, to prevent the despoliation

and destruction of wetlands, and to regulate use and development of wetlands to secure the natural benefits of those wetlands, consistent with the general welfare and beneficial economic, social and agricultural development of the State. It is the purpose of this Part to implement that policy by clarifying certain aspects of wetland mapping and delineation of jurisdiction, and by creating a system for classifying wetlands in accordance with section 24-0903(1) of the act. Such a system must take into account the present condition of wetlands as well as their many benefits described below and in section 24-0105(7) of the act.

(b) *Wetland benefits.* The preservation, protection and conservation of wetlands is of public concern because of the benefits they provide. These include:

(1) Flood and stormwater control. Wetlands may slow water runoff and temporarily store water, thus helping to protect downstream areas from flooding. Public health and private property in one part of a watershed may be harmed if wetlands are destroyed in a different part of that watershed.

(2) Wildlife habitat. Wetlands are of unparalleled value as wildlife habitat, and the perpetuation of scores of species depends upon them. Many of the species are migratory and must have nesting, migration, and wintering habitat. The destruction of one kind of wetland habitat in one place may reduce populations of wildlife elsewhere. Where specific wetlands support endangered species, destruction of those wetlands may threaten the presence of the endangered species for all time.

(3) Water supply. Wetlands themselves are a source of surface water and may, under appropriate hydrological conditions, serve to recharge groundwater and aquifers and to maintain surface water flow.

(4) Water quality. Many wetlands serve as chemical and biological oxidation basins that help cleanse water that flows through them. Wetlands can also serve as sedimentation areas and filtering basins that absorb silt and organic matter, thereby protecting channels and harbors and enhancing water quality.

(5) Fisheries. Wetlands provide the spawning and nursery grounds for several species of fish. The availability of these fish in lakes and streams may be adversely affected by the loss of wetlands adjacent to those waters.

(6) Food chains. Food and organic detritus supplied by wetlands support the fish and wildlife of adjacent waters.

(7) Recreation. Wetlands provide important hunting, fishing, boating, hiking, birdwatching, photography, camping, and other recreational opportunities. In addition, wetlands may be critical to recreation beyond their own borders because of their ability to protect water quality and protect and produce wildlife and fish.

(8) Open space and aesthetic appreciation. Wetlands provide visual variety in many different settings. Especially in urban areas, wetland open space contributes to social well-being by providing relief from intense development and a sense of connection with the natural world.

(9) Education and scientific research. Because of the high biological productivity and the variety of plant and animal species they can support, wetlands can be of broad social benefit in providing outdoor laboratories and living classrooms for studying and appreciating natural history, ecology and biology. Many of the lessons learned and principles evolved through study of wetlands are applicable to other eviron-mental issues.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.4 Classification procedures. (a) The commissioner shall classify each wetland shown on the freshwater wetlands map according to the classification system set forth in section 664.5 of this Part. That system establishes four separate classes that rank wetlands according to their ability to perform wetland functions and provide wetland benefits. Class I wetlands have the highest rank, and the ranking descends through classes II, III and IV.

(b) When a wetland contains characteristics of more than one class, the wetland shall be classified in the highest of the classes.

(c) If irreversible degradation has removed the benefits associated with the particular characteristic(s) justifying a classification, the wetland shall be classified on the basis of the remaining characteristics. For example, a wetland could be irreversibly contaminated by toxic substances that remove its benefits as habitat for fish and wildlife, or could be irreversibly visually degraded, thus removing some or all of its aesthetic, recreational and open-space benefits.

(d) Notwithstanding subdivision (c) of this section, where land originally designated as a wetland on the map was altered for agricultural purposes following the promulgation of that map, the land shall continue to be classified in light of its wetland conditions, and the wetland benefits set forth in section 24-0105 of the act and in this Part that it provided, at the time of its original designation on the map.

(e) The classification of each wetland shall be set forth in a written order by the commissioner. An explanation of the reasons for the classification shall be on file in the appropriate regional office(s) of the department. A copy of the classification order shall be filed in the office of the clerk of each local government in which the wetland is located and in the appropriate regional office(s) of the department. Notice of each order shall also be given to the chief administrative officer of each affected local government and to each owner of record, as shown on the latest completed tax assessment rolls, of classified wetlands affected by the order, and also shall be published in the department's environmental notice bulletin.

(f) The commissioner may raise or lower a classification on the basis of material new information or materially changed wetland conditions. Notice of the order setting forth the revised classification shall be given and published, and a copy of such order shall be filed, as provided in subdivision (e) of this section.

(g) Any person may request of the department a change in a wetland's classification by setting forth reasons for believing the present classification to be incorrect. Such request shall be submitted in writing in a form and manner prescribed by the department and shall set forth material new information relevant to the wetland or materially changed conditions of the wetland justifying the request. The request must include evidence addressed to the classification system set forth in section 664.5 of this Part, consisting of, for example, photographs identifying cover types justifying a different classification; water samples; or the affidavit of an expert. The department shall notify the person making the request within 15 working days as to whether the request is adequate to warrant consideration. If the department deems the request adequate, the decision to reclassify the wetland as requested, to retain the existing classification, or to change the classification to another classification not so requested shall continue to be at the discretion of the commissioner. Notice of any order setting forth a revised classification shall be given and published, and a copy of such order shall be filed, as provided in subdivision (e) of this section.

(h) Any person intending to submit an application for a permit or a letter of permission may, in the course of a preapplication conference held pursuant to subdivision (b) of section 663.4 of this Title, or in the course of analogous discussions with a

local government that is administering the act, request in writing, in a form and manner prescribed by the department, that the commissioner confirm the classification of the wetland that would be affected by the proposed activity. Within 15 working days of the department's receipt of the request, the commissioner shall decide either to confirm the existing classification or to revise (either to raise or lower) the classification on the basis of material new information or materially changed wetland conditions. Within that same 15-day period, the department shall send notice of the decision confirming or revising the classification to the person who submitted the request; and that person shall not file a permit application until such notice has been provided. Where the classification is revised, notice of the order setting forth the revised classification shall also be given and published, and a copy of such order shall be filed, as provided in subdivision (e) of this section. Once the wetland's classification has been confirmed or revised pursuant to this subdivision and the permit application that was the subject of the preapplication conference has been filed, no further department-initiated change in the wetland's classification shall change the standard for permit issuance applied to that application.

(i) If there is a public hearing on a permit application, then once that hearing has commenced, no department-initiated change in the wetland's classification shall change the standard for permit issuance applied to that application. However, any other party to such a hearing may request a change in the existing classification of that wetland in the same manner and under the same conditions as set forth in subdivision (g) of this section. Within five working days of its receipt of the request, the department must determine whether the request is adequate to warrant consideration. If the department deems the request adequate, the commissioner must act upon the request; either to reclassify the wetland as requested, to retain the existing classification, or to change the classification to another classification not so requested; within 15 working days from the date of the request, and before the permit hearing may continue.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.5 Classification system. Not all wetlands supply equally the benefits explained in section 664.3(b) of this Part. The degree to which wetlands supply benefits depends upon many factors, including: their vegetative cover, their ecological associations, their special features, their hydrological and pollution control features, and their distribution and location; and these may vary considerably from wetland to wetland. Because of this variation, the act requires the commissioner to classify wetlands in a way that recognizes that not all wetlands are of equal value. This section establishes four ranked regulatory classes of wetlands, depending upon the degree of benefits supplied. The benefits cited in section 24-0105(7) of the act are translated into discernible wetland characteristics, and these characteristics are used to classify wetlands. Section 664.6 of this Part describes each characteristic in some detail and discusses the benefits supplied by a wetland when it contains that characteristic.

(a) *Class I wetlands.* A wetland shall be a class I wetland if it has any of the following seven enumerated characteristics:

Ecological Associations

(1) It is a classic kettlehole bog (664.6[b][2]);*

Special Features

(2) It is resident habitat of an endangered or threatened animal species (664.6 [c][2] and [4]);

* The reference in parentheses after each characteristic is to the description of that characteristic and its associated benefits in section 664.6 of this Part.

(3) It contains an endangered or threatened plant species (664.6[c][4]);

(4) It supports an animal species in abundance or diversity unusual for the State or for the major region of the State in which it is found (664.6[c][1] and [6]);

Hydrological and Pollution Control Features

(5) It is tributary to a body of water which could subject a substantially developed area to significant damage from flooding or from additional flooding should the wetland be modified, filled or drained (664.6[d][1]);

(6) It is adjacent or contiguous to a reservoir or other body of water that is used primarily for public water supply, or it is hydraulically connected to an aquifer which is used for public water supply (664.6[d][2],[3] and [4]); or

Other

(7) It contains four or more of the enumerated class II characteristics. The department may, however, determine that some of the characteristics are duplicative of each other, therefore do not indicate enhanced benefits, and so do not warrant class I classification. Each species to which paragraphs (b)(6)-(8) of this section apply shall be considered a separate class II characteristic for this purpose.

(b) *Class II wetlands.* A wetland shall be a class II wetland if it has any of the following 17 enumerated characteristics:

Cover Type

(1) It is an emergent marsh in which purple loosestrife and/or reed (phragmites) constitutes less than two thirds of the cover type (664.6[a][2]);*

Ecological Associations

(2) It contains two or more wetland structural groups (664.6[b][1]);

(3) It is contiguous to a tidal wetland (664.6[b][3]);

(4) It is associated with permanent open water outside the wetland (664.6[b][4]);

(5) It is adjacent or contiguous to streams classified C(t) or higher under article 15 of the Environmental Conservation Law (664.6[b][5]);

Special Features

(6) It is traditional migration habitat of an endangered or threatened animal species (664.6[c][3] and [4]);

(7) It is resident habitat of an animal species vulnerable in the State (664.6 [c][2] and [5]);

(8) It contains a plant species vulnerable in the State (664.6 [c][5]);

(9) It supports an animal species in abundance or diversity unusual for the county in which it is found (664.6 [c][7]);

(10) It has demonstrable archaeological or paleontological significance as a wetland (664.6 [c][8]);

(11) It contains, is part of, owes its existence to, or is ecologically associated with, an unusual geological feature which is an excellent representation of its type (664.6 [c][9]);

Hydrological and Pollution Control Features

(12) It is tributary to a body of water which could subject a lightly developed area, an area used for growing crops for harvest, or an area planned for development by a local planning authority, to significant damage from flooding or from additional flooding should the wetland be modified, filled or drained (664.6 [d][1]);

(13) It is hydraulically connected to an aquifer which has been identified by a government agency as a potentially useful water supply (664.6[d][4]);

(14) It acts in a tertiary treatment capacity for a sewage disposal system (664.6 [d][3]);

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* The reference in parentheses after each characteristic is to the description of that characteristic and its associated benefits in section 664.6 of this Part.

Distribution and Location

(15) It is within an urbanized area (664.6[e][1]);

(16) It is one of the three largest wetlands within a city, town, or New York City borough (664.6[e][3]); or

(17) It is within a publicly owned recreation area (664.6 [e][4]).

(c) *Class III wetlands.* A wetland shall be a class III wetland if it has any of the following 15 enumerated characteristics:

Cover Types

(1) It is an emergent marsh in which purple loosestrife and/or reed (phragmites) constitutes two thirds or more of the cover type (664.6[a][2]);*

(2) It is a deciduous swamp (664.6[a][3]);

(3) It is a shrub swamp (664.6 [a][5]);

(4) It consists of floating and/or submergent vegetation (664.6[a][6]);

(5) It consists of wetland open water (664.6[a][7]);

Ecological Associations

(6) It contains an island with an area or height above the wetland adequate to provide one or more of the benefits described in section 664.6 (b)(6) of this Part;

Special Features

(7) It has a total alkalinity of at least 50 parts per million (664.6 [c][10]);

(8) It is adjacent to fertile upland (664.6[c][11]);*

(9) It is resident habitat of an animal species vulnerable in the major region of the State in which it is found, or it is traditional migration habitat of an animal species vulnerable in the State or in the major region of the State in which it is found (664.6 [c][1]-[3] and [5]);

(10) It contains a plant species vulnerable in the major region of the State in which it is found (664.6[c][1] and [5]);

Hydrological and Pollution Control Features

(11) It is part of a surface water system with permanent open water and it receives significant pollution of a type amenable to amelioration by wetlands (664.6 [d][3]);

Distribution and Location

(12) It is visible from an interstate highway, a parkway, a designated scenic highway or a passenger railroad, and serves a valuable aesthetic or open space function (664.6 [e][2]);

(13) It is one of the three largest wetlands of the same cover type within a town (664.6 [e][3]);

(14) It is in a town in which wetland acreage is less than one percent of the total acreage (664.6 [e][3]); or

(15) It is on publicly owned land that is open to the public (664.6 [e][5]).

(d) *Class IV wetlands.* A wetland shall be a class IV wetland if it does not have any of the characteristics listed as criteria for class I, II or III wetlands. Class IV wetlands will include wet meadows (664.6[a][1])* and coniferous swamps (664.6[a][4]) which lack other characteristics justifying a higher classification.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.6 Explanation of classification characteristics. This section describes characteristics and their associated benefits used in classifying wetlands in section 664.5 of this Part.

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* The reference in parentheses after each characteristic is to the description of that characteristic and its associated benefits in section 664.6 of this Part.

(a) *Cover types.* The different wetland cover types described in this subdivision provide wetland benefits to varying degrees. In order for a wetland to be considered to be of a given cover type and classified accordingly, that cover type should constitute at least 50 percent of the area of the wetland. However, if no single cover type constitutes 50 percent or more of the wetland area, this aspect of the wetland's classification shall be determined by adding up the areas of all the separate cover types in each class and then assigning the wetland to the class that represents the largest proportion of the wetland's area. As listed in section 664.5 of this Part, the only class II cover type is emergent marsh in which purple loosestrife and/or reed (phragmites) constitutes less than two thirds of the cover type; class III cover types are emergent marsh in which purple loosestrife and/or reed (phragmites) constitutes two thirds or more of the cover type, deciduous swamp, shrub swamp, floating and/or submergent vegetation, and wetland open water; and class IV cover types are wet meadow and coniferous swamp. The evaluations of cover types in this subdivision are distinct from the evaluations of structural groups provided in paragraph (b)(1) of this section.

(1) Wet meadow. This consists of such plants as sedges, rushes, coarse grasses, and sometimes cattails. The soil is usually saturated with water for a significant part of the growing season. Vegetation tends to grow in clumps or tussocks. Cattails, if present, tend to grow between the clumps. In agricultural areas, wet meadow is usually a cleared but uncultivated parcel; often it is pastured. If the land is pastured, the clumps are more pronounced due to trampling by livestock. Wet meadow may occur within or at the edges of a hayfield and may be mowed, depending upon the degree of wetness. Old beaver meadows and floodplains may contain wet meadow vegetation. Standing water is often present during wet periods. Wet meadow, when associated with other wetland cover types, is valuable for wildlife, especially for nesting wetland birds. When associated with certain other wetland cover types or with open water, wet meadow may be valuable for fish spawning. When not associated with other wetland cover types, however, wet meadow is likely to be of relatively low value.

(2) Emergent marsh. This consists of such plants as cattails, purple loosestrife, swamp loosestrife, arrowheads, reeds, bur reeds, pickerelweed, wild rice, water plantain, bulrushes and arrow arum. These are herbaceous plants encroaching on water areas and flooded with standing water much of the year. Emergent marsh is generally the most valuable individual cover type. The emergent vegetation itself provides nesting habitat, food and cover. Frequently, emergent vegetation produces the largest annual increase in natural organic materials of any cover type, providing nonpolluting nutrients to food chains. An emergent marsh is usually different in physical structure from surrounding areas and therefore provides habitat diversity. An exception to the high value assigned to emergent marsh may occur where purple loosestrife or reed (phragmites) is dominant, in that it constitutes two thirds or more of the cover type. In this case, a wetland shall be a class III wetland.

(3) Deciduous swamp. This consists of live deciduous trees over 4.5 meters (approximately 15 feet) in height. If not totally flooded, the terrain is hummocky. The trees include, but are not limited to, American elm, red maple, silver maple, red ash, black ash, swamp white oak, and willows. Deciduous swamps will generally be flooded or saturated during the spring and early summer but are likely to appear dry toward the end of summer and in the fall. Deciduous swamp is relatively valuable because it is frequently used by nesting waterfowl and is also heavily used by songbirds and other wildlife.

(4) Coniferous swamp. This consists of live coniferous trees over 4.5 meters (approximately 15 feet) in height. Some of the coniferous trees most commonly found in wetlands are black spruce, white cedar, red spruce, balsam fir and American larch. Flooded conifers usually grow in hummocky terrain. The trees tend to grow

out of the drier hummocks with pockets of water forming between the hummocks. The value of coniferous swamp for wildlife is considered to be relatively low, although coniferous swamp can provide important winter cover for deer and habitat for varying hare.

(5) Shrub swamp. This cover type is found in a variety of areas including floodplains; frost pockets; edges of ponds, lakes and bogs; and in association with hillside seeps. Woody vegetation is classified as shrub swamp if it is 4.5 meters (approximately 15 feet) or less in height. Species include: alders, willows, leatherleaf, bog rosemary, sweet gale, buttonbush, highbush cranberry, and red osier dogwood. Also, sphagnum moss in bog mats usually occurs in association with shrub species. The value of shrub swamp for fish and wildlife is variable, but shrub swamp can provide some of the values of emergent marsh or deciduous swamp: it is likely to have a structure different from surrounding areas and may supply significant nesting and other wildlife uses.

(6) Floating and submergent vegetation. Floating wetland vegetation may be free-floating, such as duckweed and watermeal, or rooted with floating leaves, such as water lily, water shield and spatterdock. Submergent plants, such as pondweeds, naiads, coontail, water milfoil, wild celery, muskgrass, stonewort, water smartweed, and bladderworts, normally grow beneath the surface of the water. These cover types can be important food sources for waterfowl and frequently are valuable areas for fish spawning and nurseries.

(7) Wetland open water, including open water with dead trees and open water that occasionally exposes unvegetated mud flats. Unvegetated open water is part of a wetland as a wetland cover type if it is substantially enclosed by wetland vegetation and is no larger than 2.5 hectares (approximately 6.2 acres). If the body of open water that is substantially enclosed by wetland vegetation is larger than 2.5 hectares (approximately 6.2 acres), then only that portion of the open water that is within 50 meters (approximately 165 feet) of the wetland vegetation is considered to constitute a wetland cover type and to be part of a wetland. When in close conjunction with wetland vegetation, open water can be of considerable value as fish and wildlife habitat.

(b) *Ecological associations.* A variety of significant ecological associations may occur in wetlands. Wetlands having an association of substantially different kinds of physical or vegetative structures have special ecological value, especially for wildlife and fish. Association with particular non-wetland features may be important in defining wetland benefits. In addition, the visual diversity provided serves a valuable aesthetic function. The nature and significance of these associations are set forth in this subdivision.

(1) Two or more structural groups. Three groups of wetland vegetative structures can be identified. In order to be significant enough to be considered a factor in classifying a wetland according to this class II characteristic, each structural group must constitute at least a particular minimum percentage of the area of the wetland.

(i) The herbaceous structural group consists of the cover types made up of herbaceous vegetation which emerges above the surface of the water or soil. These emergent marsh and/or wet meadow cover types must constitute at least 25 percent of the area of the wetland.

(ii) The woody structural group consists of cover types of generally woody vegetation. These deciduous swamp, coniferous swamp, and/or shrub swamp cover types must constitute at least 25 percent of the area of the wetland.

(iii) The water structural group consists of cover types in which the surface of the water is apparent. These submergent and floating vegetation and/or wetland open water cover types, including open water with dead trees and open water that occasionally exposes unvegetated mud flats, must constitute at least 15 percent of the area of the wetland.

For example, a wetland which is 80 percent shrub swamp (woody structural group) and 20 percent submergent and floating vegetation (water structural group) has this class II characteristic. A wetland which is 45 percent deciduous swamp (woody structural group), 35 percent coniferous swamp (also woody structural group), and 20 percent wet meadow (herbaceous structural group) does not have this class II characteristic because, although the woody structural group constitutes well over its minimum 25 percent of the wetland, the herbaceous structural group constitutes less than its minimum 25 percent of the wetland. The physical structure of each of these three groups is substantially different from the structure of each of the other two. The presence of this characteristic increases the value of a wetland as fish and wildlife habitat because each of the different groups can support species not found in the others, thus increasing the variety of species on the wetland as a whole. In addition, those species which need two different structural groups to meet all of their requirements can only exist when both groups are present. The presence of different groups together also provides visual variety, thus enhancing aesthetic benefits.

(2) Classic kettlehole bog. Classic kettlehole bogs are wetlands which are at least 75 meters (approximately 246 feet) in diameter within a closed drainage basin, having a minimal or no surface inlet or outlet. These bogs have complete or virtually complete concentric zones of differing vegetative cover types. The innermost zone of the bog is open water that is of pH 5.00 or lower and is typically anoxyous and dark brown. Surrounding this is a floating mat of sphagnum mosses, liverwort, and shrubby heath plants; this mat is surrounded in turn by coniferous swamp above deep deposits primarily of partly decayed sphagnum mosses. Wetlands of this type are very rare, as are many of the life forms within them, and therefore they contribute to the ecological, geological and aesthetic diversity of the State. This in turn provides educational and scientific research benefits.

(3) Wetlands contiguous to tidal wetlands. These are freshwater wetlands which abut the landward boundary of tidal wetlands shown on the tidal wetlands inventory maps promulgated pursuant to section 25-0201 of the Environmental Conservation Law. Freshwater wetlands contiguous to tidal wetlands can provide unusual fish and wildlife habitat benefits. The perpetuation of freshwater wetlands associated with tidal wetlands is likely to be essential to the protection of the tidal wetlands. These freshwater wetlands can purify water flowing into tidal wetlands and also can act with tidal wetlands to protect adjacent property against storm tides.

(4) Associated with permanent open water outside the wetland. A wetland may include open water, as described in subdivision 664.6(a)(7). However, to be considered under this characteristic, a wetland must be associated with permanent open water which exists outside of the wetland. This association must be one of close proximity, with water flow between the wetland and the open water at some time during the year. The wetland must be contiguous to the open water or, if it is separated, the separation must be only a narrow strip of land, such as a barrier beach or a railroad bed. Wetlands associated with open water have many special values. Some wildlife and fish usually found in open water must spend part of their life cycle in wetlands for reproduction, food and cover. The wetlands are also vital in providing natural nutrients to open water ecosystems. They may cleanse water entering the open water body and thus protect the quality of the open water. The associated open water often provides recreational and educational opportunities dependent upon these wetland functions.

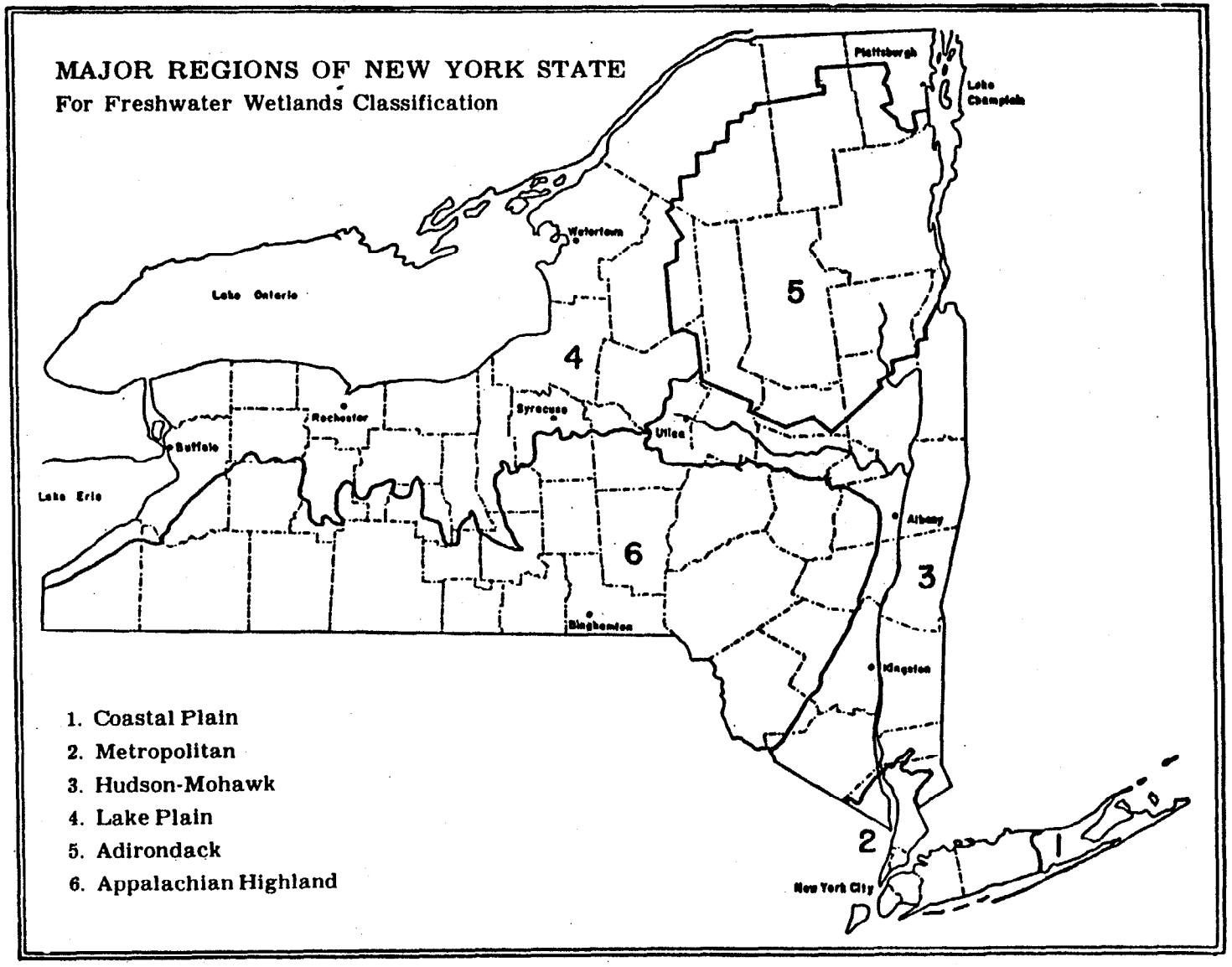
(5) Adjacent or contiguous to streams classified C(t) or higher under article 15 of the Environmental Conservation Law. Wetlands may be critical to protecting the quality of these streams. They may remove sediment and other pollutants, stabilize water flow, and help to maintain water temperatures required by desirable fish species.

(6) Island present within wetland. Islands provide nesting habitat and refuge for wildlife. They provide visual variety and interest and can be the focus of recreational and educational activities.

(c) *Special features.* Wetlands may contain particularly critical or fragile resources that require special protection. They may also contain other special features which enhance their benefits. Since some of these features are described in relation to major regions of the State, a definition of those major regions is provided in paragraph (1) of this subdivision.

(1) The major regions of the State are shown on the map in Appendix 8-D. More detailed delineations of the major regions shown on that map are available in the regional offices of the department. Where a wetland is near a major region border, the wetland's region shall be considered to extend into the adjacent region(s) to a distance of 15 kilometers (approximately 9 miles) from the wetland. However, this modification of regional borders does not apply to the borders of the metropolitan region. The major regions are:

[*continued on page 388.68u*]


MAJOR REGIONS OF NEW YORK STATE
For Freshwater Wetlands Classification
Plattsburgh
Lake Champlain
Watertown
Lake Ontario
5
4
Rochester
Syracuse
Utica
Buffalo
Lake Erie
Albany
6
3
Binghamton
Kingston
2
1
New York City
1. Coastal Plain
2. Metropolitan
3. Hudson-Mohawk
4. Lake Plain
5. Adirondack
6. Appalachian Highland

(i) Coastal plain (Long Island, outside of the New York portion of the New York-Northeastern New Jersey urbanized area, as defined by the United States Bureau of the Census—see also paragraph [e][1] of this section);

(ii) Metropolitan (the New York portion of the New York - Northeastern New Jersey urbanized area);

(iii) Hudson-Mohawk (in the Hudson Valley, north of the metropolitan region, from the eastern border of the State to the Appalachian highlands; in the Mohawk Valley, from the Appalachian highlands to the Adirondacks);

(iv) Lake plain (a narrow strip bordering Lake Erie; south of Lake Ontario to the Appalachian highlands; east of Lake Ontario to the Adirondacks; north of the Adirondacks to the St. Lawrence River or to the Canadian border; a narrow strip bordering Lake Champlain);

(v) Adirondack (within the Adirondack forest park and bordered by the lake plain and Hudson-Mohawk regions);

(vi) Appalachian highland (from the Pennsylvania and New Jersey borders to the lake plain and the Hudson-Mohawk valleys).

(2) Wetlands containing resident animal habitat. This means habitat of year-round resident animal species, or habitat of migratory species during their breeding or wintering periods.

(3) Wetlands containing traditional migration habitat of an animal species. This is a habitat used by a species in moving from breeding to wintering habitat in the late summer and fall, and from wintering to breeding habitat in the late winter and spring. Such use must be on a recurring basis so that there are grounds to believe that it will continue annually. This characteristic does not apply to the occasional occurrence of a stray or wandering individual animal during the migration period.

(4) Endangered or threatened species. This is a species or subspecies (or botanical "variety", where "variety" is used as the equivalent of the zoological "subspecies") of plant or animal (vertebrate or invertebrate) which, for the purposes of this Part, shall be considered to be of statewide significance because it has been identified as endangered or threatened by the United States Fish and Wildlife Service or in regulations, such as Part 182 of this Title, promulgated by the department pursuant to section 11-0535 of the Environmental Conservation Law, in the case of animals, or in additions to this Part after public hearing, in the case of plants.

(5) Vulnerable species. This is a species or subspecies (or botanical "variety", where "variety" is used as the equivalent of the zoological "subspecies") of plant or animal (vertebrate or invertebrate):

(i) for which extirpation from the State or a major region of the State is likely, but the species as a whole is not in jeopardy;

(ii) that is in such small numbers throughout the State or a major region of the State that it could be extirpated if recent trends degrading or diminishing its habitat continue; or

(iii) whose range is restricted in the State or a major region of the State and it or its habitat has a low tolerance for disturbance.

Vulnerable species shall be identified by the department in additions to this Part after public hearing.

(6) Wetlands having animal species in unusual abundance or diversity (statewide or regional). Certain wetlands are unusual ecosystems because they are sites of large heronries or other colonial nesting; are regularly and intensively used by raptors, waterfowl or other migrating birds; are in major deer winter concentration areas; support valuable and intensive fish spawning; are extremely productive in breeding ducks, geese, shore birds, wading birds, and/or furbearers; or otherwise contain an unusually high abundance or diversity of wildlife or fish. In order to be considered

under this characteristic, the abundance and/or diversity must be actual, not merely potential or predicted; with the expectation, based on the department's knowledge of existing conditions and fish and wildlife behavior, that the abundance and/or diversity is not merely a one-year or transitory phenomenon. However, this characteristic does not apply to domestic or invertebrate species or to disease-bearing or other noxious species such as the Norway rat.

(7) Wetlands having animal species in unusual abundance or diversity (county). The same values described under paragraph (6) of this subdivision apply here, except that they are lower because the basis for assessing abundance or diversity is countywide rather than regional or statewide.

(8) Wetlands having demonstrable archaeological or paleontological signifi-cance as wetlands. Some existing wetlands were important sites of native American activities such as food-gathering, or supported concentrations of life forms now long extinct, and the natural conditions in wetlands enabled the evidence of these functions to be preserved. Such areas now are valuable resources for education and scientific research examining the importance of wetlands to human and animal life over time. Damage to such wetlands could significantly diminish those resources.

(9) Wetlands having geological significance. Some wetlands are associated with unusual geological features which are excellent representations of their type. Examples of such features might be lakeshore barrier beaches, sand dunes, eskers, or pine barrens. Where wetlands contain, are part of, owe their existence to, or are ecologically associated with, such a feature, they comprise integral parts of unusual ecological communities. Damage to such wetlands may therefore result in the loss of unusual species of fish, wildlife or vegetation and is likely to significantly diminish the State's or a major region's ecological, educational or aesthetic resources or diminish the variety of the State's or a major region's landforms.

(10) Wetlands having a total alkalinity of at least 50 parts per million. A relatively high total alkalinity has value for wildlife and fish for at least two reasons. It is a measure of the capacity of wetlands to avoid acidic conditions and as such deters the accumulation of substances harmful to the growth of vegetation that provides good wildlife habitat. Total alkalinity is also a general indication of the natural fertility of the substrate underlying the wetland. Generally, a more naturally fertile substrate will support better habitat.

(11) Wetlands adjacent to fertile upland. This characteristic is identified by soil tests or by soils maps. Upland soils in the immediate vicinity of a wetland are an indication of the fertility of the wetland substrate. In general, those soils described by the United States Soil Conservation Service as "high base soils" (pH 5.6 or higher) will be considered fertile for the purposes of this Part. The value of fertile soils is similar to the values described in paragraph (10) of this subdivision: generally, a more naturally fertile substrate will support better habitat for fish and wildlife.

(d) *Hydrological and pollution control features.* Some wetlands provide significant hydrological and pollution control benefits. The major features of wetlands providing those benefits are set forth in this subdivision.

(1) Wetlands may provide a drainage basin with a natural stormwater retention facility. This flood storage function may slow the downstream movement of the flood crest and lower its peak elevation. The flood control benefits of a wetland generally increase with its size relative to the size of the drainage area tributary to the flood-endangered locale. The loss of a significant area of wetland within a drainage basin may therefore aggravate flooding, erosion, and sedimentation in the immediate downstream area.

(2) The protection of wetlands adjacent or contiguous to reservoirs or to other bodies of water used primarily for public water supply may be essential to preserving that supply. Disturbance or loss of these wetlands can lower water quality and cause health problems to the water users.

(3) Some wetlands that are part of a surface water system with permanent open water receive pollutants. By slowing runoff, adding water to the pollutants, and spreading water shallowly over a large area, these wetlands may remove sediment, oxidize or precipitate pollutants, and dilute wastewater, thus cleansing water in the surface water system. In some cases, such wetlands provide tertiary treatment in relation to sewage disposal systems. However, these beneficial characteristics are considered for classification only if the pollution is generally of a kind amenable to assimilation or amelioration by wetlands.

(4) Some wetlands are underlain by deposits of pervious earth materials which serve to hydraulically connect them to aquifer systems so that some of the water from such wetlands percolates into the aquifers and recharges them. For infiltration of water from a wetland to be of an amount significant enough to provide a groundwater supply source, and therefore to be either a class I or II characteristic, the pervious earth materials underlying the wetland must be more than three meters (approximately 10 feet) thick. Some of the more important aquifers in the State have already been identified by various agencies, such as the U.S. Geological Survey, the Department of Environmental Conservation, the State Department of Health and various county and regional planning agencies. Preservation of groundwater recharge areas is critical to the protection of the aquifers and the water supply. Recharge to groundwater systems generally takes place during times of the year when little foliage (which discharges water via transpiration) is present. At these times, as well as other times, wetlands can recharge aquifers if the soils at their bottoms are so pervious as to allow infiltration. For example, although the soil types underlying wetlands are usually peat, muck, marl or clay, none of which is very pervious, wetland overflow lands in floodplains may be underlain by sandy or gravelly alluvial soils. These wetlands, even if not very large, can serve to restore significant amounts of water to aquifers, thereby allowing wells to continue yielding water.

(e) *Distribution and location.* The distribution and location of wetlands are important considerations in determining the benefits of particular wetlands as open space and for recreational, aesthetic and educational purposes. Nothing in this Part or in the act, however, requires a landowner to open land to public access for such purposes.

(1) Within urbanized areas. "Urbanized areas" are defined by the United States Bureau of the Census, and consist of a central city, or cities, and surrounding suburban areas. According to that definition, the central city must have a population of 50,000 or more, and surrounding closely settled areas are included if these are:

(i) incorporated places of 2,500 inhabitants or more;

(ii) incorporated places with fewer than 2,500 persons, provided that each has a closely settled area of 100 housing units or more;

(iii) small land parcels normally less than one square mile in area having a population density of 1,000 inhabitants or more per square mile; or

(iv) other similar small areas in unincorporated territory with lower population density when these areas serve to complete urban-suburban community boundaries.

For the purposes of this Part, the urbanized areas of the State are listed by the United States Bureau of the Census as follows: New York - Northeastern New Jersey (the New York State portion), Buffalo, Albany-Schenectady-Troy, Binghamton, Rochester, Syracuse, and Utica-Rome. In addition, incorporated cities not covered by the United States Bureau of the Census definition are included for the purposes of this Part, but only the city proper and not surrounding areas. These are: Amsterdam, Auburn, Batavia, Beacon, Canandaigua, Corning, Cortland, Dunkirk, Elmira, Fulton, Geneva, Glens Falls, Gloversville, Hornell, Hudson, Ithaca, Jamestown, Johnstown,

Kingston, Little Falls, Lockport, Mechanicville, Middletown, Newburgh, Norwich, Ogdensburg, Olean, Oneida, Oneonta, Oswego, Plattsburgh, Port Jervis, Poughkeepsie, Salamanca, Saratoga Springs and Watertown. Because of their rarity, their distinctiveness from urban surroundings, and their proximity to large numbers of people, wetlands in urbanized areas can provide unusually important natural, recreational, educational, scientific, open space and aesthetic benefits.

(2) Visible from an interstate highway, a parkway, a designated scenic highway or a passenger railroad, and serves a valuable aesthetic or open space function. The following criteria will be considered in determining the applicability of this characterististic: the visibility of the wetland or of the wildlife on the wetland, the size of the wetland, and the topography and the variety of vegetative types in and surrounding the wetland. As a guideline, the wetland should be within one-half kilometer (approximately one-third mile) from the transportation corridor, although the criteria may justify a reduction or increase in this distance. For many people who commute on high use transportation corridors, the open space, visual variety, and wildlife-viewing opportunities provided by wetlands are aesthetically important benefits.

(3) One of the three largest wetlands within a city, town, or New York City borough; one of the three largest wetlands of the same cover type within a town; in a town in which wetland acreage is less than one percent of the total acreage. The rarer wetlands are, and the rarer any one cover type is in a locality, the more valuable are the recreational and educational opportunities and open space and aesthetic benefits provided by the wetlands or cover types which remain. In addition, the retention of a base of wetlands and wetland cover types in a locality can help to perpetuate fish and wildlife diversity in that locality. The size of a wetland can also be significant because many species have substantial threshold space requirements and are unable to make use of smaller areas. In addition, disturbance of wetland wildlife by activities outside the wetland or adjacent area can be buffered to some degree in larger wetlands.

(4) Within a publicly owned recreation area. These wetlands provide many recreational and educational opportunities.

(5) On publicly owned land that is open to the public. Many of the recreational, educational, scientific, aesthetic and open space benefits of wetlands cited in section 24-0105 of the act will usually be most fully realized on publicly owned lands. Such lands may have greater public use than private lands.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.7 Freshwater wetlands map maintenance, amendment and adjustment.

(a) *Procedures.* (1) The commissioner shall supervise the maintenance of each map. Maps shall be available for public examination at the appropriate regional office of the department and in the office of the clerk of each county in which each wetland or a portion thereof is located. They will also be filed with each appropriate local government.

(2) The commissioner may, upon request by any person having evidence such as photographs of the area in question, or upon department initiative, issue an order amending or adjusting any map for the following reasons and under the following circumstances:

(i) The commissioner may amend a map by adding a previously unmapped or newly created wetland to the map, by significantly expanding or contracting the boundaries of a wetland shown on the map, or by deleting a wetland from the map, all as may be necessary to conform the map to actual onsite conditions. This will be done only after a copy of the proposed amended map has been made available for public inspection in the appropriate regional office of the department and in the office of the clerk of each affected local government, and only after the commissioner has provided notice of the proposed amendment and an opportunity for a public hearing on the proposal. The notice shall be sent by certified mail, not fewer than 30 days prior to any such hearing, to each owner of record, as shown on the latest completed tax assessment rolls, of land involved in the proposed amendment and also to the chief administrative officer and clerk of each affected local government. Notice of the proposed amendment shall also be published at least once in at least two newspapers having a general circulation in the area that is the subject of the proposed amendment, and also in the department's environmental notice bulletin. If a hearing is scheduled, notice shall be provided to the same parties, and also published, in the same manner, not more than 30 nor fewer than 10 days before the date set for the hearing. Once the announcement of a proposed amendment has been made, no activity subject to regulation pursuant to the act shall be initiated within the area that is the subject of the proposal until the commissioner has either amended the map or denied the amendment. However, no activity which has already been initiated at the time of the announcement, within an area that is proposed as an addition to the map, will be subject to such regulation.

(ii) Notwithstanding subparagraph (i) of this paragraph, the commissioner may make minor adjustments to a map as follows: to reflect natural changes that have occurred through erosion or accretion since the effective date of the map, as originally established or amended; to reflect changes that have occurred as a result of granting permits under the act; to clarify the boundaries of any wetlands; to correct minor errors; or to effect other technical changes. These adjustments may be made only after notice by certified mail to each owner of record, as shown on the latest completed tax assessment rolls, of land involved in the adjustment and to the chief administrative officer of each affected local government, at least 30 days prior to the issuance of an order adjusting the map. A public hearing will not be held on any such proposed adjustment unless the commissioner determines that it is appropriate, at which time the provisions set forth in subparagraph (i) of this paragraph shall apply.

(3) Any public hearing held pursuant to paragraph (2) of this subdivision shall provide to any person an opportunity to support, oppose, or make a statement of interest in, a proposed amendment or adjustment to a map.

(4) After considering the testimony given at any such hearing and any other facts which may be deemed pertinent, and after considering the rights of affected property owners and the policy and purposes of the act, the commissioner either shall deny the amendment or adjustment or shall promulgate by order an amended or adjusted map. A copy of any such order, together with a copy of the relevant portion of the amended or adjusted map, shall be filed in the office of the clerk of each affected local government. The commissioner shall simultaneously give notice of such decision and any resultant order to each owner, as shown on the latest completed tax assessment rolls, of land that is the subject of the decision. This notice shall be given by mailing a copy of the decision and any resultant order to the owner by certified mail, in any case where a notice by certified mail was not sent under paragraph (2) of this subdivision, and in all other cases by first class mail. At the same time, the commissioner shall give notice of the decision and any resultant order to the chief administrative officer of each affected local government. A copy of the decision and

any resultant order also shall be published in at least two newspapers having a general circulation in the area that is the subject of the decision, and notice of the decision also shall be published in the department's environmental notice bulletin.

(b) *Treatment of two or more areas as a single wetland.* Two or more areas of land and/or water, as defined in paragraphs (a) through (d) of section 24-0107(1) of the act, may be considered to be a single wetland for regulatory purposes if they are determined by the commissioner to function as a unit, or to be dependent upon each other, in providing one or more of the wetland benefits listed in paragraphs (a), (b), (c), (e), (f), and (i) of section 24-0105(7) of the act, and if they are no more than 50 meters (approximately 165 feet) apart. The areas will be included, and labelled as a single wetland, on a map according to the procedures for amending a map set out in subdivision (a) of this section.

(c) *Wetlands of less than 12.4 acres (approximately 5 hectares) having unusual local importance.* (1) The commissioner shall designate an area of land and/or water, as defined in paragraphs (a) through (d) of section 24-0107(1) of the act, of less than 12.4 acres (approximately 5 hectares) as a wetland having unusual local importance if it contains any class I characteristic listed in section 664.5 (a) of this Part. Any person may nominate such an area for this purpose by providing evidence or testimony to the department that the area contains such a class I characteristic. Pursuant to section 663.3(g) of this Title, the commissioner may delegate jurisdiction over such a wetland to a local government within which the wetland is located if that government is the regulating authority for wetlands pursuant to the act.

(2) For any such area not containing a class I characteristic, the commissioner shall consider its nomination as a wetland having unusual local importance for one or more of the benefits enumerated in section 24-0105(7) of the act and, in accepting or rejecting nominations, shall take into account the expressed local interest.

(3) Where an area of land and/or water, as defined in paragraphs (a) through (d) of section 24-0107(1) of the act, of less than 12.4 acres (approximately 5 hectares) is on a State or national border, that portion of the area that is within New York shall be designated as a wetland having unusual local importance if the rest of the area is receiving protection as a wetland in the adjoining state or nation.

(4) A designation of an area as a wetland having unusual local importance shall be made pursuant to section 24-0301(1) of the act, but included on the map only after the commissioner has followed the procedures for amending a map set out in subdivision (a) of this section.

(d) *Extending the adjacent area.* All or part of a wetland's adjacent area may be extended beyond 100 feet (approximately 30 meters) from a wetland boundary where necessary to protect and preserve the wetland, pursuant to section 24-0701(2) of the act. Such an extension shall be in relation to the nature and importance of the wetland's benefits, the resulting wetland classification, and the fragility and vulnerability of the wetland and its benefits, and shall be made only after the commissioner has followed the procedures for amending a map set out in subdivision (a) of this section. The amended map will indicate what wetland has been affected by an adjacent area extension, and a record showing that extension in more detail shall be available in the same locations as the map of the wetland to which it is adjacent, as those locations are set forth in paragraph (1) of subdivision (a) of this section.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.8 Appeals and review. An appeal from, or an application for review of, a decision, determination or order under this Part may be made to the freshwater wetlands appeals board or to a court of competent jurisdiction in accordance with the provisions of title 11 of the act.

Historical Note

Sec. filed May 20, 1980; for effective date see § 664.9.

664.9 Effective date. This Part shall take effect within the boundaries of a particular local government upon the filing of a final freshwater wetlands map, promulgated pursuant to section 24-0301(5) of the act, in the office of the clerk of that local government.

Historical Note

Sec. filed May 20, 1980, to be effective as indicated therein.

APPENDIX F - NEW YORK STATE BREEDING BIRD ATLAS - BREEDING SPECIES OF CALVERTON NAVY BASE AND VICINITY

New York State Breeding Bird Atlas represents a cumulative effort from 1980-1985. These data are the result of on-site block by block surveys conducted by numerous individuals. The appropriate blocks were then selected to form a unit for which we can provide a listing of Confirmed, Probable, and Possible breeding birds. The intensity level and effort in data collecting varies throughout the State. Some blocks have been more thoroughly searched than others. For these reasons, we cannot provide a definitive statement concerning the absence of a breeding record for a species not listed in the unit. We can only provide a listing of species known to be breeding or suspected of breeding within this unit.

The highest level of confirmation of breeding recorded during the Atlas period was retained in this list. The list is grouped by breeding level with Confirmed breeders listed first followed by Probable and Possible breeders.

Definitions of the New York State legal status and the New York Natural Heritage Program (NYNHP) State ranking are provided in the "Threatened and Endangered Species Section of this report. The NYNHP rank reflects "believed" rarity within the State. It does not confer any legal protection to the species and is meant only as a "working" list, subject to change as more current data becomes available.

Questions concerning Breeding Bird Atlas data may be addressed to:

Significant Habitat Information Services
New York State Department of Environmental Conservation
Wildlife Resources Center
Delmar, NY 12054-9767

Copies of the published book, "The Atlas of Breeding Birds in New York State", by Andrle, Robert F. and Janet R. Carroll, are available from the Cornell University Press, Ithaca, NY 14850. Call toll free 1-800-666-2211. Fee charged.

NEW YORK STATE BREEDING BIRD ATLAS
BREEDING SPECIES OF : CALVERTON NAVY BASE & VICINITY
1980-1985 DATA - ALPHABETICAL BY COMMON NAME

COMMON NAME	SCIENTIFIC NAME	NEW YORK LEGAL STATUS	NATURAL HERITAGE PROGRAM STATE RANK
CONFIRMED BREEDERS			
Acadian Flycatcher	Empidonax virescens	Protected	S3
American Crow	Corvus brachyrhynchos	Game Species	S5
American Goldfinch	Carduelis tristis	Protected	S5
American Kestrel	Falco sparverius	Protected	S5
American Redstart	Setophaga ruticilla	Protected	S5
American Robin	Turdus migratorius	Protected	S5
American Woodcock	Scolopax minor	Game Species	S5
Bank Swallow	Riparia riparia	Protected	S5
Barn Swallow	Hirundo rustica	Protected	S5
Belted Kingfisher	Ceryle alcyon	Protected	S5
Black-and-white Warbler	Mniotilta varia	Protected	S5
Black-billed Cuckoo	Coccyzus erythropthalmus	Protected	S5
Black-capped Chickadee	Parus atricapillus	Protected	S5
Blue Jay	Cyanocitta cristata	Protected	S5
Blue-gray Gnatcatcher	Polioptila caerulea	Protected	S5
Blue-winged Warbler	Vermivora pinus	Protected	S5
Broad-winged Hawk	Buteo platypterus	Protected	S5
Brown Creeper	Certhia americana	Protected	S5
Brown Thrasher	Toxostoma rufum	Protected	S5
Brown-headed Cowbird	Molothrus ater	Protected	S5
Canada Goose	Branta canadensis	Game Species	S5
Carolina Wren	Thryothorus ludovicianus	Protected	S5
Cedar Waxwing	Bombycilla cedrorum	Protected	S5
Chestnut-sided Warbler	Dendroica pensylvanica	Protected	S5
Chimney Swift	Chaetura pelagica	Protected	S5
Chipping Sparrow	Spizella passerina	Protected	S5
Common Grackle	Quiscalus quiscula	Protected	S5
Common Yellowthroat	Geothlypis trichas	Protected	S5
Downy Woodpecker	Picoides pubescens	Protected	S5
Eastern Bluebird	Sialia sialis	Protected-Special Concern	S5

NEW YORK STATE BREEDING BIRD ATLAS
BREEDING SPECIES OF : CALVERTON NAVY BASE & VICINITY
1980-1985 DATA - ALPHABETICAL BY COMMON NAME

COMMON NAME	SCIENTIFIC NAME	NEW YORK LEGAL STATUS	NATURAL HERITAGE PROGRAM STATE RANK
Eastern Kingbird	Tyrannus tyrannus	Protected	S5
Eastern Meadowlark	Sturnella magna	Protected	S5
Eastern Phoebe	Sayornis phoebe	Protected	S5
Eastern Screech-Owl	Otus asio	Protected	S5
Eastern Wood-Pewee	Contopus virens	Protected	S5
European Starling	Sturnus vulgaris	Unprotected	SE
Field Sparrow	Spizella pusilla	Protected	S5
Fish Crow	Corvus ossifragus	Protected	S4
Grasshopper Sparrow	Ammodramus savannarum	Protected-Special Concern	S4
Gray Catbird	Dumetella carolinensis	Protected	S5
Great Crested Flycatcher	Myiarchus crinitus	Protected	S5
Great Horned Owl	Bubo virginianus	Protected	S5
Green-backed Heron	Butorides striatus	Protected	S5
Green-winged Teal	Anas crecca	Game Species	S3
Hairy Woodpecker	Picoides villosus	Protected	S5
Hermit Thrush	Catharus guttatus	Protected	S5
Horned Lark	Eremophila alpestris	Protected	S5
House Finch	Carpodacus mexicanus	Protected	SE
House Sparrow	Passer domesticus	Unprotected	SE
House Wren	Troglodytes aedon	Protected	S5
Indigo Bunting	Passerina cyanea	Protected	S5
Killdeer	Charadrius vociferus	Protected	S5
Least Tern	Sterna antillarum	Endangered	S3
Mallard	Anas platyrhynchos	Game Species	S5
Mourning Dove	Zenaida macroura	Protected	S5
Mute Swan	Cygnus olor	Protected	SE
Northern Bobwhite	Colinus virginianus	Game Species	S4
Northern Cardinal	Cardinalis cardinalis	Protected	S5
Northern Flicker	Colaptes auratus	Protected	S5
Northern Harrier	Circus cyaneus	Threatened	S4
Northern Mockingbird	Mimus polyglottos	Protected	S5
Northern Oriole	Icterus galbula	Protected	S5
Northern Rough-winged Swallow	Stelgidopteryx serripennis	Protected	S5

NEW YORK STATE BREEDING BIRD ATLAS
BREEDING SPECIES OF : CALVERTON NAVY BASE & VICINITY
1980-1985 DATA - ALPHABETICAL BY COMMON NAME

COMMON NAME	SCIENTIFIC NAME	NEW YORK LEGAL STATUS	NATURAL HERITAGE PROGRAM STATE RANK
Orchard Oriole	Icterus spurius	Protected	S4
Osprey	Pandion haliaetus	Threatened	S4
Ovenbird	Seiurus aurocapillus	Protected	S5
Pine Warbler	Dendroica pinus	Protected	S5
Prairie Warbler	Dendroica discolor	Protected	S5
Purple Martin	Progne subis	Protected	S5
Red Crossbill	Loxia curvirostra	Protected	S3
Red-bellied Woodpecker	Melanerpes carolinus	Protected	S5
Red-breasted Nuthatch	Sitta canadensis	Protected	S5
Red-eyed Vireo	Vireo olivaceus	Protected	S5
Red-tailed Hawk	Buteo jamaicensis	Protected	S5
Red-winged Blackbird	Agelaius phoeniceus	Protected	S5
Ring-necked Pheasant	Phasianus colchicus	Game Species	SE
Rock Dove	Columba livia	Unprotected	SE
Rose-breasted Grosbeak	Pheucticus ludovicianus	Protected	S5
Ruby-throated Hummingbird	Archilochus colubris	Protected	S5
Ruffed Grouse	Bonasa umbellus	Game Species	S5
Rufous-sided Towhee	Pipilo erythrophthalmus	Protected	S5
Scarlet Tanager	Piranga olivacea	Protected	S5
Song Sparrow	Melospiza melodia	Protected	S5
Spotted Sandpiper	Actitis macularia	Protected	S5
Swamp Sparrow	Melospiza georgiana	Protected	S5
Tree Swallow	Tachycineta bicolor	Protected	S5
Tufted Titmouse	Parus bicolor	Protected	S5
Veery	Catharus fuscescens	Protected	S5
Vesper Sparrow	Pooecetes gramineus	Protected-Special Concern	S5
Whip-poor-will	Caprimulgus vociferus	Protected	S4
White-breasted Nuthatch	Sitta carolinensis	Protected	S5
White-eyed Vireo	Vireo griseus	Protected	S4
Wood Duck	Aix sponsa	Game Species	S5
Wood Thrush	Hylocichla mustelina	Protected	S5
Yellow Warbler	Dendroica petechia	Protected	S5
Yellow-billed Cuckoo	Coccyzus americanus	Protected	S5

NEW YORK STATE BREEDING BIRD ATLAS
BREEDING SPECIES OF : CALVERTON NAVY BASE & VICINITY
1980-1985 DATA - ALPHABETICAL BY COMMON NAME

COMMON NAME	SCIENTIFIC NAME	NEW YORK LEGAL STATUS	NATURAL HERITAGE PROGRAM STATE RANK
Yellow-breasted Chat	Icteria virens	Protected	S3
PROBABLE BREEDERS			
American Black Duck	Anas rubripes	Game Species	S4
Black-throated Blue Warbler	Dendroica caerulescens	Protected	S5
Chuck-will's-widow	Caprimulgus carolinensis	Protected	S2
Clapper Rail	Rallus longirostris	Protected	S3
Common Moorhen	Gallinula chloropus	Game Species	S4
Common Nighthawk	Chordeiles minor	Protected-Special Concern	S4
Least Bittern	Ixobrychus exilis	Protected-Special Concern	S3
Marsh Wren	Cistothorus palustris	Protected	S5
Northern Parula	Parula americana	Protected	S3S4
Piping Plover	Charadrius melodus	Endangered	S2
Red-headed Woodpecker	Melanerpes erythrocephalus	Protected	S4
Savannah Sparrow	Passerculus sandwichensis	Protected	S5
Sharp-tailed Sparrow	Ammodramus caudacutus	Protected	S3
Virginia Rail	Rallus limicola	Game Species	S5
Yellow-throated Vireo	Vireo flavifrons	Protected	S5
POSSIBLE BREEDERS			
American Bittern	Botaurus lentiginosus	Protected	S4
Black-crowned Night-Heron	Nycticorax nycticorax	Protected	S3
Black-throated Green Warbler	Dendroica virens	Protected	S5
Blue-winged Teal	Anas discors	Game Species	S5
Common Barn-Owl	Tyto alba	Protected-Special Concern	S3
Kentucky Warbler	Oporornis formosus	Protected	S3
Least Flycatcher	Empidonax minimus	Protected	S5
Pied-billed Grebe	Podilymbus podiceps	Protected	S3
Purple Finch	Carpodacus purpureus	Protected	S5
Red-shouldered Hawk	Buteo lineatus	Threatened	S4
Sharp-shinned Hawk	Accipiter striatus	Protected	S4

NEW YORK STATE BREEDING BIRD ATLAS
BREEDING SPECIES OF : CALVERTON NAVY BASE & VICINITY
1980-1985 DATA - ALPHABETICAL BY COMMON NAME

COMMON NAME	SCIENTIFIC NAME	NEW YORK LEGAL STATUS	NATURAL HERITAGE PROGRAM STATE RANK
Snowy Egret	Egretta thula	Protected	S3
Summer Tanager	Piranga rubra	Protected	SR
Warbling Vireo	Vireo gilvus	Protected	S5
Worm-eating Warbler	Helmitheros vermivorus	Protected	S4

APPENDIX G - THREATENED, ENDANGERED, RARE, AND SPECIAL CONCERN

PLANT AND ANIMAL SPECIES ACCOUNT SHEETS

CONFIDENTIAL DOCUMENT

NOT FOR PUBLIC DISTRIBUTION

The authors have made this information available to the U. S. Fish and Wildlife Service in order to provide recommendations concerning land use and resource management activities. Specific locations of various rare and endangered species are presented and the disclosure of this information could further endanger their continued existence.

FROM

RARE PLANTS AND ANIMALS OF THE NWIRP, CALVERTON, LONG ISLAND, NEW YORK

Report to the United States Fish and Wildlife Service

December 1987

Kathryn J. Schneider, Program Coordinator/Zoologist
Steven E. Clemants, Botanist
Robert E. Zaremba, Long Island Botanist

New York Natural Heritage Program
Division of Fish and Wildlife
Department of Environmental Conservation
Wildlife Resources Center
Delmar, New York 12054

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Agalinis virgata Raf. Pine-barrens Gerardia

SYNONYM: Gerardia purpurea var. racemulosa (Pennell) Gleason; Gerardia racemulosa Pennell

FAMILY: Scrophulariaceae (Figwort Family)

STATUS:

New York Natural Heritage Program: G3G4 S2
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, annual herbs, 1-12 dm tall; leaves opposite, narrowly linear to almost filiform, 0.5-1 mm wide, curling on drying, exposing axillary fasciciles; racemes with 8-26 flowers; calyx tube 2/3 to 4/5 the length of the capsule, calyx lobes 5, triangular, 0.9-2 mm long; corolla sympetalous, slightly irregular, the campanulate tube often bulged beneath, 2-3.8 cm long, rose-purple; stamens 4, filaments hairy, the lower 8-9 mm long; style 1.3-1.5 cm long; stigma 2 mm long; fruit a capsule 4.5-5 mm long; seeds 0.9-1.2 mm long.

HABITAT AND ECOLOGY: Pine barrens, woods, coastal plain pond shores, swamps, and bogs. Grows in damp to dryish sandy and peaty substrates.

DISTRIBUTION:

Total: Coastal plain from New York (Long Island) to South Carolina.

New York: Long Island from Nassau and Suffolk Counties.

NWIRP Historical Records:

1. Northwest of Sandy Pond 1929

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Arthusa bulbosa L. Swamp Pink

FAMILY: Orchidaceae (Orchid Family)

STATUS:

New York Natural Heritage Program: G4 S2
Federal: not listed
New York State Museum: not listed

DESCRIPTION: A small (6-40 cm) scapose, perennial orchid, arising from a bulb-like tuber; leaf solitary, lanceolate, developing after the flower fades; flower solitary (rarely two) magenta; lateral sepals erect, middle sepal and side petals forming a hood over the lip; lip oblong, pale pink, streaked with magenta-crimson and with distinctive "hairs"; column elongate, flattened with lateral wings, erose at the apex with two pairs of soft yellow-green pollinia; fruit an ellipsoid, erect capsule, 2.5 x 1.5 cm.

HABITAT AND ECOLOGY: Wet sphagnous bogs, coastal raised bogs, pond shores, and wet meadows. This species prefers highly minerotrophic habitats.

DISTRIBUTION:

Total: Newfoundland to Ontario south to Wisconsin (Louisiana) and Maryland (South Carolina).

New York: Widely scattered locations throughout the state.

NWIRP Historical Records:

1.	Jones Pond	1923
2.	Sandy Pond	1923
3.	Manorville	1872

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

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Aster concolor L. Silvery Aster

FAMILY: Asteraceae (Aster family)

STATUS:

New York Natural Heritage Program: G4? S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial herb from a short caudex or crown often with creeping rhizomes, stems usually minutely pubescent; leaves alternate, lanceolate or oblong to broadly elliptic, up to 5 cm long and 1.5 cm broad, the lower soon deciduous, the others sessile and broad based but not strongly clasping; inflorescence narrowly racemiform or occasionally with racemiform branches; involucre 5-9 mm, pubescent, with several series of firm green-tipped, tightly apppressed phyllaries; flowers in a daisy-like head; rays 8-16, blue or sometimes pink, 7-12 mm long; disk flowers yellow; achenes densely pubescent, obscuring the nerves, pappus a single series of long capillary bristles.

HABITAT AND ECOLOGY: Dry sandy open woods, pine barrens, and open sand.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to Florida and west to Louisiana, inland north to Kentucky.

New York: Southeastern New York from Richmond to Suffolk Counties.

NWIRP Historical Records:

1. Manorville 1920
2. Calverton 1873

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field survey.

585

Botrichium oneidense (Gilb.) House — Blunt-lobed Grape Fern

SYNONYM: Botrychium multifidum var. oneidense (Gilb.) Farw.

FAMILY: Ophioglossaceae (Adder's-tongue Family)

STATUS:

New York Natural Heritage Program: G3G5Q S1S3
Federal: not listed
New York State Museum: not listed

DESCRIPTION: Low, evergreen fern, leaf blade remaining bright green throughout the winter, triangular, 5-10 cm long and 6-12 cm broad, ternately pinnate; pinnae broadly oblong, divided into a few roundish close-set segments, toward tip notched at short intervals, the tip being a segment little longer than broad, margins irregularly toothed, blade stalk 5-10 cm long; stipe ca. 2-4 cm tall, fertile segment ca. 4 times as long as blade.

HABITAT AND ECOLOGY: Moist woods, especially in floodplain of small streams.

DISTRIBUTION:

Total: New Brunswick to Ontario and Minnesota south to Indiana and North Carolina.

New York: Widely scattered throughout the state.

NWIRP Historical Records:

1. Manorville 1930

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Carex bullata Schkuhr ex Willd. **Button sedge**

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G5 S1
Federal: not listed
New York State Museum: not listed

DESCRIPTION: Erect, perennial sedge, caespitose with few to many creeping rhizomes and stolons, stems 4-8 dm tall; main leaves firm, 2-4 dm long, 2-4 mm broad, sheaths becoming fibrilose; flowers unisexual, each in axil of a scale, in spikes, without a perianth; staminate spikes 1-3 on a long peduncle much surpassing the upper pistillate spike; pistillate spikes 1-2, well separated, cylindric, 1.5-4 cm long, 1.5-2 cm wide, erect, sessile or short peduncle; perigynia numerous, ascending to slightly spreading, turgid, firm, broadly ovoid, 6-9 mm long, 2.5-3 mm broad, abruptly contracted to a stout, straight, rough-margined beak with 2 slender teeth; scales lanceolate, acute to acuminate, much smaller than the perigynia.

HABITAT AND ECOLOGY: Swamps, bogs and meadows. Growing in wet or occasionally dry, acidic, sandy soil.

DISTRIBUTION:

Total: Nova Scotia to New York south to Tennessee and Georgia.

New York: Southeastern New York from Rockland to Suffolk Counties.

NWIRP Historical Records:

1. Calverton (wet ground) 1927

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

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Carex hormathodes Fern. Sedge

SYNONYM: Carex straminea var. invisa Boott

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G3G5 SH
Federal: not listed
New York State Museum: Rare

DESCRIPTION: Erect to spreading, perennial sedge, caespitose, stems 1.5-10 dm tall; main leaves smooth except at the tip, 1-2.5 mm wide; flowers unisexual, each in the axil of a scale, in spikes, without a perianth; spikes 4-8, brown to stramineaous, well separated on the inflorescence, 3-6 cm long, pistillate part of spike rhomboid ellipsoid, 7-10 mm long, tapering to summit and base; pistillate scales lance-attenuate to aristate-tipped; perigynia flat, lanceolate ovate, 4.2-5.5 mm long, distinctly nerved on the inner face.

HABITAT AND ECOLOGY: Brackish marshes, fresh marshes, bogs, swamps, pond margins, and openings. Growing in sandy, peaty, and rocky substrates.

DISTRIBUTION:

Total: Predominantly near the coast from Newfoundland south to Virginia, inland along the St. Lawrence to Quebec, also in Indiana.

New York: Southeastern New York from Bronx to Suffolk Counties.

NWIRP Historical Records:

1. Calverton (moist woods) 1927
2. Manorville 1928

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Coreopsis rosea Nutt. Rose Coreopsis

FAMILY: Asteraceae (Aster Family)

STATUS:

New York Natural Heritage Program: G3 S3
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Rhizomatous, perennial herb, 2-6 dm tall; leaves opposite, linear, 2-5 cm long, entire; flowers in a composite head, ray flowers pink or sometimes white, disk flowers yellow; achenes wingless, pappus absent.

HABITAT AND ECOLOGY: Coastal plain pond shores, margins, standing water, and in wet depressions. Growing in damp sand, gravel, or peat.

DISTRIBUTION:

Total: Coastal plain from Nova Scotia and eastern Massachusetts to eastern Maryland.

New York: Verified from Suffolk County only, reported also from Nassau County.

NWIRP Historical Records:

1.	Manorville	1929			

NWIRP Recent Records:

1.	Third Pond Calverton	1985	Wading River	30	A
2.	Sandpit Ponds	1985	Wading River	21	B

NWIRP Field Survey:

1.	Grumman Navy Base Site	1987	Wading River	252	BC
2.	Forest Pond	1986	Wading River	88	C

THREATS TO LOCAL POPULATIONS: In some sites the plants are trampled by people and ORV users.

MANAGEMENT CONSIDERATIONS: Minimize disturbance from trampling and ORV use.

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Desmodium glabellum (Michx.) DC Tall Tick-clover

SYNONYM: Desmodium dillenii of some authors, not Darl.

FAMILY: Fabaceae (Bean Family)

STATUS:

New York Natural Heritage Program: G5 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Spreading to erect perennial herbs, stems spreading pilose to 1.5 m or more tall; stipules not persistent, 2-4 mm long; leaves pinnately tri-foliate; leaflets with rather prominent reticulate venation; appressed pilose above, paler and pilose beneath, terminal leaflet narrowly to broadly ovate to elliptic or rhombic, slightly emarginate; inflorescence a panicle or raceme; flowers pea-like, white to purple; fruit a distinctive legume, indehiscent, transversely segments and eventually separating into one seeded joints (articles), articles triangular to rhombic in outline, pubescent throughout, 6-8 mm long, 3-5 mm wide.

HABITAT AND ECOLOGY: Sandy woods and roadsides. Grows in dry, sandy substrates.

DISTRIBUTION:

Total: Massachusetts to Illinois south to Texas and South Carolina.

New York: Predominantly southeastern New York from Ulster to Suffolk Counties, scattered localities elsewhere in the state especially in western parts.

NWIRP Historical Records:

1. Manorville 1877

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Desmodium laevigatum (Nutt.) DC. Smooth Tick-clover

FAMILY: Fabaceae (Bean Family)

STATUS:

New York Natural Heritage Program: G5 SH
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial herbs, stems glabrous, to 2 m tall; stiples very early deciduous; leaves pinnately 3-foliate; leaflets glabrous to scarcely pubescent above and beneath, terminal leaflet ovate, acute to acuminate, rounded to acute at the base; inflorescence a raceme or scarcely branched panicle; flowers pea-like, white to purple; fruit a distinctive legume, indehiscent, transversely segmented and vertically separating into one-seeded joints (articles), articles half-rhombic to almost rhombic in outline and 5-7 mm long, 3.5-4 mm wide.

HABITAT AND ECOLOGY: Dry, sandy woods and clearings.

DISTRIBUTION:

Total: New York to Missouri south to Texas and Florida.

New York: Southeastern New York from Westchester to Suffolk Counties and Albany County.

NWIRP Historical Records:

1. Manorville 1873

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

58

Eleocharis equisetoides (Ell.) Torr. Knotted Spikerush

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G4 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial, rush-like herb, stems 0.5-1 m tall, septate; leaves basal; spikelets 2-4 cm long, cylindric, hardly thicker than the stem; scales oval, obtuse to broadly rounded, firm; achenes biconvex, obovoid, with transverse linear-rectangular reticulations and a conical beaked sessile tubercle; bristles shorter than the achene or wanting.

HABITAT AND ECOLOGY: Aquatic. Grows in shallow water to 18 inches deep.

DISTRIBUTION:

Total: Eastern United States from Massachusetts to Wisconsin south to Missouri, Texas, and Florida.

New York: Long Island and scattered localities in central New York.

NWIRP Historical Records:

1. Grass Pond (Grassy Pond?) 1938

NWIRP Recent Records:

1.	Sandy Pond West	1984	Wading River	23	A
2.	Twin Pond East	1985	Wading River	34	B

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: Herbicide leaching into ponds.

MANAGEMENT CONSIDERATIONS: No active management needed but protect from leaching of herbicides.

Eleocharis tricostata Torr. Three-ribbed Spikerush

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G3G4 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial, rush-like herbs, from a stout rhizome, stems 2-6 dm tall, compressed or subterete; leaves basal; spikelets 0.7-2 cm long, ellipsoid to cylindric; scales ovate to oblong, obtuse to rounded; achenes trigonous-obovoid with minutely roughened-reticulate sides and prominent keel-like angles, tubercle minute, depressed conical, acute; bristles absent.

HABITAT AND ECOLOGY: Coastal plain pond shores. Grows in sandy or peaty soil.

DISTRIBUTION:

Total: Coastal plain from Massachusetts south to Florida.

New York: Southeastern New York, known from Suffolk County and reported from Westchester County.

NWIRP Historical Records:

1. Grass Pond, NW of Manorville 1919
   (Grassy Pond)

NWIRP Recent Records: None

NWIRP Field Survey: Not found during field surveys.

585

Hypericum denticulatum Walt. Coppery St. Johns-wort

FAMILY: Clusiaceae (Mangosteen Family)

STATUS:

New York Natural Heritage Program: G5 S1
Federal: not listed
New York State Museum: Endangered

DESCRIPTION: Perennial herb, 2-5 dm tall, stems sharply 4-angled; leaves opposite, larger leaves ellipsoid to broadly ovate, oval or oboval, 0.8-2.5 cm long, base rounded to sessile, apex blunt to subacute; inflorescence a compound cyme; flowers coppery-yellow, sepals 5, herbaceous, petals 5, 4-5 mm long, persistent; stamens many; fruit a 1-locular capsule, embraced by the sepals, styles 3, persistent, distinct.

HABITAT AND ECOLOGY: Shores, swamps, ditches or pine barrens. Grows in sandy or argillaceous soils.

DISTRIBUTION:

Total: Coastal plain from New York (Long Island) to South Carolina, and inland in Tennessee.

New York: This is the only known site for this species in New York.

NWIRP Historical Records: None.

NWIRP Recent Records: None.

NWIRP Field Survey:

1. Third Pond Calverton 1987 Wading River 30 AB

THREATS TO LOCAL POPULATIONS: Off the road vehicles crush the plants during dry years.

MANAGEMENT CONSIDERATIONS: This species may not be seen in high water years. ORV's need to be eliminated from the area.

58

Lachnanthes caroliniana (Lam.) Dandy — Carolina Redroot

SYNONYM: Lachnanthes tinctoria (Lam.) Ell.

FAMILY: Haemodoraceae (Bloodroot Family)

STATUS:

New York Natural Heritage: G4 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial herbs, stems stout, 3-8 dm tall; leaves equitant, linear, 3-10 mm wide, the lower to 4 dm long; inflorescence dense, flat or rounded racemes, densely wooly; flowers with 6 tepals, 3 stamens, and one ovary; tepals 10-12 mm long, dingy yellow, densely tomentose, the outer tepals lanceolate-subulate, shorter than the linear oblong inner tepals; ovary wholly interior; capsule subglobose; seeds reddish-brown.

HABITAT AND ECOLOGY: Pond margins, bogs, and wet woods. Growing in wet sandy or peaty substrates.

DISTRIBUTION:

Total: Coastal plain from Nova Scotia to Florida and west to Louisiana.

New York: Restricted to Suffolk County.

NWIRP Historical Records:

1.	Manorville	1925
2.	Sandy Pond, Manorville	1962
3.	Forest Lake, Riverhead (Forest Pond)	1941

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

585

Lechea tenuifolia Michx. Slender Pinweed

FAMILY: Cistaceae (Rockrose Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Mat forming, perennial herb, stems 1-3 dm tall with appressed or ascending pubescence; leaves of basal shoots alternate, narrowly lanceolate or oblanceolate to linear, 4-6 mm long and less than 1 mm broad, cauline leaves linear to linear-subulate, 1-2 cm long, 1-1.5 m broad; flowers reddish, sepals 5, inner sepals concave with a conspicuous midvein but not keeled, hairy over most or all the surface, outer sepals linear, equal to or usually distinctly exceeding the inner; petals 3; fruit a broadly ovoid to subglobose capsule, usually slightly shorter than and enclosed by the calyx.

HABITAT AND ECOLOGY: Open woods, pine barrens, slopes, and fields. Grows in sandy or rocky soil.

DISTRIBUTION:

Total: Eastern United States from Maine to Minnesota south to Texas and South Carolina.

New York: Southeastern New York from Westchester to Suffolk Counties.

NWIRP Historical Records: None.

NWIRP Recent Records: None.

NWIRP Field Survey:

1. Grumman Navy Base Site 1986 Wading River 298 C

THREATS TO LOCAL POPULATIONS: Needs open areas. Succession resulting from fire suppression is a threat.

MANAGEMENT CONSIDERATIONS: Keep area open by mowing or controlled burns. This species need some disturbance.

58

Listera australis Lindl. Southern Twayblade

FAMILY: Orchidaceae (Orchid Family)

STATUS:

New York Natural Heritage Program: G4 S1S3
Federal: not listed
New York State Museum: not listed

DESCRIPTION: Erect, perennial orchid, stems frail, up to 20 cm tall; leaves 2, opposite at about mid stem, ovate, sessile, to 3.5 cm long and 2 cm wide; flowers in loose terminal racemes, greenish-purple; lateral sepals ovate, oblique, 1.5 x 1 mm, dorsal sepal ovate, obtuse, concave, petals oblong, obtuse, recurved; lip linear, distal-half split into two filamentous lobes, base extended into two obtuse, linear lobes, one to either side of the column, 9 x 1.5 mm; column less than 1 x 1 mm, anther dorsal, scarious with 2 soft yellow pollinia; fruit an ovoid, horizontal capsule, 8 x 5 mm.

HABITAT AND ECOLOGY: Bogs, swamps, and rich woods. Grows in sphagnum and rich humus.

DISTRIBUTION:

Total: Quebec to Ontario south to Texas and Florida.

New York: Scattered throughout upstate New York with only one collection fron Long Island (this site).

NWIRP Historical Records:

1. Manorville 1931

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Lobelia nuttallii R. & S. — Nuttall's Lobelia

FAMILY: Campanulaceae (Bluebell Family)

STATUS:

New York Natural Heritage Program: G4G5 S3
Federal: not listed
New York State Museum: Rare

DESCRIPTION: Slender, erect herb, 2-7.5 dm tall; lower leaves up to 4 cm long, ovate to oblanceolate, middle and upper leaves linear; pedicels bracteolate at base; flowers blue, 1 cm long, hypanthium short, becoming hemispherical in fruit; sepals 5, lance-linear; corola blue with a white center and two greenish spots, slit to the base on the upper side with the anthers protruding, 2-lipped; fruit a capsule.

HABITAT AND ECOLOGY: Coastal plain pond margins, salt meadows, swamps, wet meadows and roadsides. Grows in damp or dry sand or argillaceous soil.

DISTRIBUTION:

Total: Eastern United States from New York to Kentucky south to Alabama and Florida.

New York: Restricted to Long Island, from Queens to Suffolk County.

NWIRP Historical Records: None.

NWIRP Recent Records:

1.	Sandy Pond West	1985	Wading River	23	C

NWIRP Field Survey:

1.	Third Pond Calverton	1987	Wading River	30	B
2.	Grumman Navy Base Site	1987	Wading River	2	BC
3.	Grumman Navy Base Site	1987	Wading River	252	BC
4.	Grumman Navy Base Site	1987	Wading River	250	C

THREATS TO LOCAL POPULATIONS: ORV use is a problem at some sites.

MANAGEMENTS CONSIDERATIONS: Exclude ORV's from pond margins.

Ludwigia sphaerocarpa Ell. Ludwigia

SYNONYM: includes Ludwigia sphaerocarpa var. macrocarpa Fern & Grisc.

FAMILY: Onagraceae (Evening Primrose Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial herb, 0.3-1 m or more tall; leaves alternate, lanceolate to linear, the larger leaves 5-10 cm long; bracteoles attached near the base of the hypanthium or below it; flowers subsessile, hypanthium cylindric to obconic, sepals 4, deltoid, about equaling the fruit; petals none; fruit subglobose, finely pubescent, 2.5-4 mm long, not angled.

HABITAT AND ECOLOGY: Ponds, swamps, and coastal plain pond shores. In shallow to deep water and sandy or peaty pond margins.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to Florida and Louisiana.

New York: Southeastern New York from Ulster and Westchester to Suffolk Counties.

NWIRP Historical Records:

1. Ponds near Manorville 1928

NWIRP Recent Records:

1.	Linus Pond	1985	Wading River	20	A
2.	Sandy Pond West	1984	Wading River	23	C
3.	Grassy Pond	1985	Wading River	26	C

NWIRP Field Survey:

1.	Jones Pond	1987	Wading River	32	AB

THREATS TO LOCAL POPULATIONS: ORV use around pond shore margins.

MANAGEMENTS CONSIDERATIONS: Exclude ORV's from pond margins.

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Proserpinaca pectinata Lam. Comb-leaved Mermaid-weed

FAMILY: Haloragaceae (Water Milfoil Family)

STATUS:

New York Natural Heritage Program: G5 S2
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Low, repent, perennial herb, 0.5-3 dm tall; emersed leaves alternate, ovate-oblong, 1.5-3 cm long, all pinnatifid, the rachis scarcely wider than the 6-12 pairs of lateral segments; flowers usually solitary, sessile in the axils of emersed leaves, 3-merous; calyx lobes acuminate, petals none, stamens 3; fruit bony, nut-like, urceolate, with rounded or obtuse angles, 2.5-4 mm wide, 3 seeded.

HABITAT AND ECOLOGY: Acid ponds, bogs, swamps, and depressions. Grows in shallow water, pools, or occasionally stranded on pond margins, in sandy, muddy, or peaty substrates.

DISTRIBUTION:

Total: Chiefly coastal plain from Nova Scotia to Florida and Texas, inland to Tennessee.

New York: Southeastern New York from Orange and Suffolk Counties. Also unconfirmed reports from Ontario and Albany Counties.

NWIRP Historical Records:

1. Manorville	before 1915	

NWIRP Recent Records:

1. Sandpit Ponds	1984	Wading River	21	BC
2. Third Pond Calverton	1985	Wading River	30	A

NWIRP Field Survey:

1. Forest Pond	1985	Wading River	88	C

THREATS TO LOCAL POPULATIONS: ORV use is detrimental to plant population.

MANAGEMENTS CONSIDERATIONS: Proper management would eliminate disturbance, including ORV use.

58

Psilocarya nitens (Vahl) Wood — Short-beaked Bald-rush

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G3 S2
Federal: Not listed
New York State Museum: Threatened

DESCRIPTION: Erect, caespitose, annual, rush-like herb, 0.2-7 dm tall; leaves flat; spikelets many-flowered, ovoid terete; scales numerous, all alike and regularly imbricate, ovate, acute; perianth none; stamens 2; achenes with strong transverse ribs, not margined, scarcely stipitate; tubercle depressed, broader than high.

HABITAT AND ECOLOGY: Coastal plain ponds. Growing on wet sandy margins, peat, and in shallow water.

DISTRIBUTION:

Total: Chiefly coastal plain from Massachusetts to Florida and Texas, inland in northeastern Indiana.

New York: Restricted to Suffolk County.

NWIRP Historical Records: None.

NWIRP Recent Records:

1.	Third Pond Calverton	1985	Wading River	30	B
2.	Linus Pond	1985	Wading River	20	C

NWIRP Field Survey:

1.	Sandy Pond West	1986	Wading River	292	A
2.	Forest Pond	1986	Wading River	88	CD

THREATS TO LOCAL POPULATIONS: ORV use.

MANAGEMENTS CONSIDERATIONS: This species will be seen only during very dry years. These conditions favor ORV use in the area which is detrimental to the plant population.

585

Psilocarya scirpoides Torr. Long-beaked Bald-rush

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G3G5 S3
Federal: not listed
New York State Museum: Endangered

DESCRIPTION: Erect, caespitose, annual, rush-like herb, 1-6 dm tall; leaves flat; spikelets many-flowered, ovoid to subcylindric; scales numerous, all alike and regularly imbricate, ovate, acute; perianth none; stamens 2; achenes finely roughened, narrowly pale-margined, narrowed to a short broad stipe, tubercle long and sword-shaped, flat, nearly or quite as long as the body.

HABITAT AND ECOLOGY: Swamps, marshes, and coastal plain ponds. Growing on sandy or peaty shores and in shallow water.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to North Carolina, and inland from southern Michigan to northern Indiana.

New York: Restricted to Suffolk County.

NWIRP Historical Records: None.

NWIRP Recent Records:

1.	Linus Pond	1985	Wading River	20	C

NWIRP Field Survey:

1.	Sandy Pond West	1986	Wading River	292	A
2.	Jones Pond	1987	Wading River	32	B

THREATS TO LOCAL POPULATIONS: An aquatic species that is vulnerable to herbicide leaching.

MANAGEMENTS CONSIDERATIONS: Prevent exposure to herbicides.

Rhynchospora inundata (Oakes) Fern. Drowned Horn Rush

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G3G4 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial, rush-like herbs, stoloniferous, stems 4-7 dm tall; main leaves 4-7 mm wide; inflorescence diffusely branched; flowers perfect, or the upper staminate, perianth none, stamens 3; spikelets cymose, subglobose to narrowly ovoid, divergent or reflexed; scales spirally imbricate; achenes flat, obovate, 3.5-4.5 mm long, tubercle 14-19 mm long; bristle 6, about equal, 8-12 mm long.

HABITAT AND ECOLOGY: Coastal plain ponds and swamps. Grows in shallow water and on inundated pond margins in sandy or peaty substrates.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to South Carolina.

New York: Restricted to Suffolk County.

NWIRP Historical Records:

1.	Manorville	1922
2.	Kents Pond	1922
3.	Pond East of Kent Pond	1923

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

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Sagittaria teres S. Wats. Quill-leaf Arrowhead

FAMILY: Alismataceae (Water-plantain Family)

STATUS:

New York Natural Heritage Program: G3 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Erect, perennial, aquatic herb; leaves all basal, erect, 3-20 cm long, all represented by terete, attenuate phyllodia; scapes simple, 9-30 cm tall; flowers in whorls of 1-3, the upper usually staminate, the lower pistillate; bracts ovate, minute; sepals 3, ovate, obtuse, 3-5 mm long; petals 3, white, 1-2 cm long; stamens 12-20, filaments dilated, pubescent; pistils in several series forming a globose head; achenes 2-3 mm long, cuneate ovate, with 1-5 prominent facial wings or ridges at maturity, the beak erect to horizontal, less than 0.5 mm long.

HABITAT AND ECOLOGY: On the margins, shores and in shallow water to 2 feet deep of coastal plain ponds and swamps. Grows predominantly in sandy acidic substrates and occasionally in mud.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to Maryland.

New York: Restricted to Suffolk County.

NWIRP Historical Records:

1. Pond northeast of Kent Pond (Twin Ponds) 1923

NWIRP Recent Records:

1. Sandy Pond West 1985 Wading River 23 AB

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: Can be eaten by grass carp. Also vulnerable to herbicides.

MANAGEMENTS CONSIDERATIONS: Do not introduce grass carp in ponds inhabited by this plant. Prevent contact with herbicides.

Scleria reticularis Michx. var. **reticularis** Reticulated Nutrush

FAMILY: Cyperaceae (Sedge Family)

STATUS:

New York Natural Heritage Program: G4TU S3
Federal: not listed
New York State Museum: not listed

DESCRIPTION: Annual, rush-like herb, 1-6.5 dm tall; leaves 1-4 mm wide; lateral inflorescences subsessile or on very short erect peduncles; pistilate scales lanceolate to ovate, acute or acuminate; perianth none, stamens 1-3; achene subglobose, 1.8-2.2 mm high, glabrous, with a vertical row of regular shallow pits or reticulations.

HABITAT AND ECOLOGY: Coastal plain pond shores, swamps, bogs and depressions. Grows in sandy substrates.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to Maryland, and South Carolina to Florida, inland in northwestern Indiana.

New York: Southeastern New York from Westchester to Suffolk Counties.

NWIRP Historical Records: None.

NWIRP Recent Records:

1. Third Pond Calverton	1985	Wading River	30	A

NWIRP Field Survey:

1. Sandy Pond West	1986	Wading River	292	A

THREATS TO LOCAL POPULATIONS: ORV use on pond shore margins crushes plants.

MANAGEMENTS CONSIDERATIONS: Eliminate ORV use near pond shores.

585

Utricularia biflora Lam. **Two-flowered Bladderwort**

SYNONYM: Utricularia pumila Walt.

FAMILY: Lentibulariaceae (Bladderwort Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State Museum: not listed

DESCRIPTION: Low aquatic herbs, the stems creeping along the bottom, all stems alike; leaves delicate, twice forked, rarely over 5 mm long; flowering branches 5-10 cm long with 1-4 flowers on pedicels to 15 mm long; calyx 2-lipped; corolla 2-lipped, yellow, the lower lip 8-10 mm long with a prominent palate, spur 1/2 to as long as the lower lip; fruit a capsule.

HABITAT AND ECOLOGY: Coastal plain ponds, bogs, swamps, shallow pools, and depressions. Floating or on the margin growing on sandy or muddy substrates.

DISTRIBUTION:

Total: New England to Oklahoma south to New Mexico and Florida.

New York: Restricted to Long Island.

NWIRP Historical Records:

1. Jones Pond 1923

NWIRP Recent Records:

NOTE: Utricularia biflora and Utricularia fibrosa (see next species account) are closely related with confusing taxonomic distinctions. One or the other or both of these species have been reported from the following sites. Until the taxonomic confusion is cleared up we are unable to confirm which species is in which pond.

1.	Twin Pond West	1985	Wading River	33	B
2.	Kents Pond	1985	Wading River	22	B
3.	Sandy Pond West	1985	Wading River	23	B

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: Aquatic plants. No immediate threats except for consumption by grass carp and herbicide leaching.

MANAGEMENTS CONSIDERATIONS: No active management needed.

585

Utricularia fibrosa Walt. Fibrous Bladderwort

FAMILY: Lentibulariaceae (Bladderwort Family)

STATUS:

New York Natural Heritage Program: G4G5 S3
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Low aquatic herb, stems creeping on the bottom in shallow water, radiating from the base of the scape, dimorphic, some with rather crowded, thrice-forked, bladderless leaves up to 15 mm long, the others with small, twice-forked leaves bearing numerous bladders; flowering branches 1.5-4 dm with 2-6 long-pediceled flowers; calyx 2-lipped; corolla 2-lipped, yellow, the lower lip 8-10 mm long with a prominent palate, spur equalling or slightly exceeding the lip; fruit a capsule.

HABITAT AND ECOLOGY: Pine land ponds, bogs, swamps, pools, and shallow streams. Floating in shallow water.

DISTRIBUTION:

Total: Coastal plain from Massachusetts to Florida and Mississippi.

New York: Restricted to Suffolk County.

NWIRP Historical Records:

1.	East shore of Grassy Pond	1919
2.	Jones Pond	1924
3.	Manorville, swamps	1928

NWIRP Recent Records: See *Utricularia biflora* above.

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: See *U. biflora*.

MANAGEMENT CONSIDERATIONS: See *U. biflora*.

Utricularia geminiscapa Benj. **Hiddenfruit Bladderwort**

FAMILY: Lentibulariaceae (Bladderwort Family)

STATUS:

New York Natural Heritage Program: G? S3
Federal: not listed
New York State Museum: not listed

DESCRIPTION: Submersed, free-floating, aquatic herbs; foliage plumes 1-3.5 cm in diameter, leaves circular to oval, thrice dichotomous, 1-2 cm, leaf segments terete or capillary, many are copiously trap bearing; flowering branches 5-15 cm; flowers of two sorts, cleistogamous ones on short pedicels and developing into ovoid capsules borne from leaf axils, petaliferous flowers with 2-lipped calyx, corollas 2-lipped, sypetalous, yellow, the lower corolla lip somewhat surpassing the upper; winter buds 2-5 mm in diameter.

HABITAT AND ECOLOGY: Bogs, lakes, ponds, swamps, pools, and sluggish streams. Grows in muck, peat, or sandy substrates.

DISTRIBUTION:

Total: Newfoundland to Wisconsin south to Virginia.

New York: Scattered localities throughout the state, most often collected in Suffolk County.

NWIRP Historical Records:

1. Kent Pond 1922
2. Grass Pond, Riverhead (Grassy Pond) 1938

NWIRP Recent Records:

1. Twin Pond West 1985 Wading River 33 B

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: Herbicide use.

MANAGEMENT CONSIDERATIONS: Prevent contact with herbicides in water.

Utricularia juncea Vahl — **Rush Bladderwort**

FAMILY: Lentibulariaceae (Bladderwort Family)

STATUS:

New York Natural Heritage Program: G3G5 S1
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Terrestrial, small herbs; leaves small, linear-filiform, subterranean and seldom seen, traps minute, borne along leaf-margins; scapes 1-4 dm tall, 1-12 flowered, flowers not crowded; pedicels mostly overtopped by the bracts; calyx 2-lipped corolla 2-lipped, sympetalous, yellow, 1-1.5 cm high and 0.8-1 cm broad, the lower corolla lip obovate, palate without a spreading margin, spur 5-7 mm long; fruit a capsule.

HABITAT AND ECOLOGY: Ponds, swamps, bogs, and lakes. Grows in wet sand, peat, and muck along the shores.

DISTRIBUTION:

Total: Coastal plain from New York (Long Island) south to Florida and west to the Mississippi.

New York: Restricted to Long Island, except for one report from Ulster County.

NWIRP Historical Records: None.

NWIRP Recent Records:

1.	Linus Pond	1985	Wading River	20	B
2.	Twin Pond East	1985	Wading River	34	BC
3.	Sandy Pond West	1985	Wading River	23	C

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULAITONS: ORV use around pond margins.

MANAGEMENT CONSIDERATIONS: Exclude ORV's from pond shores.

Utricularia radiata Small — Small Floating Bladderwort

SYNONYM: Utricularia inflata var. minor Chapm.

FAMILY: Lentibulariaceae (Bladderwort Family)

STATUS:

New York Natural Heritage Program: G4 S2
Federal: not listed
New York State Museum: Threatened

DESCRIPTION: Free floating, aquatic herbs, stems elongate, submersed; lower leaves alternate, 3 cm long, repeatedly dichotomously divided into filiform segments bearing bladders; upper leaves in whorls of 4-7, rachis 1-4 cm long, inflated and acting as floats, bearing at the tip a series of finely dissected branches; peduncles 3-5 cm long; bracts 2-3 mm long; lower pedicels 1-2 cm long; flowers with 2-lipped calyx; corolla 2-lipped, sympetalous, yellow, upper and lower lips subrotund, lower 8-10 mm long, shallowly 3-lobed, with a prominent small palate; spur smaller than and appressed to the lower lip.

HABITAT AND ECOLOGY: Ponds, swamps, pools, and sluggish waters. Grows floating in the water.

DISTRIBUTION:

Total: Widespread, Nova Scotia to Tennessee south to Florida and Texas, northwestern Indiana, and tropical America.

New York: Restricted to Long Island and reported from Albany County.

NWIRP Historical Records:

1. Vicinity of Manorville 1962

NWIRP Recent Records:

1.	Third Pond Calverton	1984	Wading River	30	A
2.	Sandpit Ponds	1984	Wading River	21	B
3.	Prestons Pond	1984	Wading River	130	A
4.	Forest Pond	1985	Wading River	88	B

NWIRP Field Survey: Not found during field survey.

THREATS TO LOCAL POPULATIONS: Herbicide leaching and grass carp.

MANAGEMENT CONSIDERATIONS: Prevent contact with herbicides and do not introduce grass carp.

Uvularia puberula Michx. Mountain Bellwort

SYNONYM: *Uvularia pudica* var. *nitida* (Britt.) Fern.

FAMILY: Liliaceae (Lily Family)

STATUS:

New York Natural Heritage Program: G3G5 S1
Federal: not listed
New York State Museum: Endangered

DESCRIPTION: Low, perennial herbs, stems 1-4.5 dm tall, rhizomes very short; leaves oval, rounded to the sessile bases, smooth and shiny, margin scabrous; flowers 3-merous; tepals 6, straw yellow, 1.5-3 cm long; anthers acute; styles separate to well below the middle, about equaling or much exceeding the anthers; fruit a 3-angled capsule, sessile.

HABITAT AND ECOLOGY: Pine barrens and oak woods. Grows in moist, sandy soil.

DISTRIBUTION:

Total: New York (Long Island) to New Jersey, Virginia to West Virginia south to Alabama and Georgia.

New York: Restricted to Long Island.

NWIRP Historic Records:

1. Manorville 1928

NWIRP Recent Records: None.

NWIRP Field Survey:

1.	Jones Pond	1987	Wading River	300	AB
2.	Linus Pond	1987	Wading River	20	BC

THREATS TO LOCAL POPULATIONS: No immediate threats.

MANAGEMENT CONSIDERATIONS: No active management needed at this time.

Acris crepitans Northern Circket Frog

FAMILY: Hylidae (Treefrog Family)

STATUS:

New York Natural Heritage Program: G5 S1
Federal: not listed
New York State: Threatened, Protected

DESCRIPTION: A small warty frog (3.5 cm) with an olivaceous back and a dark triangle between the eyes and a longitudinal dark stripe on the back of the thigh. The voice is described as sounding like two pebbles being clicked together.

HABITAT AND ECOLOGY: Prefers shallow, sunny, open ponds or slow-moving streams with vegetation in the water or on the shore. Breeds April to July laying many egg masses of about 6 eggs attached to aquatic vegetation. Tadpoles hatch in about 4 days transforming late July to September. Larvae eat suspended matter, organic debris, algae, and plant tissue. Metamorphosed frogs eat small invertebrates.

DISTRIBUTION:

Total: Southern New York and Long Island to the Florida panhandle west to Texas and sosutheasatern New Mexico, north to South Dakota, Wisconsin and Michigan.

New York: Ulster, Orange, and Suffolk Counties.

NWIRP Historical Records:

1. Swan Pond, Suffolk County 1928

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

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Ambystoma maculatum Spotted Salamander

FAMILY: Ambystomatidae (Mole Salamander Family)

STATUS:

New York Natural Heritage Program: G5 S5
Federal: not listed
New York State: Special Concern, Unprotected

DESCRIPTION: A 15-20 cm long salamander with round yellow or orange spots in irregular rows along each side of the back. Back is black, slate or bluish black, underside, slate gray.

HABITAT AND ECOLOGY: Prefers deciduous woods with ponds, slow streams and vernal ponds that provide breeding habitat. Also found in mixed woods. Migrates several hundred meters to breeding ponds during heavy warm rains, March-April. Lays masses of up to 25 eggs in ponds attached to stems. Larvae hatch mid to late May, usually transform July-October but sometimes overwinter in the pond. Adults wander far from breeding ponds and are primarily fossorial outside the breeding season. Larvae eat small aquatic invertebrates; sometimes amphibian larvae and small fish. Adults eat terrestrial invertebrates including centipedes, earthworms, snails, beetles, orthopterans, isopods and vegetation.

DISTRIBUTION:

Total: Throughout most of the eastern United States and adjacent southern Canada west to Eastern Iowa and Eastern Texas.

New York: Distributed statewide.

NWIRP Historical Records: None.

NWIRP Recent Records: None.

NWIRP Field Survey:

1.	Middle Country Road Ponds	1987	Wading River	2	A

THREATS TO LOCAL POPULATIONS: Very similar to tiger salamanders. (See next species account.) Spotted salamanders usually do not occur in the same ponds as tiger salamanders because *Ambystoma tigrinum* larvae and adults eat the eggs and larve of *A. maculatum*. This site is impacted by a landfil which should be removed.

MANAGEMENT CONSIDERATIONS: See *Ambystoma tigrinum*.

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Ambystoma tigrinum — **Tiger Salamander**

FAMILY: Ambystomatidae (Mole Salamander Family)

STATUS:

New York Natural Heritage Program: G5 S2
Federal: not listed
New York State: Endangered, Protected

DESCRIPTION: A large fossorial salamander (15 - 22 cm) which inhabits sandy pine barrens with temporary or permanent pools that can be used for breeding. Background color is a greenish brown. Irregular oval or elongate yellow markings.

HABITAT AND ECOLOGY: Found in many habitats providing there is a body of water nearby suitable for breeding. Adults spend all but the breeding season in ground burrows. On Long Island found in pine barrens near breeding ponds. Most adults stay within 1000 ft of breeding ponds, usually much closer. Suitable breeding ponds have no predatory fish. On Long Island breeding occurs early to late March. In the southern part of its range this species breeds in summer or winter. Egg masses are attached to twigs and pond vegetation about 1 ft below the surface. Aquatic larvae eat isopods, insects and amphibian larvae. Young transform in August becoming terrestrial. Adults eat earthworms, frogs, insects, amphibian larvae and other salamanders.

DISTRIBUTION:

Total: Throughout much of North American, southern Canada to Puebla, Mexico. Absent from most of the Great Basin, West, New England and the Applachians. Introduced to many localities west of the Rockies.

New York: Formerly occurred as far north as Albany and possibly west to the vicinity of Oneida Lake but now apparently restricted to Long Island.

NWIRP Historical Records:

1. Riverhead	no date	

NWIRP Recent Records:

1. Runway Ponds	1984	Wading River	261	B
2. Twin Ponds	1984	Wading River	33	A
3. Bald Hill Ponds	1984	Riverhead	54	C

NWIRP Field Survey:

1. Sandpit Ponds	1987	Wading River	21	B
2. Forest Pond	1987	Wading River	88	C

3.	Firebreak Pond West	1987	Wading River	250	C
4.	North Pond at Lake Panamoka	1987	Wading River	252	A
5.	Middle County Road Ponds- North Pond	1987	Wading River	2	B

THREATS TO LOCAL POPULATIONS: Fish and bull frogs eat the eggs of tiger salamanders. Poor water quality in and of itself may not be a significant problem but if it enhances the filling in of ponds they will soon be come unsuitable for breeding. Pond disturbance can harm egg masses and lower population size. Clearing around ponds or the erection of barriers and roads between the surrounding woods may hinder spring migrations to the breeding ponds.

MANAGEMENT CONSIDERATIONS: Efforts should be made to protect surrounding woods as well as the ponds and provide the salamanders with easy access to the breeding sites. Protect water quality by reducing road runoff and other sources of pollution. Prohibit access to ponds by fish and bullfrogs and do not introduce fish to ponds. Minimize disturbance.

Ammodramus savannarum Grasshopper Sparrow

FAMILY: Emberzidae (Emberzid Family)

STATUS:

New York Natural Heritage Program: G4 S4
Federal: not listed
New York State: Special Concern, Protected

DESCRIPTION: A grassland sparrow with an unstreaked, buffy breast, yellow bend of the wing, yellow lores and a flat-looking head. Juveniles have a streaked upper breast. Males sing a grasshopper-like song from prominent perches.

HABITAT AND ECOLOGY: Preferred habitats are prairies, old fields, open grasslands, dry fields and pastures. Nest is placed on the ground, well-concealed by vegetation. Breeding territory is 0.4-1.3 ha. Clutch of 4 or 5 eggs is laid May-July. Usually two broods in New York State. Eats insects, small invertebrates, grains and seeds. Migratory.

DISTRIBUTION:

Total: Breeds from eastern Washington and southern British Columbia across southern Canada and the northern United States to southern Maine south to southern California, northeastern New Mexico, south central Texas, central Georgia, southeastern Virginia, also central Florida, southeastern Arizona. Winters from the southern United States to Costa Rica.

New York: Primarily in the Great Lakes Plain and Appalachian Plateau and the grasslands of Long Island.

NWIRP Historical Records: Well documented on Hempstead Plains.

NWIRP Recent Records:

1. Breeding Bird Atlas Block 1980
   6752B NYTM coordinates:
   N:4530000 S:4525000 E:685000 W:680000
2. Breeding Bird Atlas Block 1983
   6853C NYTM coordinates:
   N:4535000 S:4530000 E:690000 W:685000
3. Breeding Bird Atlas Block 1982
   6753D NYTM coordinates:
   N:4535000 S:4530000 E:685000 W:680000
4. Breeding Bird Atlas Block 1983
   6752B NYTM coordinates:
   N:4530000 S:4525000 E:685000 W:680000

NWIRP Field Survey:

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1. Grumman Navy Base Site 1987 Wading River 35 B

<u>THREATS TO LOCAL POPULATIONS:</u> Grassland habitat appears to be disappearing to housing, agriculture and succession.

<u>MANAGEMENT CONSIDERATIONS:</u> Maintain grassland habitat by periodic mowing or controlled burning and preventing development.

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Catocala herodias gerhardi — Pine Barrens Underwing Moth

FAMILY: Noctuidae (Owlet or Noctuid Moth Family)

STATUS:

New York Natural Heritage Program: G3T3 S2S3
Federal: not listed
New York State: Unprotected

DESCRIPTION: Forewing is grayish with a fine wood grained pattern of black and brown. The hindwing is orange with two black bands and a white fringe on the outside edge.

HABITAT AND ECOLOGY: Found in pitch pine/scrub oak barrens, areas of blackjack oak or shale barrens and dry ridge tops. A good colonizer.

DISTRIBUTION:

Total: Very patchy distribution. Occurs in the Cape Cod region and other sites in Massachusetts; Long Island and Albany, New York; southern New Jersey and other sites from West Virginia to North Carolina.

New York: So far known only from Long Island and Albany pine barrens.

NWIRP Historical Records:

1. Wading River, Long Island — pre 1950
2. Riverhead, Long Island — 1934

NWIRP Recent Records: None

NWIRP Field Survey:

1. Toppings Path — 1987 — Eastport 7 — B

THREATS TO LOCAL POPULATIONS: Habitat descruction by development and fire suppression or improper fire management. Gypsy moth spraying could destroy populations.

MANAGEMENT CONSIDERATIONS: This species occupies fire communities but can be destroyed by fires. Therefore it is critical that not all sites be burned in one season and that movement between sites remains possible. Best strategy may be to maintain several nearby populations with no barriers to dispersal between them.

Chordeiles minor **Common Nighthawk**

FAMILY: Caprimulgidae (Goatsucker Family)

STATUS:

New York Natural Heritage Program: G5 S4
Federal: not listed
New York State: Special Concern, Protected

DESCRIPTION: A nocturnal insectivore with a large, flat head, small bill, large mouth, and long, pointed wings. Generally brown with white patches on the wings and a white throat.

HABITAT AND ECOLOGY: Natural habitat is generally open including open pine barrens, bare ground, pastures and fields, sand dunes, flat rocks and logs in the open. Nighthawks also nest in cities and towns on flat gravel roofs. They feed on flying insects at night or during the day. Breeds late May to late July. In natural settings eggs are laid on bare ground. Young are semi-precocial. Migrates during the spring and fall.

DISTRIBUTION:

Total: Breeds in the southern Yukon, southern Mackenzie, northern Saskatchewan, northern Manitoba, northern Ontario, central Quebec, southern Labrador and Nova Scotia south to southern California, central Nevada, northwest/central Arizona, norhtern Mexico to the Bahamas, Jamaica and Puerto Rico. Winters in South America.

New York: Generally statewide but largely absent from the Catskills and central Adirondacks.

NWIRP Historical Records:

1. Riverhead 1938
2. Riverhead 1954

NWIRP Recent Records: None with confirmed breeding.

NWIRP Field Survey: Not confirmed to breed on NWIRP land during field surveys but suitable habitat still remains.

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Empidonax virescens **Acadian Flycatcher**

FAMILY: Tyrannidae (Tyrant Flycatcher Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State: Protected

DESCRIPTION: A flycatcher with white wing bars, a white eye ring and throat. Back olivaceous. Most earily distinguished by its call--a loud peet-suh given 2 to 4 times/min.

HABITAT AND ECOLOGY: Found in humid deciduous woods, shaded ravines, river swamps and lowlands. Nests in trees in a horizontal twig fork, toward the end of a lower branch, often over water and usually 2.5 to 6 m up. Clutch of 2-4 eggs is laid from May to July. Eats mainly insects obtained by flycatching from perches beneath the tree canopy. Migratory.

DISTRIBUTION:

Total: Breeds from southeast South Dakota east across the southern Great Lakes region to southern New England, south to southern Texas, the Gulf Coast,and central Florida west to central Kansas. Winters from Nicaragua to northern South America.

New York: Generally southeastern New York and Long Island and upstate New York from the Finger Lakes region west.

NWIRP Historical Records: Many.

NWIRP Recent Records:

1. Breeding Bird Atlas Block 1982
   6852B NYTM coordinates:
   N:4530000 S:4525000 E:695000 W:690000 SE. BUFFER ZONE AREA

NWIRP Field Survey: Not found during field survey.

THREATS TO LOCAL POPULATIONS: Reported to be in decline for unknown reasons. Protect habitat.

MANAGMENT CONSIDERATIONS: If habitat is adequately protected, no special management should be necessary.

Enneacanthus obesus — Banded Sunfish

FAMILY: Centrarchidae (Sunfish Family)

STATUS:

New York Natural Heritage Program: G5 S2
Federal: not listed
New York State: Unprotected

DESCRIPTION: A small sunfish with three anal spines and a rounded tail; maximum size about 5 cm. Easily confused with bluespot sunfish, Enneacanthus gloriosus. E. obesus adult is light greenish beige through the body with 6 to 7 vertical lines. Fully adult bluespot sunfish lacks the vertical bands. The banded sunfish has 19-22 scale rows in the caudal peduncle while the bluespot has 16-18.

HABITAT AND ECOLOGY: Prefers sluggish, acidic, heavily vegetated waters, headwater tributaries and boggy brooks. Believed to build nests in vegetation rather than in sand or gravel. Probably feeds on insects and other small invertebrates.

DISTRIBUTION:

Total: Found in the Atlantic coastal region from southern New Hampshire to the Perdido drainage of extreme western Florida.

New York: The only confirmed records are from the Peconic River and from Spruce and Cranberry Lakes in the Passaic River drainage of southeastern New York.

NWIRP Historical Records: Few reliable records due to confusion with E. gloriosus.

NWIRP Recent Records:

1.	Linus Pond	1984	Wading River	20	BC
2.	Grassy Pond	1984	Wading River	26	C

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: Habitat destruction is the primary threat to this species.

MANAGEMENT CONSIDERATIONS: If habitat is adequately protected, no special management for this species should be necessary.

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2. Rare Animals

Hemileuca maia maia Coastal Barrens Buckmoth

FAMILY: Saturniidae (Giant Silkworm and Royal Moth Family)

STATUS:

New York Natural Heritage Program: G4T2T3 S2
Federal: not listed
New York State: Special Concern, Unprotected

DESCRIPTION: A small moth with a wingspan of about two inches, brightly colored in black, white and red. Males have tufts of scarlet hairs on their thoraxes, legs, and terminal abdominal segments. Females are slightly larger and lack the red markings except on the legs. Larvae are mostly black with extensive yellow markings in bands along the sides and stinging hairs.

HABITAT AND ECOLOGY: Restricted to sandy pitch/pine scrub oak barrens. Adults are active during the day. Mating occurs in October from mid-morning to mid-afternoon and eggs are laid on scrub oak. Overwinters as an immature larva inside the egg. Pupates in late June in sandy soil emerging in the fall.

DISTRIBUTION:

Total: Sandy, coastal pitch pine/scrub oak barrens in Long Island, Rhode Island and southeastern Massachusetts.

New York: Long Island pine barrens.

NWIRP Historical Records:

1. Riverhead, Long Island 1932

NWIRP Recent Records:

1.	Manorville Hills	1984	Riverhead	~~8~~	8 D

NWIRP Field Survey:

1.	Grumman Navy Base Site	1987	Wading River	301	B
2.	Toppings Path South	1987	Eastport	14	C
3.	Sandpit Ponds	1987	Wading River	21	B

THREATS TO LOCAL POPULATIONS: Habitat destruction through development and fire suppression are the most significant threats.

MANAGEMENT CONSIDERATIONS: Pine barrens habitat needs fire management to insure adequate supply of scrub oak. Protect

habitat from development. Buckmoths need large, preferrably contiguous tracts to maintain viable populations; usually over 1,000 acres. In dry years some pupae may overwinter.

Heterodon platyrhinos Eastern Hognose Snake

FAMILY. Colubridae

STATUS:

New York Natural Heritage Program: G5 S4
Federal: not listed
New York State: Special Concern, Unprotected

DESCRIPTION: Coloration varies--yellow, brown, gray, olive, orange, red--but usually spotted. Underside of tail is paler than belly. Upturned snout. Behavior is distinctive in that snake hisses, spreads head and neck in "hood" display and plays "possum" when disturbed.

HABITAT AND ECOLOGY: Usually found in open areas with sandy soils near water--wooded upland hillsides, fields, woodland meadows, prairies, forest and grassland edges, river valleys and stream courses. Hibernates from late September to April under forest litter or trash piles. Lays 4 to 61 eggs in June-July in loose soil, under logs or in wood of decaying logs. Eggs hatch July-September. Eats mainly amphibians, especially toads. Also known to eat other amphibians, insects and occasional birds.

DISTRIBUTION:

Total: Southern New England to Minnesota and South Dakota, south to southern Texas, Gulf Coast and southern Florida.

New York: Southeastern New York north to Sullivan and Saratoga County. Disjunct populations in western New York in Monroe and Cattaraqus/Allegheny Counties.

NWIRP Historical Records:

1. Peconic River no date

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Icteria virens Yellow-breasted Chat

FAMILY: Emberizidae (Emberzid Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State: Protected

DESCRIPTION: A large warbler with white spectables, an olive green back, and a bright yellow breast.

HABITAT AND ECOLOGY: Prefers second growth, thickets, brushy areas, scrub, woodland undergrowth, and fencerows. In New York nests in deciduous woodlands, usually in saplings and thickets near the ground. Clutch of 3 to 6 eggs is laid late May to mid-July. Eats mostly insects and some small fruits. Migratory.

DISTRIBUTION:

Total: Breeds from southern British Columbia across southern Canada and the northern United States to northern New England, south to southern Baja California, central Mexico, the Gulf Coast and northern Florida. Winters from southern Baja California, southern Texas and southern Florida south to Panama.

New York: Occurs primarily on the Great Lakes Plain, Appalachian Plateau, lower Hudson Valley and Long Island. Distribution patchy and local.

NWIRP Historical Records: Many

NWIRP Recent Records:

1. Breeding Bird Atlas Block 1983
   6752B NYTM coordinates:
   N:4530000 S:4525000 E:685000 W:680000 SW. BUFFER ZONE AREA

NWIRP Field Survey: Not found during field surveys.

THREATS TO LOCAL POPULATIONS: Clearing of underbrush and other types of habitat destruction.

MANAGEMENT CONSIDERATIONS: Maintain habitat.

Kinosternon subrubrum Eastern Mud Turtle

FAMILY: Kinosternidae (Mud and Musk Turtle Family)

STATUS:

New York Natural Heritage Program: G5 S1
Federal: not listed
New York State: Threatened, Protected

DESCRIPTION: A small, semi-aquatic turtle (7.5-10 cm) with a smooth, high-domed carapace, some shade of brown. The plastron is yellowish brown or marked with black or dark brown. Legs short and feet strongly webbed.

HABITAT AND ECOLOGY: Lives in fresh or brackish shallow, slow-moving or still water with aquatic vegetation and a mud bottom. Shallow lakes, marshes, small ponds, ditches, wet fields are typical. Burrows into the mud when the habitat dries. Hibernates in burrows in the mud and dead leaves from October/November to March/April. Lays clutches of one to six eggs from mid March to May in the soil, piles of plant debris or in rotted wood. Eggs hatch the following spring. Primarily a bottom feeder eating insects, molluscs, crustaceans, amphibian larvae, carrion and aquatic plants.

DISTRIBUTION:

Total: Eastern and southern United States north to New York and Indiana, west to Oklahoma and south/central Texas.

New York: Coastal plain of Long Island. Only one verified mainland record at Sing Sing.

NWIRP Historical Records:

1. South McKay Wetlands no date
2. Riverhead, Suffolk County no date
3. Broookhaven, Suffolk County no date

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

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Loxia curvirostra **Red Crossbill**

FAMILY: Fringillidae (Finch Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State: Protected

DESCRIPTION: A small, brick red, songbird with a crossed bill and no wingbars. Immature is orange red, female has a yellow rump but is otherwise brown.

HABITAT AND ECOLOGY: Prefers coniferous, mixed coniferous/deciduous forests or pine/oak habitats. In New York normally associated with coniferous forest in mountain areas, conifer plantations or pine barrens in lowlands. Breeding season is erratic and variable, usually occurring January to August. Clutch is usually 3-4 eggs. An erratic breeder in New York usually occuring in years following large fall population irruptions associated with failure of cone crops in more northern regions. Eats seeds, buds and insects, foraging in trees. Also picks up seeds from the ground. Migratory? (See below.)

DISTRIBUTION:

Total: Coniferous forests in Eurasia and North America. Resident in North America: southeastern Alaska east to Newfoundland, south in the west to northern Baja California and Nicaragua, in the east to northern Wisconsin, Tennessee and North Carolina. Wanders irregularly in winter.

New York: Occurs as a breeder primarily in the Adirondacks and very locally in western New York but has also bred near Albany, the lower Hudson Valley and on Long Island.

NWIRP Historical Records: None.

NWIRP Recent Records:

1. Breeding Bird Atlas Block 1982
   6852A NYTM coordinates:
   N:4530000 S:4525000 E:690000 W:685000 SE. BUFFER ZONE AREA

NWIRP Field Survey: Not found during field survey.

THREATS TO LOCAL POPULATIONS: Only habitat destruction presents an imminent danger.

MANAGEMENT CONSIDERATIONS: Preserve habitat.

Pooecetes gramineus **Vesper Sparrow**

FAMILY: Emberizidae (Emberizid Family)

STATUS:

New York Natural Heritage Program: G5 S5
Federal: not listed
New York State: Special Concern, Protected

DESCRIPTION: A brown sparrow with white outer feathers on its tail. Other field marks include a notched tail, narrow eye ring and chestnut shoulders.

HABITAT AND ECOLOGY: In New York this species prefers pastures and fields with short grasses or sometimes actively cultivated. Usually seen on the ground. Singing males sit on low perches. 3-5 eggs are laid from May to August in a ground nest in grasses or under shrubs. Double brooded in New York. Feeds on seeds, grain and insects. Migratory.

DISTRIBUTION:

Total: Breeds primarily from east, central and southern British Columbia east to Nova Scotia and south to eastern and southern California, central Nevada, southwestern Utah, north and east/central Arizona, central New Mexico, Colorado, Kansas, Missouri, Tennessee and North Carolina. Winters from central California and the southwestern United States, southern Illinois, Kentucky, West Virginia southern Pennsylvania, Connecticut south to southern Mexico, the Gulf Coast and central Florida.

New York: Primarily concentrated in the Great Lakes Plain, Central Appalachians and Cattaraugus Highlands. Distributed locally through the remainder of the state but largely absent from the Adirondacks, Catskills and southeastern New York except eastern Long Island.

NWIRP Historical Records: Many

NWIRP Recent Records:

1. Breeding Bird Atlas Block 1980 SW BUFFER ZONE AREA
   6752B NYTM coordinates:
   N:4530000 S:4525000 E:685000 W:680000
2. Breeding Bird Atlas Block 1983
   6853C NYTM coordinates: BASE, NW. AND NE. BUFFER ZONE ARE
   N:4535000 S:4530000 E:690000 W:685000
3. Breeding Bird Atlas Block 1980
   6753D NYTM coordinates: BASE
   N:4535000 S:4530000 E:685000 W:680000

NWIRP Field Survey: Not found during field surveys.

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THREATS TO LOCAL POPULATIONS: Maintain habitat and prevent disturbance during the nesting season.

MANAGEMENT CONSIDERATIONS: Prevent invasion of shrub species by mowing or controlled burning.

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COPIES

Rana sphenocephala — Southern Leopard Frog

SYNONYM: Rana utriculata

FAMILY: Ranidae (True Frog Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State: Special Concern, Game

DESCRIPTION: Very similar to Rana pipiens, the northern leopard frog, but this species has a light spot in the center of the tympanum, a longer, more pointed head and only a few dark spots on the sides of the body. The mating call is distinctive--a "short, chuckl-like, guttural trill.

HABITAT AND ECOLOGY: Found in ponds, meadows, swamps, bogs, edges of streams and lakes, and canals. Generally prefers open situations. May be found inland during the summer but remains near water in the spring and fall. Clutches of several thousand eggs are attached to twigs and stems in quiet shallow, water from March to June. Adults eat small invertebrates, mainly terrestrial arthropods. Tadpoles eat suspended matter, algae, plant tissue and organic debris.

DISTRIBUTION:

Total: Lowlands of the southeastern United States, southern New York to the Florida Keys, west to eastern Kansas and eastern Texas.

New York: Southeastern New York north to Ulster County.

NWIRP Historical Records:

1. Riverhead township, ponds near Manor Road — 1969

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Scaphiopus holbrookii — Eastern Spadefoot

FAMILY: Pelobatidae (Spadefoot Toad Family)

STATUS:

New York Natural Heritage Program: G5 S3
Federal: not listed
New York State: Unprotected

DESCRIPTION: This species is easily distinguished by the presence of a single, sharp-edged black spade on each hind fooe and a pupil that is vertically elliptical in light. It is the only spadefooot toad occurring east of the Mississippi.

HABITAT AND ECOLOGY: Found in areas of sandy, gravelly or soft, light soils in wooded or unwooded terrain. Burrows underground when inactive emerging for breeding which is usually a one night phenomenon coinciding with heavy rains from April through the summer. These fossorial and nocturnal habits and unpredictable, sporadic breeding events make this species especially difficult to inventory. Spadefoots can remain underground for weeks or months during dry periods to depths of 1-2 m. Clutches of up to 2500 eggs are laid in temporary breeding pools. Aquatic larvae metamorphose into a terrestrial form in 2 to 8 weeks. Adults eat small terrestrial invertebrates. Larvae eat plankton initially, later small aquatic invertebrates and other amphibian larvae.

DISTRIBUTION:

Total: Southern New England to southeastern Missouri, south to the Gulf Coast and southern Florida. Absent at higher elevations in the Appalachians. Also found in northern Oklahoma to western Louisiana and southern Texas.

New York: Occurs on Long Island and in the lower Hudson Valley north to Albany.

NWIRP Historical Records:

1. South McKay Wetlands 1968

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys but likely to be present.

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Siala sialis **Eastern Bluebird**

FAMILY: Muscicapidae (Muscicapid Family)

STATUS:

New York Natural Heritage Program: G5 S5
Federal: not listed
New York State: Special Concern, Protected

DESCRIPTION: A songbird that is slightly smaller than a robin. Male is bright blue above with a rusty throat and breast. Female and yound have blue in the wings and tail. Female has rusty breast while juvenile is spotted.

HABITAT AND ECOLOGY: Inhabits forest edges, open woodlands and semi-open situations with scattered trees. Breeds April to mid-August in natural cavities or nest boxes. Clutch is usually 4-5 eggs. Eats mainly insects but also other invertebrates and small fruits, especially in winter. Migratory.

DISTRIBUTION:

Total: Breeds from southern Saskatchewan east across southern Canada to Nova Scotia south to Nicaragua, across the Gulf Coast, southern Florida and Bermuda west to the western Great Plains and southeastern Arizona. Winters from the middle portion of the eastern United States south to western Cuba.

New York: Breeds statewide in appropriate habitat. Winters primarily in southern parts of the state.

NWIRP Historical Records: Many.

NWIRP Recent Records:

1. Breeding Bird Atlas Block 1981
   6852A NYTM coordinates:
   N:4530000 S:4525000 E:690000 W:685000
2. Breeding Bird Atlas Block 1983
   6852B NYTM coordinates:
   N:4530000 S:4525000 E:695000 W:690000
3. Breeding Bird Atlas Block 1981
   6752B NYTM coordinates:
   N:4530000 S:4525000 E:685000 W:680000 SW. BUFFER ZONE AREA

NWIRP Field Survey:

1. Prestons Pond Meadow 1987 Wading River 6 C

THREATS TO LOCAL POPULATIONS: Bluebird populations must compete with other hole nesters for nest holes. Historically, the more aggressive, European starling has reduced bluebird populations

The popularity of nest boxes has resulted in poplation recoveries.

MANAGEMENT CONSIDERATIONS: If habitat is preserved the only necessary managment should be an adequate supply of nest holes. These can be easily supplied with artificial nest boxes.

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Speyeria idalia — **Regal Frittillary**

FAMILY: Nymphalidae (Brush-footed Butterfly Family)

STATUS:

New York Natural Heritage Program: G3 S1
Federal: C2
New York State: Unprotected

DESCRIPTION: A large butterfly with brownish-orange forewings, upper wing brighter than underside, with purplish-black spots and bars and a black margin. Hindwings are a velvety bluish-black on the upperside, tinged with orange towards the base, with two rows of spots. Underside of the hind wings is rich olive brown with numberous silvery white spots.

HABITAT AND ECOLOGY: This species is most abundant in the tall grass prairies of the Midwest. In the East, S. idalia is found in wet meadows, in open areas along streams or in wet pastures. Larval foodplants are violets. Adults nectar at a variety of flowers. The species is single brooded with a long flight season. Males emerge continuously from mid-June until late-July, The females emerge 1 to 2 weeks later and mating occurs immediately. Eggs are generally laid from late August until mid-September near Viola spp. Eggs hatch in 3 to 4 weeks and the newly emerged larvae overwinter beneath leaves near the ground's surface. They feed the following spring during the night and seek shelter by day. After five molts they form a chrysalis from which they emerge in approximately 17 days.

DISTRIBUTION:

Total: Historically, the range extended from St. Johns, New Brunswick to southern lower Michigan, Manitoba and eastern Montana, south to northwestern North Carolina, northwestern Arkansis and Kansas. Today it has disappeared from New England except for the islands off both Cape Cod and Rhode Island. No known extant populations in North Carolina, New Jersey, Delaware, eastern Pennsylvania or mainland New York.

New York: Scattered, historical sites throughout the state. Eastern populations have high extirpation and recolonization rates. No known sites.

NWIRP Historical Records:

1. Calverton, New York 1927

NWIRP Recent Records: None.

NWIRP Field Survey: Not found during field surveys.

Sylvilagus transitionalis **New England Cottontail**

FAMILY: Leporidae (Hare and Rabbit Family)

STATUS:

New York Natural Heritage Program: G4 S3
Federal: C2
New York State: Special Concern, Game

DESCRIPTION: A small rabbit, very similar in appearance to the Eastern Cottontail. The differences are so slight that the two species cannot be reliably separated except by close examination of certain skull characters. In general the New England Cottontail tends to have slightly shorter ears and a black patch between them. The outer edge of the ear has a broad black stripe and the back is generally darker than that of the Eastern Cottontail. The definitive cranial characters of the New England Cottontail include a jagged frontal-nasal suture, an anterior supraorbital process that decreases in width anteriorly and fuses with the skull with no apparent anterior process or notch, and a posterior supraorbital process that is narrow and tapers to a point that does not usually fuse to the frontal bone. There are slight but not reliable behavioral differences between the two species as well.

HABITAT AND ECOLOGY: Formerly restricted to dense, weedy sites and boreal environments, now found in restricted numbers in brushy areas and open woodlands. Nests may be constructed in underground burrows or open depressions. Several litters of three to eight young are produced in late winter to late summer. In summer this species eats herbaceous plants, especially clover and succulent grasses. Winter foods include seedlings, bark twigs and buds of maple and oak trees.

DISTRIBUTION:

Total: Occurs from southeastern New England south along the southern Appalachians to Alabama.

New York: Occurs in eastern and southeastern New York and western New York in the Allegheny region.

NWIRP Historical Records: None from the immediate study area but widely believe to be present in this part of Long Island. Many museum study skins are misidentified Eastern Cottontails.

NWIRP Recent Records: None.

NWIRP Field Survey: Not positively identified during field surveys but see below.

THREATS T OCAL POPULATIONS: In New York State this species is

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still legally taken by hunters and trappers.

MANAGEMENT CONSIDERATIONS: Preserve dense cover to protect the preferred habitat of this species. Because Eastern Cottontail and New England Cottontail cannot be distinguished except by skull characters, limited hunting of all rabbits should be considered as a potential form of management. If hunting and trapping of rabbits is permitted on NWIRP land, an organized effort to recover skulls and location data from hunters might help assess the status of this rabbit.

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NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Fish and Wildlife

NAVY COOPERATIVE AREA
FISH AND WILDLIFE MANAGEMENT ACT

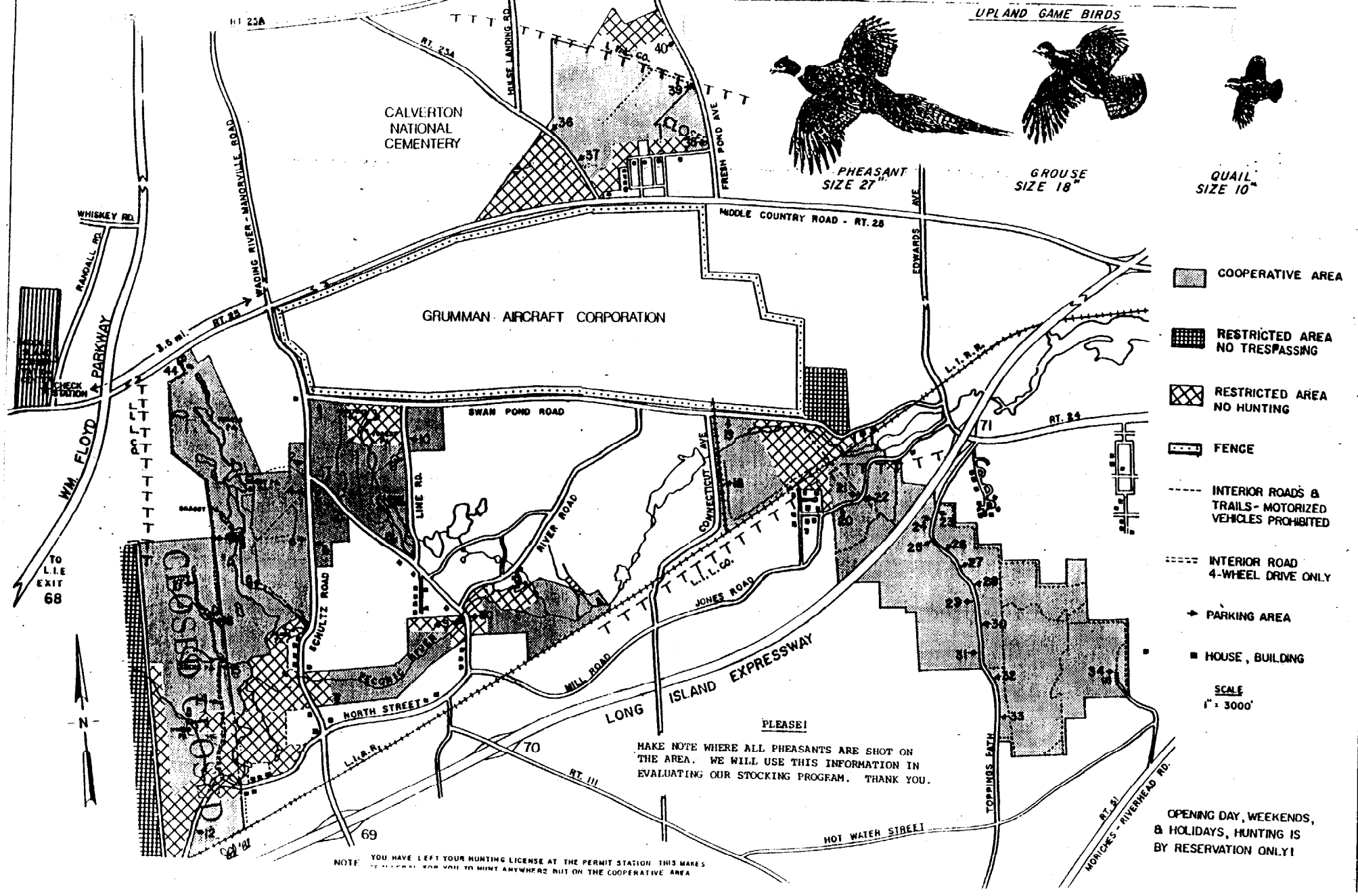
PUBLIC USE MAP AND INFORMATION SHEET

These lands are managed under cooperative agreements as part of the State's FWMA program. Public use and recreation are managed by the Department of Environmental Conservation with the cooperation of the landowners. Common sense and respect for this property are essential to ensure its continued availability. Please follow the rules and regulations printed below, realizing that the use of this area is a privilege not a right.

1. All access is prohibited on the Navy Cooperative Area lands except under permit from the Department of Environmental Conservation or special permit from the Navy Dept.
2. All regulatory signs posted by the Department shall be obeyed and all applicable provisions of the Environmental Conservation Law shall be in effect.
3. Daily permits are required for all access between November 1 and the Sunday following the third Saturday in January, and reservations are required to obtain such permit on November 1, all weekends and holidays, and each day of the January deer season. (For reservation procedures, see back page.)
4. Daily permits can only be obtained at the Department permit station on Randall Road. Permit station opens one-half hour before sunrise.
5. Applicants for daily hunting or fishing permits must surrender their valid hunting or fishing license prior to receiving a permit.
6. Daily permits are valid only for the date issued and they are non-transferable.
7. As part of the daily permit, an individual will be issued an armband and dashboard placard. The armband must be worn and visible on the left arm while on the area and the dashboard placard left visible on the dash of the permittee's vehicle while parked on the area.
8. Before leaving the area daily, permittees must return to the permit station, within one-half hour of sunset, to surrender their permit, armband, and dashboard placard and reclaim their licenses. Hunters must also present all game taken.
9. Seasonal permits for activities between mid-January and October 30 or other special access permits may be obtained in person at the permit station, while open, or in person or by mail at the Department's Bureau of Wildlife office in Stony Brook.
10. Permittees (except seasonal trappers) must park at designated parking sites and then only if the site quota is not filled.
11. Permittees shall have access only to lands situated on the same side of the road as their vehicle parking site.
12. Permits must be shown to any person requesting to see it.
13. No rifles or pistols shall be used or carried afield on the area.
14. No target or promiscuous shooting is permitted on the area.
15. Any person may be refused a permit or any permittee may be ejected from the area for disorderly conduct, intoxication, or any other conduct which endangers the public welfare.
16. The following acts are prohibited: littering; building fires; damaging signs, fences, or gates; damaging equipment or other farm property; damaging standing crops or newly planted fields; damaging nesting structures or boxes; damaging or removing trees, shrubs, plants, or rocks; hunting or shooting or otherwise disturbing persons who may be working on the cooperator's lands.
17. Permits obtained by fraud or while suspended from using the area shall be void.
18. Access fees will be charged for all uses according to a schedule posted at the permit station.
19. The area will be closed on Thanksgiving, Christmas, and New Year's Day.

NYSDEC - PERMIT STATION
RANDALL ROAD
RIDGE, NY 11961
516-924-3156

NYSDEC - BUR. OF WILDLIFE
BLDG. 40, SUNY
STONY BROOK, NY 11794
516-751-7030


UPLAND GAME BIRDS
PHEASANT SIZE 27"
GROUSE SIZE 18"
QUAIL SIZE 10"
CALVERTON NATIONAL CEMENTERY
GRUMMAN AIRCRAFT CORPORATION
MIDDLE COUNTRY ROAD - RT. 25
SWAN POND ROAD
WADING RIVER - MANORVILLE ROAD
WHISKEY RD.
RANDALL RD.
WM. FLOYD PARKWAY
CHECK STATION
3.5 mi.
RT. 25
RT. 25A
HULSE LANDING RD.
FRESH POND AVE
EDWARDS AVE
CONNECTICUT AVE
LINE RD.
RIVER ROAD
JONES ROAD
MILL ROAD
SCHULTZ ROAD
NORTH STREET
LONG ISLAND EXPRESSWAY
L.I.R.R.
L.I.L.CO.
RT. 111
RT. 24
HOT WATER STREET
TOPPINGS PATH
RT. 81
MORICHES - RIVERHEAD RD.
TO L.I.E. EXIT 68
N
COOPERATIVE AREA
RESTRICTED AREA NO TRESPASSING
RESTRICTED AREA NO HUNTING
FENCE
INTERIOR ROADS & TRAILS - MOTORIZED VEHICLES PROHIBITED
INTERIOR ROAD 4-WHEEL DRIVE ONLY
PARKING AREA
HOUSE, BUILDING
SCALE 1" = 3000'
PLEASE!
MAKE NOTE WHERE ALL PHEASANTS ARE SHOT ON THE AREA. WE WILL USE THIS INFORMATION IN EVALUATING OUR STOCKING PROGRAM. THANK YOU.
OPENING DAY, WEEKENDS, & HOLIDAYS, HUNTING IS BY RESERVATION ONLY!
NOTE: YOU HAVE LEFT YOUR HUNTING LICENSE AT THE PERMIT STATION. THIS MAKES IT ILLEGAL FOR YOU TO HUNT ANYWHERE BUT ON THE COOPERATIVE AREA

PUBLIC HUNTING OPPORTUNITIES - NAVY COOPERATIVE AREA

Small Game Hunting Procedures are as follows:

Between November 1 and the Sunday following the end of the January deer season, all access is by daily permit. Permits are issued at the department permit station which opens 1/2 hour before sunrise on each hunting day.

On November 1, weekends, and holidays, hunting will be by reservation only. Reservations may be made by calling (516) 924-3156 beginning at 8:30 a.m. on the Sunday preceding each day for which reservations are required, with the exception of reservation days which fall on a Monday for which reservations will be taken two (2) Sundays before that date. Only one reservation can be made per call.

Weekday hunting (excluding holidays) is covered by daily permits issued on a first come, first served basis at the permit station.

Maximum party size for small game hunting is three individuals and an individual or party shall not be afield with more than two dogs.

Opportunity to hunt for species whose seasons begin before or extend beyond the November 1 through mid-January period is provided by various seasonal permits; i.e., rabbit permit valid mid-January to the end of February. These can be obtained in person at the Ridge pe mit station while open, or the Stony Brook Office, or by mail to the Stony Brook Office. You must provide the following: a copy of your hunting license, vehicle license plate numb and the $2.00 seasonal permit fee by check made out to N.W.I.R.P. F&W Fund.

Big Game Hunting Procedures are as follows:

Archery Season - Procedures are the same as described above for small game hunting.

Shotgun & Muzzleloading Season - Those eligible to select a date and site to hunt D.E.C. Bureau of Wildlife managed areas will be determined by a random drawing held in early December. For specifics on the Deer Season and how to enter the drawing, send a stamped, self-addressed envelope to DEER INFO, Bldg. 40, SUNY, Stony Brook, NY 11794, in early November.

Maximum party size for big game hunting is two individuals.

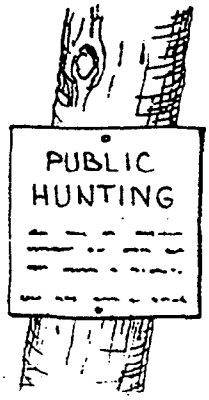
* *

PLEASE!

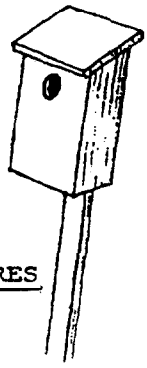
TO PROTECT YOUR INTERESTS AND THOSE OF OTHER SPORTSMEN, PLEASE OBEY ALL REGULATIONS AND ACT CONSCIENTIOUSLY WHILE AFIELD. RESPECT THE RIGHTS OF LANDOWNERS AND OTHER RECREATIONISTS.

DO NOT SHOOT!

PROTECTED SPECIES
All songbirds, hawks and owls.



SIGNS



NESTING STRUCTURES

REMEMBER!

YOUR ACTIONS WILL AFFECT NOT ONLY YOUR HUNTING OPPORTUNITIES, BUT THOSE OF ALL SPORTSMEN.

NAVY COOPERATIVE AREA
FIELD TRAIL AND DOG TRAINING POLICY

1. Applications for all spring and fall trials must be submitted to the Regional Office by January 31. Applications may be submitted earlier, but no preferential treatment will be accorded based on date of application. Applications must indicate whether the trial is a sanctioned or a fun event. A current insurance certificate which covers all dates requested must be on file at the Regional Office.

2. Requests for field trial dates will be prioritized and considered in four separate categories as follows:

a) All licensed trials with predetermined dates mandated by American Kennel Club or Amatuer Field Trial Clubs of America will be considered and assigned first. Proof of such date requirements should accompany the application.

b) All sanctioned trials will be considered and assigned second. Documentation of the need for specific dates may be required if conflicts arise.

c) All "fun" trials will be considered and assigned after all requests in the first two categories have been accommodated.

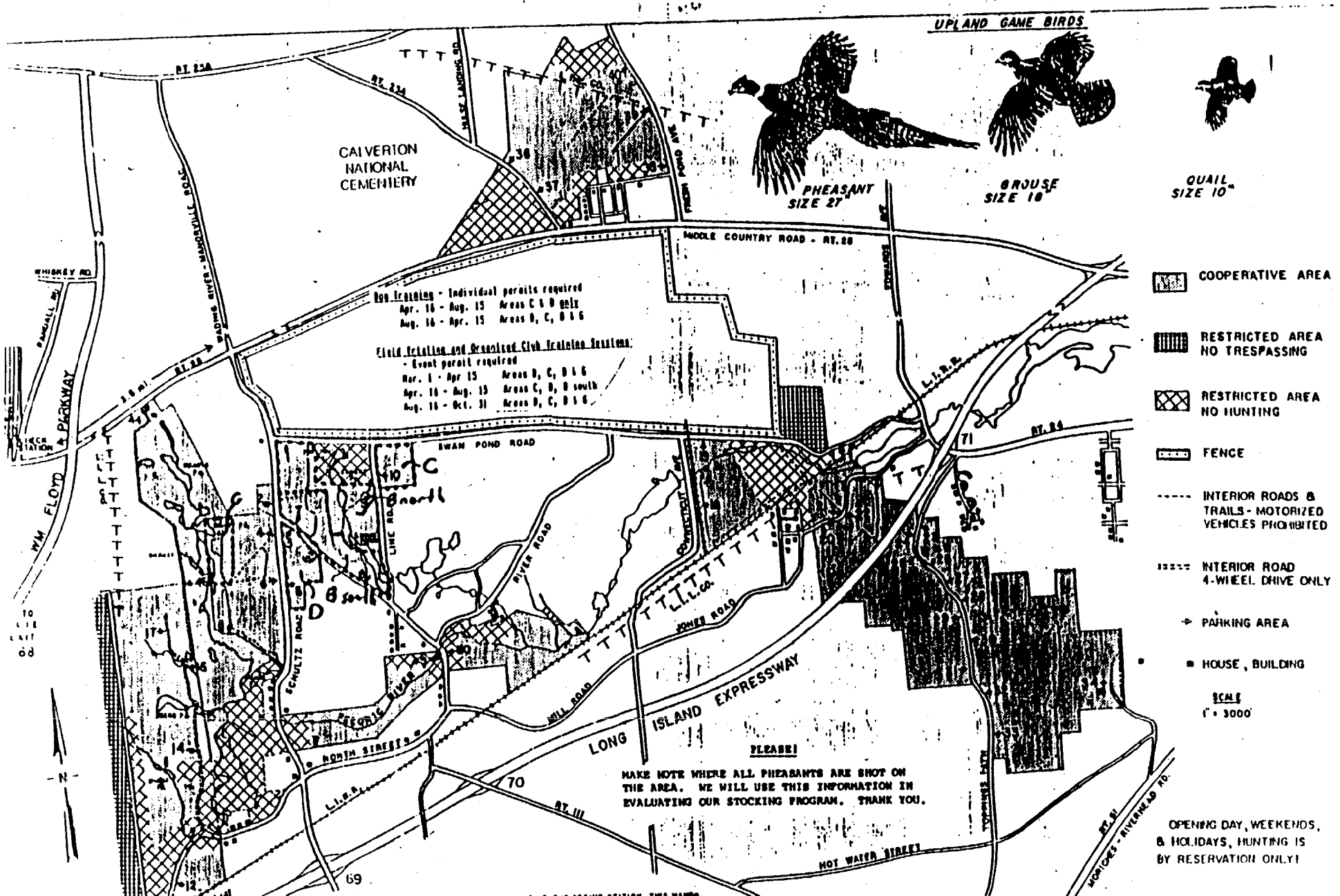
d) Requests for any other types of events will be considered if any dates or suitable portions of the area remain open.

3. The NYSDEC, Division of Fish and Wildlife will make the final decision with regard to the issuance of any permits for any specific dates or locations. In the event of scheduling conflicts, a decision will be made by NYSDEC according to the priorities outlined in item 2 above. If there are any conflicts remaining within categories, the conflicts will be resolved by lottery or coin toss, in the presence of representatives of both organizations.

4. A final schedule will be established and approved by NYSDEC by February 15, and permits will be issued accordingly.

5. Any open dates after the schedule is approved may be filled with late requests at the discretion of the NYSDEC.

6. No field trials or training may take place in area D between March 1 and April 15. Exceptions to this policy may be made for sanctioned trials, at the discretion of NYSDEC.


UPLAND GAME BIRDS
PHEASANT SIZE 27"
GROUSE SIZE 18"
QUAIL SIZE 10"
CALVERTON NATIONAL CEMENTERY
MIDDLE COUNTRY ROAD - RT. 28
Dog Training - Individual permits required
Apr. 16 - Aug. 15 Areas C & D only
Aug. 16 - Apr. 15 Areas B, C, D & G
Field Trialing and Organized Club Training Sessions
- Event permit required
Mar. 1 - Apr 15 Areas B, C, D & G
Apr. 16 - Aug. 15 Areas C, D, B south
Aug. 16 - Oct. 31 Areas B, C, D & G
SWAN POND ROAD
WADING RIVER - MANORVILLE ROAD
WHISKEY RD.
WM FLOYD PARKWAY
SCHULTZ ROAD
LINE RD.
RIVER ROAD
JONES ROAD
MILL ROAD
NORTH STREET
PECONIC RIVER
LONG ISLAND EXPRESSWAY
HOT WATER STREET
TOPPINGS PATH
MORICHES - RIVERHEAD RD.
L.I.R.R.
RT. 24
RT. 111
RT. 25A
RT. 25A
COOPERATIVE AREA
RESTRICTED AREA NO TRESPASSING
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PLEASE!
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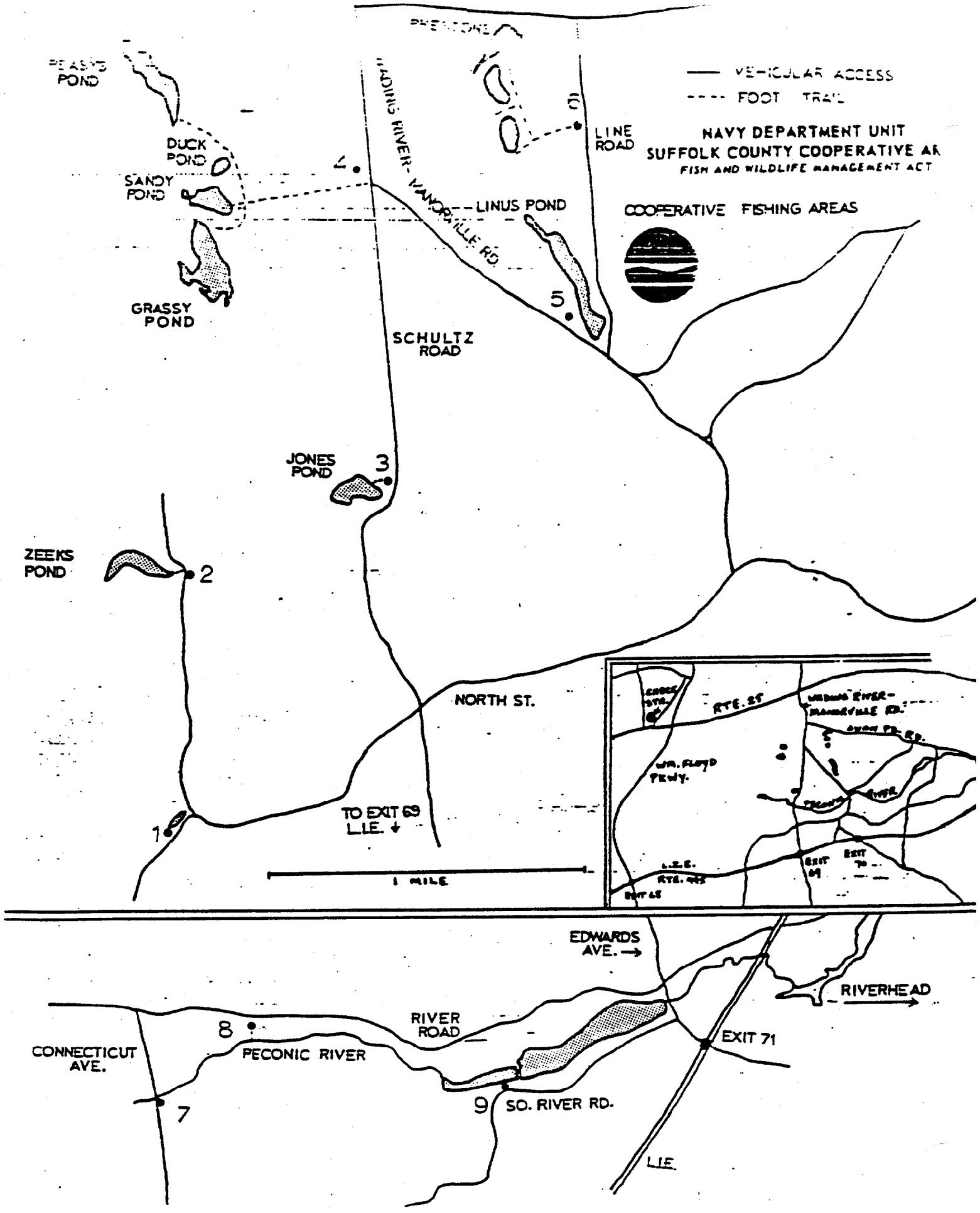
VEHICULAR ACCESS
FOOT TRAIL
NAVY DEPARTMENT UNIT
SUFFOLK COUNTY COOPERATIVE AR
FISH AND WILDLIFE MANAGEMENT ACT
COOPERATIVE FISHING AREAS
PEASY POND
DUCK POND
SANDY POND
GRASSY POND
LINUS POND
LINE ROAD
SCHULTZ ROAD
JONES POND
ZEEKS POND
NORTH ST.
TO EXIT 69 L.I.E.
1 MILE
EDWARDS AVE.
RIVERHEAD
RIVER ROAD
CONNECTICUT AVE.
PECONIC RIVER
EXIT 71
SO. RIVER RD.
L.I.E.

APPENDIX I. INSTALLATION GUIDELINES FOR USING GEOTEXTILE FABRIC UNDER GRAVEL ROADS OR PARKING AREAS

SITE PREPARATION

Clear the roadway or parking area of trees, large brush, etc. Tree stumps should be cut at ground level. What grading of the surface that is possible should be done to provide surface drainage.

PLACING GEOTEXTILE FABRIC

Simply unroll the geotextile fabric on the subsoil as seen in Illustration 1. Overlap the fabric sufficiently to insure acceptable performance. Table 1 provides general guidelines for overlapping or sewing seams.

Illustration 1

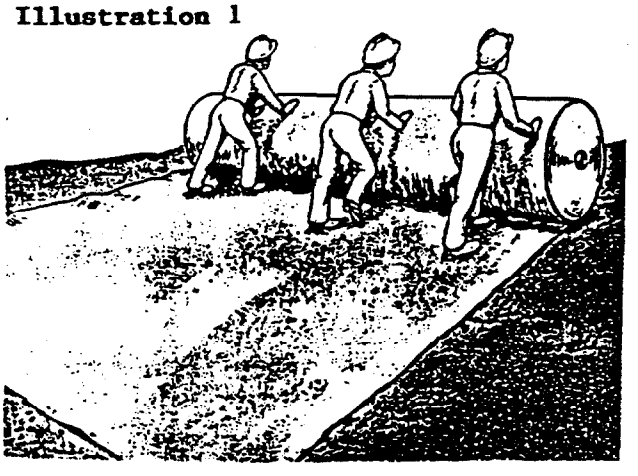

TABLE 1
Recommended Overlaps

Sewn fabric requires "S" fold overlap on soil ground to insure fabric conformability.

Soil Strength (CBR)[1]/	Overlap Unsewn(In.)	Sewnlap Sewn(In.)
Less than 1	48	9
1 - 2	36	6
2 - 3	30	3
3 & above	24	-

1/ California Bearing Ratio

CUTTING AND SEWING

Geotextile fabric can be cut utilizing a sharp knife or with sharp, sturdy scissors.

It can be sewn at the fabric overlaps. Sewing the fabric can reduce the suggested overlap as seen in Table 1.

Sew the fabric as shown in Illustration 2. The seam is located two to three inches from the fabric edge, and sewn twice.

Unsewn fabric should not be unrolled more than 25 feet ahead of aggregate placement in order to avoid overlap separation.

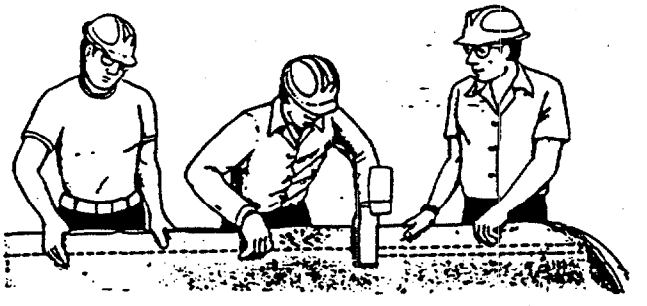

Illustration 2

AGGREGATE SELECTION AND PLACEMENT

Crushed angular quarry stone is recommended as the aggregate cover over the geotextile fabric. Scarcity of such crushed quarry has often required lesser quality or dirty gravels to be utilized. Increased risk of rutting within the aggregate cover material often must be weighed against aggregate costs.

The recommended ideal crushed aggregate is:

Screen Size	% Passing by Weight
2 in.	100
1 in.	70 - 90
3/4 in.	50 - 80
#4	30 - 55
#200	3 - 10

If ideal aggregate is not available, cleaner compactable sands, or gravels have been utilized successfully. Round river rock should be avoided.

PLACING AND COMPACTING AGGREGATE FILL

The aggregate should be back dumped and spread in a uniform lift maintaining the recommended aggregate thickness at all times; as seen in Illustrations 3 and 4.

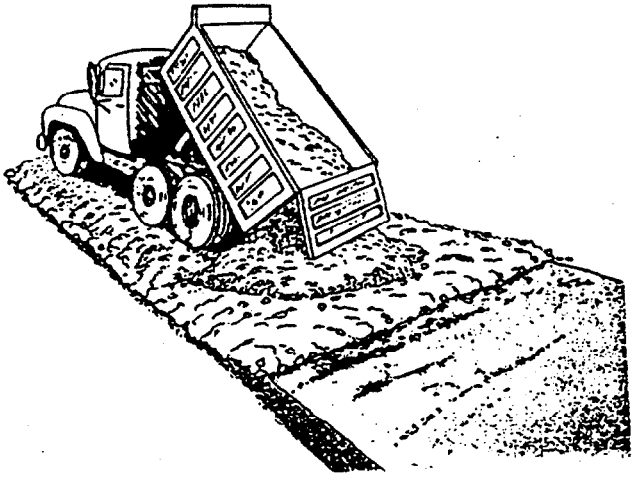

Illustration 3

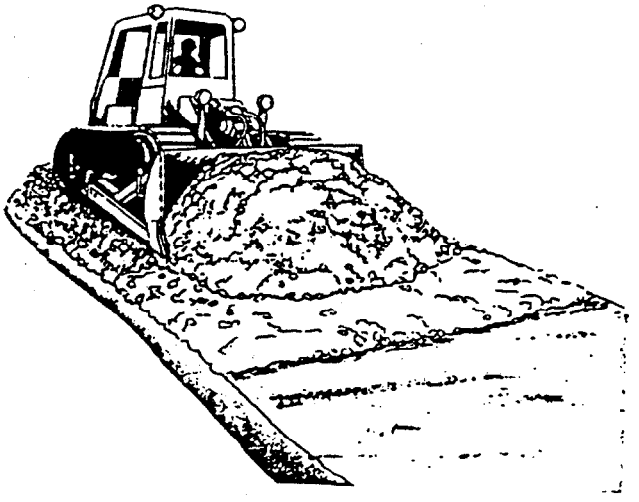

Illustration 4

Overstressing the soil should be avoided by utilizing equipment in spreading that exerts only moderate pressures on the soil. Severe rutting at the time of placement is an indication of overstressing the soil. Such soil overstressing must be avoided. Increasing aggregate depths and reducing loads are two methods of reducing the pressures on the soil.

Any ruts which develop during spreading or compacting should be filled with additional aggregate rather than bladed from surrounding areas. Placing additional aggregate into the rutted areainsures that the recommended aggregate thickness is maintained.

Trevira® Spunbonds are highly needled nonwoven ngineering fabrics with excellent tensile properties, nigh filtration potential and outstanding permeability.

Trevira® Spunbond Type 11 products are 100% continuous filament polyester nonwoven needlepunched engineering fabrics. They deliver a combination of advantages unmatched by any other spunbonded geotextiles. They're resistant to freeze-thaw, soil chemicals and ultraviolet light exposure.

Trevira® Spunbonds are excellent where the requirement is (1) tensile reinforcement, (2) planar flow, (3) filtration, and (4) separation. For example, in roadways, railbeds, drainage systems, pondliners, retaining walls. And much more. Trevira® Spunbonds are extraordinary engineering fabrics.

TYPICAL PHYSICAL PROPERTIES OF TREVIRA® TYPE 11 PRODUCTS

Fabric Type	1112	1114	1120	1125	1135	1145	1155
Fabric Weight (oz/yd²)	3.5	4.1	6.0	7.4	10.5	13.5	16.2
Thickness (mils) (ASTM D-1777)	60	65	95	110	150	175	210
Grab Strength (LB, MD/CD*) (ASTM D-1682)	110/90	135/110	205/175	270/230	390/340	450/400	600/560
Grab Elongation (%, MD/CD) (ASTM D-1682)	80/85	75/85	80/85	75/85	80/90	90/95	90/95
Trapezoid Tear Strength (LB, MD/CD) (ASTM D-1117)	50/40	60/50	80/75	105/95	135/130	190/190	205/200
Puncture Strength—5/16" (LB) (ASTM D-751)	50	60	90	110	155	180	240
Mullen Burst Strength (PSI) (ASTM D-3786)	175	200	315	380	525	625	825
Vertical Water Flow (GAL/MIN/FT²) (5" Head)	340	325	300	250	225	200	175
AOS (U.S. Std. Sieve) (CW-02215 mod. to 10 min.)	70	70-100	50-100	70-100	70-100	100-140	120-170
Std. Roll Widths (FT)**	12.5 and 15.0						
Std. Roll Length (FT)**	400		300				

*MD = Machine Direction, CD = Cross Machine Direction **Other width and length rolls are available upon request.

Note: Typical Physical Properties of Type 11 Products represent typical average values as opposed to Minimum Average Roll Values.

MINIMUM AVERAGE ROLL VALUES (Weakest Principal Direction) OF TREVIRA® TYPE 11 PRODUCTS

Fabric Type	1112	1114	1120	1125	1135	1145	1155
Fabric Weight (oz/yd²)	3.4	4.0	5.7	7.1	10.0	13.0	16.0
Thickness (mils) (ASTM D-1777)	50	55	85	100	135	160	200
Grab Strength (LB) (ASTM D-1682)	80	100	155	205	300	350	500
Grab Elongation (%) (ASTM D-1682)	65	70	65	60	65	80	80
Trapezoid Tear Strength (LB) (ASTM D-1117)	30	40	60	75	100	155	170
Puncture Strength—5/16" (LB) (ASTM D-751)	35	45	75	90	130	150	200
Mullen Burst Strength (PSI) (ASTM D-3786)	155	180	285	350	485	575	750
Vertical Water Flow (GAL/MIN/FT²) (5" Head)	275	250	225	200	175	150	125
AOS (U.S. Std. Sieve) (CW-02215 Mod. to 10 min.)	50	70	50	70	70	100	120

Hoechst Fibers Industries
A division of American Hoechst Corporation
P.O. Box 5887
Spartanburg, SC 29304-5887 U.S.A.
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APPENDIX J-1

SOIL AND WATER CONSERVATION PLAN
FOR
AGRICULTURAL OUTLEASE
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK
PARCEL "A"

Prepared in cooperation with USDA Soil Conservation Service, Riverhead and Syracuse, New York, by the Natural Resources Management Branch, Northern Division Naval Facilities Engineering Command, Philadelphia, Pennsylvania (hereinafter referred to as NORTHDIV or NAVFACENGCOM).

November 1986
Revised 1990

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Exhibit A - Parcel A Location Map
Exhibit B - Soil Map
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SOIL AND WATER CONSERVATION PLAN FOR PARCEL A AGRICULTURAL OUTLEASE

I. INTRODUCTION

This plan is prepared as the basis for lease of land for agricultural crop production. The parcel to be leased is located along the north-central boundary of the Naval Weapons Industrial Reserve Plant (NWIRP) at Calverton, in Suffolk County, New York. NWIRP is located on Long Island approximately sixty miles east of New York City and six miles west of the town of Riverhead.

NWIRP Calverton is a government-owned, but contractor-operated, naval aviation production facility. The total land area is approximately 6048 acres government-owned, of which 2930 acres are leased to the Grumman Corporation and 3125 acres are buffer zones of the aircraft runway and related air operations facilities. Approximately 411 acres, divided among four parcels located in the buffer zones, are leased for agricultural proposes. This leased parcel is located in the northern air clearance, safety and crash zone, "AICUZ" (Air Installation Compatible Use Zone) area.

A. Access

Access to the parcel is from River Road. The parcel is bounded by a Navy owned fenced area to the east, River Road to the south, and Navy owned forest to the west and north.

B. Description

The parcel is approximately 43 acres of cropland oriented in a north-south direction (see Exhibit A).

C. Climate

The climate is controlled by and originates within surrounding humid-continental land areas of North America. Maritime influence is significant. Continental air masses and weather systems create cold winters and hot, humid summers. Maritime influences moderate continental weather by extending the frost-free period, lowering daily and annual temperatures and creating heavier winter precipitation than summer. The relative geographic location of this parcel from the shoreline, is also a factor.

The average precipitation is 43.4 inches and varies from about 40.6 to 46.5 each year. Monthly precipitation varies from 2.7 to 4.5 inches. June, July, September, and October are the driest months and March,

August, November, and December are the wettest months. Snow is likely between December and early March. The average yearly snow accumulation is 26 to 34 inches although total accumulations greater than 40 inches are recorded. The frost-free growing season is about 20 to 210 days. About 23 to 25 inches of rain falls during the April to October growing season.

The daily average low temperature is 44 degrees Fahrenheit (F)and the average high temperature is 61 degrees F. Coldest winter temperatures range between 0 degrees and 10 degrees F. The coldest months are January and February. The minimum summer temperatures are 60 degrees and 70 degrees F. High temperatures of 90 degrees or higher occur 4 to 6 days or longer each year. The sun shines 50 to 55 percent in winter and as much as 60 to 65 percent from May through October.

D. Soils

Soils of the outlease parcel have been cleared, but were previously forested with pitch pine, scrub oak, and white oak. The cropland area has been in cultivation (reportedly) greater than forty years. Past crops have been potatoes and vegetable crops. The cropland soil is primarily of the Haven Riverhead Association, a deep nearly level, well-drained medium textured and moderately course textured soil on a past glacier outwash plain. The surface soil of the cultivated area is loam and the substratum or lower soil is loam, silt loam, or sandy loam. A substratum of sand and gravel lies beneath the cropland at a depth of 18 to 36 inches.

The soils of the leased premises are further divided into subdivisions or "soil series", which is the basic soil mapping unit used in land management. The soil series found on Parcel A are shown on map Exhibit B and listed and described on Exhibit C. Each soil series is rated by a capability classification. The capability classification shows, in a general way, the suitability of the soil to produce crops commonly grown in the area. Each soil capability is categorized by their major limitations for agriculture uses, the risk of damage when so used, and the way the soils respond to treatment.

E. Authorized Land Uses

The purpose of this conservation plan is a two-fold approach to land management, in that this plan will: (1) guide the leased agricultural use of land by setting land use requirements, (2) establish a list of conservation practices to protect or improve the productivity of the land.

This parcel is available for cultivation of any locally adapted dry land and irrigated crops. The growing of sod is prohibited. Certain uncleared or partially cleared portions of the parcel may be utilized by blueberry production and apiculture (beekeeping). Livestock grazing is not allowed.

II. COORDINATION WITH THE MILITARY

A. Military Use

NWIRP Calverton is under the Command of Naval Plant Representative Office (NAVPRO), at Bethpage, New York. The primary use of NWIRP Calverton is for military aircraft assembly plant and aircraft testing activities. The agricultural outlease operation is secondary and subject to the military requirements for the land at all times. The leasee shall conduct their operation in a manner that will not interfere with military requirements, uses, or activities. The lessee, employees, and agents shall adhere to all NWIRP and NAVPRO regulations regarding safety, vehicle travel, security, and health.

B. Notification and Coordination

The lessee shall closely coordinate farming operations with the NAVPRO, or the designated representative (telephone 516/575-9159). The leasee shall also provide the NAVPRO with current telephone numbers where the lessee may be contacted during working and non-working hours. The lessee shall be available at all times to correct emergency situations with regard to the outlease parcel. Access routes to and from the outlease fields may be designated by the NAVPRO and if designated, such routes shall be utilized by the lessee, employees, and agents.

C. Other Activities

The right is reserved for others, at the direction of the NAVPRO and/or NORTHDIV, to conduct natural resources conservation programs, fire control, or fire prevention and weed/pest control on the outleased area. Hunting on the outleased parcel is allowed only through coordination with the New York State Department of Environmental Conservation Office at Ridge, New York (telephone 516/751-7900 extension 265).

III. AGRICULTURAL AND CONSERVATION PRACTICES AND MEASURES

A. Agricultural Practices

Conservation practices are discussed for erosion control. Some of the practices shall be performed at the lessee's cost and expense. Other practices may be paid for

by the Navy. If paid by the government, compensation shall take the form of a rental credit against future rental due or a reimbursement from rental payments previously made. Under no circumstances shall the lessee undertake any reimbursable work item with prior written authorization from NORTHVACFACENGCOM. The total amount of rental credit, and or, the amount of reimbursement shall not exceed the total rental due for the premises during the current lease year.

1. Crop and tillage limitations - The lessee shall participate in a conservation program that will preserve the agricultural resource. Annual or biennial crop rotation, minimized tillage or other acceptable conservation practices shall be adhered to by the lessee to result in the minimum allowable soil loss.

2. Annual Meeting - The lessee and the Navy shall meet on or about 1 December each year to review a cropping plan for the subsequent crop year. The Universal Soil Loss Equation, as defined by the USDA Agricultural Handbook No. 537 of December 1978, or subsequent revisions, shall be used to calculate the approximate amount of average annual soil lost based on long term crop rotation and crop management. The lessee shall limit the type of equipment, type of crop(s) grown, the crop rotation or other agricultural practices to keep within allowable soil loss estimates.

Wind erosion will be estimated using the Wind Erosion Equation procedures defined in the SCS Field Office Technical Guide. Management of cover crops or other crop residue may be required to protect the land resources during storm events. It may also reduce the dust hazard to the Navy operation.

3. Only about one-quarter of the parcel is farmed each year. It would appear that there is opportunity to establish a conservation rotation such as grass sod for six years, and cole crops for two years. On this assumption, I would suggest dividing the field into four equal parts. Grow vegetables for two consecutive years on one parcel while the others are in permanent grass and rotate to the next parcel every two years.

4. Soil Fertility and Nutrient Management - The Navy reserves the right to establish minimal soil fertility levels by either soil test or plant tissue analysis. The Navy shall conduct the initial soil test at any time after the commencement of the lease. Thereafter, the lessee shall make all necessary fertilizer applications to insure that soil fertility meets or exceeds all desirable levels of the initial soil test. Soil nutrient levels to be tested will include: phosphorous (P), potassium (K), pH (lime) levels, calcium (Ca), magnesium (Mg), and soil organic matter (om).

The leasee shall make up all deficiencies (P,K, and lime only) that result between the initial soil test and the expiration or termination of the lease. The Navy will invite the lessee to be present at the time soil samples are taken and then notify the lessee promptly of the results of the soil tests. All other fertilizer applications may be made at the option, and at the expense, in the amounts and kinds determined by the lessee to be necessary for the crop. Nutrient application shall not exceed crop requirements as determined from a nutrient budget for nitrogen and phosphorus, or the recommendations of Cooperative Extension Service. Soil testing shall be done every 3-5 years to monitor the soil chemistry.

5. Assuming cole crops (cabbage, broccoli, cauliflower) will be grown:

a. Adjust soil pH to 6.8 with ground limestone and, in addition, broadcast and incorporate at least 1500 lb/A of hydrated lime at least six weeks before planting cole crops. Hydrated lime should be applied each year unless the soil pH exceeds 7.5 to assist in controlling clubroot. Clubroot was reported as a significant problem.

b. Add other nutrients as recommended by Cooperative Extension including boron, magnesium, and molybdenum.

c. Apply nitrogen in split applications for efficient use of N by the crop. This will reduce the potential for leaching of nitrates to the groundwater.

6. Cover Crop - A winter cover crop of rye (Secale cereale) shall be seeded at a two bu. per acre rate by the lessee. This shall be seeded immediately after harvest, or no later than October 30. This will normally allow sufficient growing degree days for the rye to germinate and become established to provide some winter protection. Spring growth will provide some additional organic matter to incorporate into the soil and should give the field a higher yield potential for grain. The rye may be harvested as grain or managed as a green manure or residue crop.

If the field is able to be seeded on or before September, then ryegrass (Lolium spp.) may be a better choice as a soil improvement crop. It has a more massive, fibrous root system, but does require more warm temperature to establish.

The cover crop may prevent the leaching of 30 to 50 or more pounds of nitrogen per acre.

7. Permanent sod - The grass or legume-grass mixture should be seeded late August, after the second year of cole crop. Soil fertility should be adequate for establishment. After the sod is established, mow to six inch height as needed, to maintain an actively growing sod.

8. Tall fescue sod perimeter of the farmed portion could be maintained, 12 to 15 feet wide. This would provide a reasonable driving lane and provide a sediment trap for any sediment leaving the field. The tall fescue lane or road would help keep the vehicle and produce clean.

9. Bird Hazards - Parcel A is located approximately 1500 feet east from the south end of the east runway. Certain agricultural crops may create a safety hazard or nuisance to nearby aircraft testing flights. The lessee shall discontinue any cropping operations or other activities which jeopardize air operations upon notification by NAVPRO.

10. Apiculture (beekeeping) - A 1/4 acre portion of the "Conservation Area" may be utilized by the lessee for apiculture purposes. Beehives shall be arranged in a neat and orderly arrangement. All grass and herbaceous vegetation within the apiary and extending outward, not less than 20 feet from any hives, shall be kept mowed to a maximum height of six inches. No beekeeping supplies or materials shall be stored at the apiary site. The beekeeper shall comply with all New York State, Suffolk County, or other appropriate laws regarding the use and registration of the apiary. All beehives shall be registered with the state of New York for the control of foul brood disease and to allow regular inspection of the apiary by the State of New York.

11. All farm equipment shall be parked in a neat and orderly manner. The lessee shall take care not to spill or drain fuel, oil, or hydraulic fluid into the soil. Any spilled petroleum product shall be contained to a confined area and cleaned in accordance with appropriate regulations taking all necessary precautions to prevent contamination of surface or ground water.

12. Harvested crops shall not be stored on the leased premises except in approved crop storage facilities. Temporary accumulation of harvested crops is allowed, not to exceed 30 days of the harvest period.

13. The lessee shall plan and implement his planting and harvesting schedule so that all crops are harvested prior to the termination date of the final lease year. No lease extension is allowed for the purpose of crop harvest.

B. Maintenance Requirements

1. The lessee shall keep the premises clean of all trash and debris. The lessee shall dispose of all refuse and debris generated by agricultural operations off of the premises. Dumping of agricultural refuse is prohibited.

2. The lessee shall keep clean all drainage ditches and/or culverts on the premises. Drainage ditches shall be clear of all shrubby plant growth, silt or other obstacles to surface water flow.

3. The lessee shall protect any well heads from physical damage and prevent the contamination of the soil and water from oils and pesticides.

4. Maintenance of fallow areas - All areas of the outleased premises, which are not farmed, shall be maintained litterfree and weed free condition by the lessee. Any field or sizable farmable area shown as "cultivated" on Exhibit "A", if not farmed, shall be seeded to perennial ryegrass or tall fescue and maintained by mowing by the lessee to a height six inches until farmed or the lease expires. More frequent mowing within 72 hours notice by the Navy to the lessee, not to exceed two additional mowings per year, may be required.

C. Pest Management

1. The lessee shall control all noxious or undesirable cropland weeds, vertebrate, insect, or other pests on the leased parcel. As used herein, the term "pesticide" includes herbicides, insecticides, fungicides, rodenticides, algaecides, and avicides. With regard to all actions relating to pest control undertaken by the lessee or his agents, the lessee shall assume full responsibility for complying with all federal, state, and local standards for the prevention, control, and abatement of environmental pollution.

2. All applications of pesticides shall be at the lessee's expense and shall be accomplished in compliance with Department of Defense requirements for safety, effectiveness, and environmental protection. In this regard, the services of the Pest Control Coordinator of the NWIRP or the appropriate designated personnel, hereinafter referred to as the PCC, will be provided as needed. In addition, any state or county permits required for application of a particular pesticide shall be obtained by the lessee prior to application.

3. Specific and complete information concerning the proposed pesticide application program shall be furnished by the lessee directly to the PCC a minimum of five working days prior to any pesticide applications. This information shall include the following: (a) common name and concentration of product (pesticide); (b) formulation of product; (c) approximate acreage to be treated; (d) application rate (per acre); (e) approximate time and frequency of application; and a current Material Safety Data Sheet (MSDS). Additional advisory assistance on how to submit the above information is available upon request from the PCC. Only those pesticides reported to and approved by the PCC shall be utilized by the lessee. The Government may provide a trained and certified pest controller to observe and approve all pest control operations conducted on the leased area.

4. As Integrated Pest Management programs are developed for the crops being grown, implementation of scouting, record keeping, and treating the crops necessary should be utilized.

D. Fire Prevention

1. The lessee, agents, and all persons employed shall perform farming operations in a manner to prevent or reduce fire hazards. The lessee shall comply with the NWIRP fire control and prevention regulations, a copy of which may be obtained from the NAVPRO. In the event of any accidental or uncontrolled fire on the premises, the lessee shall immediately contact the NWIRP Fire Department and exert efforts to prevent damage to the premises from such a fire.

2. All engine driven equipment such as tractors, combines, and motor vehicles utilized by the lessee on the premises shall be equipped with operable spark arresters, mufflers, and tail pipe assemblies. Additional care shall be taken when using any 1975 or newer vehicle having a catalytic converter pollution control device due to the extreme heat generated by this device, which may ignite dry grass or plant residue.

3. Flammable materials, such as fuel and oil, may not be permanently stored in bulk on the outlease parcel. Safe, temporary storage of flammable materials is allowed only in connection with ongoing field operations. All fuel and lubricant storage areas shall be kept in a neat and orderly condition at all times, with extreme care taken by the lessee to reduce the risk of fire. All empty fuel or oil containers and used oil filters shall be disposed of in accordance with accepted environmental regulations.

III. TECHNICAL ASSISTANCE

Technical assistance for the application of conservation management practices described herein is available from the following offices:

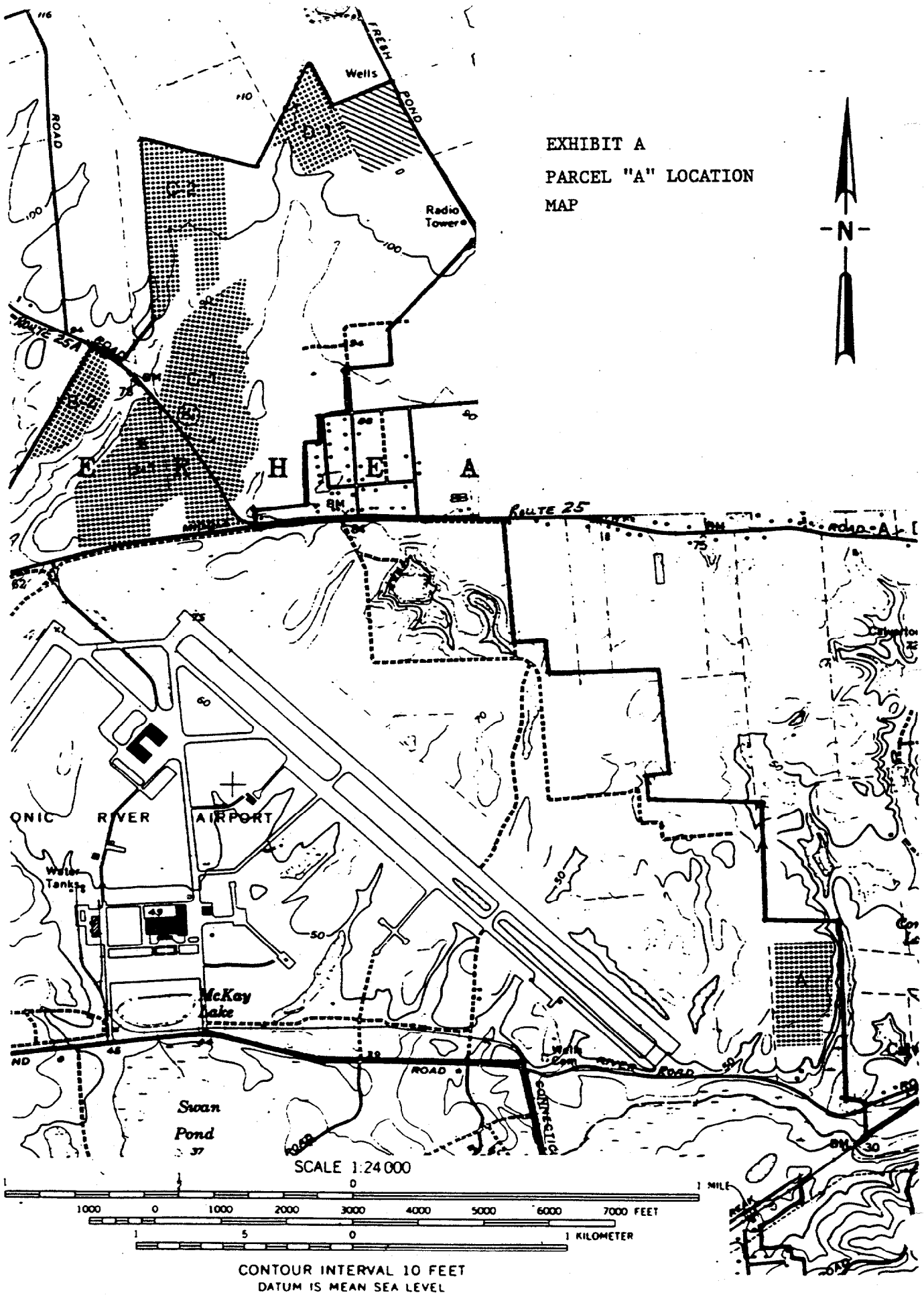
A. Northern Division, Naval Facilities Engineering Command
Natural Resources Management Branch(Code 24B)
U.S. Naval Base, Building 77-L
Philadelphia, PA 19112-5094
Telephone: (215) 897-6207

B. USDA-Soil Conservation Service and Suffolk Co. Soil and Water Conservation District
164 Old Country Road, Rt. 58
Riverhead, NY 11901
Telephone: (516) 727-2315

C. USDA Cooperative Extension Service Suffolk County
246 Griffing Avenue
Riverhead, NY 11901
Telephone: (516) 727-7850

EXHIBIT A

PARCEL "A" LOCATION MAP



SCS-CPA-015
12-85

EXHIBIT B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MAP

Owner NAVY Operator

County SUFFOLK State NEW YORK

Soil survey sheet (s) or code nos. 43 Aproximate scale 1:20,000

N

Prepared by U. S. Department of Agriculture, Soil Conservation Service cooperating with SUFFOLK SOIL AND WATER Conservation District

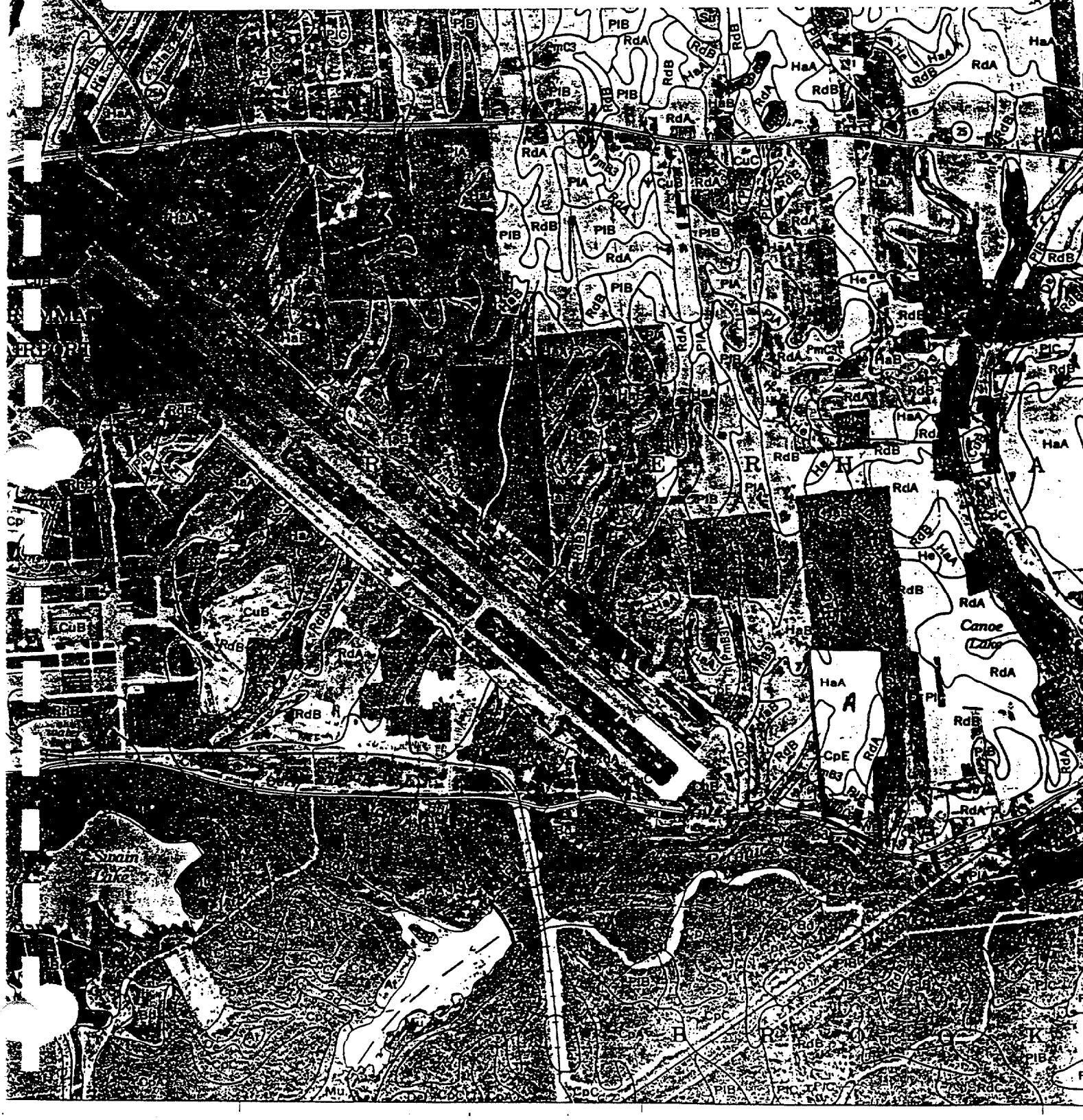


EXHIBIT C - SOIL MAP SYMBOLS AND DESCRIPTIONS OF SOILS WITHIN AGRICULTURAL OUTLEASED PARCEL "A". INFORMATION FROM SUFFOLK COUNTY, NEW YORK SOIL SURVEY

Haven loam, 0 to 2 percent slopes (HoA).—This soil ıas the profile described as representative of the series. :t is mostly nearly level and generally is on outwash ›lains. Some areas of this soil are on moraines and gen- rally are on the top of low-lying hills. Some of these .reas are slightly undulating. Most areas of this soil are arge, but on moraines the areas are smaller and are rregular in shape.

Included with this soil in mapping are small areas of ›cio soils and some crescent-shaped, gravelly areas. Also ıcluded are soils that have a moderately coarse textured urface layer and a medium-textured subsoil. In many reas of this soil that are mapped in association with 3ridgehampton soils, the soil is deeper and siltier than hat described as representative of the series. Bridge- ıampton soils generally are included in mapping in hese areas. Also included, on moraines, are areas of Montauk soils that have a very weak fragipan. Montauk oils formed in loose, sandy till.

The hazard of erosion is slight on this Haven soil. Primary management concerns are keeping the soil from rusting after rain, maintaining tilth, and reducing the ›lowpan.

soil is used extensively for crops, and it is well o all crops commonly grown in the county. Pota- oe. .e the main crop, but cauliflower, cabbage, corn, nion, and sod crops are also grown. Because of the early level slope and ease of excavation, most areas of his soil in the western part of the county are being used or housing developments and industrial parks. Capabil- y unit I–1; woodland suitability group 3o1.

Haven loam, 2 to 6 percent slopes (HoB).—This soil is n outwash plains and moraines, commonly along shal- ›w, intermittent drainage channels. Slopes are short. In ırger areas this soil is mostly undulating. Most areas of his soil are smaller than the areas of Haven loam, 0 to 2 ercent slopes.

In cultivated areas this soil is 2 or 3 inches shallower › sand and gravel than the soil described as representa- ive of the series, and it contains a larger amount of ravel. Otherwise the two profiles are similar.

Included with this soil in mapping are small areas of :iverhead and Bridgehampton soils, some of which are ı a complex pattern with the dominant Haven soil. 'hese included soils generally are in the larger areas of ıis soil. Also included are Montauk silt loams that have very weak fragipan. In places areas of this soil that re mapped near Montauk soils have layers of till deep ı the substratum. Also included are areas along the ›ttom of narrow drainage channels that have a silty ırface layer that is thicker than that in the profile escribed.

The hazard of erosion is moderate to slight on this Haven soil. Management concerns are controlling runoff and erosion and keeping the surface loose and free from crusting.

This soil is well suited to all crops commonly grown in the county. It generally is farmed the same as adjoining areas of nearly level soils. Crops commonly grown are potatoes, cauliflower, cabbage, and corn. Most areas in the western part of the county are used for housing developments. Capability unit IIe–1; woodland suitability group 3o1.

Riverhead sandy loam, 0 to 3 percent slopes (RdA).—This soil has the profile described as representative of the series. It generally is on outwash plains, and the areas are large and uniform. Where this soil occurs on outwash plains, it generally has slope characteristics of this landform. Slopes are undulating in places. A few small, irregular areas are on moraines.

Included with this soil in mapping are small areas of Sudbury soils that are less than 1 to 2 acres in size. Also included are areas of soils near Bridgehampton that have a profile similar to that of this soil, except that at a depth of about 30 inches they have layers of gray and strong-brown silt loam 1 to 2 feet thick. Also included are areas of Haven and Plymouth soils that have a texture marginal to sandy loam and areas of soils that have a loam or fine sandy loam surface layer and a sandy loam subsoil. Areas of Montauk soils on moraines that have a very weak fragipan formed in loose sandy till are included.

The hazard of erosion is slight on this Riverhead soil. This soil is limited only by moderate droughtiness in the moderately coarse textured solum. It tends to develop a plowpan if it is intensively farmed.

This soil is well suited to all crops commonly grown in the county, and it is used extensively for that purpose. Most areas in the western part of the county, however, are used for housing developments and industrial parks. Capability unit IIs–1; woodland suitability group 3o1.

Riverhead sandy loam, 3 to 8 percent slopes (RdB).—This soil is on moraines and outwash plains. It generally is in areas along shallow, intermittent drainageways. Slopes generally are moderately short, but large areas on moraines are undulating.

The profile of this soil is similar to the one described as representative of the series, though in cultivated areas this soil is likely to be 2 to 3 inches shallower to coarse sand and gravel, and the surface layer is likely to contain a slightly larger amount of gravel.

Included with this soil in mapping are small areas of Bridgehampton, Haven, and Plymouth soils in a complex pattern. The texture of these soils is marginal to sandy loam. These included soils generally are on large separations. Near Bridgehampton are included areas of Riverhead soils that have gray and strong-brown silt loam layers at a depth of 26 to 30 inches. Also included are narrow strips of Haven loam, thick surface layer, along intermittent drainageways, and soils that have a surface layer of loam or fine sandy loam and a subsoil of sandy loam. Included with this soil on moraines are Montauk soils that have a very weak fragipan that formed in loose, sandy till.

The hazard of erosion is moderate to slight on this Riverhead soil. The main concerns of management are controlling runoff and erosion and providing adequate moisture.

This soil is well suited to all crops commonly grown in the county, and it is used mainly for this purpose. Most areas in the western part of the county, however, are used for housing developments and as industrial sites. Capability unit IIe-2; woodland suitability group 3o1.

Plymouth loamy sand, 3 to 8 percent slopes (PlB).—This soil is on moraines and outwash plains. Slopes are undulating, or they are single along the sides of intermittent drainageways. The undulating areas generally are large. The areas along intermittent drainageways are narrow and long, and they follow the course of the drainage channel.

Included with this soil in mapping are small areas of Riverhead soils that are marginal to loamy sand in texture. Also included are loamy sands that have profiles similar to those of soils in the Carver series. Other inclusions on moraines are Montauk loamy sand, sandy variant soils that have a weak fragipan or areas that are too small to map separately. These are intergrades between Plymouth loamy sand and Montauk loamy sand, sandy variant soils. Small gravelly areas less than about 2 acres in size are included. Included are a few small areas, particularly on Fishers Island, that are dominantly fine sand.

The hazard of erosion is slight on this Plymouth soil. This soil tends to be droughty.

This soil is fairly well suited to the crops commonly grown in the county. Some areas were formerly used for farming, but most such areas are in brush or are idle. In the western part of the county, this soil is used mainly for housing developments. Capability unit IIIs-1; woodland suitability group 4s1.

Wareham loamy sand (We).—This is the only Wareham soil mapped in the county. It is along the margins of tidal marshes and creeks or in low-lying positions around marshes and ponds. Slopes are 3 percent or less. Areas are small are long and narrow in most places. They are between areas of very poorly drained marshy soils and well-drained upland soils.

Included with this soil in mapping are areas of Atsi and Berryland soils that are too small to map separatel Walpole soils are included in places where textures a marginal between loamy sand and sandy loam. Al included are somewhat poorly drained loamy sands th have a brownish subsoil to a depth of 20 inches.

The hazard of erosion is slight on this Wareham soi Drainage is poor on this soil, and artificial drainage needed if it is used for farming. Permeability is rapi Difficulty in locating outlets seriously reduces the feas bility of installing drainage for crop production. Th soil is ponded for a short time during prolonged we periods. Natural fertility is low.

This soil is not well suited to most crops. Almost a of this soil is wooded, but a few areas along the sout shore are filled and are used as homesites. This soil i well suited to use as woodland or as habitat for wild life. Capability unit IVw-1; woodland suitability grou 4w1.

Carver and Plymouth sands, 15 to 35 percent slope (CpE).—These soils are almost exclusively on moraines ex cept for a few steep areas on side slopes along some o the more deeply cut drainage channels on outwasl plains. On morainic landforms these areas are large, an slopes generally are complex, especially on the Ronkon koma moraine. On the outwash plains the areas are i long, narrow strips parallel to the drainage channels Some areas are made up entirely of Carver sand, other entirely of Plymouth sand, and still others of a combina tion of the two soils.

The Carver soil in this mapping unit has a profil similar to the profile described as representative of tha series, except that the gravel content is greater, an gravel makes up as much as 15 percent, by volume, o the soil in some places. The Carver soil in this unit gen erally is a few inches thinner to the substratum than th soil described as representative. The Plymouth soil i this unit is similar to the soil described as representativ of the Plymouth series, except that its texture is san rather than loamy sand. Also, it has a higher content o gravel, and gravel makes up as much as 15 percent, b volume, of the soil in some places.

Included with these soils in mapping are small area of loamy sand and small areas of Carver and Plymouth sands, 0 to 3 percent slopes, or 3 to 15 percent slopes Also, on moraines, some areas of this unit contain a much as 30 percent gravel and a few cobblestones. Such areas generally are small and are in a mixed pattern with soils that contain less gravel. Also included ar areas of Montauk loamy sand, sandy variant, 15 to 35 percent slopes, that have a weakly developed fragipan o a fragipan that is at a depth of more than about 4 feet Also included are soils that are similar to Carver soils that have dark iron and humus coatings on the sand grains in the upper part of the subsoil. Also included are small areas of Haven and Riverhead soils that have slopes of more than 15 percent.

The hazard of erosion is moderate to severe on the soils in this unit. These soils are droughty, and natural fertility is low. Moderately steep to steep slopes are a limitation to use.

The soils of this unit are poorly suited to crops commonly grown in the county. Areas of these soils have not been cleared for farming. A few areas in the western part of the county along the north shore are being used as homesites. Capability unit VIIs–1; woodland suitability group 5s2.

SOIL AND WATER CONSERVATION PLAN
FOR
AGRICULTURAL OUTLEASE
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK
PARCEL "B"

Prepared in cooperation with USDA Soil Conservation Service, Riverhead and Syracuse, New York, by the Natural Resources Management Branch, Northern Division Naval Facilities Engineering Command, Philadelphia, Pennsylvania (hereinafter referred to as NORTHDIV or NAVFACENGCOM).

November 1986
Revised 1990

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EXHIBITS

Exhibit A - Parcel B Location Map
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SOIL AND WATER CONSERVATION PLAN
FOR PARCEL B
AGRICULTURAL OUTLEASE

I. INTRODUCTION

This plan is prepared as the basis for lease of land for agricultural crop production. The parcel to be leased is located along the north-central boundary of the Naval Weapons Industrial Reserve Plant (NWIRP) at Calverton, in Suffolk County, New York. NWIRP is located on Long Island approximately sixty miles east of New York City and six miles west of the town of Riverhead.

NWIRP Calverton is a government-owned, but contractor-operated, naval aviation production facility. The total land area is approximately 6048 acres government-owned, of which 2930 acres are leased to the Grumman Corporation and 3125 acres are buffer zones of the aircraft runway and related air operations facilities. Approximately 411 acres, divided among four parcels located in the buffer zones, are leased for agricultural proposes. This leased parcel is located in the northern air clearance, safety and crash zone, "AICUZ" (Air Installation Compatible Use Zone) area.

A. Access

Access to the parcel is from North Country (Parker) Road, State Route 25A and from State Route 25. The parcel is bounded by the Veteran's Cemetery to the north east, Route 25A to the north and Route 25 to the south.

B. Description

The parcel is approximately 73 acres of cropland located on two irregular fields designated as B1 and B2 (see map Exhibit "A").

C. Climate

The climate is controlled by and originates within surrounding humid-continental land areas of North America. Maritime influence is significant. Continental air masses and weather systems create cold winters and hot, humid summers. Maritime influences moderate continental weather by extending the frost-free period, lowering daily and annual temperatures and creating heavier winter precipitation than summer. The relative geographic location of this parcel from the shoreline, is also a factor.

The average precipitation is 43.4 inches and varies from about 40.6 to 46.5 each year. Monthly precipitation varies from 2.7 to 4.5 inches. June, July,

September, and October are the driest months and March, August, November, and December are the wettest months. Snow is likely between December and early March. The average yearly snow accumulation is 26 to 34 inches although total accumulations greater than 40 inches are recorded. The frost-free growing season is about 200 to 210 days. About 23 to 25 inches of rain falls during the April to October growing season.

The daily average low temperature is 44 degrees Fahrenheit (F) and the average high temperature is 61 degrees F. Coldest winter temperatures range between 0 degrees and 10 degrees F. The coldest months are January and February. The minimum summer temperatures are 60 degrees and 70 degrees F. High temperatures of 90 degrees or higher occur 4 to 6 days or longer each year. The sun shines 50 to 55 percent in winter and as much as 60 to 65 percent from May through October.

D. Soils

Soils of the outlease parcel have been cleared, but were previously forested with pitch pine, scrub oak, and white oak. The cropland area has been in cultivation (reportedly) greater than forty years. Past crops have been potatoes and vegetable crops. The cropland soil is primarily of the Haven Riverhead Association, a deep nearly level, well-drained medium textured and moderately course textured soil on a past glacier outwash plain. The surface soil of the cultivated area is loam and the substratum or lower soil is loam, silt loam, or sandy loam. A substratum of sand and gravel lies beneath the cropland at a depth of 18 to 36 inches.

The soils of the leased premises are further divided into subdivisions or "soil series", which is the basic soil mapping unit used in land management. The soil series found on Parcel B are shown on map Exhibit B and listed and described on Exhibit C. Each soil series is rated by a capability classification. The capability classification shows, in a general way, the suitability of the soil to produce crops commonly grown in the area. Each soil capability is categorized by their major limitations for agriculture uses, the risk of damage when so used, and the way the soils respond to treatment.

E. Authorized Land Uses

The purpose of this conservation plan is a two-fold approach to land management, in that this plan will: (1) guide the leased agricultural use of land by setting land use requirements, (2) establish a list of conservation practices to protect or improve the productivity of the land.

This parcel is available for cultivation of any locally adapted dry land and irrigated crops. The growing of sod is prohibited. Certain uncleared or partially cleared portions of the parcel may be utilized by blueberry production and apiculture (beekeeping). Livestock grazing is not allowed.

II. COORDINATION WITH THE MILITARY

A. Military Use

NWIRP Calverton is under the Command of Naval Plant Representative Office (NAVPRO), at Bethpage, New York. The primary use of NWIRP Calverton is for military aircraft assembly plant and aircraft testing activities. The agricultural outlease operation is secondary and subject to the military requirements for the land at all times. The lessee shall conduct their operation in a manner that will not interfere with military requirements, uses, or activities. The lessee, employees, and agents shall adhere to all NWIRP and NAVPRO regulations regarding safety, vehicle travel, security, and health.

B. Notification and Coordination

The lessee shall closely coordinate farming operations with the NAVPRO, or the designated representative (telephone 516/575-9159). The lessee shall also provide the NAVPRO with current telephone numbers where the lessee may be contacted during working and non-working hours. The lessee shall be available at all times to correct emergency situations with regard to the outlease parcel. Access routes to and from the outlease fields may be designated by the NAVPRO and if designated, such routes shall be utilized by the lessee, employees, and agents.

C. Other Activities

The right is reserved for others, at the direction of the NAVPRO and/or NORTHDIV, to conduct natural resources conservation programs, fire control, or fire prevention and weed/pest control on the outleased area. Hunting on the outleased parcel is allowed only through coordination with the New York State Department of Environmental Conservation Office at Ridge, New York (telephone 516/751-7900 extension 265).

III. AGRICULTURAL AND CONSERVATION PRACTICES AND MEASURES

A. Agricultural Practices

Conservation practices are discussed for erosion control. Some of the practices shall be performed at the lessee's cost and expense. Other practices may be paid for by the Navy. If paid by the government, compensation shall take the form of a rental credit against future rental due or a reimbursement from rental payments previously made. Under no circumstances shall the lessee undertake any reimbursable work item with prior written authorization from NORTHVACFACENGCOM. The total amount of rental credit, and or, the amount of reimbursement shall not exceed the total rental due for the premises during the current lease year.

1. Crop and tillage limitations - The lessee shall participate in a conservation program that will preserve the agricultural resource. Annual or biennial crop rotation, minimized tillage or other acceptable conservation practices shall be adhered to by the lessee to result in the minimum allowable soil loss.

2. Annual Meeting - The lessee and the Navy shall meet on or about 1 December each year to review a cropping plan for the subsequent crop year. The Navy, through cooperation with the local USDA - Soil Conservation Service (SCS) office, shall determine the maximum allowable soil loss allowed and therein shall establish standards to limit soil lost by water erosion. The Universal Soil Loss Equation, as defined by the USDA Agricultural Handbook No. 537 of December 1978, or subsequent revisions, shall be used to calculate the approximate amount of average annual soil lost based on long term crop rotation and crop management. The lessee shall limit the type of equipment, type of crop(s) grown, the crop rotation or other agricultural practices to keep within allowable soil loss estimates.

Wind erosion will be estimated using the Wind Erosion Equation procedures defined in the SCS Field Office Technical Guide. Management of cover crops or other crop residue may be required to protect the land resources during storm events. It may also reduce the dust hazard to the Navy operation.

3. A conservation cropping system will help maintain a favorable soil tilth by increasing the organic matter content and improving the soil structure. The important crop in a conservation system is the sod or small grain. Chisel plowing to reduce plow pan or other compacted layer should be done prior to seeding. The pH should be adjusted to 5.5 to 5.8 and P and K brought up to levels for the crop or sod requirements. The pH should be adjusted upward to 6.5 if potatoes are not part of the rotation.

4. Soil Fertility and Nutrient Management - The Navy reserves the right to establish minimal soil fertility levels by either soil test or plant tissue analysis. The Navy shall conduct the initial soil test at any time after the commencement of the lease. Thereafter, the lessee shall make all necessary fertilizer applications to insure that soil fertility meets or exceeds all desirable levels of the initial soil test. Soil nutrient levels to be tested will include: phosphorous (P), potassium (K), calcium (Ca), magnesium (Mg), pH (lime) levels, and soil organic matter (OM). The lessee shall make up all deficiencies (P, K, and lime only) that result between the initial soil test and the expiration or termination of the lease. The Navy will invite the lessee to be present at the time soil samples are taken and then notify the lessee promptly of the results of the soil tests. All other fertilizer applications may be made at the option, and at the expense, in the amounts and kinds determined by the lessee to be necessary for the crop. Nutrient application shall not exceed crop requirements as determined from a nutrient budget for nitrogen and phosphorus, or the recommendations of Cooperative Extension Service. Soil testing shall be done every 3-5 years to monitor the soil chemistry.

5. Cover Crop - A winter cover crop of rye (Secale cereale) shall be seeded at a two bu. per acre rate by the lessee. This shall be seeded immediately after harvest, or no later than October 30. This will normally allow sufficient growing degree days for the rye to germinate and become established for some winter protection. Spring growth will provide some additional organic matter to incorporate into the soil and should give the field a higher yield potential for grain. The rye may be harvested as grain or managed as a green manure or residue crop.

If the field is able to be seeded on or before September 1, then ryegrass (Lolium spp.) may be a better choice as a soil improvement crop. It has a more massive, fibrous root system, but does require more warm temperature to establish.

The cover crop may prevent the leaching of 30 to 50 pounds or more of nitrogen per acre.

6. Permanent sod - There are two small sections of field B1 which should be seeded to permanent vegetation. These are steep and eroding areas. The access road from Route 25A and the corn end-rows should be seeded to tall

fescue (Festuca arundinacea) at 100 pounds per acre. A small grass waterway may also be needed in the six percent slope area. On site assistance by the Suffolk County Soil and Water Conservation District is available to provide specific help in proper location and design of the waterway.

Field B2 is small in size and is separated from the Veteran's Cemetery by an access road. Corn was grown during 1988. Cropping sequence needs to have a high organic matter producing crop in it to provide better soil structure and more efficient nutrient management.

7. Bird Hazards - Parcel B is located approximately 1500 feet from the north end of both runways. Certain agricultural crops may create a safety hazard or nuisance to nearby aircraft testing flights. The lessee shall discontinue any cropping operations or other activities which jeopardize air operations upon notification by NAVPRO.

8. Apiculture (beekeeping) - A 1/4 acre portion of the "Conservation Area" may be utilized by the lessee for apiculture purposes. Beehives shall be arranged in a neat and orderly arrangement. All grass and herbaceous vegetation within the apiary and extending outward, not less than 20 feet from any hives, shall be kept mowed to a maximum height of six inches. No beekeeping supplies or materials shall be stored at the apiary site. The beekeeper shall comply with all New York State, Suffolk County, or other appropriate laws regarding the use and registration of the apiary. All beehives shall be registered with the state of New York for the control of foul brood disease and to allow regular inspection of the apiary by the State of New York.

9. All farm equipment shall be parked in a neat and orderly manner. The lessee shall take care not to spill or drain fuel, oil, or hydraulic fluid into the soil. Any spilled petroleum product shall be contained to a confined area and cleaned in accordance with appropriate regulations taking all necessary precautions to prevent contamination of surface or ground water.

10. Harvested crops shall not be stored on the leased premises except in approved crop storage facilities. Temporary accumulation of harvested crops is allowed, not to exceed 30 days of the harvest period.

11. The lessee shall plan and implement his planting and harvesting schedule so that all crops are harvested prior to the termination date of the final lease year. No lease extension is allowed for the purpose of crop harvest.

B. Maintenance Requirements

1. The lessee shall keep the premises clean of all trash and debris. The lessee shall dispose of all refuse and debris generated by agricultural operations off of the premises. Dumping of agricultural refuse is prohibited.

2. The lessee shall keep clean all drainage ditches and/or culverts on the premises. Drainage ditches shall be clear of all shrubby plant growth, silt or other obstacles to surface water flow.

3. The lessee shall protect any well heads from physical damage and prevent the contamination of the soil and water from oils and pesticides.

4. Maintenance of fallow areas - All areas of the outleased premises, which are not farmed, shall be maintained litterfree and weed free condition by the lessee. Any field or sizable farmable area shown as "cultivated" on Exhibit "A", if not farmed, shall be seeded to perennial ryegrass or tall fescue and maintained by mowing by the lessee to a height six inches until farmed or the lease expires. More frequent mowing within 72 hours notice by the Navy to the lessee, not to exceed two additional mowings per year, may be required.

C. Pest Management

1. The lessee shall control all noxious or undesirable cropland weeds, vertebrate, insect, or other pests on the leased parcel. As used herein, the term "pesticide" includes herbicides, insecticides, fungicides, rodenticides, algaecides, and avicides. With regard to all actions relating to pest control undertaken by the lessee or his agents, the lessee shall assume full responsibility for complying with all federal, state, and local standards for the prevention, control, and abatement of environmental pollution.

2. All applications of pesticides shall be at the lessee's expense and shall be accomplished in compliance with Department of Defense requirements for safety, effectiveness, and environmental protection. In this regard, the services of the Pest Control Coordinator of the NWIRP or the appropriate designated personnel, hereinafter referred to as the PCC, will be provided as needed. In addition, any state or county permits required for application of a particular pesticide shall be obtained by the lessee prior to application.

3. Specific and complete information concerning the proposed pesticide application program shall be furnished by the lessee directly to the PCC a minimum of five working days prior to any pesticide applications. This information shall include the following: (a) common name and concentration of product (pesticide); (b) formulation of product; (c) approximate acreage to be treated; (d) application rate (per acre); (e) approximate time and frequency of application; and a current Material Safety Data Sheet (MSDS). Additional advisory assistance on how to submit the above information is available upon request from the PCC. Only those pesticides reported to and approved by the PCC shall be utilized by the lessee. The Government may provide a trained and certified pest controller to observe and approve all pest control operations conducted on the leased area.

4. As Integrated Pest Management programs are developed for the crops being grown, implementation of scouting, record keeping, and treating the crops as necessary should be utilized.

D. Fire Prevention

1. The lessee, agents, and all persons employed shall perform farming operations in a manner to prevent or reduce fire hazards. The lessee shall comply with the NWIRP fire control and prevention regulations, a copy of which may be obtained from the NAVFRO. In the event of any accidental or uncontrolled fire on the premises, the lessee shall immediately contact the NWIRP Fire Department and exert efforts to prevent damage to the premises from such a fire.

2. All engine driven equipment such as tractors, combines, and motor vehicles utilized by the lessee on the premises shall be equipped with operable spark arresters, mufflers, and tail pipe assemblies. Additional care shall be taken when using any 1975 or newer vehicle having a catalytic converter pollution control device due to the extreme heat generated by this device, which may ignite dry grass or plant residue.

3. Flammable materials, such as fuel and oil, may not be permanently stored in bulk on the outlease parcel. Safe, temporary storage of flammable materials is allowed only in connection with ongoing field operations. All fuel and lubricant storage areas shall be kept in a neat and orderly condition at all times, with extreme care taken by the lessee to reduce the risk of fire. All empty fuel or oil containers and used oil filters shall be disposed of in accordance with accepted environmental regulations.

III. TECHNICAL ASSISTANCE

Technical assistance for the application of conservation management practices described herein is available from the following offices:

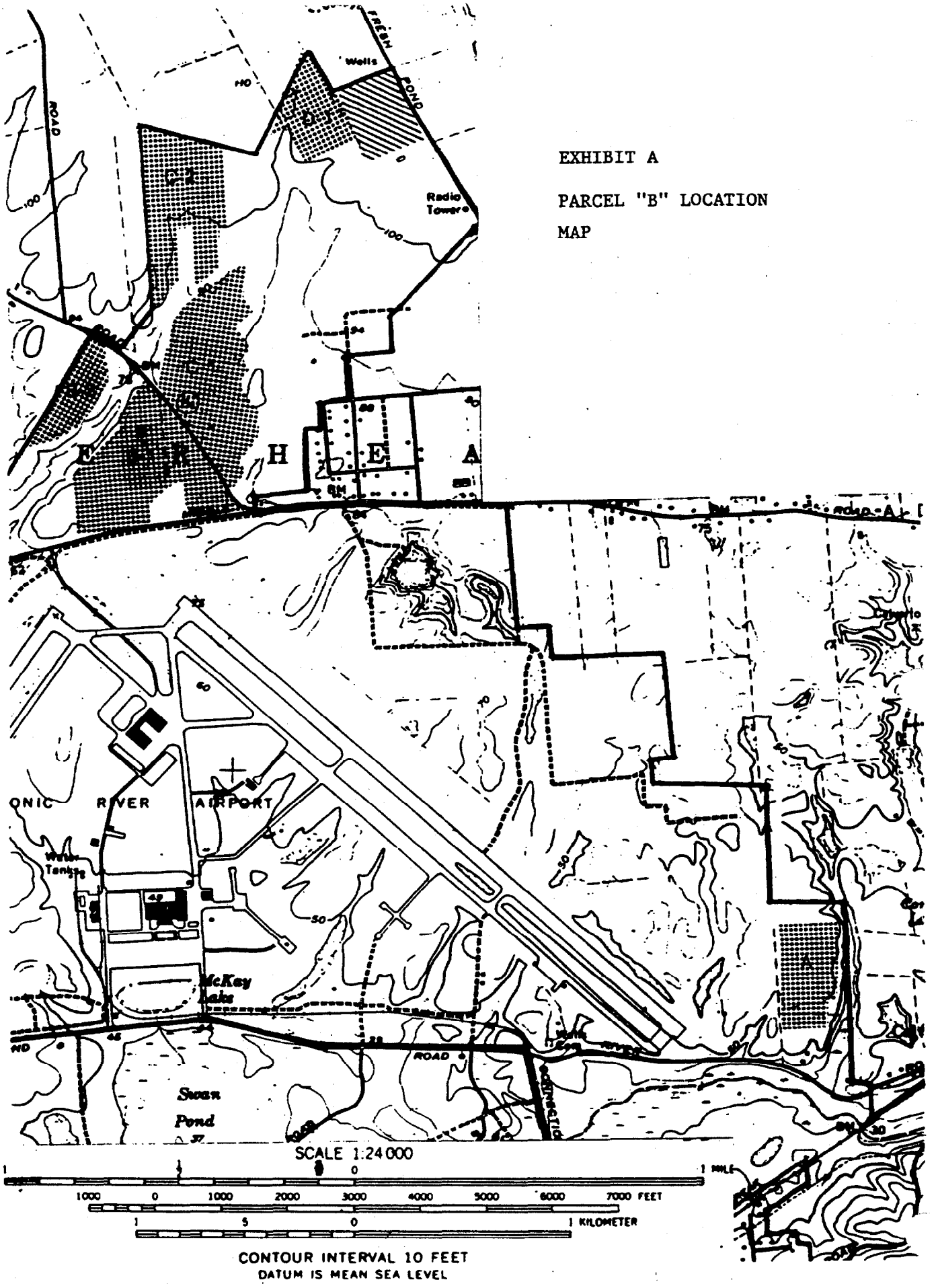
A. Northern Division, Naval Facilities Engineering Command
Natural Resources Management Branch(Code 24B)
U.S. Naval Base, Building 77-L
Philadelphia, PA 19112-5094
Telephone: (215) 897-6207

B. USDA-Soil Conservation Service and Suffolk Co. Soil and Water Conservation District
164 Old Country Road, Rt. 58
Riverhead, NY 11901
Telephone: (516) 727-2315

C. USDA Cooperative Extension Service Suffolk County
246 Griffing Avenue
Riverhead, NY 11901
Telephone: (516) 727-7850

EXHIBIT A

PARCEL "B" LOCATION MAP



SCS-CPA-015
12-85

EXHIBIT B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MAP

Owner NAVY Operator

County SUFFOLK State NEW YORK

Soil survey sheet (s) or code nos. 27 and 43 Aproximate scale 1:20,000

N

Prepared by U. S. Department of Agriculture, Soil Conservation Service cooperating with SUFFOLK COUNTY SOIL AND WATER Conservation District

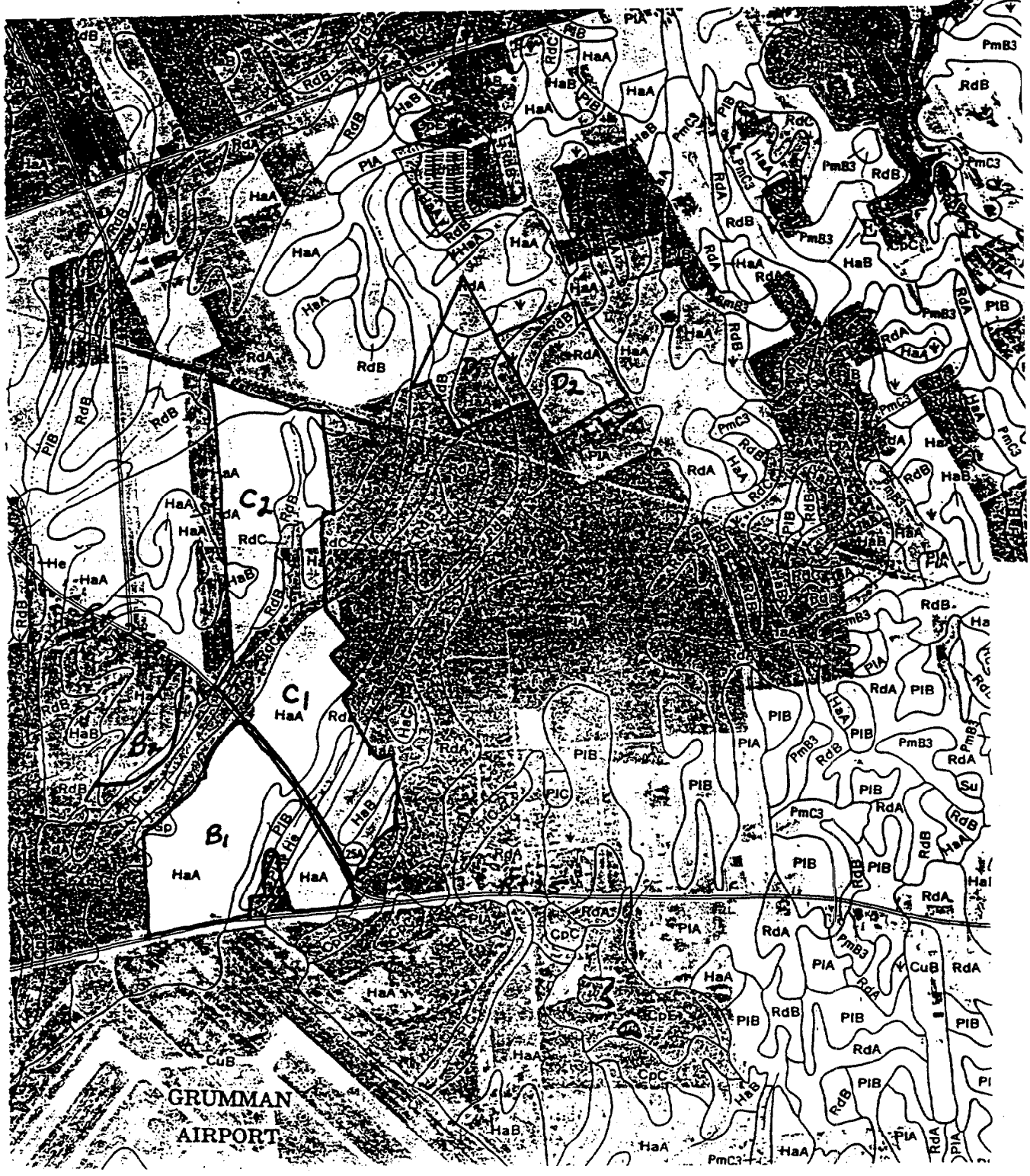


EXHIBIT C - SOIL MAP SYMBOLS AND DESCRIPTIONS OF SOILS WITHIN AGRICULTURAL OUTLEASED PARCEL "B". INFORMATION FROM SUFFOLK COUNTY, NEW YORK SOIL SURVEY

Haven loam, 0 to 2 percent slopes (HoA).—This soil has the profile described as representative of the series. It is mostly nearly level and generally is on outwash plains. Some areas of this soil are on moraines and generally are on the top of low-lying hills. Some of these areas are slightly undulating. Most areas of this soil are large, but on moraines the areas are smaller and are irregular in shape.

Included with this soil in mapping are small areas of Scio soils and some crescent-shaped, gravelly areas. Also included are soils that have a moderately coarse textured surface layer and a medium-textured subsoil. In many areas of this soil that are mapped in association with Bridgehampton soils, the soil is deeper and siltier than that described as representative of the series. Bridgehampton soils generally are included in mapping in these areas. Also included, on moraines, are areas of Montauk soils that have a very weak fragipan. Montauk soils formed in loose, sandy till.

The hazard of erosion is slight on this Haven soil. Primary management concerns are keeping the soil from crusting after rain, maintaining tilth, and reducing the plowpan.

This soil is used extensively for crops, and it is well suited to all crops commonly grown in the county. Potatoes are the main crop, but cauliflower, cabbage, corn, onion, and sod crops are also grown. Because of the nearly level slope and ease of excavation, most areas of this soil in the western part of the county are being used for housing developments and industrial parks. Capability unit I–1; woodland suitability group 3o1.

Haven loam, thick surface layer (He).—This soil is mainly on outwash plains throughout the county. It occupies the bottom of the larger drainage channels or closed depressions where silty material has accumulated from surrounding areas. Slope is less than 3 percent. Areas of this soil generally are quite small. They are mostly long and narrow, but in closed depressions the areas are nearly round.

This soil has the profile described as representative of the series, except that the content of organic matter in the surface layer increases with depth, and the surface layer ranges from about 12 to 30 inches in thickness. Also, in most places the surface layer contains more silt than the soil described as representative of the series, and in some places the subsoil is loam or silt loam.

Included with this soil in mapping are small areas of soils that have a surface layer less than 1 foot thick or more than 2½ feet thick. These included soils are on the same landform and in close association with this soil. Also included are small areas of Scio soils, on the wetter sites, and areas of coarser textured soils that have thick accumulations on the surface. Areas of somewhat poorly drained or wetter soils are shown on the map by the conventional symbol for wet spots.

The hazard of erosion is slight on this Haven soil, except where the soil receives large amounts of water from adjoining sloping soils. Summer crops in closed depressions are damaged if heavy rain falls during the growing season.

Most areas of this soil are well adapted to most crops commonly grown in the county. In closed depressions, however, wheat and rye are frequently damaged by ponding. Areas of this soil generally are used along with adjoining areas of Haven, Bridgehampton, and Riverhead soils. Most areas are cleared and are used for crops or, in the western part of the county, for homesites. Capability unit IIw–2; woodland suitability group 3o1.

Plymouth loamy sand, 0 to 3 percent slopes (PlA).—This soil has the profile described as representative of the series. It is mainly on outwash plains south of the Ronkonkoma moraine. It is also on flat hilltops and in drainageways on morainic deposits. The areas generally are nearly level, but they are somewhat undulating in some places. Areas on outwash plains are large and uniform, and areas on the moraine are small and irregular.

Included with this soil in mapping are small areas of Riverhead soils that have a texture that is marginal to loamy sand. Also included are some loamy sands that have a profile similar in appearance to the soils of the Carver series. On moraines, scattered areas of Montauk sandy variant soils that have a weak fragipan and loose underlying till layers are included. These areas intergrade between Plymouth loamy sands and Montauk loamy sand, sandy variants. In the larger areas of this unit, small acreages of Carver and Plymouth sands are included. Scattered throughout the county and on Fishers Island are areas that are dominantly fine sand.

The hazard of erosion is slight on this Plymouth soil. This soil is fairly well suited to crops commonly grown in the county. Many areas were formerly cleared for farming, but most of these areas are idle or are in brush or trees. Small areas that are in large tracts with Riverhead or Haven soils are the only areas used for farming. In the western part of the county, most of this soil is used for housing developments and as industrial sites. Capability unit IIIs–1; woodland suitability group 4s1.

Plymouth loamy sand, 3 to 8 percent slopes (PlB).—This soil is on moraines and outwash plains. Slopes are undulating, or they are single along the sides of intermittent drainageways. The undulating areas generally are large. The areas along intermittent drainageways are narrow and long, and they follow the course of the drainage channel.

Included with this soil in mapping are small areas of Riverhead soils that are marginal to loamy sand in texture. Also included are loamy sands that have profile similar to those of soils in the Carver series. Other inclusions on moraines are Montauk loamy sand, sandy variant soils that have a weak fragipan or areas that are too

small to map separately. These are intergrades between Plymouth loamy sand and Montauk loamy sand, sandy variant soils. Small gravelly areas less than about 2 acres in size are included. Included are a few small areas, particularly on Fishers Island, that are dominantly fine sand.

The hazard of erosion is slight on this Plymouth soil. This soil tends to be droughty.

This soil is fairly well suited to the crops commonly grown in the county. Some areas were formerly used for farming, but most such areas are in brush or are idle. In the western part of the county, this soil is used mainly for housing developments. Capability unit IIIs-1; woodland suitability group 4s1.

Riverhead sandy loam, 3 to 8 percent slopes (RdB).—This soil is on moraines and outwash plains. It generally is in areas along shallow, intermittent drainageways. Slopes generally are moderately short, but large areas on moraines are undulating.

The profile of this soil is similar to the one described as representative of the series, though in cultivated areas this soil is likely to be 2 to 3 inches shallower to coarse sand and gravel, and the surface layer is likely to contain a slightly larger amount of gravel.

Included with this soil in mapping are small areas of Bridgehampton, Haven, and Plymouth soils in a complex pattern. The texture of these soils is marginal to sandy loam. These included soils generally are on large separations. Near Bridgehampton are included areas of Riverhead soils that have gray and strong-brown silt loam layers at a depth of 26 to 30 inches. Also included are narrow strips of Haven loam, thick surface layer, along intermittent drainageways, and soils that have a surface layer of loam or fine sandy loam and a subsoil of sandy loam. Included with this soil on moraines are Montauk soils that have a very weak fragipan that formed in loose, sandy till.

The hazard of erosion is moderate to slight on this Riverhead soil. The main concerns of management are controlling runoff and erosion and providing adequate moisture.

This soil is well suited to all crops commonly grown in the county, and it is used mainly for this purpose. Most areas in the western part of the county, however, are used for housing developments and as industrial sites. Capability unit IIe-2; woodland suitability group 3o1.

Riverhead sandy loam, 8 to 15 percent slopes (RdC).—This soil is in narrow bands on outwash plains along the side slopes of deep, intermittent drainageways. Slopes are short. On the Harbor Hill moraine and on the Ronkonkoma moraine east of the Shinnecock Canal, the areas of this soil are larger than in other places in the county and they generally are rolling.

The profile of this soil is similar to the one described as representative of the Riverhead series, but in cultivated areas this soil generally is 3 to 4 inches shallower to coarse sand and gravel, and it is as much as 15 percent gravel, by volume.

Included with this soil in mapping are eroded and gravelly areas too small to map separately. Also included in a complex pattern with this Riverhead soil are Haven and Plymouth soils that have a texture marginal to sandy loam. These soils generally are in large separations on moraines. Along the bottom of intermittent drainageways, strips of Haven loam, thick surface layer, that are too narrow to map separately are also included. Other inclusions are Montauk soils that have a very weak fragipan that formed in loose sandy till and some areas that have a sand and gravel substratum, 1 to 2 feet thick, underlain by till at a depth of more than 42 inches.

The hazard of erosion is moderately severe on this Riverhead soil. Controlling erosion is the main concern of management. This soil is limited by droughtiness and by the difficulty of applying irrigation water. The response of crops to applications of lime and fertilizer is good. Slope limits the use of large farm machines.

This soil is suited to crops commonly grown in the county; however, the hazard of erosion reduces its usefulness for farming. Most areas of this soil are in trees or brush. A few small tracts were formerly cleared and farmed along with adjoining less sloping soils, but many of these areas are now in grass or brush because the use of heavy farm equipment on these areas is impracticable. Many of the larger areas of this soil are used for housing developments where large lots are needed. These rolling areas are in the western part of the county. Capability unit IIIe-1; woodland suitability group 3o1.

Carver and Plymouth sands, 0 to 3 percent slopes (CpA).—These soils are mainly on outwash plains; however, they are also on some flatter hilltops and intervening draws on moraines. A small part of this mapping unit is slightly undulating. This unit can be made up entirely of Carver sand, entirely of Plymouth sand, or of a combination of the two soils.

The Carver soil in this mapping unit has the profile described as representative of the Carver series. The Plymouth soil has a profile similar to the one described as representative of the Plymouth series, except that its texture is sand throughout the profile, rather than loamy sand.

Included with these soils in mapping are small areas of Plymouth loamy sand and areas of loamy sands that have a profile similar to soils of the Carver series. Also included are soils that are like Carver soils that have dark iron and humus coatings on the sand grains in the upper part of the subsoil. Also included are small areas of Haven or Riverhead soils on moraines that have dense cover of vegetation and a complex topography.

The hazard of erosion is slight on the soils in this unit. These soils are droughty. Natural fertility is low.

These soils are not well suited to the crops commonly grown in the county. Because these soils tend to be droughty, lawns and shrub plantings are difficult to establish and maintain. Almost all of this unit has been left in woodland or in brush. Many areas previously cleared for farming are now idle. Most areas in the western part of the county and near the shores of the eastern part of the county are used for housing developments. Capability unit VIIs-1; woodland suitability group 5s1.

APPENDIX J-3

SOIL AND WATER CONSERVATION PLAN
FOR
AGRICULTURAL OUTLEASE
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK
PARCEL "C"

Prepared in cooperation with USDA Soil Conservation Service, Riverhead and Syracuse, New York, by the Natural Resources Management Branch, Northern Division Naval Facilities Engineering Command, Philadelphia, Pennsylvania (hereinafter referred to as NORTHDIV or NAVFACENGCOM).

November 1986
Revised 1990

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SOIL AND WATER CONSERVATION PLAN FOR PARCEL C AGRICULTURAL OUTLEASE

I. INTRODUCTION

This plan is prepared as the basis for lease of land for agricultural crop production. The parcel to be leased is located along the north-central boundary of the Naval Weapons Industrial Reserve Plant (NWIRP) at Calverton, in Suffolk County, New York. NWIRP is located on Long Island approximately sixty miles east of New York City and six miles west of the town of Riverhead.

NWIRP Calverton is a government-owned, but contractor-operated, naval aviation production facility. The total land area is approximately 6048 acres government-owned, of which 2930 acres are leased to the Grumman Corporation and 3125 acres are buffer zones of the aircraft runway and related air operations facilities. Approximately 411 acres, divided among four parcels located in the buffer zones, are leased for agricultural proposes. This leased parcel is located in the northern air clearance, safety and crash zone, "AICUZ" (Air Installation Compatible Use Zone) area.

A. Access

Access to the parcel is from North Country (Parker) Road, State Route 25A. The parcel is bounded by Navy owned forest to the east, Route 25A to the south and privately owned farmland to the west and north.

B. Description

The parcel is approximately 145 acres, located on two irregular fields (designated as C1 and C2) oriented in a north-south direction divided by a natural drainage area. The leased parcel is composed of approximately 105 acres of tillable cropland and approximately 20 acres of semi-cleared land for soil conservation and wildlife habitat (see map Exhibit "A"). There is a well head within the semi-cleared conservation use area (quality of well is unknown).

C. Climate

The climate is controlled by and originates within surrounding humid-continental land areas of North America. Maritime influence is significant. Continental air masses and weather systems create cold winters and hot, humid summers. Maritime influences moderate continental weather

by extending the frost-free period, lowering daily and annual temperatures and creating heavier winter precipitation than summer. The relative geographic location of this parcel from the shoreline, is also a factor.

The average precipitation is 43.4 inches and varies from about 40.6 to 46.5 each year. Monthly precipitation varies from 2.7 to 4.5 inches. June, July, September, and October are the driest months and March, August, November, and December are the wettest months. Snow is likely between December and early March. The average yearly snow accumulation is 26 to 34 inches although total accumulations greater than 40 inches are recorded. The frost-free growing season is about 200 to 210 days. About 23 to 25 inches of rain falls during the April to October growing season.

The daily average low temperature is 44 degrees Fahrenheit (F) and the average high temperature is 61 degrees F. Coldest winter temperatures range between 0 degrees and 10 degrees F. The coldest months are January and February. The minimum summer temperatures are 60 degrees and 70 degrees F. High temperatures of 90 degrees or higher occur 4 to 6 days or longer each year. The sun shines 50 to 55 percent in winter and as much as 60 to 65 percent from May through October.

D. Soils

Soils of the outlease parcel have been cleared, but were previously forested with pitch pine, scrub oak, and white oak. The cropland area has been in cultivation (reportedly) greater than forty years. Past crops have been potatoes and vegetable crops. The cropland soil is primarily of the Haven Riverhead Association, a deep nearly level, well-drained medium textured and moderately course textured soil on a past glacier outwash plain. The surface soil of the cultivated area is loam and the substratum or lower soil is loam, silt loam, or sandy loam. A substratum of sand and gravel lies beneath the cropland at a depth of 18 to 36 inches.

The soils of the leased premises are further divided into subdivisions or "soil series", which is the basic soil mapping unit used in land management. The soil series found on Parcel B are shown on map Exhibit B and listed and described on Exhibit C. Each soil series is rated by a capability classification. The capability classification shows, in a general way, the suitability of the soil to produce crops commonly grown in the area. Each soil capability is categorized by their major limitations for agriculture uses, the risk of damage when so used, and the way the soils respond to treatment.

E. Authorized Land Uses

The purpose of this conservation plan is a two-fold approach to land management, in that this plan will: (1) guide the leased agricultural use of land by setting land use requirements, (2) establish a list of conservation practices to protect or improve the productivity of the land.

This parcel is available for cultivation of any locally adapted dry land and irrigated crops. The growing of sod is prohibited. Certain uncleared or partially cleared portions of the parcel may be utilized by blueberry production and apiculture (beekeeping). Livestock grazing is not allowed.

II. COORDINATION WITH THE MILITARY

A. Military Use

NWIRP Calverton is under the Command of Naval Plant Representative Office (NAVPRO), at Bethpage, New York. The primary use of NWIRP Calverton is for military aircraft assembly plant and aircraft testing activities. The agricultural outlease operation is secondary and subject to the military requirements for the land at all times. The lessee shall conduct their operation in a manner that will not interfere with military requirements, uses, or activities. The lessee, employees, and agents shall adhere to all NWIRP and NAVPRO regulations regarding safety, vehicle travel, security, and health.

B. Notification and Coordination

The lessee shall closely coordinate farming operations with the NAVPRO, or the designated representative (telephone 516/575-9159). The lessee shall also provide the NAVPRO with current telephone numbers where the lessee may be contacted during working and non-working hours. The lessee shall be available at all times to correct emergency situations with regard to the outlease parcel. Access routes to and from the outlease fields may be designated by the NAVPRO and if designated, such routes shall be utilized by the lessee, employees, and agents.

C. Other Activities

The right is reserved for others, at the direction of the NAVPRO and/or NORTHDIV, to conduct natural resources conservation programs, fire control, or fire prevention and weed/pest control on the outleased area. Hunting on the outleased parcel is allowed only through coordination with the New York State Department of Environmental Conservation Office at Ridge, New York (telephone 516/751-7900 extension 265).

III. AGRICULTURAL AND CONSERVATION PRACTICES AND MEASURES

A. Agricultural Practices

Conservation practices are discussed for erosion control. Some of the practices shall be performed at the lessee's cost and expense. Other practices may be paid for by the Navy. If paid by the government, compensation shall take the form of a rental credit against future rental due or a reimbursement from rental payments previously made. Under no circumstances shall the lessee undertake any reimbursable work item with prior written authorization from NORTHVACFACENGCOM. The total amount of rental credit, and or, the amount of reimbursement shall not exceed the total rental due for the premises during the current lease year.

1. Crop and tillage limitations - The lessee shall participate in a conservation program that will preserve the agricultural resource. Annual or biennial crop rotation, minimized tillage or other acceptable conservation practices shall be adhered to by the lessee to result in the minimum allowable soil loss. A conservation cropping system will help maintain a favorable soil tilth by increasing the organic matter content and improving the soil structure. The important crop in a conservation system is the sod or small grain. Chisel plowing to reduce plow pan or other compacted layer should be done prior to seeding. Crop residue management is essential for controlling wind erosion.

2. Annual Meeting - The lessee and the Navy shall meet on or about 1 December each year to review a cropping plan for the subsequent crop year. The Navy, through cooperation with the local USDA - Soil Conservation Service (SCS) office, shall determine the maximum allowable soil loss allowed and therein shall establish standards to limit soil lost by water erosion. The Universal Soil Loss Equation, as defined by the USDA Agricultural Handbook No. 537 of December 1978, or subsequent revisions, shall be used to calculate the approximate amount of average annual soil lost based on long term crop rotation and crop management. The lessee shall limit the type of equipment, type of crop(s) grown, the crop rotation or other agricultural practices to keep within allowable soil loss estimates.

Wind erosion will be estimated using the Wind Erosion Equation procedures defined in the SCS Field Office Technical Guide. Management of cover crops or other crop residue may be required to protect the land resources during storm events. It may also reduce the dust hazard to the Navy operation.

3. Soil Fertility and Nutrient Management - The Navy reserves the right to establish minimal soil fertility levels by either soil test or plant tissue analysis. The Navy shall conduct the initial soil test at any time after the commencement of the lease. Thereafter, the lessee shall make all necessary fertilizer applications to insure that soil fertility meets or exceeds all desirable levels of the initial soil test. Soil nutrient levels to be tested will include: phosphorous (P), potassium (K), calcium (Ca), magnesium (Mg), pH (lime) levels, and soil organic matter (OM). The lessee shall make up all deficiencies (P, K, and lime only) that result between the initial soil test and the expiration or termination of the lease. The Navy will invite the lessee to be present at the time soil samples are taken and then notify the lessee promptly of the results of the soil tests. All other fertilizer applications may be made at the option, and at the expense, in the amounts and kinds determined by the lessee to be necessary for the crop. Nutrient application shall not exceed crop requirements as determined from a nutrient budget for nitrogen and phosphorus, or the recommendations of Cooperative Extension Service. Soil testing shall be done every 3-5 years to monitor the soil chemistry.

4. Cover Crop - A winter cover crop of rye (*Secale cereale*) shall be seeded at a two bu. per acre rate by the lessee. This shall be seeded immediately after harvest, or no later than October 30. This will normally allow sufficient growing degree days for the rye to germinate and become established for some winter protection. Spring growth will provide some additional organic matter to incorporate into the soil and should give the field a higher yield potential for grain. The rye may be harvested as grain or managed as a green manure or residue crop.

If the field is able to be seeded by or before September 1, then ryegrass (*Lolium spp.*) may be a better choice as a soil improvement crop. It has a more massive, fibrous root system, but does require warm temperature to establish.

The cover crop may prevent the leaching of 30 or more pounds of nitrogen per acre.

5. Bird Hazards - Parcel "C" is located approximately 2,000 feet from the north end of the east runway. The parcel is also under the flightline, and approximately 3,000 feet from the end of the west runway. Certain agricultural crops may create a safety hazard or nuisance to nearby aircraft testing flights. The lessee shall discontinue any cropping operations or other activities which jeopardize air operations upon notification by NAVPRO.

6. Apiculture (beekeeping) - A 1/4 acre portion of the "Conservation Area" may be utilized by the lessee for apiculture purposes. Beehives shall be arranged in a neat and orderly arrangement. All grass and herbaceous vegetation within the apiary and extending outward, not less than 20 feet from any hives, shall be kept mowed to a maximum height of six inches. No beekeeping supplies or materials shall be stored at the apiary site. The beekeeper shall comply with all New York State, Suffolk County, or other appropriate laws regarding the use and registration of the apiary. All beehives shall be registered with the state of New York for the control of foul brood disease and to allow regular inspection of the apiary by the State of New York.

7. All farm equipment shall be parked in a neat and orderly manner. The lessee shall take care not to spill or drain fuel, oil, or hydraulic fluid into the soil. Any spilled petroleum product shall be contained to a confined area and cleaned in accordance with appropriate regulations taking all necessary precautions to prevent contamination of surface or ground water.

8. Harvested crops shall not be stored on the leased premises except in approved crop storage facilities. Temporary accumulation of harvested crops is allowed, not to exceed 30 days of the harvest period.

9. The lessee shall plan and implement his planting and harvesting schedule so that all crops are harvested prior to the termination date of the final lease year. No lease extension is allowed for the purpose of crop harvest.

10. Grass Waterways: Grass waterways are needed in two locations. Refer to Parcel C plan map attached for approximate locations. The exact location and design will need to be determined by the Suffolk County Soil and Water District. The areas must be shaped and seeded to obtain a permanent grass sod. If farm equipment and trucks will be crossing a waterway, a stone lining may be required for the road portion to support the load without creating tire ruts. An option to stone lining is to excavate about 6-8 inches, use a geosynthetic (geotextile material) fabric and cover

with stone or gravel. This would need to be accomplished following the manufacturer's recommendations or an engineering design to assure the proper material is used and installed correctly.

All tillage, cultivation and planting shall be directed into the grassed waterway to aid in the gradual flow of water from the field. Annual mowing (to a height of 4-6 inches) of the waterway when dry is required.

11. Permanent Sod - Two areas within the fields should be seeded to permanent sod to eliminate erosion problems currently existing. The northern tip of the present Conservation Area should be seeded after a grass waterway is constructed in field C2 to the southeast which will outlet into the Conservation Area. The total area in C2 to be seeded is about one-half acre. The second area is the southern end of field C1 which is currently gullying. The total area is about one-half acre.

12. Diversion or Broad-base Terrace - Surface water needs to be diverted from the sloping area on southwest end of field C2. Water may be directed in two directions if needed to obtain a safe outlet. The Suffolk County Soil and Water Conservation District can assist in designing a safe, erosion control practice.

Alternative: The sloping area could be seeded to permanent sod.

Alternative: The sloping area could be placed into a rotation including 2 years sod/hay with two years row crop.

B. Maintenance Requirements

1. The lessee shall keep the premises clean of all trash and debris. The lessee shall dispose of all refuse and debris generated by agricultural operations off of the premises. Dumping of agricultural refuse is prohibited.

2. The lessee shall keep clean all drainage ditches and/or culverts on the premises. Drainage ditches shall be clear of all shrubby plant growth, silt or other obstacles to surface water flow.

3. The lessee shall protect the well head from physical damage and prevent the contamination of the soil and water from oils and pesticides. Well Head Protection: During a field review in November, 1988, the power source and pump had been removed from the well site. It was evident that oil had been spilled or drained on the ground. This is an unacceptable practice and should be cleaned up before the well is used again.

4. Maintenance of fallow areas - All areas of the outleased premises, which are not farmed, shall be maintained litterfree and weed free condition by the lessee. Any field or sizable farmable area shown as "cultivated" on Exhibit "A", if not farmed, shall be seeded to perennial ryegrass or tall fescue and maintained by mowing by the lessee to a height six inches until farmed or the lease expires. More frequent mowing within 72 hours notice by the Navy to the lessee, not to exceed two additional mowings per year, may be required.

5. Conservation Area - The existing area is being crossed by farm equipment. On such crossing is beginning to erode. This crossing should be seeded down to permanent grass such as tall fescue (Festuca arundinacea). Seed at 100 pounds per acre and fertilize and lime as per a soil test recommendation for the crossing.

C. Pest Management

1. The lessee shall control all noxious or undesirable cropland weeds, vertebrate, insect, or other pests on the leased parcel. As used herein, the term "pesticide" includes herbicides, insecticides, fungicides, rodenticides, algaecides, and avicides. With regard to all actions relating to pest control undertaken by the lessee or his agents, the lessee shall assume full responsibility for complying with all federal, state, and local standards for the prevention, control, and abatement of environmental pollution.

2. All applications of pesticides shall be at the lessee's expense and shall be accomplished in compliance with Department of Defense requirements for safety, effectiveness, and environmental protection. In this regard, the services of the Pest Control Coordinator of the NWIRP or the appropriate designated personnel, hereinafter referred to as the PCC, will be provided as needed. In addition, any state or county permits required for application of a particular pesticide shall be obtained by the lessee prior to application.

3. Specific and complete information concerning the proposed pesticide application program shall be furnished by the lessee directly to the PCC a minimum of

five working days prior to any pesticide applications. This information shall include the following: (a) common name and concentration of product (pesticide); (b) formulation of product; (c) approximate acreage to be treated; (d) application rate (per acre); (e) approximate time and frequency of application; and a current Material Safety Data Sheet (MSDS). Additional advisory assistance on how to submit the above information is available upon request from the PCC. Only those pesticides reported to and approved by the PCC shall be utilized by the lessee. The Government may provide a trained and certified pest controller to observe and approve all pest control operations conducted on the leased area.

4. As Integrated Pest Management programs are developed for the crops being grown, implementation of scouting, record keeping, and treating the crops as necessary should be utilized.

D. Fire Prevention

1. The lessee, agents, and all persons employed shall perform farming operations in a manner to prevent or reduce fire hazards. The lessee shall comply with the NWIRF fire control and prevention regulations, a copy of which may be obtained from the NAVFRO. In the event of any accidental or uncontrolled fire on the premises, the lessee shall immediately contact the NWIRF Fire Department and exert efforts to prevent damage to the premises from such a fire.

2. All engine driven equipment such as tractors, combines, and motor vehicles utilized by the lessee on the premises shall be equipped with operable spark arresters, mufflers, and tail pipe assemblies. Additional care shall be taken when using any 1975 or newer vehicle having a catalytic converter pollution control device due to the extreme heat generated by this device, which may ignite dry grass or plant residue.

3. Flammable materials, such as fuel and oil, may not be permanently stored in bulk on the outlease parcel. Safe, temporary storage of flammable materials is allowed only in connection with ongoing field operations. All fuel and lubricant storage areas shall be kept in a neat and orderly condition at all times, with extreme care taken by the lessee to reduce the risk of fire. All empty fuel or oil containers and used oil filters shall be disposed of in accordance with accepted environmental regulations.

III. TECHNICAL ASSISTANCE

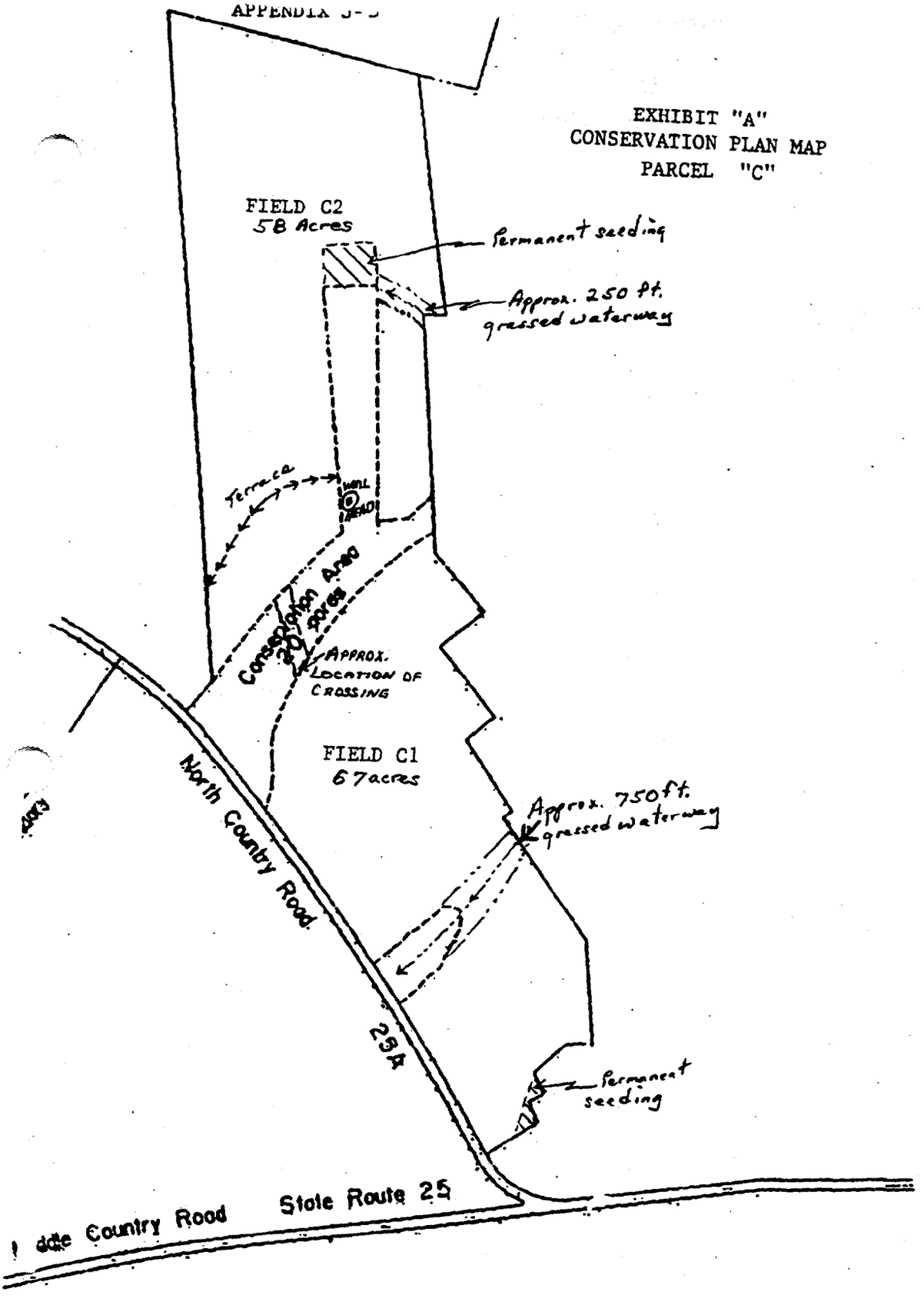
Technical assistance for the application of conservation management practices described herein is available from the following offices:

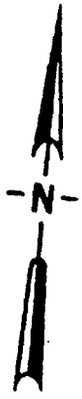
A. Northern Division, Naval Facilities Engineering Command
Natural Resources Management Branch(Code 24B)
U.S. Naval Base, Building 77-L
Philadelphia, PA 19112-5094
Telephone: (215) 897-6207

B. USDA-Soil Conservation Service and Suffolk Co. Soil and Water Conservation District
164 Old Country Road, Rt. 58
Riverhead, NY 11901
Telephone: (516) 727-2315

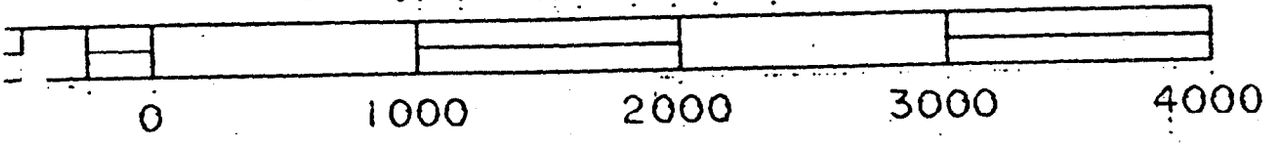
C. USDA Cooperative Extension Service Suffolk County
246 Griffing Avenue
Riverhead, NY 11901
Telephone: (516) 727-7850

EXHIBIT "A"
CONSERVATION PLAN MAP
PARCEL "C"





SCALE IN FEET



SCS-CPA-015
12-85

Appendix J-3

EXHIBIT "B"

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MAP

Owner NAVY Operator NEW YORK
County SUFFOLK State
Soil survey sheet (s) or code nos. 27 and 43 Aproximate scale 1:20,000

N

Prepared by U. S. Department of Agriculture, Soil Conservation Service cooperating with SUFFOLK COUNTY SOIL AND WATER Conservation District

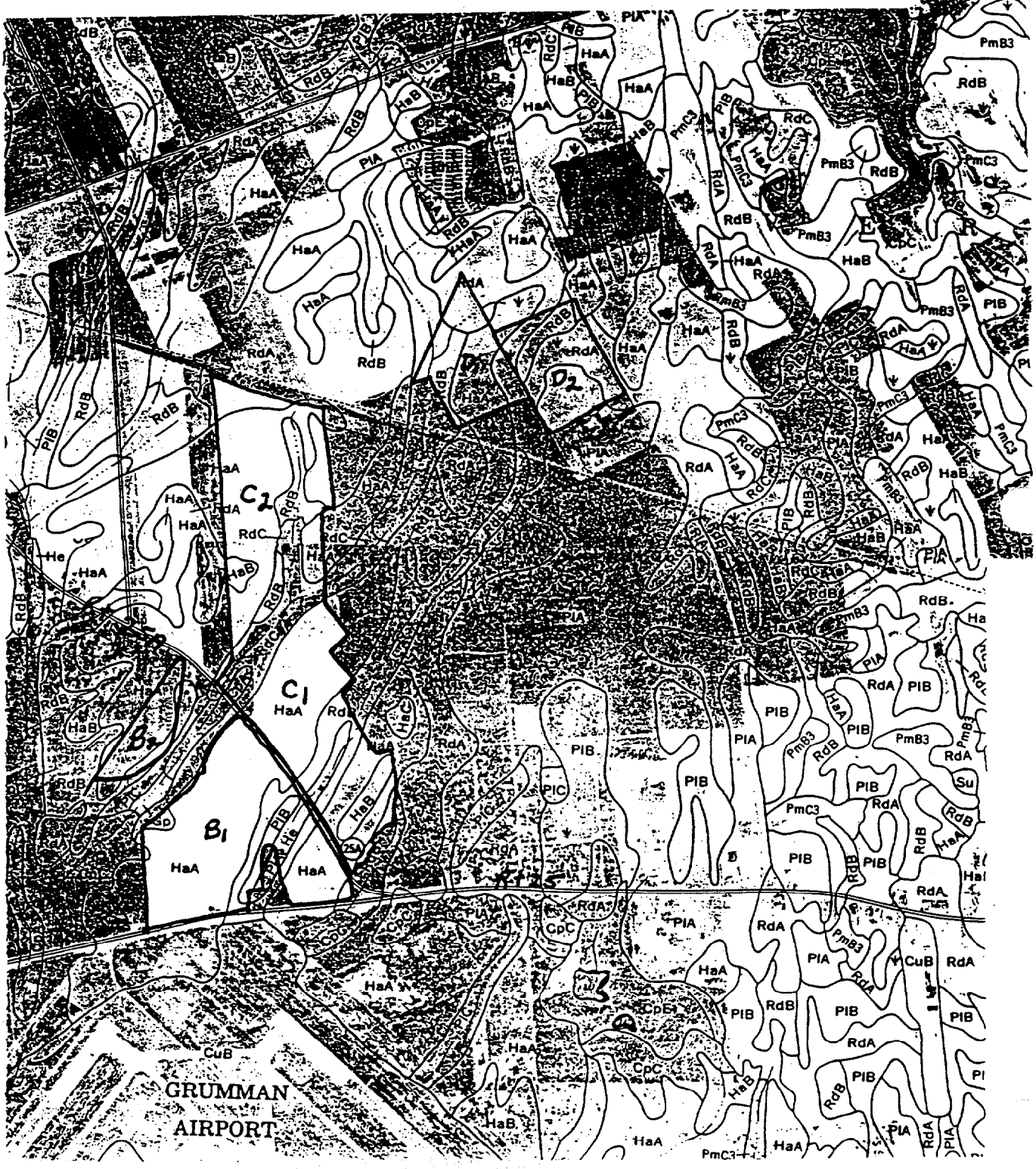


EXHIBIT C - SOIL MAP SYMBOLS AND DESCRIPTIONS OF SOILS WITHIN AGRICULTURAL OUTLEASED PARCEL "C". INFORMATION FROM SUFFOLK COUNTY, NEW YORK SOIL SURVEY

Haven loam, 0 to 2 percent slopes (HaA).—This soil has the profile described as representative of the series. It is mostly nearly level and generally is on outwash plains. Some areas of this soil are on moraines and generally are on the top of low-lying hills. Some of these areas are slightly undulating. Most areas of this soil are large, but on moraines the areas are smaller and are irregular in shape.

Included with this soil in mapping are small areas of Scio soils and some crescent-shaped, gravelly areas. Also included are soils that have a moderately coarse textured surface layer and a medium-textured subsoil. In many areas of this soil that are mapped in association with Bridgehampton soils, the soil is deeper and siltier than that described as representative of the series. Bridgehampton soils generally are included in mapping in these areas. Also included, on moraines, are areas of Montauk soils that have a very weak fragipan. Montauk soils formed in loose, sandy till.

The hazard of erosion is slight on this Haven soil. Primary management concerns are keeping the soil from crusting after rain, maintaining tilth, and reducing the plowpan.

This soil is used extensively for crops, and it is well suited to all crops commonly grown in the county. Potatoes are the main crop, but cauliflower, cabbage, corn, onion, and sod crops are also grown. Because of the nearly level slope and ease of excavation, most areas of this soil in the western part of the county are being used for housing developments and industrial parks. Capability unit I-1; woodland suitability group 3o1.

Haven loam, 2 to 6 percent slopes (HaB).—This soil is on outwash plains and moraines, commonly along shallow, intermittent drainage channels. Slopes are short. In larger areas this soil is mostly undulating. Most areas of this soil are smaller than the areas of Haven loam, 0 to 2 percent slopes.

In cultivated areas this soil is 2 or 3 inches shallower to sand and gravel than the soil described as representative of the series, and it contains a larger amount of gravel. Otherwise the two profiles are similar.

Included with this soil in mapping are small areas of Riverhead and Bridgehampton soils, some of which are in a complex pattern with the dominant Haven soil. These included soils generally are in the larger areas of this soil. Also included are Montauk silt loams that have a very weak fragipan. In places areas of this soil that are mapped near Montauk soils have layers of till deep in the substratum. Also included are areas along the bottom of narrow drainage channels that have a silty surface layer that is thicker than that in the profile described.

The hazard of erosion is moderate to slight on this Haven soil. Management concerns are controlling runoff and erosion and keeping the surface loose and free from crusting.

This soil is well suited to all crops commonly grown in the county. It generally is farmed the same as adjoining areas of nearly level soils. Crops commonly grown are potatoes, cauliflower, cabbage, and corn. Most areas in the western part of the county are used for housing developments. Capability unit IIe-1; woodland suitability group 3o1.

Haven loam, thick surface layer (He).—This soil is mainly on outwash plains throughout the county. It occupies the bottom of the larger drainage channels or closed depressions where silty material has accumulated from surrounding areas. Slope is less than 3 percent. Areas of this soil generally are quite small. They are mostly long and narrow, but in closed depressions the areas are nearly round.

This soil has the profile described as representative of the series, except that the content of organic matter in the surface layer increases with depth, and the surface layer ranges from about 12 to 30 inches in thickness. Also, in most places the surface layer contains more silt than the soil described as representative of the series, and in some places the subsoil is loam or silt loam.

Included with this soil in mapping are small areas of soils that have a surface layer less than 1 foot thick or more than 2½ feet thick. These included soils are on the same landform and in close association with this soil. Also included are small areas of Scio soils, on the wetter sites, and areas of coarser textured soils that have thick accumulations on the surface. Areas of somewhat poorly drained or wetter soils are shown on the map by the conventional symbol for wet spots.

The hazard of erosion is slight on this Haven soil, except where the soil receives large amounts of water from adjoining sloping soils. Summer crops in closed depressions are damaged if heavy rain falls during the growing season.

Most areas of this soil are well adapted to most crops commonly grown in the county. In closed depressions, however, wheat and rye are frequently damaged by ponding. Areas of this soil generally are used along with adjoining areas of Haven, Bridgehampton, and Riverhead soils. Most areas are cleared and are used for crops or, in the western part of the county, for homesites. Capability unit IIw-2; woodland suitability group 3o1.

Riverhead sandy loam, 3 to 8 percent slopes (RdB).—This soil is on moraines and outwash plains. It generally is in areas along shallow, intermittent drainageways. Slopes generally are moderately short, but large areas on moraines are undulating.

The profile of this soil is similar to the one described as representative of the series, though in cultivated areas this soil is likely to be 2 to 3 inches shallower to coarse sand and gravel, and the surface layer is likely to contain a slightly larger amount of gravel.

Included with this soil in mapping are small areas of Bridgehampton, Haven, and Plymouth soils in a complex pattern. The texture of these soils is marginal to sandy loam. These included soils generally are on large separations. Near Bridgehampton are included areas of Riverhead soils that have gray and strong-brown silt loam layers at a depth of 26 to 30 inches. Also included are narrow strips of Haven loam, thick surface layer, along intermittent drainageways, and soils that have a surface layer of loam or fine sandy loam and a subsoil of sandy loam. Included with this soil on moraines are Montauk soils that have a very weak fragipan that formed in loose, sandy till.

The hazard of erosion is moderate to slight on this Riverhead soil. The main concerns of management are controlling runoff and erosion and providing adequate moisture.

This soil is well suited to all crops commonly grown in the county, and it is used mainly for this purpose. Most areas in the western part of the county, however, are used for housing developments and as industrial sites. Capability unit IIe-2; woodland suitability group 3o1.

Riverhead sandy loam, 8 to 15 percent slopes (RdC).—This soil is in narrow bands on outwash plains along the side slopes of deep, intermittent drainageways. Slopes are short. On the Harbor Hill moraine and on the Ronkonkoma moraine east of the Shinnecock Canal, the areas of this soil are larger than in other places in the county and they generally are rolling.

The profile of this soil is similar to the one described as representative of the Riverhead series, but in cultivated areas this soil generally is 3 to 4 inches shallower to coarse sand and gravel, and it is as much as 15 percent gravel, by volume.

Included with this soil in mapping are eroded and gravelly areas too small to map separately. Also included in a complex pattern with this Riverhead soil are Haven and Plymouth soils that have a texture marginal to sandy loam. These soils generally are in large separations on moraines. Along the bottom of intermittent drainageways, strips of Haven loam, thick surface layer, that are too narrow to map separately are also included. Other inclusions are Montauk soils that have a very weak fragipan that formed in loose sandy till and some areas that have a sand and gravel substratum, 1 to 2 feet thick, underlain by till at a depth of more than 42 inches.

The hazard of erosion is moderately severe on this Riverhead soil. Controlling erosion is the main concern of management. This soil is limited by droughtiness and by the difficulty of applying irrigation water. The response of crops to applications of lime and fertilizer is good. Slope limits the use of large farm machines.

This soil is suited to crops commonly grown in the county; however, the hazard of erosion reduces its usefulness for farming. Most areas of this soil are in tree or brush. A few small tracts were formerly cleared and farmed along with adjoining less sloping soils, but many of these areas are now in grass or brush because the use of heavy farm equipment on these areas is impracticable. Many of the larger areas of this soil are used for housing developments where large lots are needed. These rolling areas are in the western part of the county. Capability unit IIIe-1; woodland suitability group 3o1.

APPENDIX J-4

SOIL AND WATER CONSERVATION PLAN
FOR
AGRICULTURAL OUTLEASE
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
CALVERTON, NEW YORK
PARCEL "D"

Prepared in cooperation with USDA Soil Conservation Service, Riverhead and Syracuse, New York, by the Natural Resources Management Branch, Northern Division Naval Facilities Engineering Command, Philadelphia, Pennsylvania (hereinafter referred to as NORTHDIV or NAVFACENGCOM).

November 1986
Revised 1990

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EXHIBITS

Exhibit A - Parcel "D" Location Map
Exhibit B - Soil Map
Exhibit C - Map Symbols and Descriptions of Soils Within Parcel D

SOIL AND WATER CONSERVATION PLAN FOR PARCEL D AGRICULTURAL OUTLEASE

I. INTRODUCTION

This plan is prepared as the basis for lease of land for agricultural crop production. The parcel to be leased is located along the north-central boundary of the Naval Weapons Industrial Reserve Plant (NWIRP) at Calverton, in Suffolk County, New York. NWIRP is located on Long Island approximately sixty miles east of New York City and six miles west of the town of Riverhead.

NWIRP Calverton is a government-owned, but contractor-operated, naval aviation production facility. The total land area is approximately 6048 acres government-owned, of which 2930 acres are leased to the Grumman Corporation and 3125 acres are buffer zones of the aircraft runway and related air operations facilities. Approximately 411 acres, divided among four parcels located in the buffer zones, are leased for agricultural proposes. This leased parcel is located in the northern air clearance, safety and crash zone, "AICUZ" (Air Installation Compatible Use Zone) area.

A. Access

Access to the parcel is from North Country (Parker) Road, State Route 25A. The parcel is bounded by Navy owned forest to the east, Route 25A to the south and privately owned farmland to the west and north.

B. Description

The parcel is approximately 53 acres of cropland, located on two irregular fields (designated as D1 and D2) - see Exhibit A. Field D1 is presently being cropped. No serious erosion problems exist. Protection of a naturally occurring recharge basin should be addressed.

C. Climate

The climate is controlled by and originates within surrounding humid-continental land areas of North America. Maritime influence is significant. Continental air masses and weather systems create cold winters and hot, humid summers. Maritime influences moderate continental weather by extending the frost-free period, lowering daily and annual temperatures and creating heavier winter precipitation than summer. The relative geographic location of this parcel from the shoreline, is also a factor.

The average precipitation is 43.4 inches and varies from about 40.6 to 46.5 each year. Monthly precipitation varies from 2.7 to 4.5 inches. June, July, September, and October are the driest months and March, August, November, and December are the wettest months. Snow is likely between December and early March. The average yearly snow accumulation is 26 to 34 inches although total accumulations greater than 40 inches are recorded. The frost-free growing season is about 200 to 210 days. About 23 to 25 inches of rain falls during the April to October growing season.

The daily average low temperature is 44 degrees Fahrenheit (F) and the average high temperature is 61 degrees F. Coldest winter temperatures range between 0 degrees and 10 degrees F. The coldest months are January and February. The minimum summer temperatures are 60 degrees and 70 degrees F. High temperatures of 90 degrees or higher occur 4 to 6 days or longer each year. The sun shines 50 to 55 percent in winter and as much as 60 to 65 percent from May through October.

D. Soils

Soils of the outlease parcel have been cleared, but were previously forested with pitch pine, scrub oak, and white oak. The cropland area has been in cultivation (reportedly) greater than forty years. Past crops have been potatoes and vegetable crops. The cropland soil is primarily of the Haven Riverhead Association, a deep nearly level, well-drained medium textured and moderately course textured soil on a past glacier outwash plain. The surface soil of the cultivated area is loam and the substratum or lower soil is loam, silt loam, or sandy loam. A substratum of sand and gravel lies beneath the cropland at a depth of 18 to 36 inches.

The soils of the leased premises are further divided into subdivisions or "soil series", which is the basic soil mapping unit used in land management. The soil series found on Parcel D are shown on map Exhibit B and listed and described on Exhibit C. Each soil series is rated by a capability classification. The capability classification shows, in a general way, the suitability of the soil to produce crops commonly grown in the area. Each soil capability is categorized by their major limitations for agriculture uses, the risk of damage when so used, and the way the soils respond to treatment.

E. Authorized Land Uses

The purpose of this conservation plan is a two-fold approach to land management, in that this plan will: (1) guide the leased agricultural use of land by setting

land use requirements, (2) establish a list of conservation practices to protect or improve the productivity of the land.

This parcel is available for cultivation of any locally adapted dry land and irrigated crops. The growing of sod is prohibited. Certain uncleared or partially cleared portions of the parcel may be utilized by blueberry production and apiculture (beekeeping). Livestock grazing is not allowed.

II. COORDINATION WITH THE MILITARY

A. Military Use

NWIRP Calverton is under the Command of Naval Plant Representative Office (NAVPRO), at Bethpage, New York. The primary use of NWIRP Calverton is for military aircraft assembly plant and aircraft testing activities. The agricultural outlease operation is secondary and subject to the military requirements for the land at all times. The lessee shall conduct their operation in a manner that will not interfere with military requirements, uses, or activities. The lessee, employees, and agents shall adhere to all NWIRP and NAVPRO regulations regarding safety, vehicle travel, security, and health.

B. Notification and Coordination

The lessee shall closely coordinate farming operations with the NAVPRO, or the designated representative (telephone 516/575-9159). The lessee shall also provide the NAVPRO with current telephone numbers where the lessee may be contacted during working and non-working hours. The lessee shall be available at all times to correct emergency situations with regard to the outlease parcel. Access routes to and from the outlease fields may be designated by the NAVPRO and if designated, such routes shall be utilized by the lessee, employees, and agents.

C. Other Activities

The right is reserved for others, at the direction of the NAVPRO and/or NORTHDIV, to conduct natural resources conservation programs, fire control, or fire prevention and weed/pest control on the outleased area. Hunting on the outleased parcel is allowed only through coordination with the New York State Department of Environmental Conservation Office at Ridge, New York (telephone 516/751-7900 extension 265).

III. AGRICULTURAL AND CONSERVATION PRACTICES AND MEASURES

A. Agricultural Practices

Conservation practices are discussed for erosion control. Some of the practices shall be performed at the lessee's cost and expense. Other practices may be paid for by the Navy. If paid by the government, compensation shall take the form of a rental credit against future rental due or a reimbursement from rental payments previously made. Under no circumstances shall the lessee undertake any reimbursable work item with prior written authorization from NORTHVACFACENGCOM. The total amount of rental credit, and or, the amount of reimbursement shall not exceed the total rental due for the premises during the current lease year.

1. Crop and tillage limitations - The lessee shall participate in a conservation program that will preserve the agricultural resource. Annual or biennial crop rotation, minimized tillage or other acceptable conservation practices shall be adhered to by the lessee to result in the minimum allowable soil loss. A conservation cropping system will help maintain a favorable soil tilth by increasing the organic matter content and improving the soil structure. The important crop in a conservation system is the sod or small grain. Chisel plowing to reduce plow pan or other compacted layer should be done prior to seeding. Crop residue management is essential for controlling wind erosion.

2. Annual Meeting - The lessee and the Navy shall meet on or about 1 December each year to review a cropping plan for the subsequent crop year. The Navy, through cooperation with the local USDA - Soil Conservation Service (SCS) office, shall determine the maximum allowable soil loss allowed and therein shall establish standards to limit soil lost by water erosion. The Universal Soil Loss Equation, as defined by the USDA Agricultural Handbook No. 537 of December 1978, or subsequent revisions, shall be used to calculate the approximate amount of average annual soil lost based on long term crop rotation and crop management. The lessee shall limit the type of equipment, type of crop(s) grown, the crop rotation or other agricultural practices to keep within allowable soil loss estimates.

Wind erosion will be estimated using the Wind Erosion Equation procedures defined in the SCS Field Office Technical Guide. Management of cover crops or other crop residue may be required to protect the land resources during storm events. It may also reduce the dust hazard to the Navy operation.

3. Soil Fertility and Nutrient Management - The Navy reserves the right to establish minimal soil fertility levels by either soil test or plant tissue analysis. The Navy shall conduct the initial soil test at any time after the commencement of the lease. Thereafter, the lessee shall make all necessary fertilizer applications to insure that soil fertility meets or exceeds all desirable levels of the initial soil test. Soil nutrient levels to be tested will include: phosphorous (P), potassium (K), calcium (Ca), magnesium (Mg), pH (lime) levels, and soil organic matter (OM). The lessee shall make up all deficiencies (P, K, and lime only) that result between the initial soil test and the expiration or termination of the lease. The Navy will invite the lessee to be present at the time soil samples are taken and then notify the lessee promptly of the results of the soil tests. All other fertilizer applications may be made at the option, and at the expense, in the amounts and kinds determined by the lessee to be necessary for the crop. Nutrient application shall not exceed crop requirements as determined from a nutrient budget for nitrogen and phosphorus, or the recommendations of Cooperative Extension Service. Soil testing shall be done every 3-5 years to monitor the soil chemistry.

4. Conservation cropping system will help maintain a favorable soil tilth by increasing the organic matter content and improving the soil structure. The important crop in a conservation system is the sod or small grain. Chisel plowing to reduce plow pan or other compacted layer should be done prior to seeding. The pH should be adjusted to 5.5 to 5.8 and P and K brought up to levels for the crop or sod requirements. The pH should be adjusted upward to 6.5 if potatoes are not part of the rotation.

5. Cover Crop - A winter cover crop of rye (Secale cereale) shall be seeded at a two bu. per acre rate by the lessee. This shall be seeded immediately after harvest, or no later than October 30. This will normally allow sufficient growing degree days for the rye to germinate and become established for some winter protection. Spring growth will provide some additional organic matter to incorporate into the soil and should give the field a higher yield potential for grain. The rye may be harvested as grain or managed as a green manure or residue crop.

If the field is able to be seeded on or before September 1, then ryegrass (Lolium spp.) may be a better choice as a soil improvement crop. It has a more massive, fibrous root system, but does require more time to establish.

The cover crop may prevent the leaching of 30 or more pounds of nitrogen per acre.

6. Permanent Sod - One area within the field should be seeded to permanent sod to provide a buffer zone around the pot-hole which exists in the north-central portion of the field. A 30 foot wide grass buffer strip will remove about ninety percent of any sediments from overland flow, keep farm equipment away from the wet area, and provide some protection from pesticide sprays and fertilizers. The total area to be seeded is about one quarter acre.

7. Field D2 is not being cropped at the present. There are brush and briars (Rubus spp.) and various sand lot plants present. The field appears to be excessively well drained. If it is desirable to keep the field open, then it should be mowed at least once every three years. It would benefit wildlife more if a scheduled cutting was initiated such that one third of the field were to be mowed each year. This way, all sections of the field are mowed at least once in three years. Bare areas must be seeded if an erosion potential exists.

8. Bird Hazards - Parcel "D" is located approximately 4,000 feet from the north end of the east runway. The parcel is also under the flightline, and approximately 3,000 feet from the end of the west runway. Certain agricultural crops may create a safety hazard or nuisance to nearby aircraft testing flights. The lessee shall discontinue any cropping operations or other activities which jeopardize air operations upon notification by NAVPRO.

9. Apiculture (beekeeping) - A 1/4 acre portion of the "Conservation Area" may be utilized by the lessee for apiculture purposes. Beehives shall be arranged in a neat and orderly arrangement. All grass and herbaceous vegetation within the apiary and extending outward, not less than 20 feet from any hives, shall be kept mowed to a maximum height of six inches. No beekeeping supplies or materials shall be stored at the apiary site. The beekeeper shall comply with all New York State, Suffolk County, or other appropriate laws regarding the use and registration of the apiary. All beehives shall be registered with the state of New York for the control of foul brood disease and to allow regular inspection of the apiary by the State of New York.

10. All farm equipment shall be parked in a neat and orderly manner. The lessee shall take care not to spill or drain fuel, oil, or hydraulic fluid into the soil. Any spilled petroleum product shall be contained to a confined area and cleaned in accordance with appropriate regulations taking all necessary precautions to prevent contamination of surface or ground water.

11. Harvested crops shall not be stored on the leased premises except in approved crop storage facilities. Temporary accumulation of harvested crops is allowed, not to exceed 30 days of the harvest period.

12. The lessee shall plan and implement his planting and harvesting schedule so that all crops are harvested prior to the termination date of the final lease year. No lease extension is allowed for the purpose of crop harvest.

B. Maintenance Requirements

1. The lessee shall keep the premises clean of all trash and debris. The lessee shall dispose of all refuse and debris generated by agricultural operations off of the premises. Dumping of agricultural refuse is prohibited.

2. The lessee shall keep clean all drainage ditches and/or culverts on the premises. Drainage ditches shall be clear of all shrubby plant growth, silt or other obstacles to surface water flow.

3. The lessee shall protect any well heads from physical damage and prevent the contamination of the soil and water from oils and pesticides.

4. Maintenance of fallow areas - All areas of the outleased premises, which are not farmed, shall be maintained litterfree and weed free condition by the lessee. Any field or sizable farmable area shown as "cultivated" on Exhibit "A", if not farmed, shall be seeded to perennial ryegrass or tall fescue and maintained by mowing by the lessee to a height six inches until farmed or the lease expires. More frequent mowing within 72 hours notice by the Navy to the lessee, not to exceed two additional mowings per year, may be required.

C. Pest Management

1. The lessee shall control all noxious or undesirable cropland weeds, vertebrate, insect, or other pests on the leased parcel. As used herein, the term "pesticide" includes herbicides, insecticides, fungicides, rodenticides, algaecides, and avicides. With regard to all actions relating to pest control undertaken by the lessee or his agents, the lessee shall assume full responsibility for complying with all federal, state, and local standards for the prevention, control, and abatement of environmental pollution.

2. All applications of pesticides shall be at the lessee's expense and shall be accomplished in compliance with Department of Defense requirements for safety, effectiveness, and environmental protection. In this regard, the services of the Pest Control Coordinator of the NWIRP or the appropriate designated personnel, hereinafter referred to as the PCC, will be provided as needed. In addition, any state or county permits required for application of a particular pesticide shall be obtained by the lessee prior to application.

3. Specific and complete information concerning the proposed pesticide application program shall be furnished by the lessee directly to the PCC a minimum of five working days prior to any pesticide applications. This information shall include the following: (a) common name and concentration of product (pesticide); (b) formulation of product; (c) approximate acreage to be treated; (d) application rate (per acre); (e) approximate time and frequency of application; and a current Material Safety Data Sheet (MSDS). Additional advisory assistance on how to submit the above information is available upon request from the PCC. Only those pesticides reported to and approved by the PCC shall be utilized by the lessee. The Government may provide a trained and certified pest controller to observe and approve all pest control operations conducted on the leased area.

4. As Integrated Pest Management programs are developed for the crops being grown, implementation of scouting, record keeping, and treating the crops as necessary should be utilized.

D. Fire Prevention

1. The lessee, agents, and all persons employed shall perform farming operations in a manner to prevent or reduce fire hazards. The lessee shall comply with the NWIRP fire control and prevention regulations, a copy of which may be obtained from the NAVPRO. In the event of any accidental or uncontrolled fire on the premises, the lessee shall immediately contact the NWIRP Fire Department and exert efforts to prevent damage to the premises from such a fire.

2. All engine driven equipment such as tractors, combines, and motor vehicles utilized by the lessee on the premises shall be equipped with operable spark arresters, mufflers, and tail pipe assemblies. Additional care shall be taken when using any 1975 or newer vehicle having a catalytic converter pollution control device due to the extreme heat generated by this device, which may ignite dry grass or plant residue.

3. Flammable materials, such as fuel and oil, may not be permanently stored in bulk on the outlease parcel. Safe, temporary storage of flammable materials is allowed only in connection with ongoing field operations. All fuel and lubricant storage areas shall be kept in a neat and orderly condition at all times, with extreme care taken by the lessee to reduce the risk of fire. All empty fuel or oil containers and used oil filters shall be disposed of in accordance with accepted environmental regulations.

III. TECHNICAL ASSISTANCE

Technical assistance for the application of conservation management practices described herein is available from the following offices:

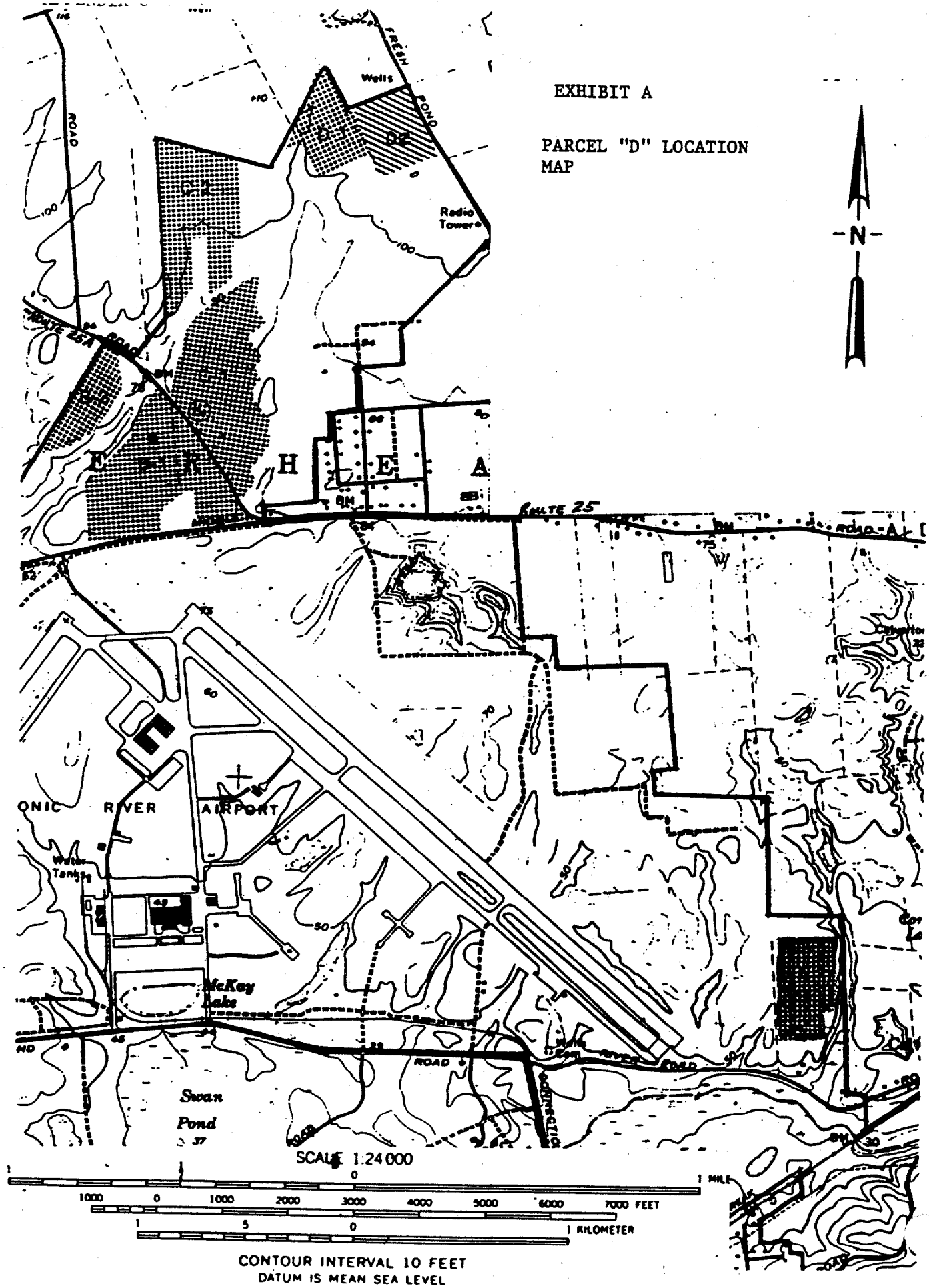
A. Northern Division, Naval Facilities Engineering Command
Natural Resources Management Branch(Code 24B)
U.S. Naval Base, Building 77-L
Philadelphia, PA 19112-5094
Telephone: (215) 897-6207

B. USDA-Soil Conservation Service and Suffolk Co. Soil and Water Conservation District
164 Old Country Road, Rt. 58
Riverhead, NY 11901
Telephone: (516) 727-2315

C. USDA Cooperative Extension Service Suffolk County
246 Griffing Avenue
Riverhead, NY 11901
Telephone: (516) 727-7850

EXHIBIT A

PARCEL "D" LOCATION MAP



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APPENDIX J-4

EXHIBIT B

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SOIL MAP

Owner NAVY Operator

County SUFFOLK State NEW YORK

Soil survey sheet (s) or code nos. 27 and 43 Aproximate scale 1:20,000

N

Prepared by U. S. Department of Agriculture, Soil Conservation Service cooperating with SUFFOLK COUNTY SOIL AND WATER Conservation District

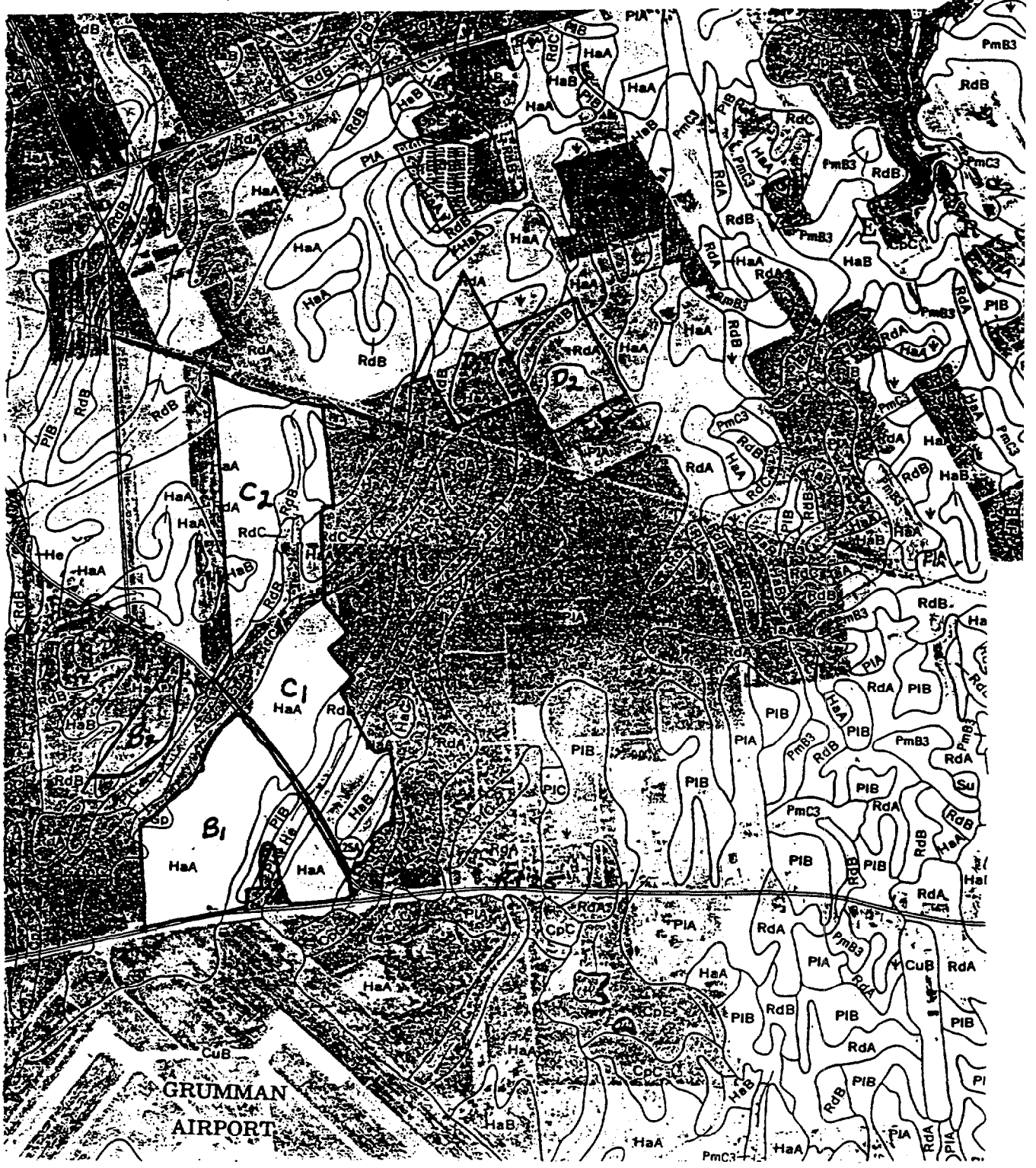


EXHIBIT C - SOIL MAP SYMBOLS AND DESCRIPTIONS OF SOILS WITHIN AGRICULTURAL OUTLEASED PARCEL "D". INFORMATION FROM SUFFOLK COUNTY, NEW YORK SOIL SURVEY

Haven loam, 0 to 2 percent slopes (HoA).—This soil has the profile described as representative of the series. It is mostly nearly level and generally is on outwash plains. Some areas of this soil are on moraines and generally are on the top of low-lying hills. Some of these areas are slightly undulating. Most areas of this soil are large, but on moraines the areas are smaller and are irregular in shape.

Included with this soil in mapping are small areas of Scio soils and some crescent-shaped, gravelly areas. Also included are soils that have a moderately coarse textured surface layer and a medium-textured subsoil. In many areas of this soil that are mapped in association with Bridgehampton soils, the soil is deeper and siltier than that described as representative of the series. Bridgehampton soils generally are included in mapping in these areas. Also included, on moraines, are areas of Montauk soils that have a very weak fragipan. Montauk soils formed in loose, sandy till.

The hazard of erosion is slight on this Haven soil. Primary management concerns are keeping the soil from crusting after rain, maintaining tilth, and reducing the plowpan.

This soil is used extensively for crops, and it is well ed to all crops commonly grown in the county. Pota- s are the main crop, but cauliflower, cabbage, corn, onion, and sod crops are also grown. Because of the nearly level slope and ease of excavation, most areas of this soil in the western part of the county are being used for housing developments and industrial parks. Capability unit I-1; woodland suitability group 3o1.

Riverhead sandy loam, 0 to 3 percent slopes (RdA).—This soil has the profile described as representative of the series. It generally is on outwash plains, and the areas are large and uniform. Where this soil occurs on outwash plains, it generally has slope characteristics of this landform. Slopes are undulating in places. A few small, irregular areas are on moraines.

Included with this soil in mapping are small areas of Sudbury soils that are less than 1 to 2 acres in size. Also included are areas of soils near Bridgehampton that have a profile similar to that of this soil, except that at a depth of about 30 inches they have layers of gray and strong-brown silt loam 1 to 2 feet thick. Also included are areas of Haven and Plymouth soils that have a texture marginal to sandy loam and areas of soils that have a loam or fine sandy loam surface layer and a sandy loam subsoil. Areas of Montauk soils on moraines that have a very weak fragipan formed in loose sandy till are included.

The hazard of erosion is slight on this Riverhead soil. This soil is limited only by moderate droughtiness in the moderately coarse textured solum. It tends to develop a plowpan if it is intensively farmed.

This soil is well suited to all crops commonly grown in the county, and it is used extensively for that purpose. Most areas in the western part of the county, however, are used for housing developments and industrial parks. Capability unit IIs-1; woodland suitability group 3o1.

Riverhead sandy loam, 3 to 8 percent slopes (RdB).—This soil is on moraines and outwash plains. It generally is in areas along shallow, intermittent drainageways. Slopes generally are moderately short, but large areas on moraines are undulating.

The profile of this soil is similar to the one described as representative of the series, though in cultivated areas this soil is likely to be 2 to 3 inches shallower to coarse sand and gravel, and the surface layer is likely to contain a slightly larger amount of gravel.

Included with this soil in mapping are small areas of Bridgehampton, Haven, and Plymouth soils in a complex pattern. The texture of these soils is marginal to sandy loam. These included soils generally are on large separations. Near Bridgehampton are included areas of Riverhead soils that have gray and strong-brown silt loam layers at a depth of 26 to 30 inches. Also included are narrow strips of Haven loam, thick surface layer, along intermittent drainageways, and soils that have a surface layer of loam or fine sandy loam and a subsoil of sandy loam. Included with this soil on moraines are Montauk soils that have a very weak fragipan that formed in loose, sandy till.

The hazard of erosion is moderate to slight on this Riverhead soil. The main concerns of management are controlling runoff and erosion and providing adequate moisture.

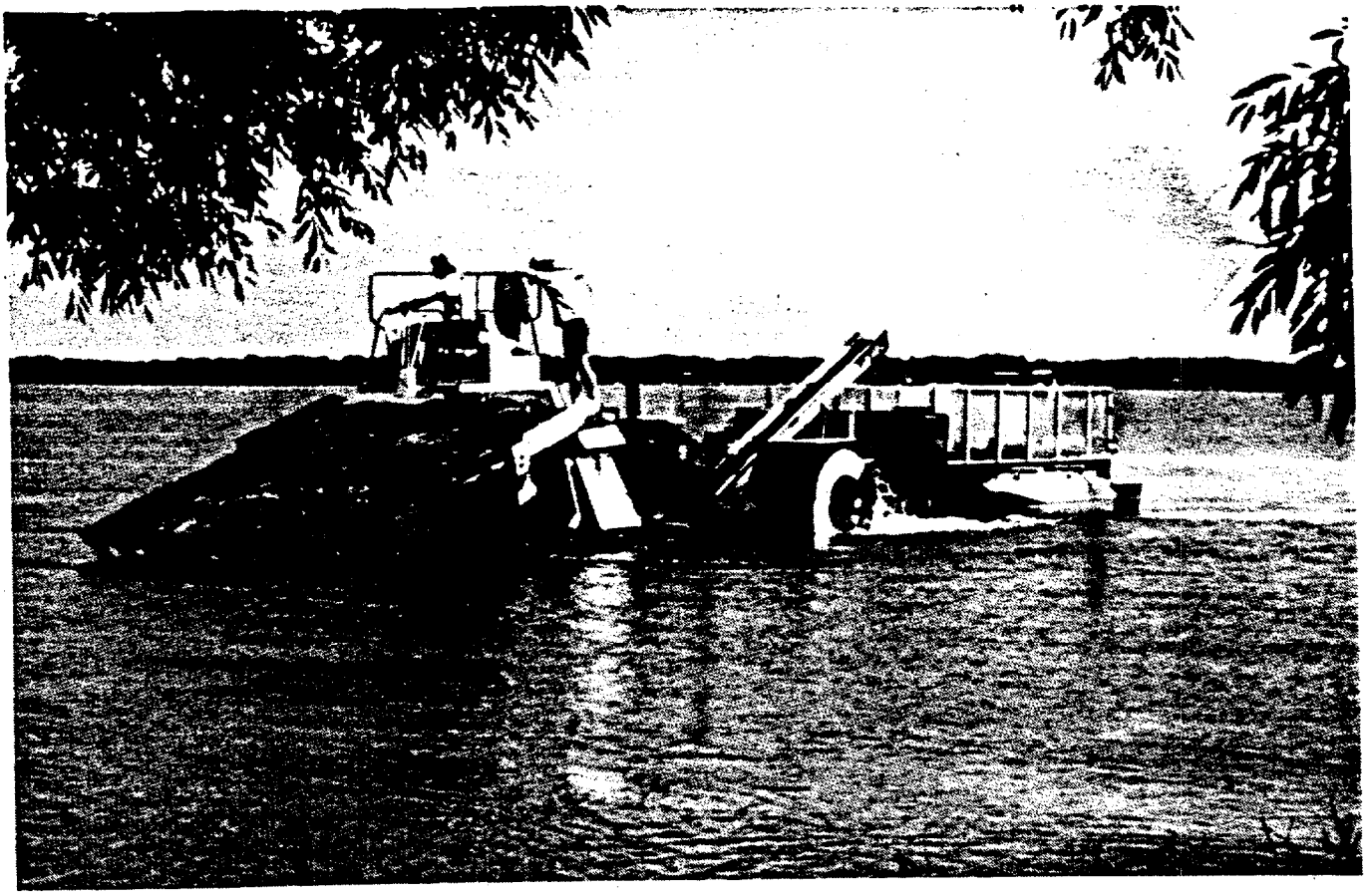
This soil is well suited to all crops commonly grown in the county, and it is used mainly for this purpose. Most areas in the western part of the county, however, are used for housing developments and as industrial sites. Capability unit IIe-2; woodland suitability group 3o1.

Plymouth loamy sand, 0 to 3 percent slopes (PlA).—This soil has the profile described as representative of the series. It is mainly on outwash plains south of the Ronkonkoma moraine. It is also on flat hilltops and in drainageways on morainic deposits. The areas generally are nearly level, but they are somewhat undulating in some places. Areas on outwash plains are large and uniform, and areas on the moraine are small and irregular.

EXHIBIT C

Included with this soil in mapping are small areas of Riverhead soils that have a texture that is marginal to loamy sand. Also included are some loamy sands that have a profile similar in appearance to the soils of the Carver series. On moraines, scattered areas of Montauk sandy variant soils that have a weak fragipan and loose underlying till layers are included. These areas intergrade between Plymouth loamy sands and Montauk loamy sand, sandy variants. In the larger areas of this unit, small acreages of Carver and Plymouth sands are included. Scattered throughout the county and on Fishers Island are areas that are dominantly fine sand.

The hazard of erosion is slight on this Plymouth soil. This soil is fairly well suited to crops commonly grown in the county. Many areas were formerly cleared for farming, but most of these areas are idle or are in brush or trees. Small areas that are in large tracts with Riverhead or Haven soils are the only areas used for farming. In the western part of the county, most of this soil is used for housing developments and as industrial sites. Capability unit IIIs-1; woodland suitability group 4s1.



Mechanical Control of Aquatic Weeds

A Guide for Lakeshore Owners, Lake Associations, Municipalities and Individual Pond Owners

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Introduction

Lakes, ponds, and reservoirs are dynamic bodies of water, full of living plants and animals. Fish and aquatic plants are the most visible biological elements.

Aquatic plants are a vital part of the biological community of a lake, pond or reservoir. When aquatic plants grow where they are not wanted, or interfere with planned recreational uses, they become weeds.

The purpose of this publication is to explain the value of aquatic plants and describe mechanical control techniques. The control techniques can be used in swimming areas, around docks, boat moorings and other intensely used areas, and to provide access lanes to deeper weed-free waters.

Too many aquatic plants = WEEDS

Understanding Your Lake and Reasons for Weed Problems

Every lake, reservoir, and pond has a natural life cycle which starts when it is created and ends only when it ultimately fills in and becomes dry land. Nutrients in the water and bottom soil stimulate the growth of plants in the water body. In turn, plant-eating animals make use of the plants.

Over many years, lakes and ponds gradually fill in as organic matter and sediment accumulate. Organic matter comes from the partial decomposition of aquatic plants and leaves and other debris from terrestrial plants. Sediment is the result of soil erosion in the watershed and along the shore. This aging process is called "eutrophication." Activities that accelerate this process are termed "cultural" eutrophication.

Some lakes age faster than others because of more aquatic plant growth. Factors accounting for dense aquatic plant growth and rapid aging are shallow depth, gently sloping shoreline, good rooting material, warm water, clear water, and high fertility. A lack of wave or current action also contributes to plant growth. Aquatic plant growth is usually inhibited in soft water with low fertility, deep water, steep shorelines, unstable bottoms, cold water, and colored muddy water where light penetration is inhibited.

Not all areas of a lake will age at the same rate. Coves, the windward side of lakes, inlets, and outlet areas normally age faster. These areas receive the heaviest amount of organic matter and sediment deposition. Leaves, broken pieces of weeds and suspended sediment are blown or are deposited in these areas creating suitable conditions for aquatic plant growth. This in turn accelerates the aging process. Some areas of a lake may remain weed-free for years because of a rocky bottom or relatively sterile bottom soil conditions.

Types of Aquatic Plants

Several types of aquatic plants occur in New York waters. Three types of algae occur: microscopic, filamentous, and "rooted" algae. There are three general types of flowering vascular plants that are found in most waters: submergents, emergents and floating plants. The value of and control techniques for plants of the different groups vary and will be described later.

Algae

Microscopic algae occurs in suspension in all natural waters. Depending on its density, the water may appear almost clear or have a slight greenish tint. On occasion, it may look like "pea soup," in response to higher temperatures and nutrient content. Microscopic algae is beneficial in ponds, as will be discussed later, and is only a problem when it looks like "pea soup." There are no mechanical control techniques for microscopic algae.

Filamentous algae is generally thread or hair-like. It occurs as floating mats, often called "pond scum," or may be attached to rocks, plants, and other objects.

"Rooted" algae—*Chara*, often called muskgrass, and *Nitella*, stonewort, grow attached to the bottom like other submerged flowering plants but have no true roots. These plants have a main stem with whorled leaf-like branches. *Chara* commonly occurs in hard water and is often encrusted with lime. *Nitella* species commonly occur in soft-water.

Flowering Vascular Plants

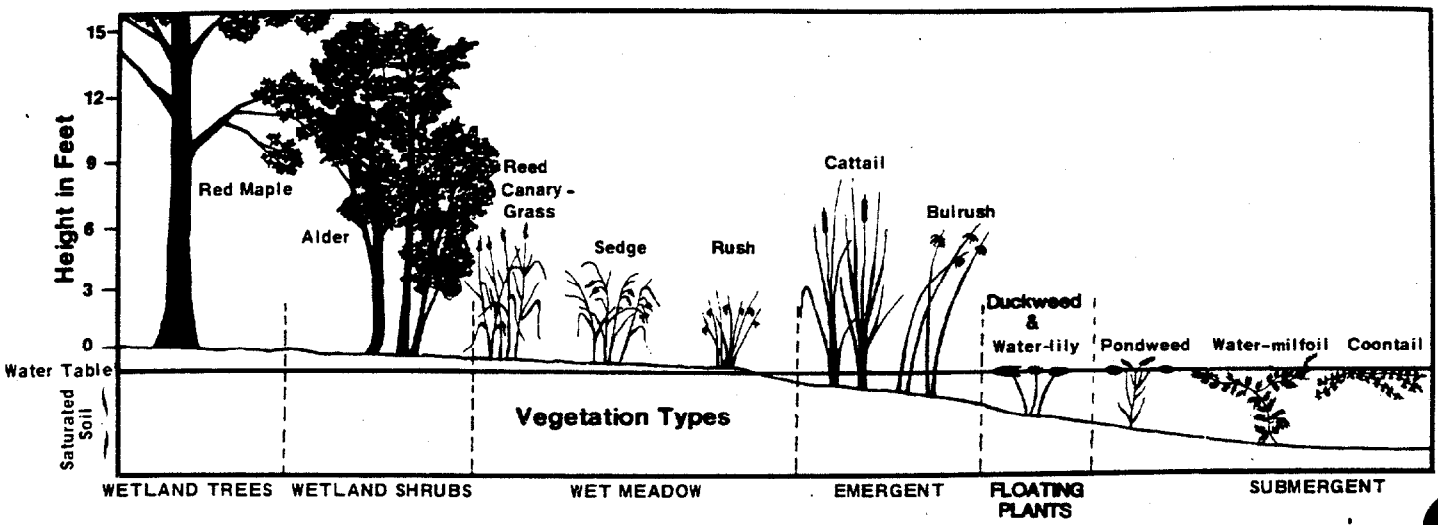
Submergents grow in both shallow and deep waters generally to depths of 15 feet. Except during flowering they grow entirely underwater. Examples of these are *Elodea*, pondweeds, milfoil, and coontail.

Emergents grow in shallow water of marshes and swamps, and along the shore of lakes and ponds, rooted to the bottom with stems and leaves extending above the water. They generally do not grow in water over two feet deep. Examples include cattails, rushes, reeds, arrowheads, and sedges.

Floating plants include the free floating duckweeds, and the waterlilies, watershield, water chestnut, and spatterdock that have floating leaves attached to the bottom by long stems. The duckweeds are 1/8 to 1/2 inch in size, are lobed, and have short roots hanging from the leaves. These plants may drift or be blown from one area to another. In very shallow water spatterdock appears like an emergent.

Figure 1 shows the general proximity of aquatic plants as they occur in a "Typical Cross Section of a Pond, Lake or Marsh."

Figure 1 Typical Cross Section of a Pond, Lake or Marsh



Value of Aquatic Plants

Aquatic plants are commonly referred to as weeds when they grow where they are not wanted, or are in excessive amounts that impair recreational use. With information about the value of aquatic plants, those once considered weeds may be looked upon as valuable plants to be managed instead of eliminated.

Plants have positive value to man and the environment. All green plants produce oxygen in the presence of sunlight. The oxygen is in turn used by other living organisms of the aquatic community including fish and by the plants themselves for respiration.

Microscopic algae and microscopic animals are collectively called plankton and are the base of the aquatic food chain (Figure 2). They give water its greenish color. The microscopic plants, called phytoplankton (algae), utilize nutrients from the water and energy from the sun for growth. Plankton provides food for aquatic insects which in turn are eaten by forage fish. Predatory fish eat the forage fish. Wildlife and man are the consumers at the top end of the food chain utilizing both predatory and forage fish.

Some species of fish and amphibians deposit their eggs on submerged vegetation including the underwater parts of emergent plants.

The stems and leaves of submerged plants harbor aquatic insects, crustaceans and snails which are food for fish. These same plants also provide hiding places that help protect the smaller fish from the larger predatory fish.

Ducks feed on floating duckweed and watermeal; on the seeds, tubers, winter buds, and finer leaves of the submerged aquatics; and on aquatic insects that live in association with the aquatic vegetation.

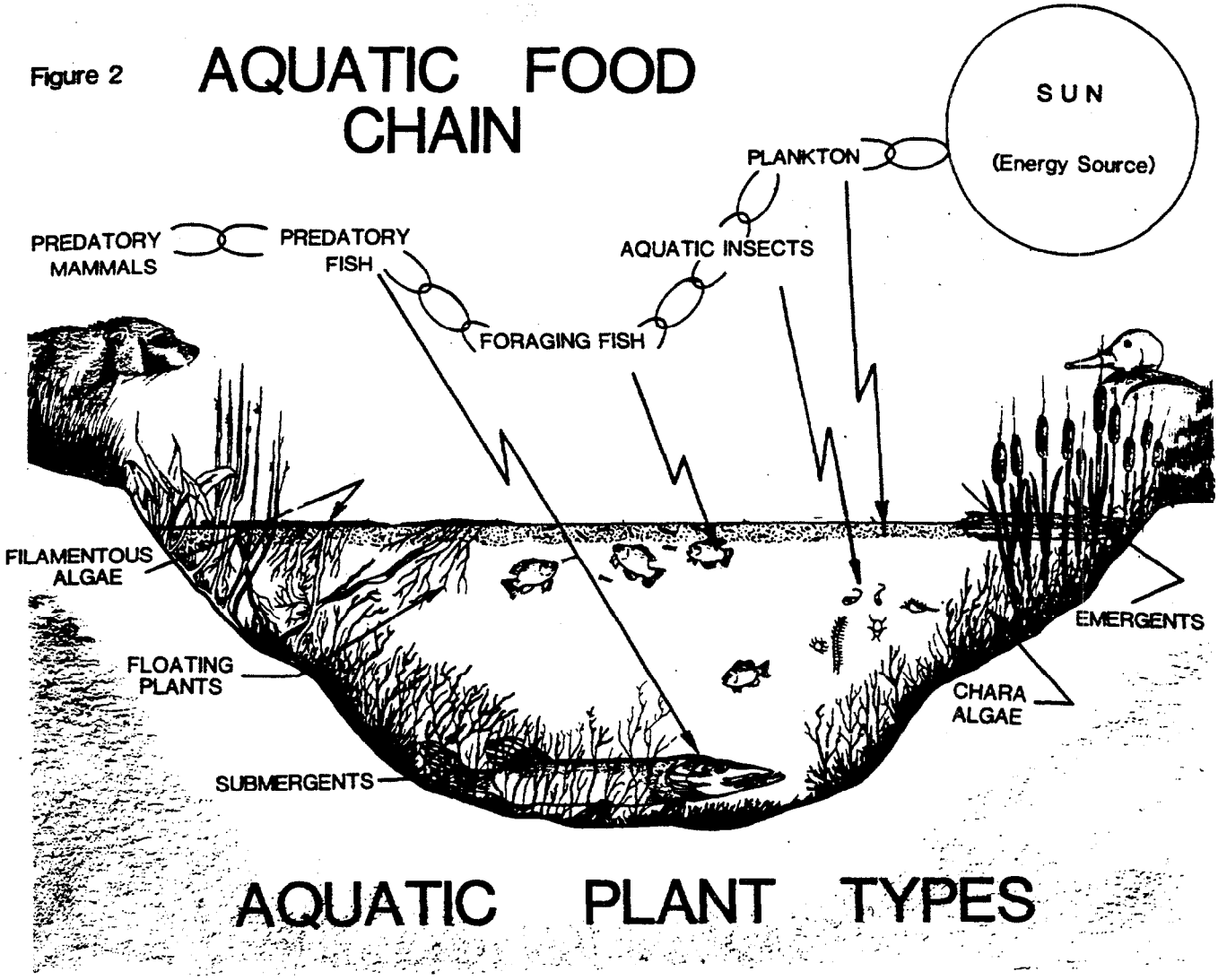
Emergent plants growing along the shore help break the force of waves and reduce shoreline erosion. They also help trap sediment.

Ducks, geese, muskrats, and beavers use emergent plants for food and material to build their nests and homes. Many species of songbirds, marsh birds, frogs, and other animals nest, and seek food and cover in emergents.

On the negative side, submerged and floating leaved plants hinder swimmers, foul motorboat propellers, snag fishing lines, and are often unsightly. Emergents too, are often unsightly, hinder access to the water and provide quiet water in which mosquitos can hatch and develop. Filamentous algae and floating duckweed are unsightly and degrade swimming areas. Several species of algae give water a disagreeable taste and odor and make it unfit to drink without special treatment.

Microscopic algae "blooms," which turn the water to a "pea soup" appearance, are a result of excessive nutrients in the water.

During long periods of cloudy weather during the sum-



mer, or under ice with a deep snow covering, plants consume more oxygen than they produce because of a lack of sunlight. This reduces the amount of oxygen in the water and fish kills may occur either during the summer or winter. The decay of excessive vegetation may cause a foul odor in the summer.

There needs to be a balance between the amount of open water and aquatic plants. The proportions depend on the intended use of the lake or pond.

Table 1 summarizes some positive environmental values provided by groups of aquatic plants, and some typical problems associated with them.

Factors Which Accelerate Weed Problems

Aquatic plants need water, sunlight, and nutrients, and rooted plants additionally need suitable bottom material for growth. Of the nutrients, phosphorus has the greatest influence on eutrophication. It is considered a limiting factor. Forest runoff and atmospheric nutrient fallout, which are natural processes, account for about 21 percent of the dissolved phosphorus from an average watershed in central New York. Human activities are responsible for 75 to 85 percent of the dissolved phosphorus reaching lakes and ponds.

Sewage from both septic tanks and municipal sources is the largest contributor of phosphorus with 55 percent; agricultural runoff is second with 18 percent; followed by residential runoff with 6 percent. Human activities, therefore, have the greatest effect on accelerating eutrophication (cultural eutrophication, Figure 3).

Because nutrients are tied to soil and organic matter, churning of mucky bottom sediments in shallow areas by motorboats permits more nutrients to be released.

Most aquatic plants reproduce by means of seeds, root stocks and plant fragments. Submerged plants broken off by motorboats, water skiers, anglers, etc., may start new plants. Therefore, control of floating segments is very important, particularly during harvesting, cutting, raking, and other control techniques where plants may be fragmented.

TABLE 1. Aquatic Plants—Their Value and Some Typical Problems

Plant Groups	Value	Problems
Algae		
1. Phytoplankton—microscopic plants	Primary producers of the aquatic food chain; food for zooplankton which is critical to survival of fry stages of many fish; food for some species of fish and mollusks.	Creates "blooms," making the water become soupy green, brown or reddish-brown depending on the type of algae; creates problems for fish and swimmers. May cause off-flavor of drinking water.
2. Filamentous—floating or clinging thread or hairlike plants: (ex.—*Spirogyra sp.)*	Harbors aquatic insects which are important fish foods.	Free floating and those clinging to rocks and plants are unsightly, foul docks, piling and boat surfaces; messy for swimmers and slippery underfoot. May have foul odor.
3. "Rooted" Species—attached to the bottom with no true roots; low growing, not generally over 2' tall: (ex.—*Chara* and *Nitella)*	Harbors aquatic insects, provides cover for small fish; solid stands keep other taller aquatic plants from invading; is a waterfowl food.	Strong smelling odor when crushed; frees fine black organic matter when detached.
Flowering Vascular Plants		
4. Emergents—attached to the bottom with leaves extending above water. (ex.—cattails, burreed, rushes)	Protects shoreline from erosion; is muskrat and waterfowl food; provides cover for nesting songbirds; vegetation is spawning area for some amphibians and fish.	Makes access to water more difficult; blocks view of water; usually restricted to water less than 2 feet deep; creates still water for mosquitoes.
5. Submerged—attached to bottom, entire plant underwater. (ex. milfoil, pondweeds, *Elodea).*	Harbors aquatic insects; provides hiding and nursery place for fish; vegetation is spawning area for amphibians and fish; provides some food for waterfowl.	Interferes with swimming and fishing; fouls motorboat propellers; commonly don't exceed 20 feet in depth, but can be found in about 30 feet of water. (See Table 2, page 6.) Fouls domestic and municipal water intakes.
6. Floating—free floating on water surface (ex. duckweed); submerged plants with large floating leaves like water lilies are often included.	Harbors aquatic insects; duckweed is food for waterfowl.	Interferes with swimming, water skiing, and fishing; unsightly; floats from area to area.

Rooted living aquatic plants absorb nutrients primarily from sediments. When these plants die, the nutrients are released back into the water or bottom sediments, and may stimulate new growth.

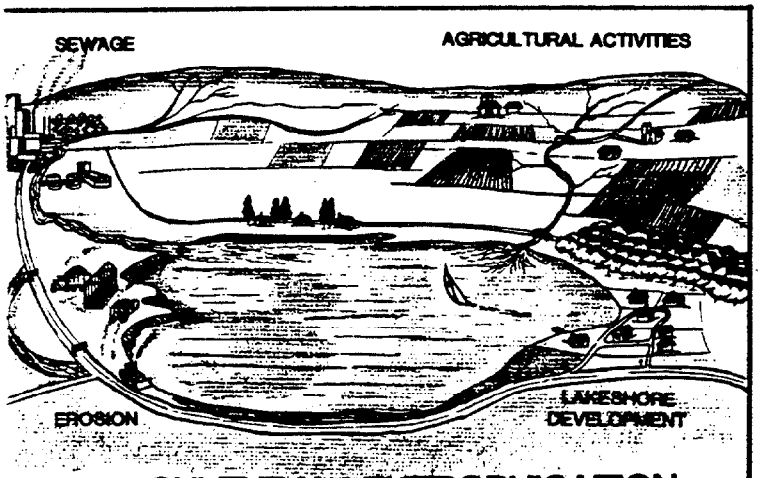


Figure 3 CULTURAL EUTROPHICATION

Reducing Cultural Eutrophication

An effective weed control program on a lake with multiple landowners requires the cooperation of all surrounding property owners and those in the lake's watershed.

In many cases, a lake association, or a lake management district[1], should coordinate and help guide lake management activities. If there is no lake association or district, consideration should be given to forming one. Town and county governments, Department of Environmental Conservation (DEC), Cooperative Extension personnel, and New York State Department of Health personnel may be able to provide assistance.

The North American Lake Management Society, (NALMS), is an international non-profit organization of scientists, students, and lay persons from government, academia, industry and the public who share

[1]In 1981, the New York State Legislature amended the county law to provide for creation of special lake management districts. While no appropriations are associated with the bill, it allows an established district to collect funds for lake management purposes, including restoration.

common interests in lake management. Members are provided technical as well as administrative information through newsletters and annual meetings. For information contact: NALMS, P. O. Box 217, Merrifield, VA 22116.

Since sewage is the greatest contributor of phosphorus, all lakeshore homes and business septic systems should be functioning properly. A sanitary survey should be conducted under the guidance of the county or district health department to determine those that are malfunctioning or overloaded and contributing to lake pollution.

A dye test can be performed to determine if a septic system is functioning properly. This is accomplished by flushing dye into a system. The dye will appear in the lake if the system is not working properly.

To insure that all systems around a lake are dye tested, it has been found to be most efficient for one person, or a team, to do the testing, rather than to rely on property owners to test their own system.

Some properly functioning septic systems with leach beds or filter fields that are located near the water may still contribute some nutrients to the water as effluent percolates through the soil.

A sewage treatment plant for all cottages with the discharge downstream of the lake is an alternative where large numbers of systems are malfunctioning and cannot be corrected because of site conditions. Such a treatment plant may need special treatment to reduce nutrient discharge. This would be particularly important where lakes and ponds are in series.

Nutrients may be entering lakes, reservoirs, etc., from the general watershed area, from the natural decay process, agricultural sources, or point sources such as industry. Efforts should be made to identify and control these sources of nutrients. As an example, the use of lawn fertilizer around the body of water should be minimal.

The presence of deciduous trees close to the water's edge can add substantial amounts of organic matter and nutrients to a lake or pond through the deposition and decomposition of their leaves. Planting of deciduous trees close to the water should be discouraged. Coniferous trees are not as detrimental as needle loss is very gradual and needle decomposition does not yield large quantities of nutrients or organic material.

Planning Aquatic Weed Control

The first step toward control of aquatic weeds is to identify them correctly. Successful control very often is species specific. A sketch map, showing location, species, extent, and relative density, may be helpful.

Next, evaluate their value in relation to your objectives and the overall lake or pond community and its conditions. Property owners' weed control practices should conform with the overall lake management plan of a lake association.

After determining which plants are truly problem weeds and need to be "managed," select the most appropriate control techniques and the extent of control suited for your resources. Plant location, type and density will also enter into the decision on the appropriate control techniques.

If help is needed, contact the appropriate resource agency listed on page 10, under "Agencies to Contact for Assistance."

Once a weed problem is under control, diligent treatment of regrowth is necessary to maintain control.

Aquatic Weed Control Techniques

There are three general types of aquatic weed control techniques: chemical, biological, and mechanical. Of these, mechanical control techniques are currently the most environmentally acceptable and are generally quite practical in the northeast.

Chemical Control Techniques

Chemicals are relatively easy to apply, but are expensive and have many drawbacks.

A PERMIT FROM THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION IS REQUIRED TO APPLY ANY HERBICIDE INTO OR ON ANY LAKE, POND, OR RESERVOIR HAVING A REGULARLY FLOWING OUTLET, AND THE APPLICATOR MUST BE CERTIFIED BY THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (New York State Conservation Law).

Local, county, or district health departments should be consulted as they may have additional restrictions on the use of aquatic herbicides.

There may be a restricted use period after each application and chemicals may adversely affect aquatic organisms.

Decaying weeds release their locked up nutrients back into the water or to bottom sediments to stimulate other plants to grow. Algae blooms are often stimulated by the released nutrients. There is no guarantee that chemicals will work under all conditions. Some chemicals kill, and some only "knock down" or reduce weed growth for the season. However, generally there is no long lasting effect or carry over to the next season. Seeds not affected by herbicides will germinate and roots not killed will sprout.

In small volume lakes and ponds, decomposition of dead plants may consume sufficient dissolved oxygen from the water to cause fish kills.

The use of chemicals can change the species of weeds which are dominant with other less desirable plants often becoming dominant.

Biological control through the use of exotic plant-eating fish such as the white amur or grass carp is not a recommended technique. The possession or release of white amur, or their hybrids into New York waters is currently illegal, as per New York State Environmental Conservation Law. In addition to aquatic plants, grass carp also eat aquatic insects and other invertebrates, and can be detrimental to other fish and water quality.

Domestic waterfowl feed on certain aquatic plants, but the fertility added to the water from their fecal material helps to create algae blooms and stimulate the growth of rooted aquatic vegetation.

Fertilizing water to enhance a plankton population, and thus increase shading of rooting aquatics, is not recommended in New York as the fertilizer generally stimulates the rooted aquatic plants rather than reducing them in the long run.

Because of unpredictable and unacceptable results, biological controls are not recommended.

Mechanical control techniques can be used immediately, in most protected waters, in localized areas and with no technical supervision. There are no restrictions on the use of the water following treatment. These techniques produce the most immediate effects and environmentally, the most acceptable.

On the other hand, they are time consuming, energy intensive, and may pose a problem of weed disposal.

The removal of the weeds with their nutrient load helps to a minor extent reduce the nutrient content of the water. The weeds which are high in nitrogen and phosphorus make excellent garden mulch. Some have also been successfully fed to sheep, goats, and pigs.

Harvesting is also not a one-time operation but must be done several times in a season to remove new root and stem sprouts and missed plants. Seeds do remain in the soil to germinate later. Over several years of consistent harvesting of the same areas, the harvesting schedule may be reduced to a maintenance program. Remember, removal of plant fragments is advised due to the ability of plant segments to develop new shoots and roots, especially milfoil, *Naiads*, fanwort and waterweed *(Elodea)*.

TABLE 2—Aquatic "Weeds"—Type—Species—Typical Water Depth and Mechanical Control Techniques

Plant Groups	Typical Water Depth Feet	Mechanical Control Techniques								
		Skimming	Pulling	Raking	Dragging	Cutting	Shading	Smothering	Winter Drawdown	Deepening
Algae										
Microscopic	Throughout Water	None Practical								
Filamentous	0-3	X								
Chara (Muskgrass) & *Nitella* (Stonewort)	.5-4			X	X			X		
Flowering Vascular Plants										
Floating										
Duckweed	Surface	X						X		
Waterchestnut	1-15		X				X	X		
Waterlilies	1.6-6.6*		X					X	X	
Emergents										
Arrowhead	0-1		X				X	X	X	X
Bulrush	0-1		X				X	X	X	X
Burreed	0-1		X				X	X	X	X
Cattail	0-2		X				X	X	X	X
Rice-cutgrass	0-.5		X					X	X	X
Rushes	0-.5		X					X	X	X
Sedges	0-.5		X					X	X	X
Smartweed	0-.5		X					X	X	X
Spike rushes	0-.5		X					X	X	X
Water Plantain	0-.5		X					X	X	X
Submergents										
Bladderwort	.7-6.6*			X	X			X	X	
Coontail	2-32*			X				X	X	X
Elodea	.7-18*			X		X		X	X	
Naiads	1.6-32*			X	X			X	X	
Pondweeds (*Potamogeton sp.*)	1-20*			X				X	X	X**
Water Milfoil	1-20*			X				X	X	X
Waterweed (see *Elodea*)										
Wild Celery	1-15*			X				X	X	

*From: *Ecological Inventory of Aquatic Vegetation in the Major Lakes of Cayuga County, New York and Recommendations for their Management*, Gary L. Miller. September 1, 1978.

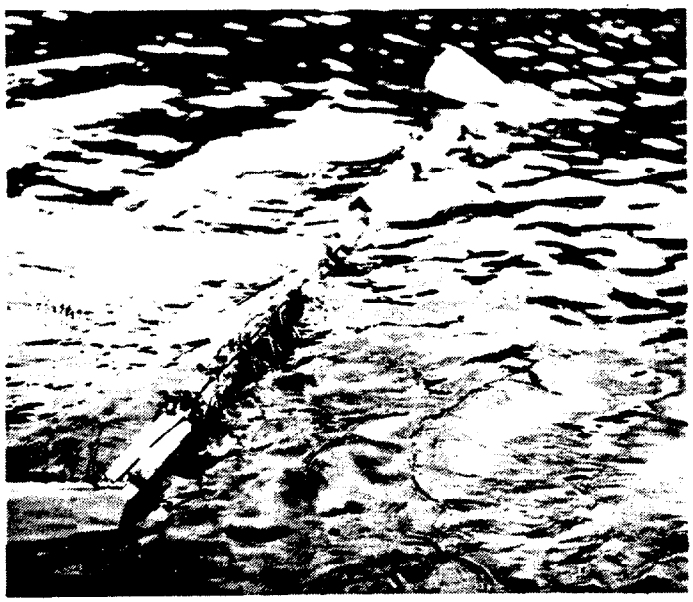
****Potamogeton robbinsii* and *amplifolius* species only.

Mechanical Weed Control

Mechanical weed control techniques are described below, along with information on the type of weeds that are controllable. Table 2 is a summary of this information and includes typical water depth in which the plants may grow. Hand techniques are most effective for small scale operations and when plants first appear before dense beds become established.

A. SKIMMING—Duckweed, floating algae and plant fragments can be removed by skimming. A seine, dip net or a floating boom is effective.

A floating boom can be made of short pieces of wood fastened together with rope or screw eyes. Nails driven into the bottom of the boards, approximately one inch apart, or 3 to 4 inches of hardware cloth fastened to the boards is needed to catch and hold plant fragments. The boom can be drawn in a circle by boat or a swimmer to draw duckweed, floating algae mats, etc., to shore where they can be raked or dipped out. The boom can also be anchored downwind to catch fragments from other mechanical control operations.



Anchored floating boom catches aquatic plant fragments.

B. HAND PULLING—Emergent plants such as cattails, rushes, sedges, water chestnut, etc., are effectively controlled by hand pulling. Always start at the deep water side of the weed patch so as to remove the rhizomes that are starting to sprout and spread. The operation is much like pulling up a rug. Rhizome fragments left in the bottom may sprout, thus requiring more than one operation.

C. RAKING—The use of a long handled steel garden rake is effective to remove submerged plants in water less than 5 or 6 feet deep. This removes roots as well. Be sure to skim up all plant fragments. An extension can be attached to the handle for use in deeper water.

D. DRAGGING—In water deeper than 5 or 6 feet, it will be necessary to use a drag of some type. Many individuals have fabricated their own drags which are lowered into the water from a boat or rolled into the water and then pulled onto shore by ropes or chains.

Barbed wire, angle iron or chains with bolts 2 to 4 inches extending through them pulled by manpower or one or two vehicles have been used. Some devices may cut off the plants near the bottom and not get all of the roots which will regrow. Try to get as many roots as possible. Don't bite off too much at a time as it will be hard to pull. A lot of plant fragments will surface. Be sure to skim all plant fragments.

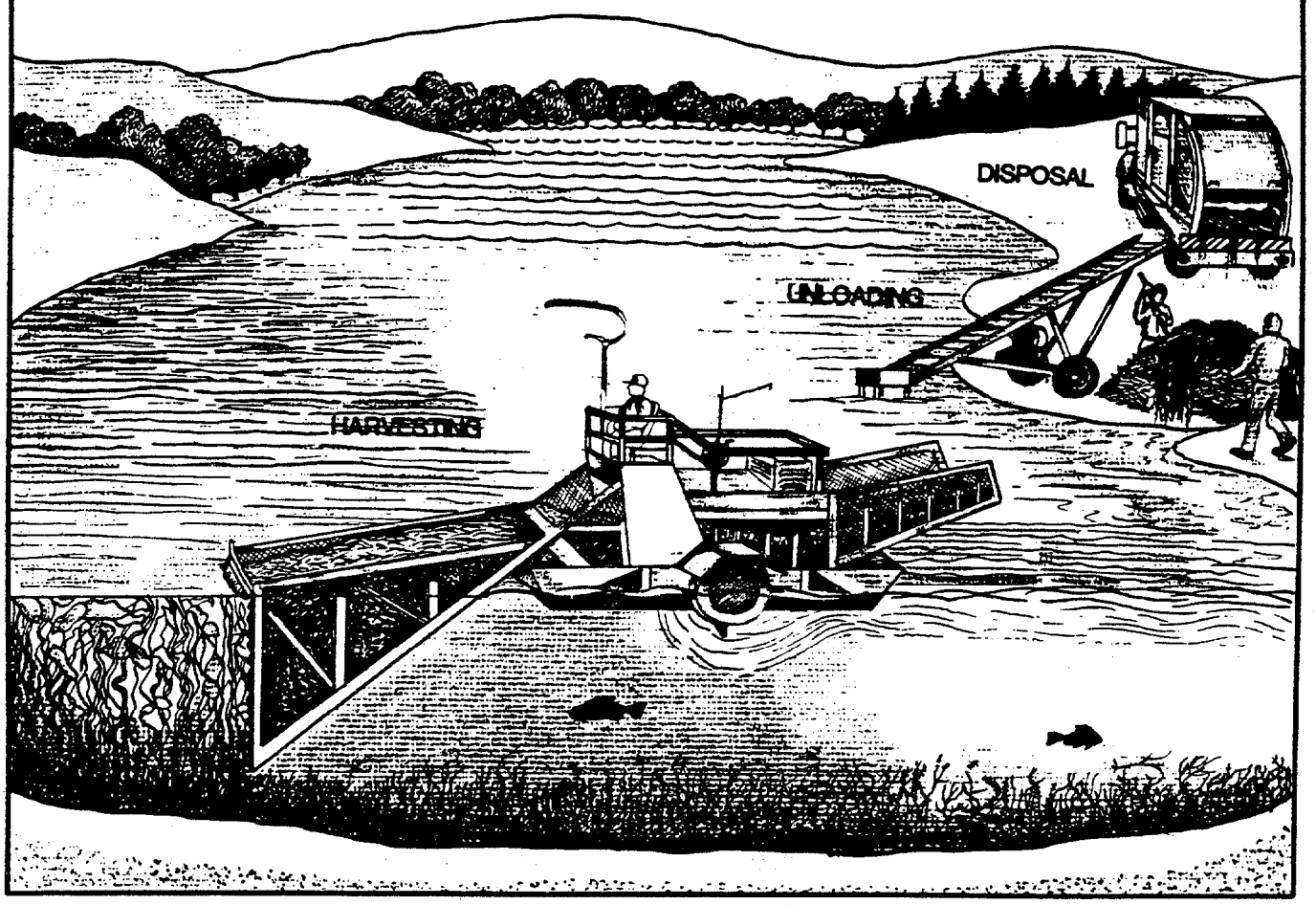
E. HARVESTING—Power weed cutters or harvesters (Figure 4) can be employed to cut submerged weeds to a depth of 5 to 8 feet. Most of these machines cut the weeds and gather them from the water by a conveyor. Cutting machines that do not gather, or "harvest" the weeds from the water, are not recommended as cut plants floating on the surface are problems for recreationists. Also, weed problems may be transmitted to other areas of a lake.

Conveyor transports cut plants to the deck of the harvester which carries the plants to an unloading site.

Regardless of the harvester, skimming is recommended to gather any plant fragments that may drop from the harvester.

Harvesting equipment is expensive and the results are temporary, sometimes requiring frequent cutting to maintain control. Generally, two harvests in the same area during the summer are recommended for most weed species. The first cutting should preferably be about mid-June, with the second cutting in mid-July. This does not imply that cutting at other times is not effective. Cutting from May 1 to the end of November can be effective.

Figure 4 AQUATIC WEED HARVESTING



If harvesting is not thorough in an area, weed growth can actually be stimulated rather than retarded. Frequent cutting can also promote bushy growth of less valuable weed species such as water milfoil.

Harvesting machines need room in which to maneuver to be most efficient. The harvester must be emptied of cut weeds frequently. The disposal of the large volume of weeds can be a problem. Depending on the density of the weeds, size of machine, and travel distance to a dumping site on shore, machines can harvest, on the average, about 1-1/2 to 2 acres per day.

F. CUTTING—Emergent plants, like cattails, can be controlled by repeated cutting. This can be done by hand or with a tractor and cutter bar. Repeated elimination of the food producing leaves in early summer, while a plant is actively growing, gradually starves the root system and the plant will eventually die over a period of years. Results are most effective when emergents are cut off under water as the direct air supply network to the roots is severed.

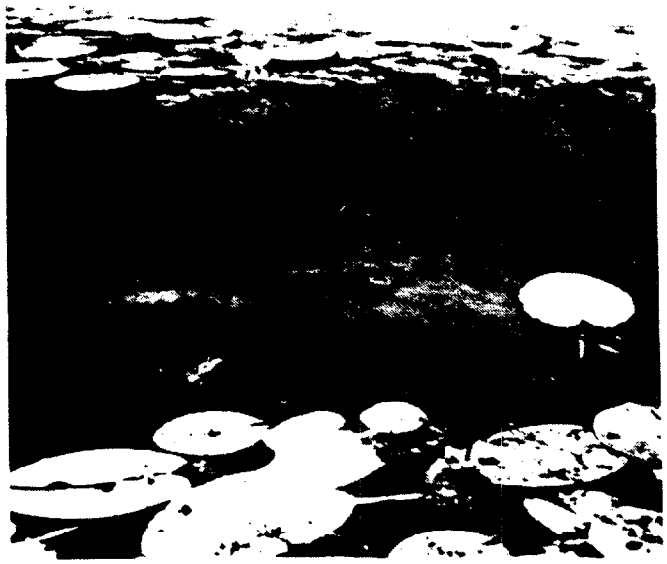
Cutting submergents has been discussed under "Harvesting."

G. SHADING

1. Floating shades made of black polyethylene plastic film, mounted on a braced 2" x 4" frame, can be used to control aquatic plants. These shades, when anchored in place from May through June, will control rooted growth for most plants. The shades interfere with water use but at a time when use is not heavy.

2. A commercial coloring agent, such as "Aquashade"™ can be added to small bodies of water to shade and inhibit the growth of submerged aquatic plants. It is not a chemically active substance; is not harmful to fish, wildlife or livestock; it is safe to use treated water for swimming and irrigation, and will not stain tissue or clothing after dispersal in the water. Depending on the water flow, fertility, etc., several treatments per season may be needed.

Smothering material is "walked down" and smoothed out prior to anchoring with pins, rocks or bricks.



An open area is created in dense growth of water lilies and milfoil by smothering with black vinyl plastic, Aquascreen TM or commercial construction filter cloth.

H. SMOTHERING—Submerged weeds can be smothered with 10 mil or heavier black or gray vinyl plastic[1], or a commercial window screen-like material called "Aquascreen"TM.

These materials can be laid down over dense weed growth, but it is most desirable to install the material when plants are young (May to June), or after summer harvesting.

The vinyl comes in 5 feet wide rolls; AquascreenTM in 7 feet wide rolls. Strips can be bonded together with a commercially available bonding agent, like glue, to cover large areas. It has been found that 14-15 feet wide strips are most efficient to apply.

Carefully, clear away sharp debris as plants will grow through any cut or tear in the material. Weight or pin down one end of the vinyl or screening then unroll the remainder, adding weights along its length. Walk the material down, smooth it out and anchor it securely along the edges. It should be left in place at least 30 days to kill the weeds.

The material can be moved to a new location, used another season, or left in place. If left in place, and sufficient silt is deposited on the material, new plants may start to grow in the silt, however, they can easily be pulled out.

Some small weeds may sprout through the screening but these will normally remain stunted.

Gases from decomposition of the weeds may form large bubbles under the impervious vinyl and cause portions to rise. Gas bubbles can be expelled by puncturing the material with a pitch fork.

Emergent plants in shallow water can be controlled by smothering with black or gray vinyl plastic or black polyethylene. It should be applied early in the growing season before plants get tall or they should be flattened to facilitate laying the material. The material must be well anchored in the water so waves do not wash the material towards shore. Most plants should be killed in about 30 days.

I. WINTER DRAWDOWN—If a lake, pond, or reservoir can be drawn down in winter to expose the roots of aquatic plants to freezing and frost heaving, some species can be controlled. The plants must be exposed for at least four weeks with bottom mud frozen to a 4 inch depth between December and the first of April. Deep snow or heavy ice formation after drawdown, may result in inefficient weed control due to inadequate frost penetration.

Waterlilies, muskgrass (*Chara* algae), coontail (*Ceratophyllum demersum*), water milfoil (*Myriophyllum spp.*), and two species of pondweed (large-leaf pondweed and fern pondweed)which are illustrated on pages 11-13 can be controlled with winter drawdown. While *Chara* is susceptible to drawdown it recovers quickly.

Waterweed (*Elodea spp.*), and curly-leaf pondweed (*Potamogeton crispus*), have been controlled in some cases, and remain unaffected in others.

Other *Potamogeton* species, particularly the thin leaf pondweeds and *Najas* (bushy pondweed) are resistant to freezing and cannot be controlled by winter drawdown.

Adjacent shallow wells may be affected by the drawdown.

Fish kills from oxygen depletion may occur if fish and organic matter are concentrated in a small volume of water unless there is a substantial flow through the pond or lake.

There can be significant consolidation of sediments by drawdown, especially when the soils are high in organic matter. Such compaction can retard plant growth. It should be remembered that this will happen around the entire lake, including major fish spawning and feeding

[1]Black or gray vinyl is denser than water and sinks easily, while black polyethylene plastic is less dense than water and very difficult to sink.

areas. Compaction is the most irreversible of all effects of drawdown.

The influence of drawdown on plant nutrient availability is not straightforward. Sediment oxidation and stabilization can work to decrease nutrient availability. At the same time, increased aeration can stimulate microbial action which can release nutrients. The result could be a shift from rooted plants to algal "blooms."

It is impossible to predict the effects of drawdown on nutrient availability in any particular body of water without careful study.

Damage to surrounding wetlands also should be considered. Freezing and soil compaction of these areas can seriously effect their plant growth resulting in decreased fish and wildlife habitat.

A DEPARTMENT OF ENVIRONMENTAL CONSERVATION PERMIT MAY BE NEEDED.

J. DEEPENING—Emergent and some shallow submerged plants can be controlled by deepening the water with dredges, drag lines, or backhoes. This technique may be extremely expensive but does not have to be repeated annually and results last generally longer than other techniques.

Emergent vegetation can be restricted to a narrow area by steepening sloping shorelines to a three to one[1] or steeper slope to at least a depth of three feet.

Shallow offshore areas can also be deepened, ideally to a depth to which the problem weeds do not normally grow. (See Table 2 for typical water depth of plants.) This removal of the lake bottom sediments down to the subsoil essentially eliminates the stored nutrients for plant growth. It will be several years at least, until bottom sediments accumulate again to sufficient depth to support weed growths.

The disposal of dredged material may be a problem and the dredging may not be compatible with other uses of the lake waters.

A PERMIT FROM THE DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND A PERMIT FROM THE ARMY CORPS OF ENGINEERS MAY BE NEEDED FOR MOST DEEPENING OR DREDGING OPERATIONS.

[1]Three feet horizontally to one foot vertical drop.

Agencies to Contact for Assistance

A. County Soil and Water Conservation District.
   1. Some provide aquatic plant management services.
   2. Land treatment application assistance.
   3. Assistance from Soil Conservation Service.
B. Soil Conservation Service, local county office.
   1. Conservation planning for all types of land and water management, including fishponds, aquatic plants, etc.
   2. Land treatment planning and application assistance.
   3. Sources of materials.
C. Department of Environmental Conservation Regional offices.
   1. Permits.
   2. Fisheries/aquatic plant management relationship information.
   3. Assistance with point source pollution control.
D. Cooperative Extension County office including Sea Grant.
   1. Information bulletins.
   2. Sources of materials.
E. County or District Health Department office.
   1. Guidance on sanitary surveys.
   2. Information on health regulations.

References for Additional Information

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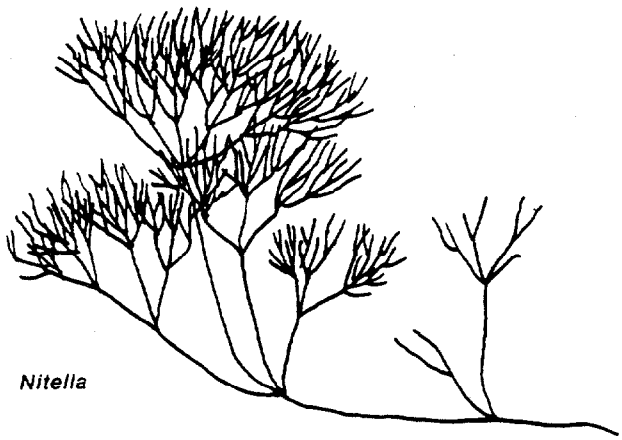
Illustrations of Some Common Aquatic Plants

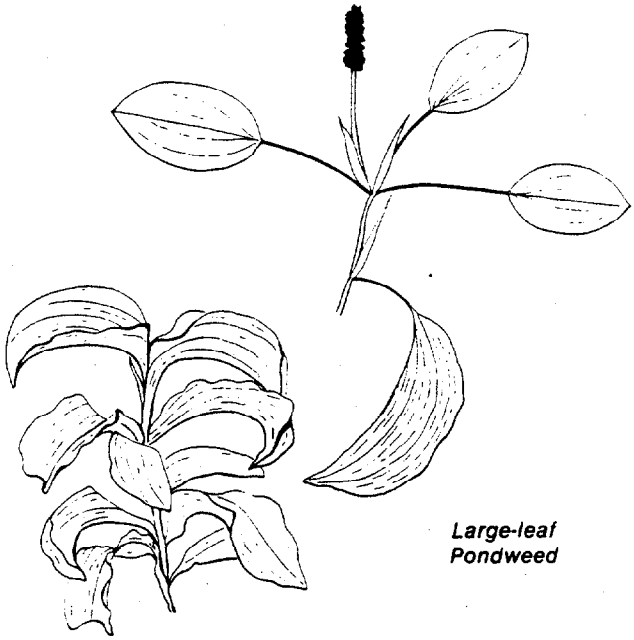


Nitella

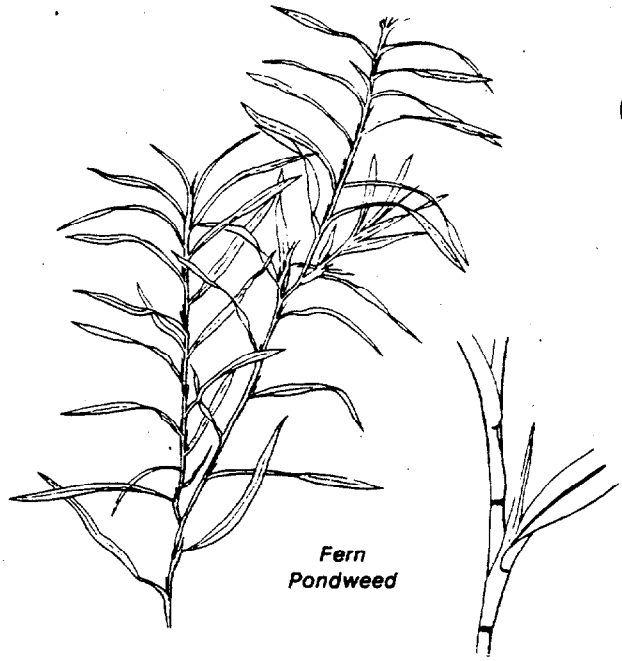
Chara

Naiads

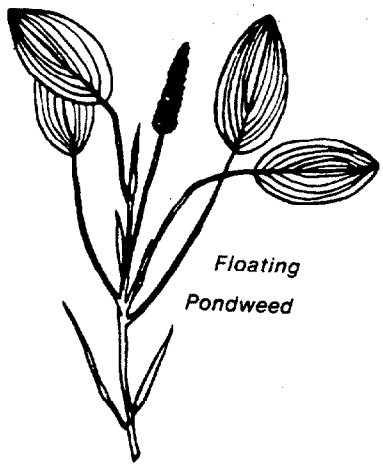
Coontail



Large-leaf Pondweed



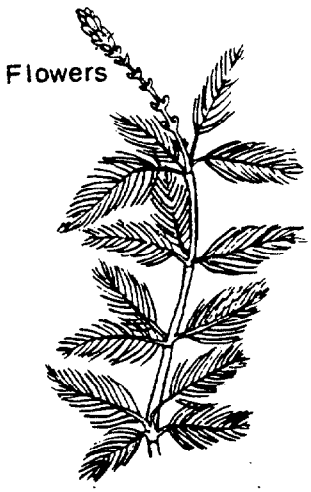
Fern Pondweed



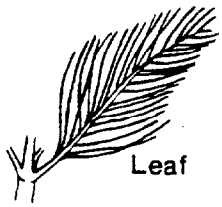
Floating Pondweed

Sago Pondweed

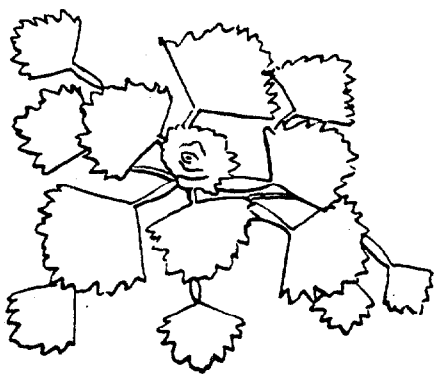
Curly Leaf Pondweed



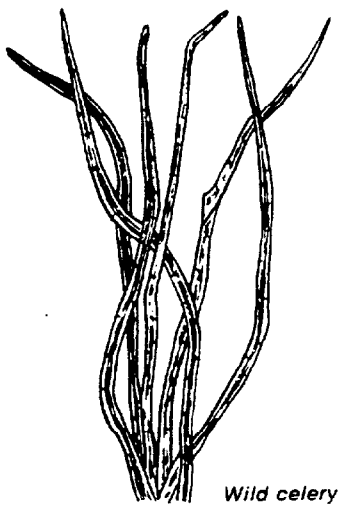
Water-milfoil

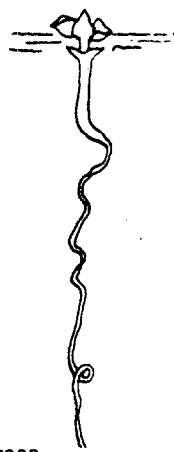


Waterweed or *Elodea*



Water Chestnut





Wild celery or *Eelgrass*

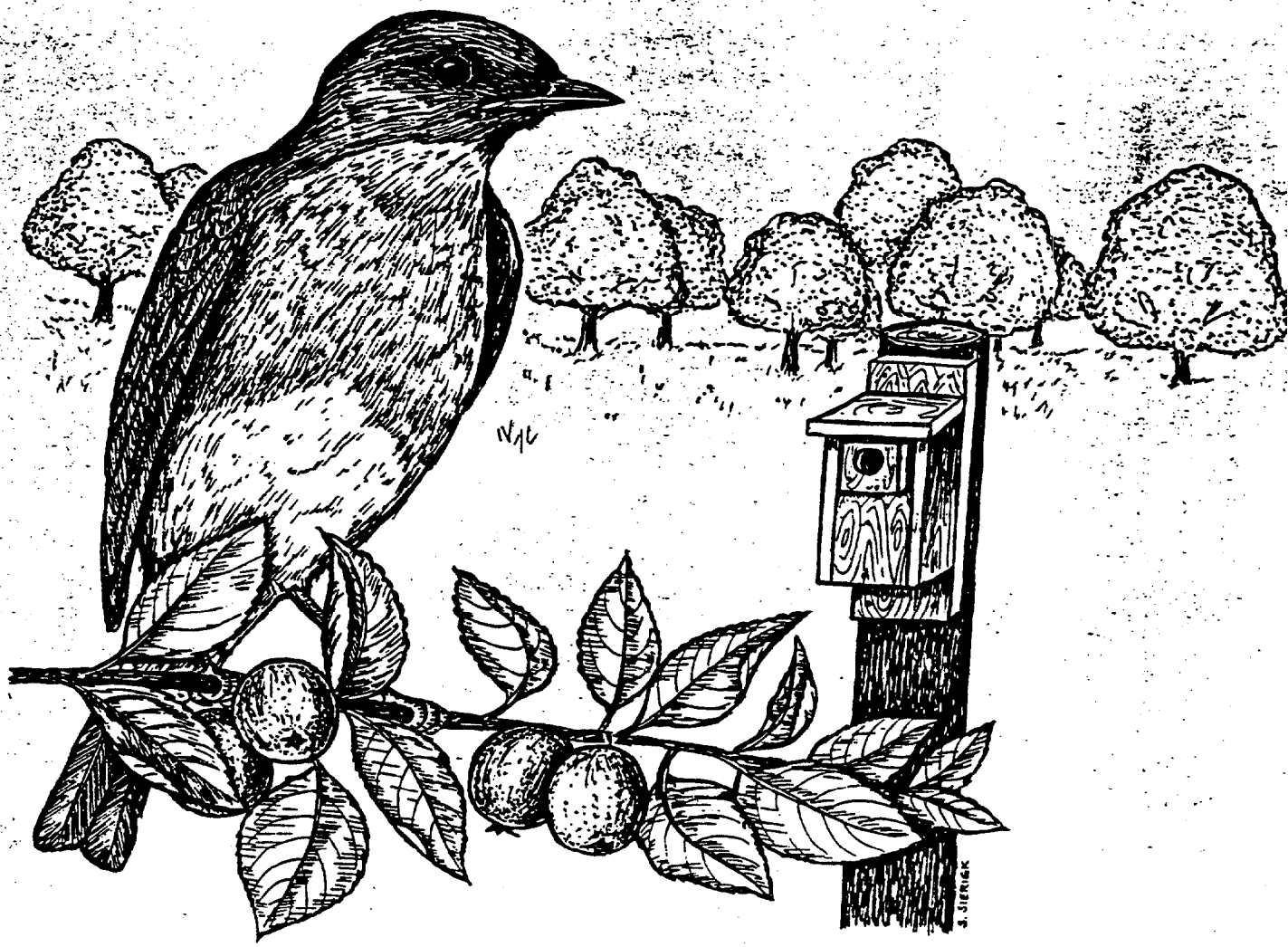
4 - H Members' Guide

EXERPTS FROM ;

Bluebirds in New York

by

Beth G. Silverman and Marianne E. Krasny



Illustrated by Steve Sierigk

CORNELL COOPERATIVE EXTENSION, 4-H DEPT. CORNELL UNIV., ITHACA, N.Y., 1989

Build a Bluebird Nest Box

Eastern Bluebirds nest in many types of boxes. By using a well-designed box, you can discourage other kinds of birds from using a bluebird nest box. For example, if a nest box has an opening that is only 1 1/2 inches across, then larger birds like starlings will not be able to fit through the entrance hole.

In this section, you will find plans for two different boxes that are just right for bluebirds. Read over the instructions for both boxes. You can choose to make one or both nest boxes.

Plan A shows you how to make a wooden box. You may need help from an adult when drilling and sawing wood for this box. This nest box will take more time and money to build than the other box, but it will last longer and may look a little nicer. You can also open this style box while the bluebirds are nesting, making it easier to watch their progress. If you like working with wood, then this project is for you!

Plan B is for a nest box made from milk cartons. This box costs less and is easier and faster to make than a wooden box. If you paint the outside of the carton and bring it indoors each winter, it can also last a long time (up to three years) and look very nice. By building a milk carton nest box, you will be recycling materials that otherwise would be thrown out.

A. Wooden Nest Box

Materials Needed:

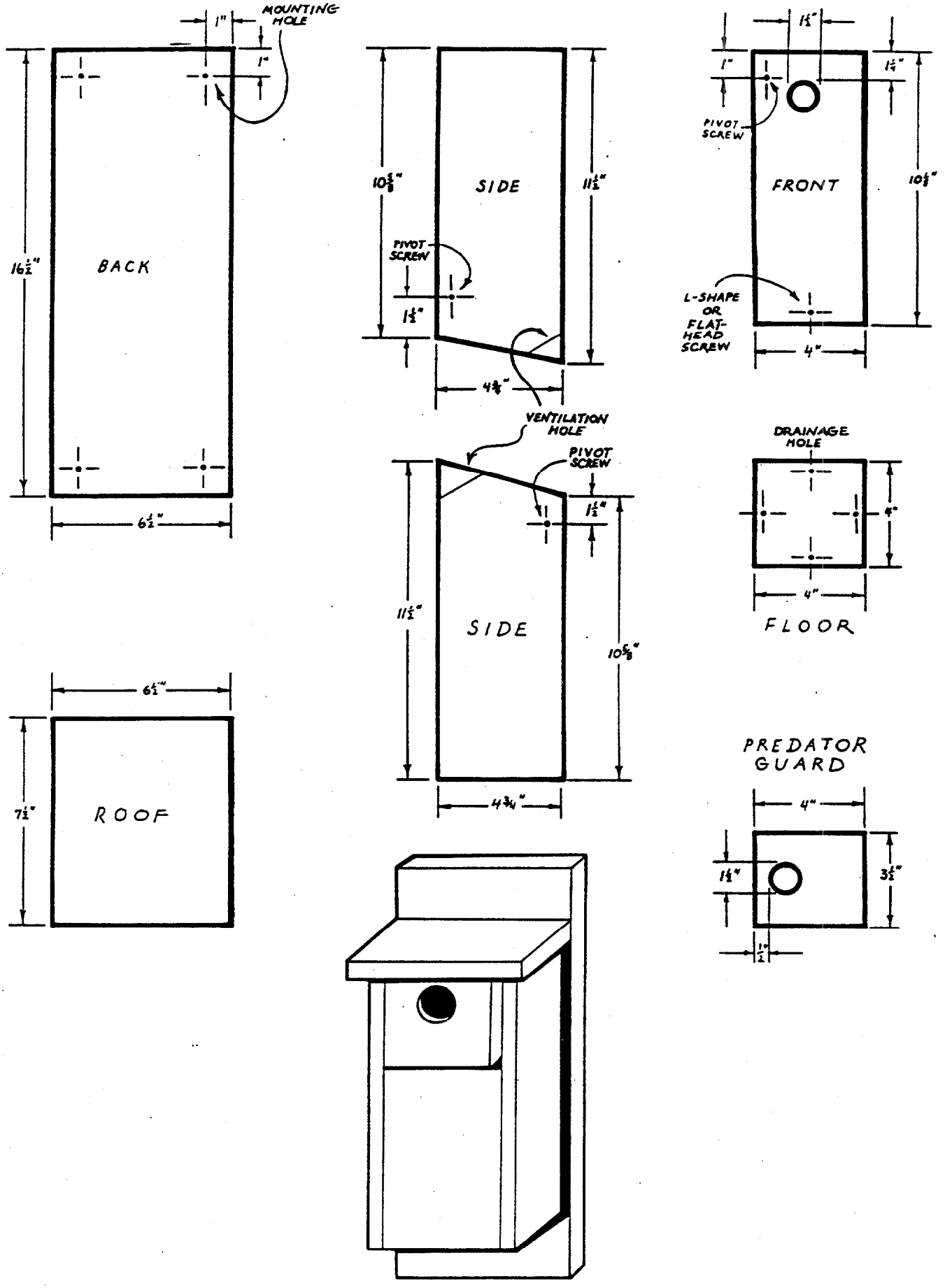
- ❑ rough-cut lumber, 1" thick (You can use any scrap lumber, except interior plywood.) For each box you will need three pieces measuring at least 2' x 6 1/2", 2' x 4 3/4", and 18" x 4".
- ❑ 16-20 aluminum or galvanized nails (2 1/2")
- ❑ 2 screws (1 1/2")
- ❑ 1 L-shape screw or flat-head wood screw
- ❑ 3/8" hardware cloth (screen), 4" x 6"
- ❑ saw for cutting wood
- ❑ hole saw
- ❑ drill (with a 1/4" or 3/8" bit and a 1/8" bit)
- ❑ hammer

Directions:

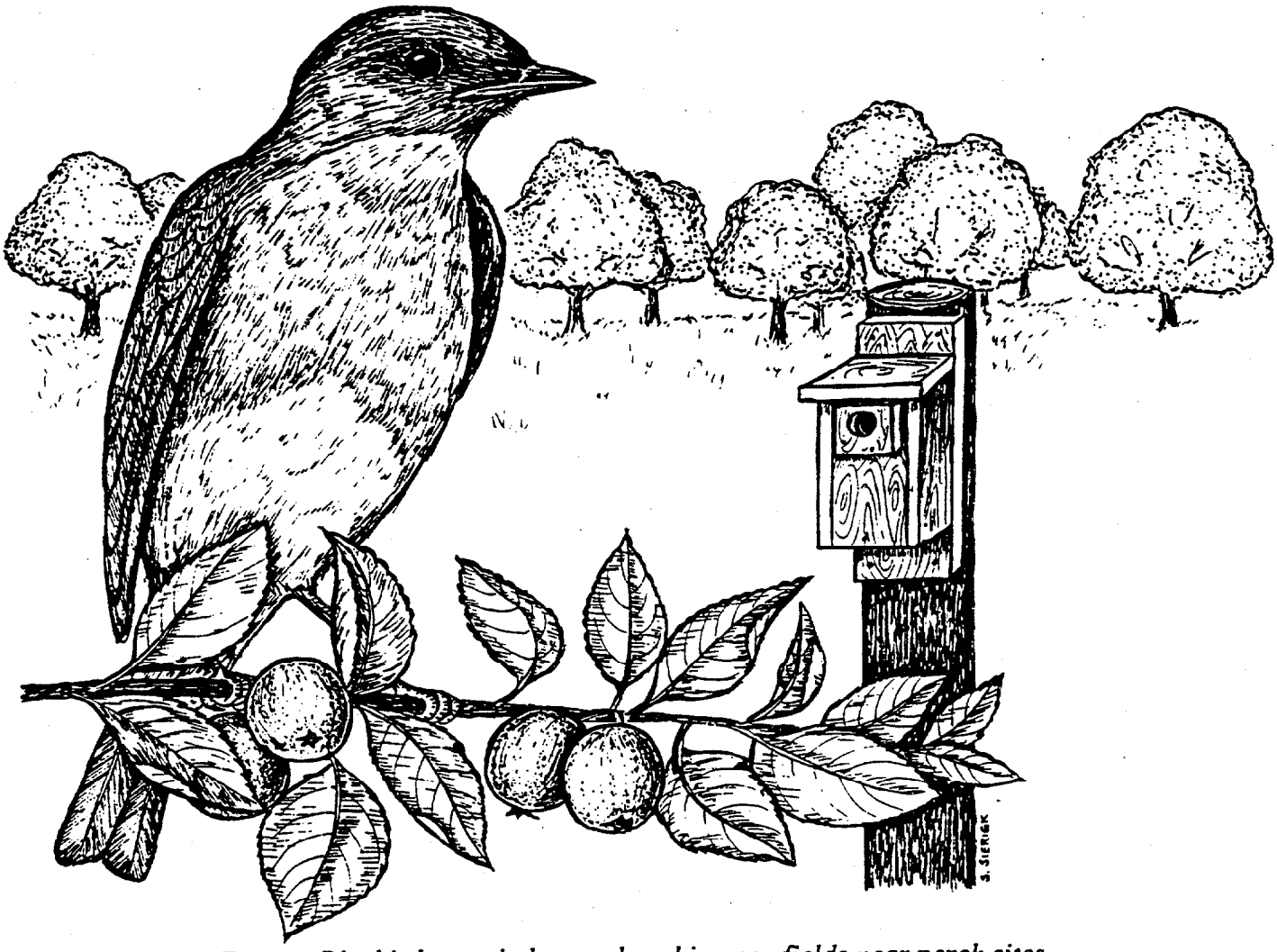
1. Refer to Diagram A. Draw the outline of all pieces on the lumber with a pencil and a ruler. Check to make certain that each piece is the correct size.
2. Carefully cut the pieces along the pencil outline. Cut the top corner off both side pieces to give the nest box good ventilation. You should cut a triangle with sides measuring about 1".
3. Drill four small (1/4" - 3/8") holes in the floor piece. These holes will let rain drain out of the box and should be located as shown in the diagram.

4. Drill four holes (1/8" diameter) in the back piece, two at the top and two at the bottom. Each hole should be 1" in from the corners. These holes will be used to mount the box.
5. Use a hole saw (a drill attachment that makes round holes — ask an adult to help with this) to drill a 1 1/2" diameter hole in the center of the front board, 1 1/4" from the top (as shown in the diagram). Drill another 1 1/2" hole in the predator guard with your hole saw, down 1/2" from the top. Nail the predator guard to the front of the box, aligning the entrance holes. The thick predator guard will make it difficult for raccoons and other predators to reach into the box and grab eggs or young at the bottom of the box.
6. You are now ready to assemble your box. Before hammering or screwing pieces together, drill small pilot holes where nails or screws will go. The diameter of the pilot holes should be slightly smaller than the diameter of the nails or screws you use. Pre-drilled holes help prevent the wood from splitting and make it easier to hammer pieces together.
7. Fasten each side board to the front piece with a screw, placed 1" from the top of the front piece and 1 1/2" from the top of the side boards. (The bottom edge of the side and front boards should be aligned. The top of the front piece will be 1/2" lower than the top of the side pieces, allowing the front to pivot to open the box.) The screws go through the side boards and into the front piece (see diagram for placement). Since these two screws let the front of the box pivot open, they must be exactly the same distance from the top.
8. Install the floor board next. Position it so the grain of the wood runs from side to side. Nail the floor board in place.
9. Nail the back in place. Center the box along the back board. This allows room at the top and bottom of the back to mount the box.
10. Nail the roof firmly to the top of the box. There should be a 1/2" gap between the front of the box and the roof, allowing the front to pivot open.
11. Drill a pilot hole through the bottom center of the front board into the floor board and insert the L-shape or flat-head screw. To open the box, remove this screw. An L-shape screw is easiest to unscrew, but if your box will be placed in an area where a person might tamper with it, insert a flat-head screw.
12. Before you mount your box, install a piece of 3/8" hardware cloth, 1" above the floor of the box. You will need a piece of screen that measures 4" x 6". Fold the edge over 1" on two sides. The screen now measures 4" x 4" and fits in the bottom of the box. (See illustration on page 11.) This screen will trap blowfly larvae below the bluebirds' nest, so the insects cannot harm the baby birds. When blowfly larvae find bluebirds, they suck the birds' blood and can kill young bluebirds.
13. You are now ready to mount your box!

WOODEN NEST BOX
DIAGRAM A



Mounting Nest Boxes



Eastern Bluebirds nest in boxes placed in open fields near perch sites.

Bluebirds like to live in open fields with scattered trees, shrubs, fences, or wires for perching. They use these perch sites to hunt for insects (like grasshoppers) that live in grassy fields. A pair of bluebirds needs lots of insects to feed themselves and their youngsters, so a lookout perch is important. But the most important part of a bluebird's home is a nesting cavity — your nest box will help!

Mount the nest box in an *open area* that has at least *one perch site*. House Wrens often chase blue-

birds out of nest boxes. But House Wrens usually nest near densely growing shrubs. If you place your box at least *100 feet (30 meters) away from any woods or brushy areas,* you will avoid wrens. You should also place your nest box well away from houses or barns, since House Sparrows often live close to buildings. Cemeteries, golf courses, parks, pastures, hayfields, and large lawns are all good places for a bluebird nest box. Avoid areas that are near busy roads. If you mount a nest box near a quiet road, face the opening of the box away from the street. In New York State, March is the best time to set up nest boxes, before Eastern Bluebirds begin to search for nesting spots.

Mount your box on a *pole or tree, three to five feet (1 - 1.3 meters) up from the ground.* If the box is lower than three feet, predators (like raccoons or house cats) have an easy time capturing young birds and eggs. Predators have easier access to boxes mounted on trees than those on poles — so place your nest box on a pole if possible. A box that is higher than five feet (1.3 meters) often attracts House Sparrows.

The *opening of the nest box should face a tree, pole, or fence* that the young bluebirds can land on when they first fly out. Young bluebirds can fly only 50 to 100 feet (15 - 30 meters) when they leave the nest. If they do not see a safe place to land, they will end up on the ground, where predators can grab them.

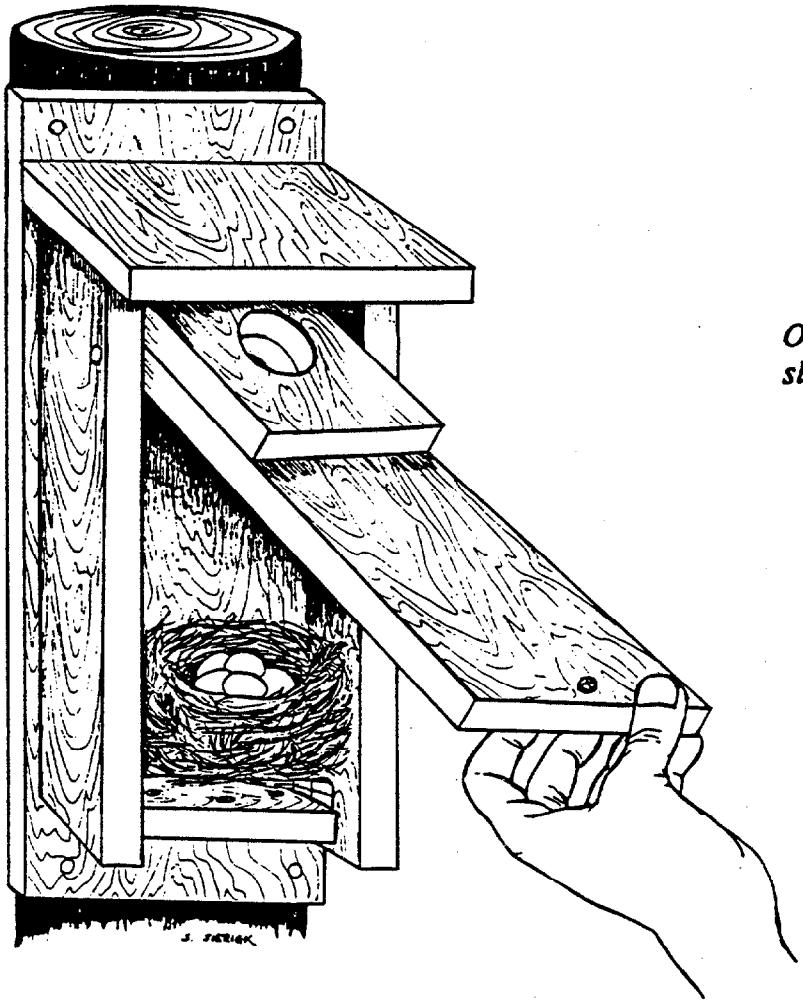
Bluebirds are territorial — a pair of bluebirds defends the area around its nest and prevents other bluebirds from nesting nearby. You must place nest boxes at least *300 feet (100 meters) apart* to attract two pairs of Eastern Bluebirds. Tree Swallows also need nest boxes and will nest close to a pair of bluebirds (although they will not nest close to other Tree Swallows since swallows are also territorial). By placing two boxes 10 to 20 feet (3 - 6 meters) apart, you can provide a home for both bluebirds and swallows, and lessen competition between these birds.

If your club has several boxes to mount, you can set up a bluebird trail. Use your knowledge about bluebirds' and Tree Swallows' territories to encourage the best use of your nest boxes. Place two boxes within 20 feet (6 meters) of each other, and separated from other boxes by at least 300 feet (100 meters). If you set up several boxes in one field, you and other members of your club can take turns checking all the nest boxes along your trail.

Use the Nest Box Map Record Sheet at the end of this manual to keep track of where your boxes are.

Once you have mounted your nest boxes, you will want to monitor the progress of birds that nest in them.

Monitoring Nest Boxes



Open the nest box slowly and carefully.

Many people are afraid that birds will leave a nest if people are nearby. But bluebirds do not desert their youngsters when people check on them. If you are very careful not to disturb the birds or their nests, you can help bluebirds by watching their progress. At the same time, you will learn about these birds. Follow the directions in this section when you monitor your nest boxes.

Check all nest boxes at least once a week from April through August. Bring a pad of paper and a pencil. Record which bird species uses each box, the exact dates when parents build a nest, how

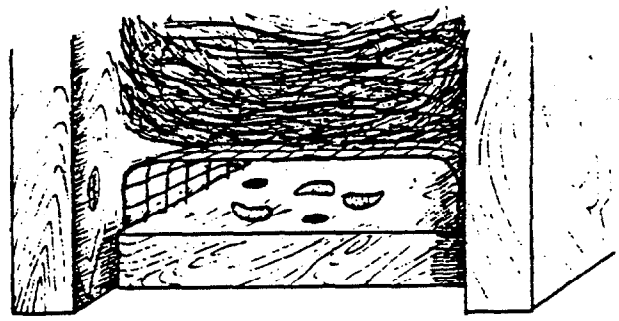
many eggs the female lays, when the young hatch, and when they leave the nest. You can record this information on the Nest Box Monitoring Record Sheet at the end of this manual. Use one record sheet for each box that you check. The Nest Box Summary Record Sheet, also at the end of this manual, can be used to summarize all your Nest Box Monitoring Record Sheets.

Make a little noise as you approach the nest box so the birds will know that you are nearing. Stand to one side of the nest box and tap lightly or scratch on the box's side, giving the adult birds time to fly out before you open the box. Open the nest box slowly and carefully — you may find wasps, snakes, or startled birds inside. If you are monitoring nest boxes made from milk cartons, use a flashlight to peer in through the entrance hole (you may need to stand on a stepladder or a tree stump). Check the box quickly for eggs, babies, or any evidence of disease or parasites (particularly blowfly larvae) and then leave the area of the box. If you do find a problem, contact your local Cooperative Extension office for information on what to do.

The female begins laying eggs shortly after the nest is built. Bluebirds lay their eggs in the morning, so after the nest is built, it is best to check the box in the afternoon. Bluebirds usually lay one pale blue egg a day for four to five days.

Keep careful track of the age of the baby birds. Once the nestlings are 12 days old, you should no longer open the nest box, as this may cause the birds to jump out before they are ready to fly. Bluebirds generally fledge (leave the nest) when they are 15 to 20 days old.

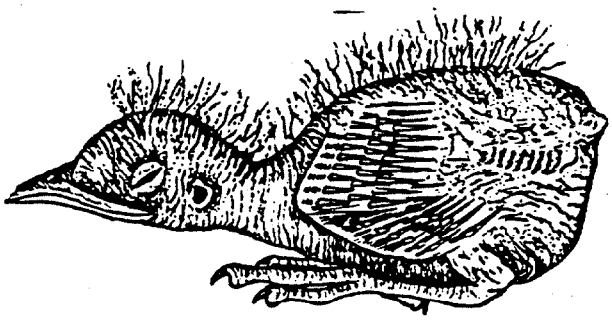
As soon as the youngsters have fledged, clean out the nest box. It is important to clean out the nest box because parasitic blowfly larvae may be living in the nesting material. By clearing out the old nest, you help to reduce parasite problems for the bluebirds when they raise a second family. Clean out nesting material again in the fall after the bluebirds finish nesting. Then, clean the boxes in February as mice and squirrels often spend the winter in bluebird boxes. Also clean them if you find dead birds in the box. Dead birds and old nests attract predators, so dump them at least 150 feet (50 meters) away from the nest box.



Blowfly larvae on bottom of nest box. Placing a screen in your nest box will help keep blowflies away from the bluebirds.

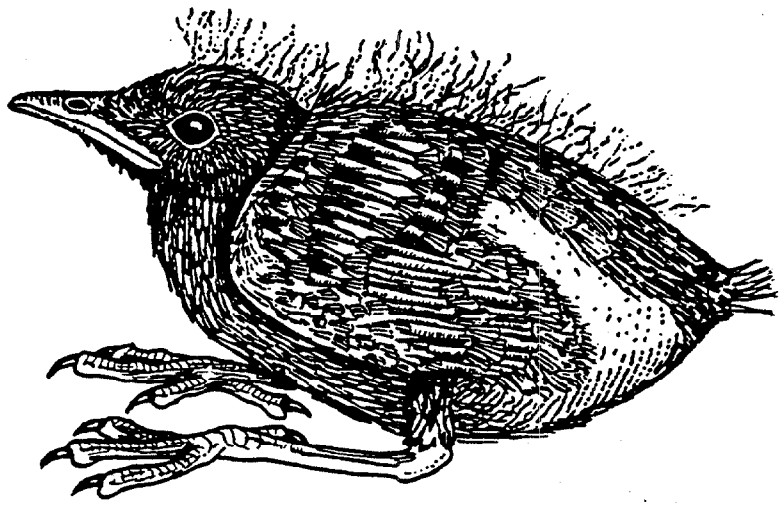
Several kinds of birds use nest boxes. Follow this guide to recognize these birds and the nests they build.

Eastern Bluebirds are blue birds! Unlike Blue Jays, bluebirds do not have crests on their



Eastern Bluebird, less than a week old. It is difficult to distinguish the naked downy young bluebird from young of other species.

Eastern Bluebird, ten days old. The tufts of feathers sticking out of the sheaths on the wing are called pin feathers. The male's pin feathers should be blue and the female's brownish-gray with a hint of blue.



Almost fledged Eastern Bluebird, about 15 days old. At this age, the young look like ragged adults. Avoid opening the box at this point because the birds may jump out before they are ready to fledge.

heads. Male bluebirds have bright blue backs, tails and wings. Their throats and breasts are reddish-brown and their bellies are white. Females look similar to males, but are less brightly colored. Adult bluebirds are medium-sized birds, about six to seven inches (15 - 18 centimeters) long. Bluebirds build a neat, cup-shaped nest of dried grass and weed stems. Female bluebirds usually lay four to five pale blue eggs (although a few females will lay white eggs).

Tree Swallows are blue birds too, but they are slightly smaller than true bluebirds. They have iridescent dark blue or blue-green backs, and white breasts and bellies. Tree Swallows weave a nest of dried grasses and weed stems and line it with feathers. The female lays four to six white eggs in her nest. Often one or two white feathers cover the eggs. You will enjoy watching adult swallows dart through the air to catch flying insects. If a Tree Swallow inhabits one of your nest boxes, monitor its progress just as you would a bluebird.

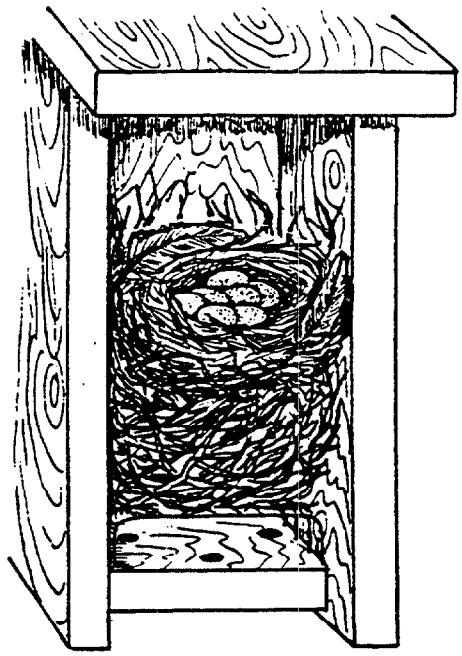
House Wrens usually nest only in dense shrubs, along the edges of woods, or near other thickly growing plants. These small brown birds have an upturned tail and brown bars on their wings and tail. The male will fill a number of nest boxes with a mass of twigs, and the female will choose one box and line it with hair, wool, grass, or any other soft material. Six to eight white eggs, speckled with small brown markings, are laid in the nest.

When House Wrens find a bluebird nest, they frequently puncture the bluebird eggs and build their own nest on top of the bluebirds' nest. The best way to prevent a House Wren from occupying your bluebird house is to place your box far enough away (100 feet or 30 meters) from House Wren habitat. If you monitor your bluebird boxes frequently, you will be able to detect the beginnings of a House Wren nest (a mass of twigs). You can then remove the half-finished nest and move your box away from wren habitat. However, if the House Wren has completed building its nest, it is illegal to destroy the nest. This is because House Wrens are native birds and are therefore protected by law. They also have a beautiful song and are great fun to watch.

House Sparrows are thick-billed birds, slightly smaller than Eastern Bluebirds. Male sparrows have a gray crown and a black bib under the bill. Females have no bib. Both males and females have brown streaked backs and dingy unstreaked breasts. House Sparrows build a large cup-shaped nest of grass, stems, and trash (like paper, string, or cloth), and line it with feathers, hair, or wool. Females lay three to five white eggs with gray spots.

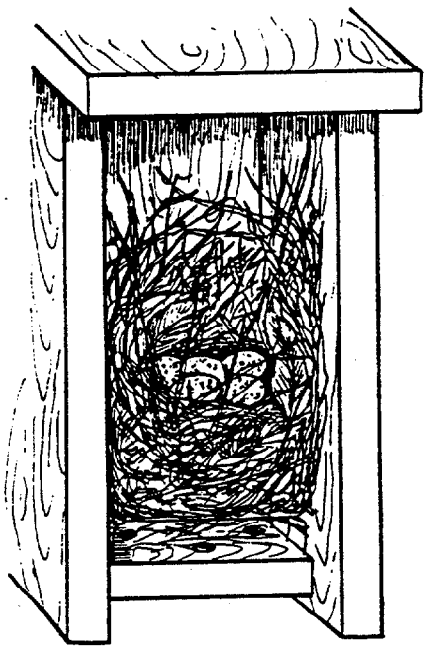
House Sparrows will break bluebird eggs, kill young bluebirds and even adults, and then b a nest over the bluebird family. But if you convince a pair of House Sparrows to search for a new nest site, bluebirds may return to the nest box. Because House Sparrows are not native to the United States, they are not protected by law. Therefore, if you find House Sparrows nesting in one of your boxes, discourage them by removing their nests and eggs. You may have to do this several times before the sparrows search for another nesting site. (You can also cover up the box's entrance hole for a few days after removing the nests and eggs.) House Sparrows and European Starlings are the only cavity-nesting birds not protected by federal law — so do not interfere with any other birds that have already nested in your box.

By carefully watching bluebirds you will learn a lot about their habits. Learn more about bluebird behavior in the next section.



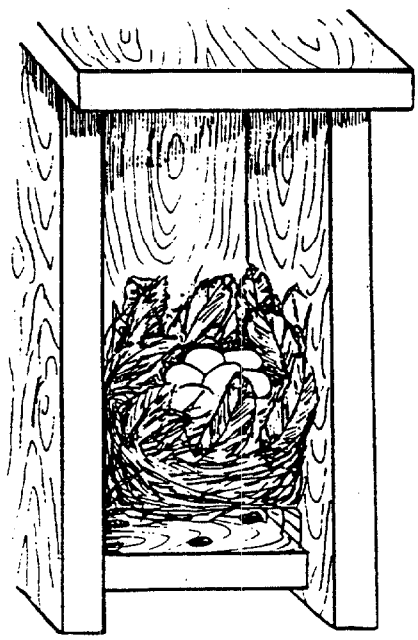
House Wren Nest

Males fill the box with twigs. If a female chooses the box, she will remove some twigs and line the nest with soft material. The female House Wren lays six to eight white eggs speckled with small brown markings.



House Sparrow Nest

Nest is made from grass, stems and trash, and lined with soft material. The female House Sparrow lays three to five white eggs with gray spots.



Tree Swallow Nest

Nest is woven from dried grass and weeds and lined with feathers. The female Tree Swallow lays four to six white eggs.

to record the bluebirds' progress and behavior on the Nest Box Record Sheet and Bluebird Project Record.

The first bluebird you notice will probably be a male bird. (Remember, males are more brightly colored than females.) Males fly north before females and reach New York State in late February or early March. (Occasionally, bluebirds overwinter in southern and central New York State.) The male's first job is to find a place to build a nest. He looks for a natural hole in a tree or fence post, or a human-made nest box.

Once a male bluebird chooses a nest site, he must defend the land around the nest hole (his territory). Other birds looking for a place to nest might try to take over his hole. If you see a male bluebird flying at another bluebird, he is probably trying to keep the intruder off his territory. A male also tries to chase away other kinds of birds that approach his nest hole (like Tree Swallows and House Sparrows), but he lets them use other nest boxes or cavities on his territory.

Soon after the male chooses a nest hole and territory, he must convince a female bluebird to be his mate. Starting in mid-March, he perches near the nest hole and sings. When a female nears, he flies up in the air while singing. If she lands in his territory, the male flies first toward her and then to the nest hole. He spreads open his bright blue wings and tail, rocks back and forth, hops into the nest hole and peers out at the female.

If the female flies toward the nest hole singing softly, the male gets very excited. He circles around her, singing loudly. Again he enters the nest cavity, but this time the female follows him. If the male has found several unoccupied nest holes on his territory, he shows her each site.

Once the female has chosen a nest hole and accepted a mate, she starts to build a nest. Usually you will see a female carrying grasses and dried weeds for the nest during the first two weeks of April. On rare occasions, the male assists the female in gathering nesting material, but usually he just follows her and sings. The female weaves the grasses and weeds into a cup-shaped nest. Both birds now defend their nest box and territory from intruders.

When her nest is complete, the female lays her first pale blue egg. Each day she lays another egg, until four or five eggs fill the nest. For the next 12 to 14 days, the mother incubates her eggs — she keeps them warm by covering them with her body. While she sits on the eggs, her mate may bring her food, but usually she takes short trips away from the nest box to get her own food.

Both the mother and father bluebirds find food in the field near their nest. You may see a bluebird perched on a tree, wire, or fence post, scanning the ground for grasshoppers, crickets, caterpillars, and other insects. When the bluebird spies an insect in the grass, it darts down and captures the prey. The bird then returns to its perch and devours the insect. One reason why bluebirds nest in open fields is that they can find plenty of ground-dwelling insects there. Bluebirds have always been a friend of farmers since they capture many insects that could damage a farmer's crops. After the bluebirds' eggs hatch, the parent birds help a farmer even more by spending most of their day patrolling for bugs to feed their hungry youngsters.

In early May, you will find what you have been waiting for in your nest box — baby bluebirds! The babies are blind and helpless when they hatch, and depend entirely on their parents for survival.

'he mother bird carries the empty eggshells away from the nest when the youngsters hatch, so predators will be less likely to find her babies. She may eat the shells, and get the extra calcium she will need ·vhen she lays more eggs.

Both parents search for insects to feed their youngsters. At first the babies eat only soft-bodied nsects like caterpillars. As they get older, their parents bring them grasshoppers, beetles, and other larger, hard-bodied insects.

Each night and during the day when the birds are very young, the mother bluebird sits on her babies to keep them warm. Once the youngsters grow feathers, their mother only warms them on very cold nights.

About 15 to 20 days after the youngsters hatch, the bluebirds are ready to leave their nest box. opening of the nest box faces a tree or shrub, youngsters will fly there and land safely above any predators. When you are certain that all the young have fledged (left the nest), clean out the nest to rid the box of blowfly larvae and other parasites that may be living in the nesting material.

After the young have left the nest box, they still rely on their parents for food and protection for the next three weeks. The growing birds fly from tree to tree, practicing and perfecting their flying skills. They call out many times during the day, and their parents bring them food. Each night the bluebird young huddle together on a tree branch to stay warm.

Ten days after her young have left the nest, the mother bluebird may return to the nest box to build a new nest and lay more eggs. The male bluebird continues to care for the young, but the female devotes all her energy to starting a new family. When the second set of eggs hatches, the father and sometimes the grown-up youngsters help feed the newborns. You will want to watch this second set of bluebird young grow up — record their progress exactly as you did that of the earlier bluebirds. Fill in another Nest Box Monitoring Record Sheet for this new bluebird family.

The entire bluebird family remains together in the summer and fall, feeding on wild berries and insects. In the fall, they join up with other bluebirds and form a flock. The flock gradually moves southward, stopping frequently where it finds food. Eastern Bluebirds from New York State spend the winter where food is plentiful, often as far south as Virginia and North Carolina.

If you watch bluebirds carefully and learn to recognize their behaviors, you will become a bluebird expert. Demonstrate your knowledge by filling in the crossword puzzle in the next section. You can also use your knowledge to help scientists who study bluebirds. Find out how in Section 7.

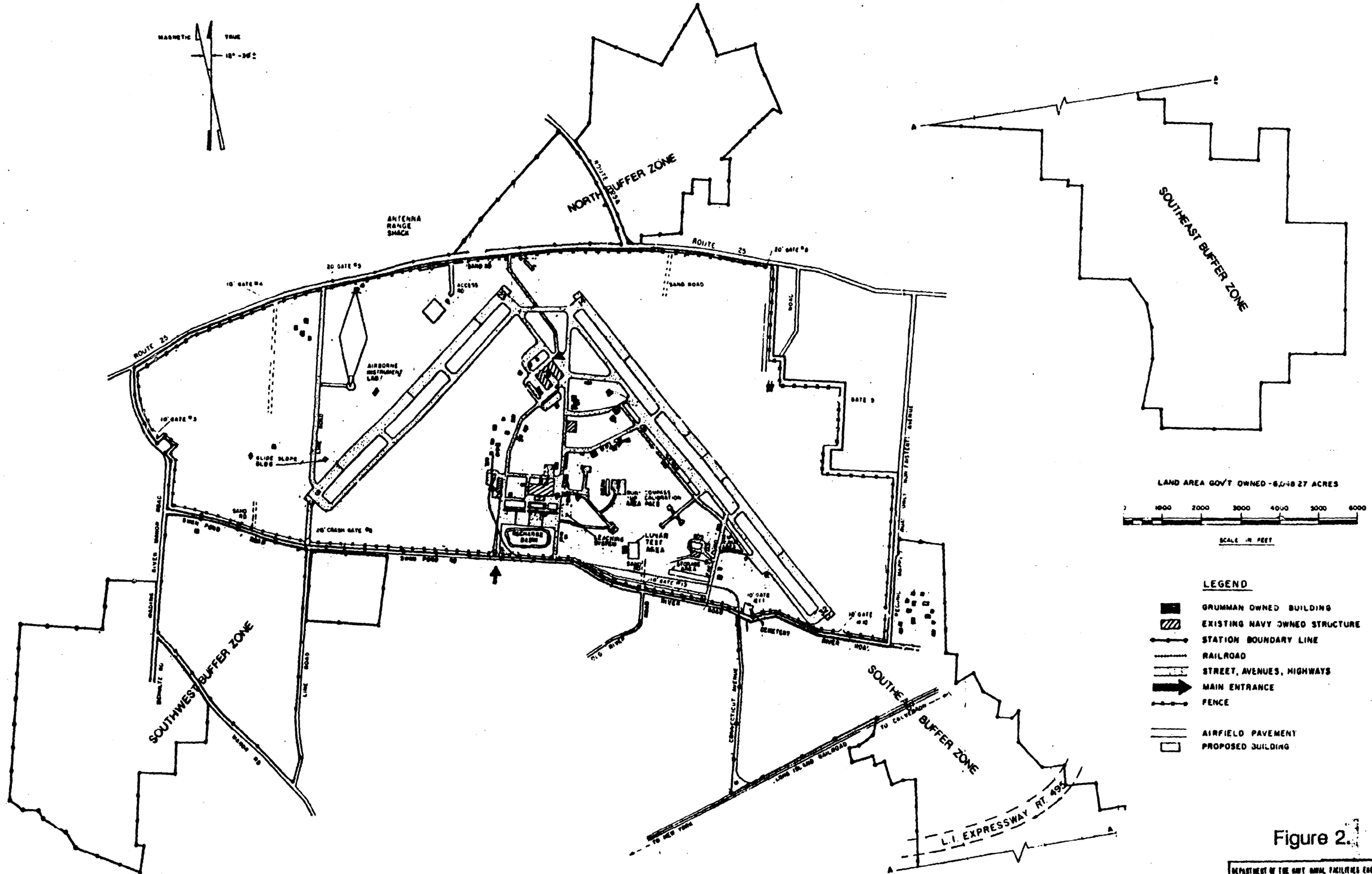


Figure 2.

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, N.Y.

GENERAL DEVELOPMENT MAP

EXISTING AND PLANNED PRE-M-DAY

Figure 5 - PROBLEM SOILS MAP

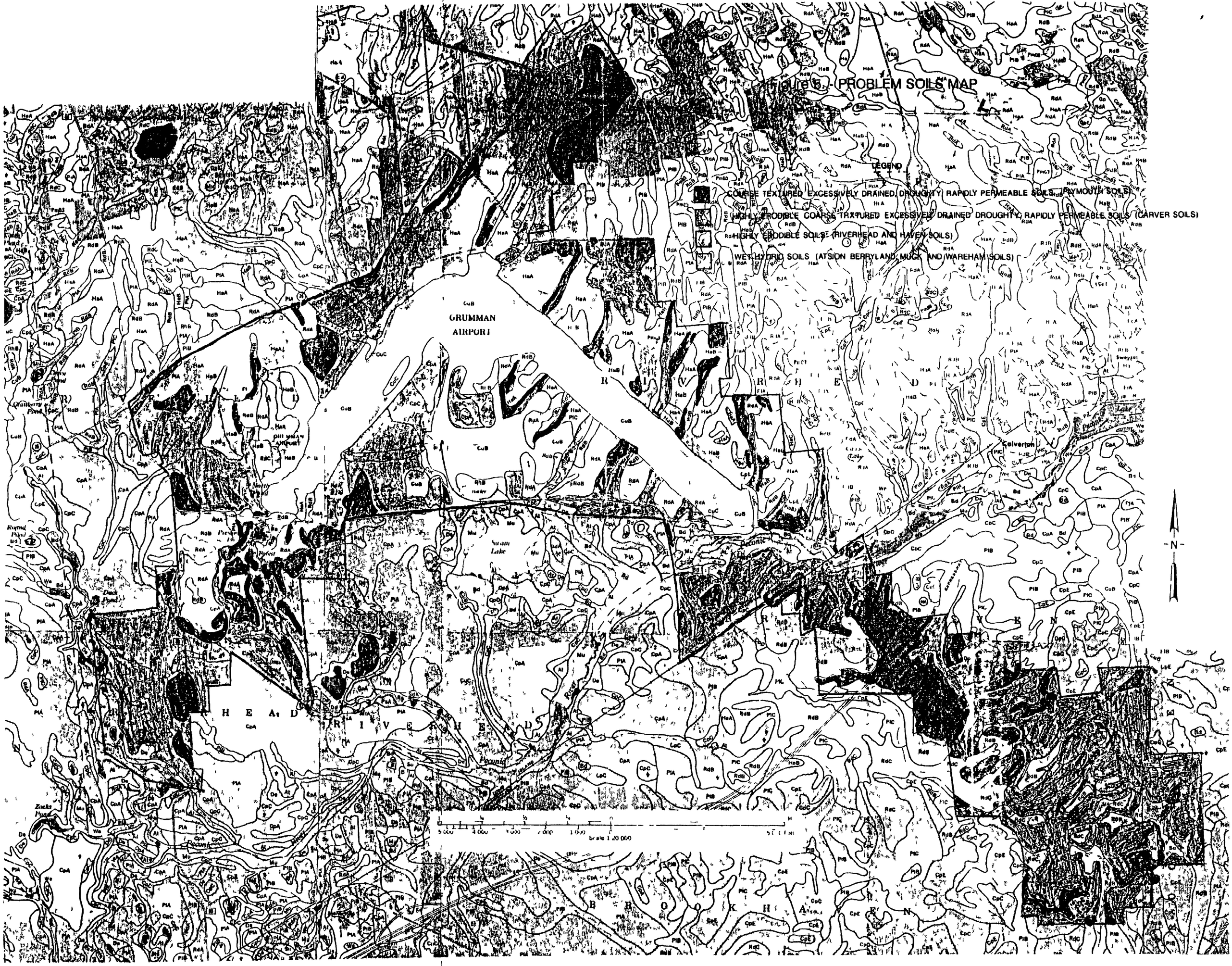


Figure 7. - 100 YEAR FREQUENCY FLOOD PLAIN MAP

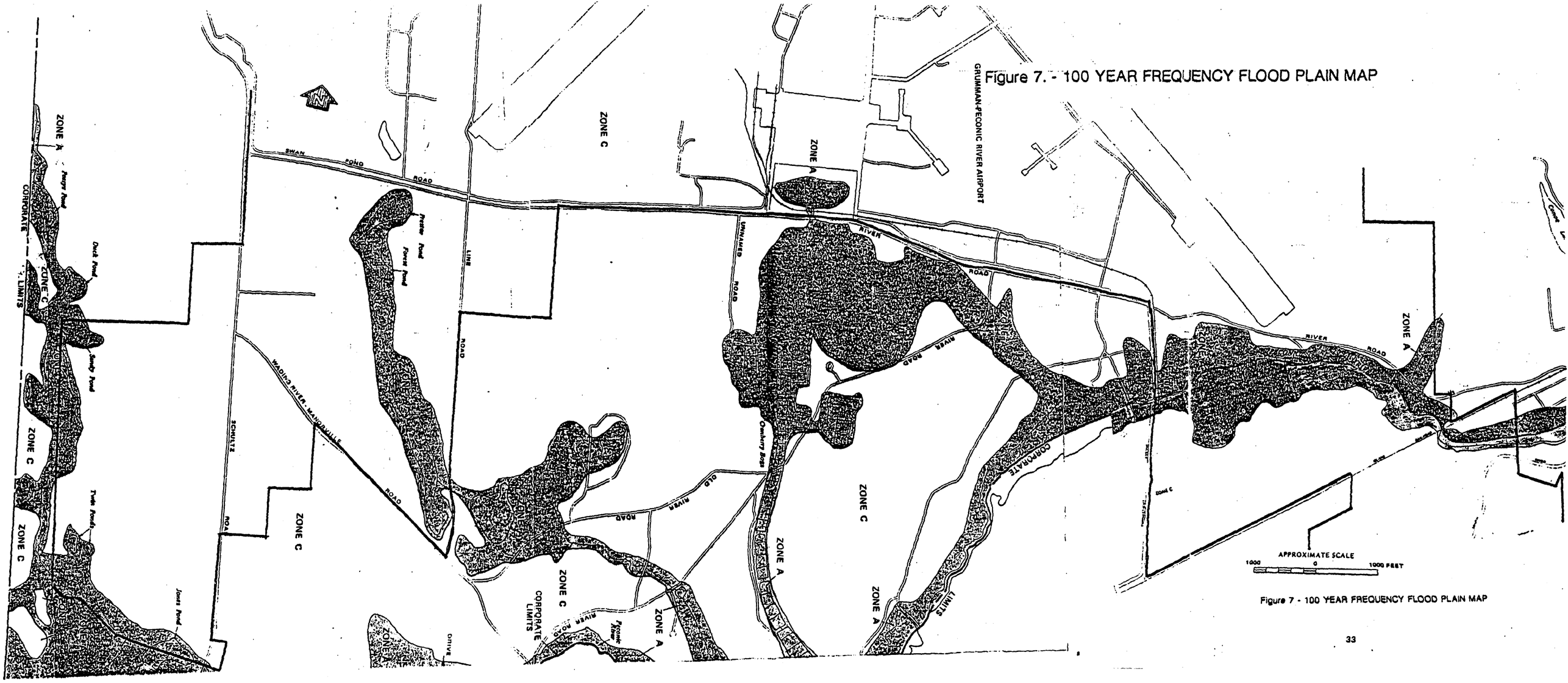
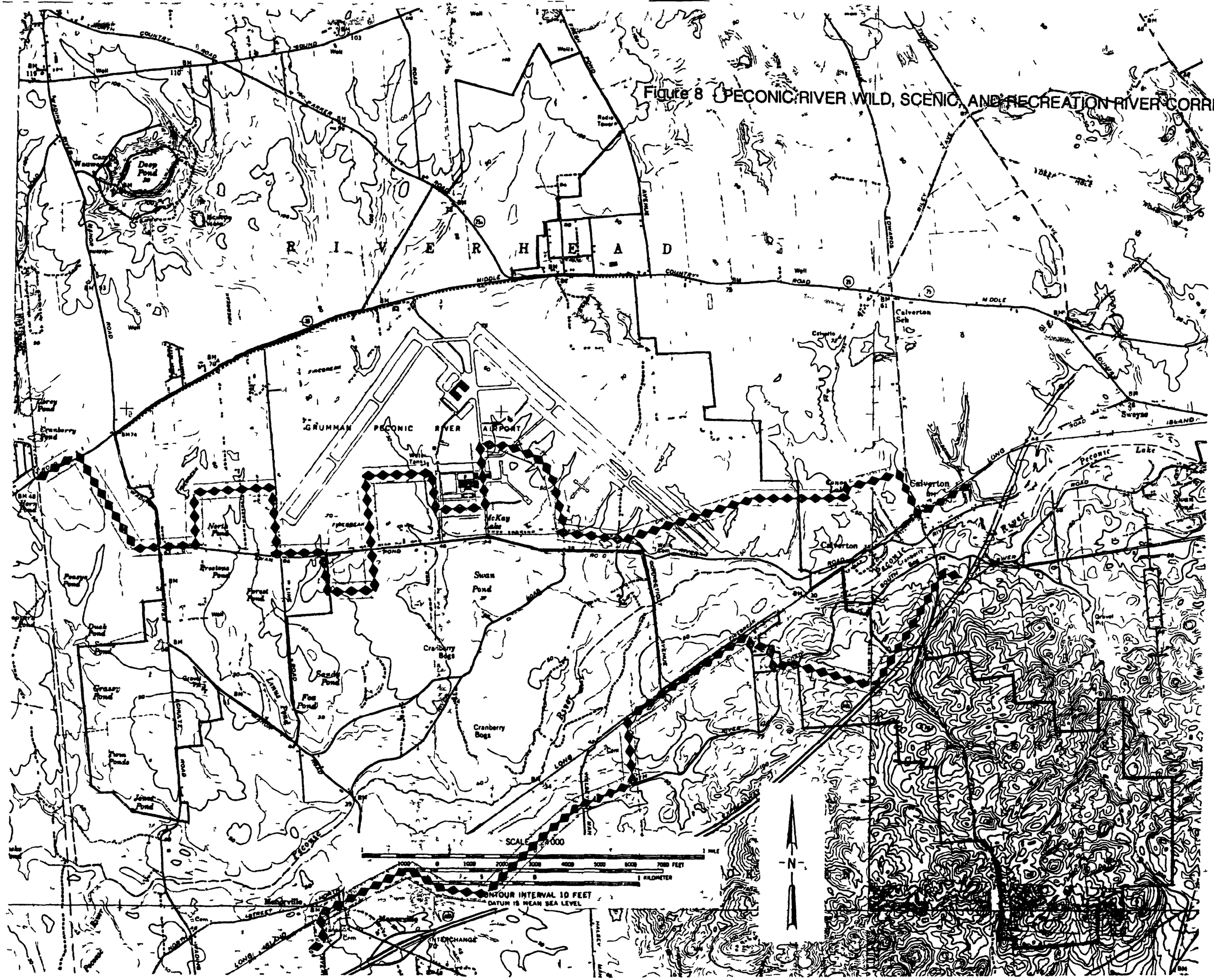
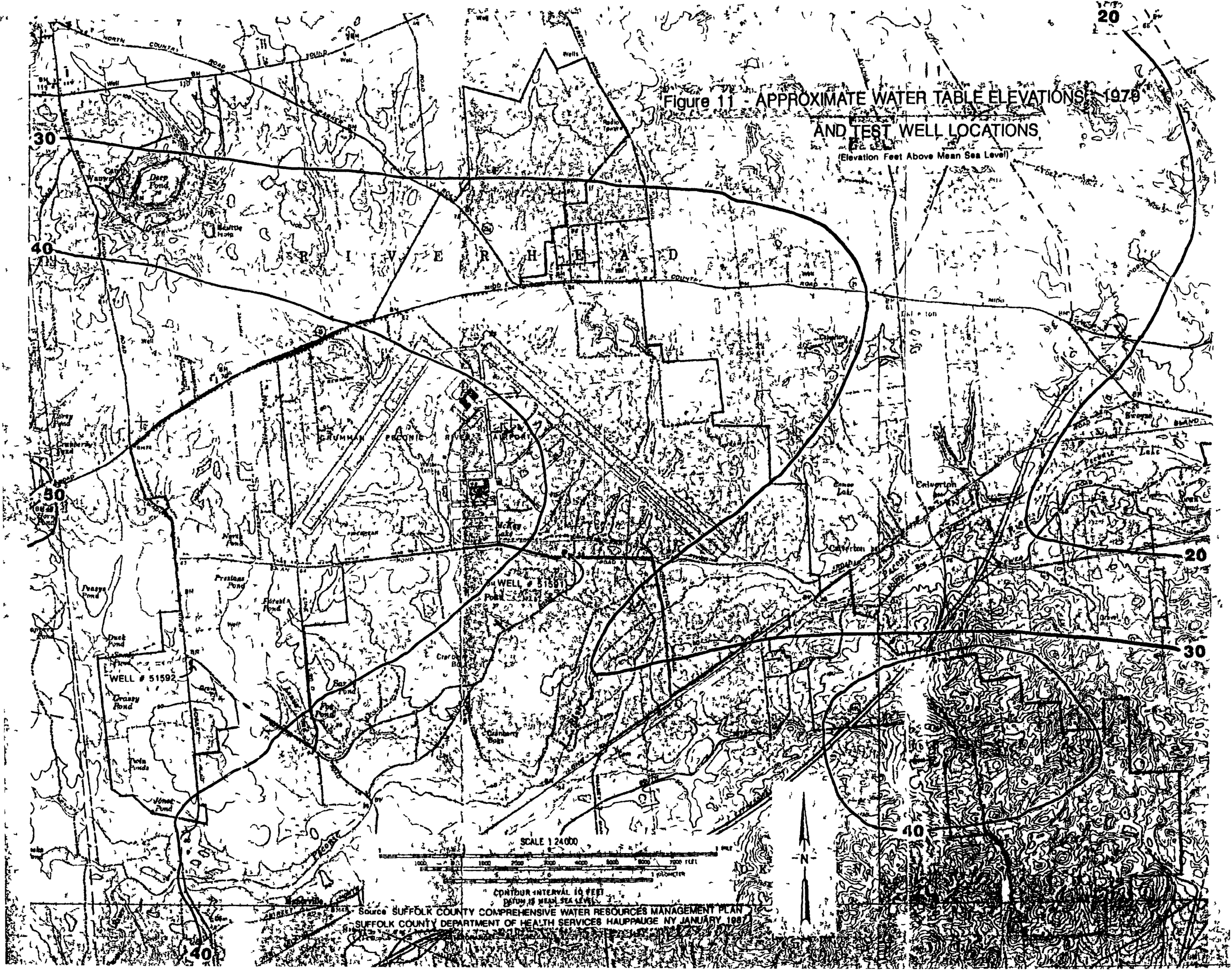


Figure 7 - 100 YEAR FREQUENCY FLOOD PLAIN MAP

Figure 8 PECONIC RIVER WILD, SCENIC, AND RECREATION RIVER CORRIDOR





Source SUFFOLK COUNTY COMPREHENSIVE WATER RESOURCES MANAGEMENT PLAN
SUFFOLK COUNTY DEPARTMENT OF HEALTH SERVICES HAUPPAUGE NY JANUARY 1987

FIGURE 12. - VEGETATION MANAGEMENT CATEGORY MAP

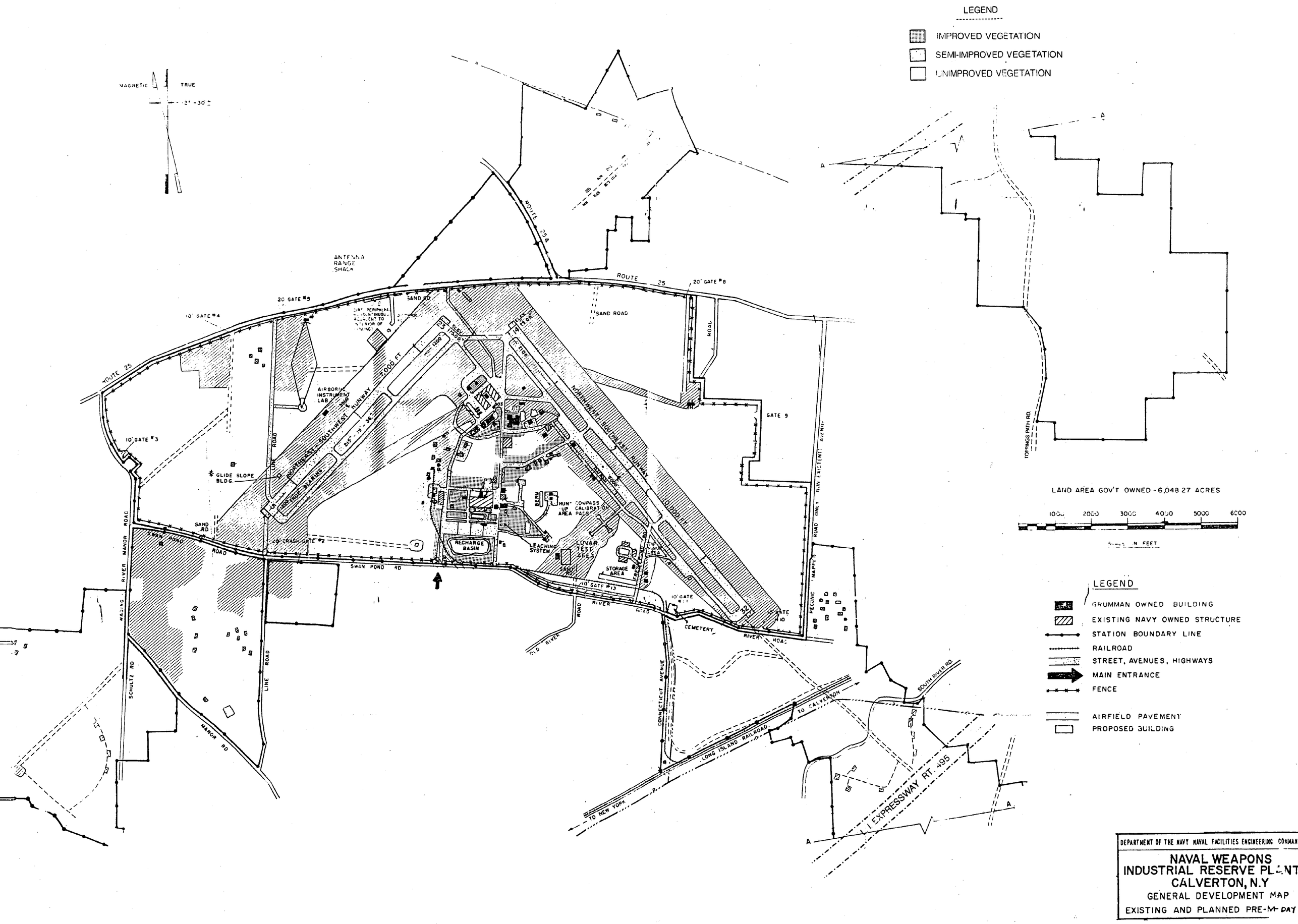


Figure 14. CURRENT AND POTENTIAL AGRICULTURAL OUTLEASE AREAS

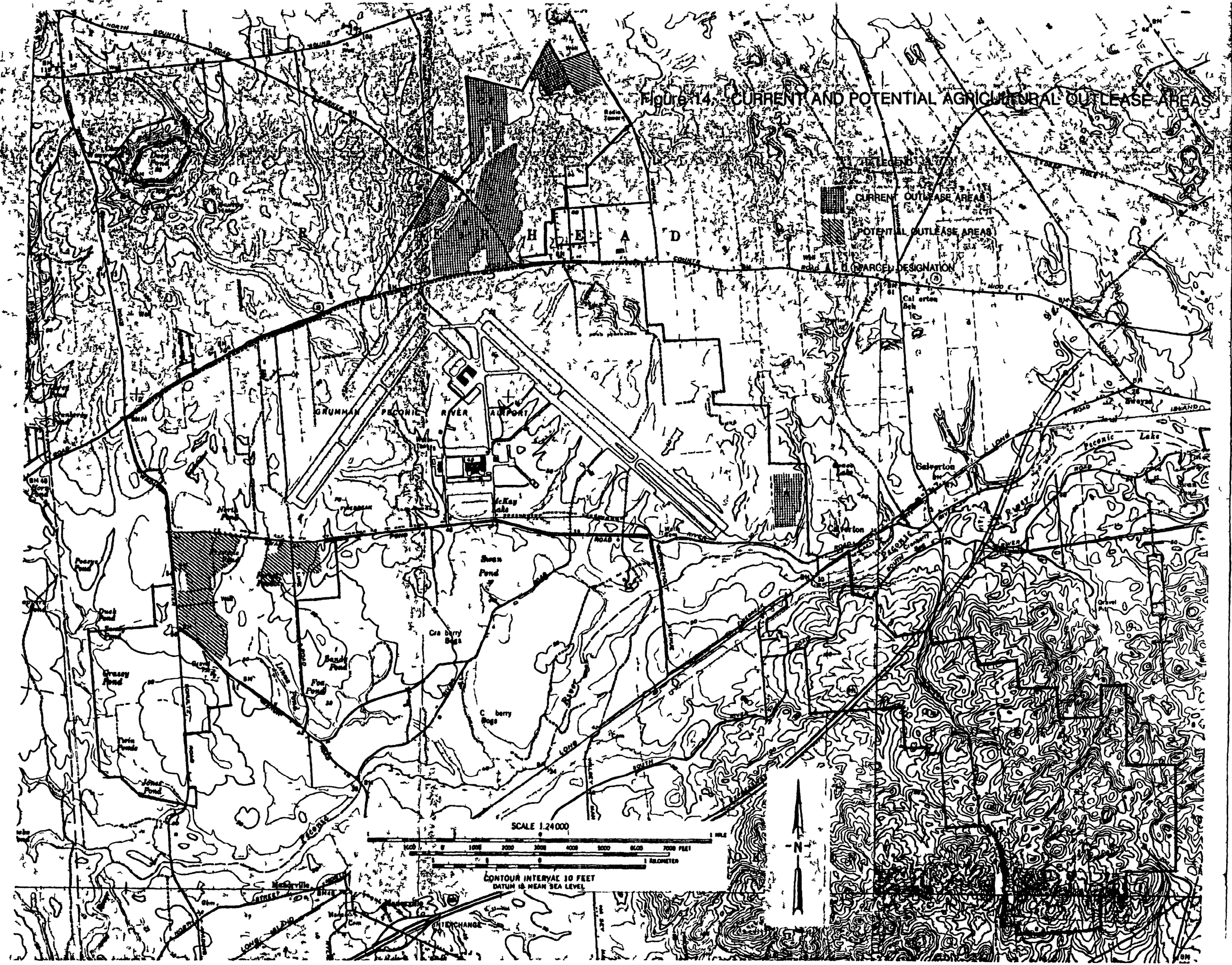
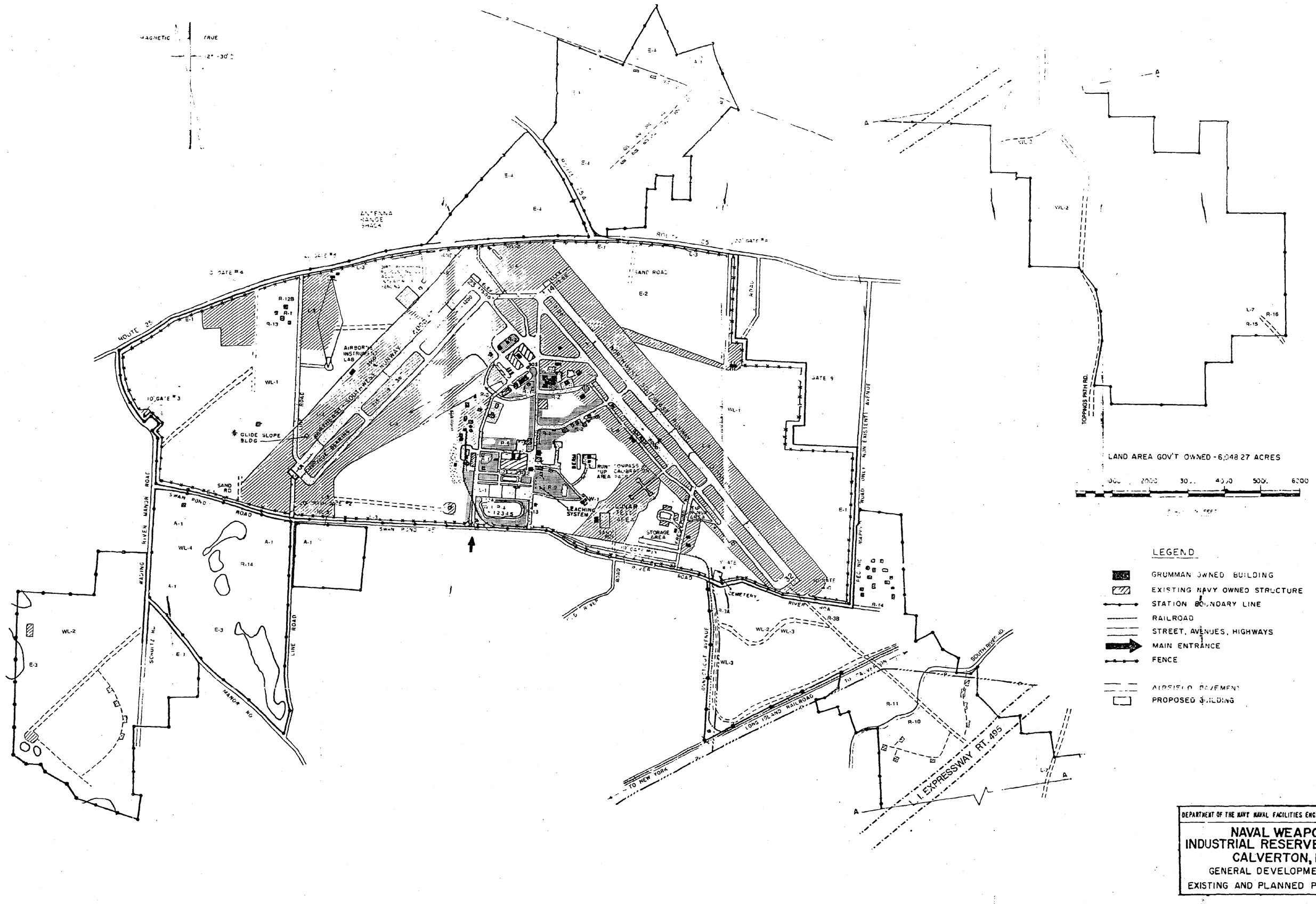


FIGURE 15. - LOCATION OF SITE SPECIFIC MANAGEMENT RECOMMENDATIONS



DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT CALVERTON, N.Y.

GENERAL DEVELOPMENT MAP

EXISTING AND PLANNED PRE-M-DAY