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Rare Plants and Natural Communities
of the New York Side of the Upper
Delaware Scenic and Recreational
River Corridor

Report to the Mid-Atlantic Region
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I. ABSTRACT

A survey of the New York side of the Upper Delaware Scenic and Recreational River (UDSRR) was conducted to determine the presence of Federal and State endangered, threatened, vulnerable and rare plant species. The New York Natural Heritage Program's (NYNHP) Rare Plant Status List (Clemants 1986) and the Federal Endangered and Threatened Wildlife and Plants List (USFWS) were used as the basis for this study which included herbarium searches and field surveys. Historical records for nine state rare plant species were discovered for the survey area, two of these were found during the 1985-1986 field seasons. An additional two, new, rare plant species were also discovered during field surveys. No federally listed or federal candidate plant species has any past or present record from the study area.

During the course of the investigation, eleven natural communities were described from the study area.

II. INTRODUCTION

A. Purpose

This study was undertaken to review and determine the status of federal and state endangered, threatened, vulnerable, and rare plants and rare and exemplary natural communities along the New York side of the Upper Delaware Scenic and Recreational River (UDSRR) corridor. The study included identifying and mapping historical localities of rare plants and natural communities, field surveys of these historical localities to document their existence and field surveys of new, potential habitats to document new localities. The New York Natural Heritage Program (NYNHP) Rare Plant Status List (Clemants 1986) and Natural Community List (Reschke 1986) were used as the basis for determining rarity.

This study was also undertaken to describe necessary conservation measures and land protection specifications for those rare plants found along the New York side of the UDSRR and to describe any management strategies, if applicable.

B. Plant Protection in New York State

1. Status of Plant Protection in New York

There are four lists of rare or protected plant classification in New York State. These are: The U.S. Endangered Species Act (federal list), The New York Natural Heritage Program (NYNHP) Rare Plant Status List, the New York State Museum-A Checklist of New York State Plants and The New York Department of Environmental Conservation's Protected Native Plants List.

Federal Rarities:

The U.S. Endangered Species Act (federal list) protects listed species from import, export, interstate commerce or sale. In New York, only Aconitum noveboracense (northern monkshood) and Isotria medeoloides (small-whorled pogonia) are formally listed under this act at this time. Neither of these species have historical or extant records from the Upper Delaware River corridor. The ranking system for federal listing is presented in Appendix A.

State Rarities:

The New York Natural Heritage Program Rare Plant Status List (Clemants 1986) is a ranked listing of 659 rare vascular plants in New York State. This list is New York's most up-to-date list of rare plant species; however, it currently has no legal status. The NYNHP and the NYS Department of Environmental Conservation are currently working on a legal status for rare plant species in New York state based on this list. A more detailed discussion of this list occurs in the next section.

The New York State Museum-A Checklist of New York State Plants (Mitchell) is very similar to the NYNHP list; it identifies and ranks rare plant species. This list also has no legal status. The ranking system is presented in Appendix A.

Protected Plants:

The New York State-DEC Protected Native Plants List (Environmental Conservation Law 9-1503 and State Regulation NYCRR 1933) protects listed species against removal without the landowners permission; the penalty is \$25.00 per incident/per plant. This list is not based on plant species rarity although it may contain some rare species; rather it names the more showy plants which are vulnerable to picking by wildflower enthusiasts and commercial collectors. This list and the regulation are presented in Appendix A.

2. Basis for Rarity

The New York Natural Heritage Program's Rare Plant Status List was chosen as the basis for rarity because it is the most up-to-date list for New York State. It contains all federally listed species, all federal candidate species and almost all species considered rare by the New York State Museum as well as other plant species considered rare by the NYNHP staff and botanical experts throughout New York. It should be emphasized that this is a working list which is continually evolving. Further research and field work may result in some species being deleted from this list while others may be added.

Plant species are entered on this list based on number of occurrences on a world-wide and state-wide basis. Each species on the list is given a global rank, reflecting its rarity world-wide and a state rank reflecting the rarity within New York State. Table 1. gives an explanation of this ranking system.

Each species has a double code, a G rank component for global rarity and an S rank component for state rarity. For example, Aconitum novaboracense (northern monkshood), has been given a rank of G2,S2 which means that the species is imperiled through-out its range (globally) and imperiled in New York State. Species are entered on to the NYNHP Rare Plant Status list if they receive a rank of G5,SU or higher. Table 2. illustrates the priority sequence of this double code system.

TABLE 2: Priority Sequence of Combined G and S Ranks
(Read down each column)

(Most Rare)					
G1S1	G2S1	G3S1	G4S1	G5S1	G6S1
	G2S2	G3S2	G4S2	G5S2	G6S2
		G3S3	G4S3	G5S3	G6S3
			G4SU	G5SU	G6SU
			G5S4	G6S4	
			G5S5	G6S5	
			G5S6	G6S6	
			G5S7	G6S7	
			G5S8	G6S8	
			G5S9	G6S9	
			G5SU	G6SU	
					(Least Rare)

Table 1: New York Natural Heritage Program (NYNHP) Ranks

Each species is given a global rank reflecting the rarity throughout the world and a state rank reflecting the rarity within NYS. For infraspecific taxa a taxon rank is added to the global rank reflecting the infraspecific taxon's rarity throughout the world.

Global rank

- G1 = Critically imperiled throughout its range due to extreme rarity (5 or fewer sites or very few remaining individuals) or extremely vulnerable to extinction due to biological factors.
- G2 = Imperiled throughout its range due to rarity (6 - 20 sites or few remaining individuals) or highly vulnerable to extinction due to biological factors.
- G3 = Either very rare and local throughout its range (21 - 100 sites), with a restricted range (but possibly locally abundant), or vulnerable to extinction due to biological factors.
- G4 = Apparently secure throughout its range (but possibly rare in parts).
- G5 = Demonstrably secure throughout its range (however it may be rare in certain areas).
- GH = No extant sites known but it may be rediscovered.
- GX = Species believed extinct.
- GU & G? = Status unknown.

State rank

- S1 = Critically imperiled in NYS because of extreme rarity (5 or fewer sites or very few remaining individuals or extremely vulnerable to extirpation from NYS due to biological factors).
- S2 = Imperiled in NYS because of rarity (6 - 20 sites or few remaining individuals) or highly vulnerable to extirpation from NYS due to biological factors.
- S3 = Rare in NYS (usually 21 - 100 extant sites).
- S4 = Apparently secure in NYS.
- S5 = Demonstrably secure in NYS.
- SH = No extant sites known in NYS but it may be rediscovered.
- SX = Apparently extirpated from NYS.
- SU & S? = Status unknown
- SE = Exotic, not native to NYS.

Taxon rank

The T-rank definitions are the same as those for the global rank but they pertain only to the subspecific taxon.

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

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

C. Classification of Natural Communities

The NYNHP Natural Community List (Reschke 1986) was used as a basis for classification of natural communities and in the determination of their rarity. This list is also a working list subject to revision as more field work and research are done. This list was compiled after literature reviews, field work, and consultation with regional and state community experts. Natural communities are ranked using the same codes, global and state, as plant species (see table 1). However, unlike plant species, all natural communities are listed, including those ranked as G5, S5 (common). The purpose of the NYNHP community classification is to document best examples of each community type.

D. Overview of the Survey Area

1. Vegetation

Very few floristic studies have focused on the New York side of the Upper Delaware River corridor. In the Catskill region slightly to the north, many investigators have studied the composition and ecology of the forest types. These studies include those of Kudish (1971) on the vegetational history of the Catskill high peaks, McIntosh's (1971) study of the deciduous forest of the Catskills, primarily in Greene and Ulster counties, and a study of the coniferous forest types by McIntosh and Hurley (1964). Vegetation studies that cover a wider geographic area have included the survey area. Braun (1950) included the northern three quarters of the river in the Hemlock-White Pine-Northern Hardwood region, specifically the Northern Appalachian Highland division-Allegheny Section, on her maps of the eastern deciduous forests. However, she described this area in greater detail in her book as "a region of ill defined boundaries and a zone between encroaching more southern species and retreating more northern species." In other words, there is a northward migration of southern species of the Oak-Chestnut or Oak-Hickory forest (oaks, chestnut-now merely a small understory tree, hickories, and tulip tree) in this transition zone along rivers such as the Delaware which flow into other regions to the south (Braun 1950). These "tongues" of Oak-Chestnut, Oak-Hickory forests reach upstream and up slope to approximately 1500 feet or higher along south facing slopes in the survey area. Above this elevation and in the cooler stream valleys leading down into this area the more northern Hemlock-White Pine-Northern Hardwood forest dominates (Braun 1950). This same conclusion was reached by Bray (1915). He placed the entire river corridor, up to Hancock, NY in a zone dominated by oak, hickory, chestnut and tulip tree.

The Renewable Resource Evaluation Group (RRE) of the U.S. Forest Service has recognized ten forest types for the eastern U.S. Based on their maps, the northern two thirds of the UDSRR corridor falls into the Maple-Beech-Birch type while the southern one third falls into the Oak-Hickory type. These types are related to the Society of American Foresters (SAF) cover types (Frye 1980). The Maple-Beech-Birch type is roughly equivalent to the SAF Northern Forest and the Oak-Hickory type is roughly equivalent to the SAF Central Forest. Within the Northern Forest cover type the more specific SAF types that could exist along the UDSRR include Hemlock-Yellow Birch, Sugar Maple, Sugar Maple-Beech-Yellow Birch and Black Cherry-Maple while Chestnut Oak, White Oak-Black Oak-Northern Red Oak and Northern Red Oak types could exist in that area mapped as the Central Forest region of the UDSRR corridor.

Other investigators/botanists, dealing with something other than forest cover types, have included parts of the Upper Delaware River corridor in their studies. Muenscher (1936) surveyed the aquatic plants in the Biological Survey of New York-Lower Hudson Area. In his study he included a description of plant associations and lists of common plants found in parts of the Delaware River watershed. Taylor (1915) in his "Flora of the Vicinity of New York" covered the southern edge of the survey area. Brooks (1979, 1980a and b, 1983) lists plant species from the towns in Delaware county that border the Delaware river.

2. Geology and Soils

The survey area is part of the Appalachian Plateau region which was formed by an uplift of an ancient delta (McIntosh 1978). The strata of sediments in this delta; shales, sandstones and conglomerates, are oriented nearly horizontally or are gently folded. The entire plateau trends northeast to southwest, dipping gently to the northwest (NPS Natural Resource Data Book 1981). During the pleistocene era the Upper Delaware region of the plateau was glaciated. There is ample evidence of the last, or Wisconsin glacier and it is assumed that the three earlier glaciers also covered this area. The present landscape was sculpted from glacial action including the flow of massive amounts of water from the receding ice pack (McIntosh 1978). In addition to the actual carving of the valley itself, the glacier was also responsible for various deposits. Unstratified ground moraine is the principle glacial deposit found at varying depths on the uplands of the river corridor (NPS Natural Resource Data Book 1981). In the river valley and along tributary stream valleys, glacial outwash or stratified glacial material occurs as narrow discontinuous bands. Throughout the area, outwash also occurs as kames and kame terraces (NPS Natural Resource Data Book 1981).

The soils in the area are the result of glacial processes and of the underlying bedrock material. They are derived from rock in the immediate area, primarily sandstones and shale, or from glacial till which could be derived from the immediate area or could be of foreign origin (Soil Surveys of Delaware, Sullivan and Orange Counties). Soils of the uplands, including well drained, imperfectly drained and poorly drained are generally medium textured and acidic. Soils of the river valleys are generally loamy sands and also acidic.

3. Ecoregions

The New York State Department of Environmental Conservation has recognized distinct ecological units or zones within the state to provide a basis for the collection and analysis of wildlife or other environmental data (Dickinson 1979). The major zones are based on landforms and geological history which are then broken down into sub-zones based on soils and land use characteristics. The New York side of the Upper Delaware river corridor falls within one of the major zones known as the Appalachian Plateau. This is the largest zone in the state and consists of a typical plateau formation (see section on geology). There are three sub-zones along the Upper Delaware river corridor:

1. The Delaware Hills-Includes the area From Hancock south to Hankins.
2. The Neversink Highlands-Includes the area from Hankins to just south of Narrowsburg.
3. The Mongaup Hills-Includes the area from south of Narrowsburg to Port Jervis.

4. Hydrologic Regions

The study area is also divided into hydrologic units by the U.S. Geologic Survey and the U.S. Water Resources Council. Their maps delineate river basins in the U.S. with drainage areas greater than 700 square miles. On the New York side of the UDSRR corridor there are two of these units. One unit includes the drainage area for the length of the river between Hancock and Minisink Ford. Major streams in this area include Callicoon, Basket and Hankins Creeks. The other unit includes the drainage area between Minisink Ford and Pt. Jervis. Major streams in this area include Halfway Brook, Mongaup River and the Neversink River.

5. Summary

Floristic data for the New York side of the Upper Delaware river corridor is sparse; investigators have either focused only

on forest cover typing or have surveyed only small parts of the area. This survey will better define the plant communities found in the area and document historic and new occurrences of rare plant species. Data such as soils, geology, ecoregion and hydrologic unit will be considered and documented as part of the survey.

III. MATERIALS AND METHODS

A. Historical Records

The first phase of this survey was to gather existing data on rare plants and natural communities from the study area. Using the New York Natural Heritage Program's Rare Plant Status List (Clemants 1986) as a basis, the New York State Museum, the New York Botanical Garden, Cornell University, and the State University of New York at Binghamton herbaria were searched for specimens collected from the New York side of the UDSRR corridor. In most cases, specimen identification was verified at the time of the search. Pertinent literature was also reviewed for historical observations of rare plants, including several floras, the 1936 NYS Biological Survey and various scientific journal articles. Individuals with knowledge of the botany of the survey area were contacted directly. Plant distribution cards developed by Stanley Smith, former curator of Botany at the NYS Museum, were also searched for historical records. From these sources, a list of rare plants and communities and their historical locations along the UDSRR corridor was compiled.

B. Identification of Potential Habitats

To identify potential habitats for new occurrences of rare plants and natural communities, aerial photographs and soil, geology and topographic maps were reviewed. The latest color infra-red as well as the older black and white aerial photographs were examined. The black and white photos were often taken in the field to aid location of various sites. Soil and geology maps were used to identify different soil groups, geologic features or changes in bedrock that would indicate a unique habitat type.

C. Field Survey

During the summers of 1985-1986, 21 days were spent in the field. The entire length of the Upper Delaware river was surveyed by canoe, except for those areas that were more easily reached by car or on foot. All upland sites identified as historical or potential habitats were also surveyed. If it was necessary to go on to privately owned land, owner permission was obtained.

Plant specimens that were not positively identified in the field were collected and pressed for future identification. Those specimens that were particularly difficult to identify were sent to individuals knowledgeable with that particular family or genus for verification.

IV. RESULTS

A. Rare Plants

1. Overview

Historical records indicate the occurrence of nine rare plant species along the Upper Delaware River corridor, based on the New York Natural Heritage Program Rare Plant Status List (Clemants 1986). These species and a summary of the information gathered on each is presented in Table 3. No federally endangered, threatened, vulnerable, rare or candidate plant species have historical records from the Upper Delaware River Corridor nor were any new, extant populations of federally listed species found during the 1985-1986 field seasons. Of the species with historical records from the UDSRR area, two were located during this survey. They are, Hypericum ascyron, great St. Johns-wort (G4,S3) with twenty-one occurrences and Betula nigra, river birch (G5,S3) with sixteen occurrences. Two, new rare plant species were also discovered along the UDSRR. They are Prunus pumila var. depressa, prostrate sand cherry (G5T5,S3) with six occurrences, and Juncus debilis, weak rush (G5,S1) with one occurrence. All of these occurrences varied in quality and quantity of individuals.

2. River Management Recommendations

All of the rare plant species found during the 1985-1986 field season occur within the floodplain area of the river. The habitat necessary for the existence of these species is the result of natural river processes. Any disturbance to the river system and its natural flow could eliminate these habitats and consequently the rare plant species that occur in them. River system manipulation that would be detrimental to the existence of these species would include dam, dike or levee construction, flow regulation and/or bank stabilization projects.

3. Species Annotations

Each species found during the 1985-1986 field seasons or with historical records from the river corridor are described in the following annotations. Included in the annotations are; status of the species based on NYNHP global and state ranks, federal status if any, status in surrounding states, occurrence of the species on other lists such as the NY Protected Plant List or the NY State Museum List, plant descriptions, total range of the species, state distribution, historical location within the UDSRR river corridor, results of the 1985-1986 field seasons, land protection specifications and any specific management practices required to maintain the species.

Table 3: Summary of the Status of Endangered, Threatened, Vulnerable, and Rare Vascular Plants
of the New York Side of the Upper Delaware Scenic and Recreational River.

SPECIES	HERBARIUM RECORDS	SITES CONFIRMED	DATE OF MOST RECENT SITING	NYNHP RANK	NYS PROTECTED PLANT STATUS**	NYS MUSEUM STATUS**	FEDERAL STATUS**	HABITAT TYPE	POTENTIAL THREATS
<i>Agalinis setacea</i>	1	0	1981	G4G5,S3	NL*	Rare	NL*	Dry, sandy soil.	
<i>Betula nigra</i>	1	16	1985	G5,S3	NL	Rare	NL	Riverbanks,floodplains, swamps.	Riverbank manipulations
<i>Carex emoryi</i>	1	0	1915	G5,S1	NL	Rare:T3	NL	Swamps,river margins	
<i>Carex typhina</i>	1	0	No date	G5,S1	NL	Rare	NL	Swamps, wet meadows	
<i>Epilobium ciliatum</i>	2	0	1956	G5,SH	NL	NL	NL	Damp spots, springy places,wet rocks.	
<i>Halenia deflexa</i>	1	0	1887	G5,S1	NL	Rare:T3	NL	Wide,flat riverbanks	
<i>Hypericum ascyron</i>	3	21	1985	G4G5,S3	NL	NL	NL	Riverside meadows, cobble and sand banks.	Riverbank manipulations
<i>Juncus debilis</i>	0	1	1985	G5,S1	NL	Rare:E3	NL	Riverside meadows,sand and gravel banks.	Trampling, riverbank manipulations.
<i>Juncus subcaudatus</i>	1	0	1956	G5,SH	NL	Rare	NL	Bogs,mossy woods,shaded spring heads.	
<i>Prunus pumila</i> v. <i>depressa</i>	0	6	1985	G5T5,S3	NL	NL	NL	Riverside meadows,cobble and gravel shores	Trampling,harvesting, riverbank manipulation.
<i>Sisyrinchium mucronatum</i>	1	0	1916	G5,SH	NL	NL	NL	Meadows,fields,sandy places.	

* Not Listed

** See Appendix A for explanation of codes.

Agalinis setacea (Walt.)Raf. Thread-leaved Gerardia, False Foxglove

SYNONYM: Gerardia setacea

FAMILY: Scrophulariaceae (Figwort Family)

STATUS:

NY Natural Heritage Program: G4G5,S3

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Mitchell, R. 1986. A Checklist of New York State Plants-Rare.

DESCRIPTION: An herbaceous annual, 1.5-7 dm tall, with showy pink flowers. The five flower petals are fused at the base into a tube while the upper parts form lobes of unequal size. The whole flower is approximately 1.5-2.5 cm long with a very long stalk. The stems are very slender with many ascending branches. The leaves are narrow, less than 1 mm wide.

IDENTIFICATION PROBLEMS: Closely resembles Agalinis tenuifolia.

HABITAT AND ECOLOGY: Dry sandy soil on the coastal plain and adjacent piedmont.

DISTRIBUTION:

Total: Coastal plain and outer piedmont, Georgia and Alabama to Long Island.

New York: There are historical records of this plant from Suffolk, Nassau, Richmond (Staten Island) and Sullivan counties. There are many recent field sightings from all counties of Long Island and from the boroughs of New York City. The record from Sullivan county is out of the historical range for the species and may be the result of an identification error.

UDSRR:

Historical Records:

1. Delaware River Bank, Vicinity of Hankins, Sullivan Co., 1981.

Field Survey: Not found during the 1985/1986 field seasons. However, many occurrences of Agalinis tenuifolia var. tenuifolia were located. It is very likely that the specimen collected in 1981 was identified incorrectly and is actually A. tenuifolia var. tenuifolia.

Betula nigra L.

River or Red Birch

SYNONYM: none

FAMILY: Betulaceae (Corylaceae) (Birch Family)

STATUS:

NY Natural Heritage Program: G5,S3

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Mitchell, R. 1986. A Checklist of New York
State Plants-Rare

DESCRIPTION: A tree up to 30 m tall. The leaves are oval to oblong, 4-8 cm long and sharply doubly serrate. The bark is brown and separates freely into large thin papery scales which turn back and expose a pink-brown inner layer. The male catkins are 5-7.5 cm long, dangling and approximately 1 mm wide with dull chestnut-brown scales. The fruiting or female catkin is erect and ripens in late spring to early summer. It is 2.5-3 cm long and 1.5 cm wide.

HABITAT AND ECOLOGY: Swamps, floodplain forests, banks of streams and ponds at low altitudes. Often inundated for several weeks at a time. The only semi-aquatic birch tree species and the only birch ripening its seeds in spring or early summer. Attains its largest size in damp semitropical lowlands of Florida, Louisiana and Texas.

DISTRIBUTION:

Total: New Hampshire to northern Florida, through the Gulf States to Texas, north in the interior to Tennessee, southern Ohio, southern Michigan, southeastern Minnesota and eastern Kansas.

New York: The historical records indicate that this species had been found along major rivers in sixteen counties of New York. The range included all counties of Long Island, north to Greene County and west to Niagara county. Recent field observations have been from the Delaware river in Sullivan and Orange counties.

UDSRR:

Historical Records:

1. Vicinity of Pond Eddy,
Sullivan Co. 1954.

Field Survey: Found at 16 locations along the New York side of the Upper Delaware river.

THREATS TO LOCAL POPULATIONS: *Betula nigra* occurs in many places along the southern half of the UDSRR. However, it is commonly seen as a group of small shrubs which most likely represent only one season's growth. Annual spring floods and ice scouring would destroy the previous year's growth and perpetuate the shrub-like growth form. In a few places along the river, usually up off the actual river banks, there are some fairly mature stands. The major threats to these areas would be cutting and clearing for development of boat launch areas, campsites, and new home sites, and clearing for easy access to the river. These activities have already done the most damage to mature stands. This species of tree is not particularly known for any commercial use and would therefore not be cut for logging except by individual landowners for firewood. Use of the mature stand areas as low intensity picnic or primitive campsites would not adversely affect the species.

The habitat this species occupies is created by the natural action of the large river system; flooding, scouring and deposition of silt and sand. Any disturbance to these processes by damming, diking, construction of levees, flow regulation or bank stabilization projects could eliminate the habitat and communities that support this species.

LAND PROTECTION SPECIFICATIONS: Protection of land up to the spring high-water line (strand area) would adequately protect the best stands of this species. Secondary boundaries or buffer zones would probably not be necessary.

RECOVERY POTENTIAL: If the floodplain area is left undisturbed, the potential for seedlings to take hold and mature in accordance with natural processes and succession is high.

MANAGEMENT: This species does not require any active management program. Land protection, protection of existing mature stands, and protection from disturbance due to development is sufficient.

Carex emoryi Dewey ex Torr. Emory's Sedge

SYNONYM: Carex stricta var. elongata (Bock) Gleason

FAMILY: Cyperaceae (Sedge Family)

STATUS:

NY Natural Heritage Program: G5,S1

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Mitchell, R. 1986. A Checklist of NY State
Plants-Rare:T-3.

DESCRIPTION: A perennial grass-like herb growing in colonies or beds with triangular stems and three-ranked leaves. The non-showy flowers grow in spikes at the end of these stems. At the base of the stems are purple-red low sheaths. The pistillate or female flowering spikes number 3-6, they are strongly overlapping and are 2-10 cm long. The perigynia (sac surrounding the achene or nut) are oval and have a short beak.

IDENTIFICATION PROBLEMS: Resembles Carex stricta

HABITAT AND ECOLOGY: Swamps, river margins, shores. Usually in basic or calcareous waters. Flowering in May-June.

DISTRIBUTION:

Total: Florida to Texas and New Mexico, north to northwestern New Jersey, New York, Ohio, Indiana, Wisconsin, Minnesota, Manitoba, and Colorado.

New York: Historical records are from Cattaraugus and Sullivan Counties.

UDSRR:

Historical Records:

1. Delaware River, Sullivan Co. 1915.

Field Survey: Not found during the 1985-1986 field seasons.

Carex typhina Michx.

Cat-tail Sedge

SYNONYM: Carex squarrosa

FAMILY: Cyperaceae (Sedge Family)

STATUS:

NY Natural Heritage Program: G5,S1

Federal: Not listed

NJ Heritage Program: G5,S1

PA Heritage Program : Not listed

NYS Other: Mitchell, R. 1986. A Checklist of New York State
Plants-Rare.

DESCRIPTION: A perennial grass-like herb, gray-green in color, 3-8 dm tall, with triangular stems and three-ranked leaves. The flowering spikes number 1-6, with the uppermost mostly pistillate or female with a short staminate portion at the base. The pistillate portion is large, 2-4 cm long and 1.5 cm wide.

IDENTIFICATION PROBLEMS: Similar to and confused with Carex squarrosa. Hybridizes with Carex shortiana.

HABITAT AND ECOLOGY: Swamps, low meadows, wet woods and marshes. Flowering and fruiting from June through September.

DISTRIBUTION:

Total: Quebec to Wisconsin and south to Georgia, Iowa, and Louisiana.

New York: Historical records indicate that this species was found in 13 counties throughout the state. These records are mostly from Long Island and across the southern tier. There is also one record from Essex County.

UDSRR:

Historical Records:

1. Narrowsburg, Sullivan County,
July (No Date).

Field Survey: Not found during the 1985-1986 field seasons.

Epilobium ciliatum Raf.

Hairy willow herb

SYNONYMS: Epilobium americanum, Epilobium adenocaulon var.
perplexus

FAMILY: Onagraceae (Evening Primrose Family)

STATUS:

NY Natural Heritage Program: G5,SH

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Not Listed

DESCRIPTION: A perennial herb, 1-3 dm tall with white to pale pink flowers. The flowers have four petals and are approximately 3-6 mm in length. The leaves are oval-shaped and pale green in color.

IDENTIFICATION PROBLEMS: Resembles Epilobium glandulosum.

HABITAT AND ECOLOGY: Damp spots, springy places, wet rocks.

DISTRIBUTION:

Total: Newfoundland west to British Columbia, and south to New England and Pennsylvania. Also widely distributed in the western states.

New York: Historically found in 25 counties from Erie county in the west, St Lawrence and Essex counties to the north and Suffolk county to the south.

UDSRR:

Historical Records:

1. Vicinity of Pond Eddy,
Sullivan Co., 1956
2. Kilgour Spur, Delaware Co., 1955

Field Survey: Not found during the 1985-1986 field seasons.

Halenia deflexa (Sm.) Griseb.

Spurred Gentian

SYNONYM: none

FAMILY: Gentianaceae (Gentian Family)

STATUS:

NY Natural Heritage Program: G5,S1

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Mitchell, R. 1986. A Checklist of New York State
Plants-Rare:T3.

DESCRIPTION: A leafy annual or biennial herb, 1-9 dm tall with purplish-green flowers. The flowers are 10-12 mm long with glandular spurs at the base and are arranged in loose cymes (clusters) of 5-9 flowers. The lower leaves are spatulate (spoon-shaped) while the principal leaves are sessile (stalkless), lanceolate and 2-5 cm long.

IDENTIFICATION PROBLEMS: None.

HABITAT AND ECOLOGY: Moist, damp, or wet woods and bogs and areas of wide flat riverbanks that are ice-scoured during spring run-off. In the UDSRR this species is associated with the Riverside Ice Meadow and Riverside sand/gravel communities.

DISTRIBUTION:

Total: Labrador to British Columbia and south to New York, Minnesota and South Dakota. Also found in the mountains of Mexico.

New York: Historical records indicate that this species was originally found along rivers in Sullivan, Herkimer, and Oneida counties. Recent field sitings are from along the Hudson River in Warren county.

UDSRR:

Historical Records:

1. Cohecton, Sullivan County, 1887

Field Survey: Not found during the 1985-1986 field seasons.

Hypericum ascyron L. Great St. John's-wort

SYNONYM: Hypericum pyramidatum Ait.

FAMILY: Clusiaceae (Mangosteen Family)
(Also placed in the Guttiferae or Hypericaceae)

STATUS:

NY Natural Heritage Program: G4G5,S3

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Not listed

DESCRIPTION: A perennial herb, 0.6-2.0 m tall with large (4-5 cm wide) deep-yellow flowers. The flowers occur on the ends of stout stems and branches. The leaves are oval to oblong and sessile or partly clasping the stem. The stamens are numerous. The fruiting capsule is large (2-3 cm tall) and conical (or pyramidal) in shape.

HABITAT AND ECOLOGY: River meadows, cobble/sand banks, areas annually flooded by rivers and dominated by herbaceous vegetation. The flowering period is June through August.

DISTRIBUTION:

Total: From Quebec, west to Manitoba, south to western New England, New Jersey, Pennsylvania, northern Maryland and west to Indiana and Kansas.

New York: There are historical records from riverbanks in 29 counties. Their distribution is from Niagara to St. Lawrence counties, south to Putnam county and in most counties along the southern tier. The only recent field observations are from one site along the St. Regis River in St. Lawrence county and from along the Upper Delaware in Sullivan, Delaware and Orange counties.

UDSRR:

Historical Records:

1. Cohecton, Sullivan Co.,
1888 and 1889.
2. Basket Creek-Long Eddy,
Sullivan Co., 1982.
3. Kilgour Spur, Delaware Co., 1955

Field Survey: Found at twenty-one locations along the New York side of the Upper Delaware River.

THREATS TO LOCAL POPULATIONS: This species is found frequently along the Upper Delaware River. The best populations occur in the most common community type found along the river: riverside sand/gravel bar. Mowing, grazing or clearing for development are the activities that would greatly disturb this species. In addition, any alteration to the free flowing river system would be detrimental to this species. The construction of dams, levees, dikes, bank stabilization or other flow regulation projects could eliminate the communities and habitats which support this species.

LAND PROTECTION SPECIFICATIONS: To adequately protect this species, the narrow strip of land along the river known as the strand area (high-water line) should be protected from over development. No secondary boundaries or buffer strips would be necessary to adequately protect this species.

RECOVERY POTENTIAL: In those sites where the strand cobble area has been greatly disturbed and which could support a population of this species, protection from any continued disturbance and allowing the area to go back to a natural state should be sufficient to allow the species to reinvade the area and establish a new population.

MANAGEMENT: No active management program is necessary to maintain a healthy population along the Upper Delaware River.

Juncus debilis Gray

Weak rush

SYNONYM: None

FAMILY: Juncaceae (Rush Family)

STATUS:

NY Natural Heritage Program: G5,S1

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Mitchell, R. 1986, A Checklist of New York State
Plants-Rare:E3.

DESCRIPTION: A perennial grass-like herb 1-4 dm tall. The flowers resemble those of lilies, three petals and three sepals, but are sedge-like in aspect and texture. The leaves are round in cross-section and are 0.5-1.0 mm in diameter.

IDENTIFICATION PROBLEMS: Resembles Juncus acuminatus.

HABITAT AND ECOLOGY: Wet places, shores, moist sandy soil.

DISTRIBUTION:

Total: Rhode Island to Missouri and south to Florida and Mississippi.

New York: Historically found in four counties: Suffolk, Nassau, Orange, and Schenectady. Also found for the first time in Sullivan county during the 1985 field season.

UDSRR:

Historical Records: None

Field Survey: Found at one location along the New York side of the Upper Delaware River.

THREATS TO LOCAL POPULATIONS: Trampling by boaters and picnickers.

LAND PROTECTION SPECIFICATIONS: Protect the strand area of the river (high-water line) from over-development.

MANAGEMENT: No active management program is necessary to protect this species.

Juncus subcaudatus (Engelm.) Cov. and Blake Woods Rush

SYNONYM: Juncus canadensis var. engelm.

FAMILY: Juncaceae (Rush Family)

STATUS:

NY Natural Heritage Program: G5,S1

Federal: Not listed

NJ/PA Heritage Programs: Not listed

NYS Other: Mitchell, R. 1986. A Checklist of New York State
Plants-Rare.

DESCRIPTION: A perennial grass-like herb; densely tufted and sprawling. The stems are very slender and 2-9 dm long. The leaves are round in cross section and approximately 1.0 mm in diameter. The flowers resemble lilies, 3 sepals and 3 petals, but are grass-like in aspect and texture.

IDENTIFICATION PROBLEMS: Similar to Juncus canadensis.

HABITAT AND ECOLOGY: Bogs, mossy woods, shaded spring heads, swamps and wet shores.

DISTRIBUTION:

Total: Nova Scotia to Georgia. Also known from Ohio and Missouri.

New York: Historically found in ten counties. West to Erie, north to Herkimer and south to Suffolk.

UDSRR:

Historical Records:

1. Pond Eddy, Sullivan Co., 1956.

Field Survey: Not found during the 1985-1986 field seasons.

Prunus pumila L. var. depressa (Pursh) Gleason Prostrate Sand
Cherry

SYNONYM: Prunus depressa

FAMILY: Rosaceae (Rose Family)

STATUS:

NY Natural Heritage Program: G5T5,S3
Federal: Not listed
NJ Natural Heritage Program: G5T5,S1
PA Natural Heritage Program: G5T5,S3
NYS Other: Not listed

DESCRIPTION: Low, diffusely branched, prostrate shrub. New shoots are red and will often freely root. The leaves are narrowly oblong (4-10 cm) with finely serrate leaf margins which have glandular teeth. The flowers are white with round flower petals that are 4-8 mm long and occur in clusters of two or four. The fruit is an edible purple to black berry, 10-15 mm in diameter.

IDENTIFICATION PROBLEMS: none

HABITAT AND ECOLOGY: Cobble, gravel or sand beaches and shores. Flowering in May through July and fruiting in late July through September.

DISTRIBUTION:

Total: From the Gaspe Penninsula, west to Ontario, south to the rivers of New Brunswick, New England, New York and Eastern Pennsylvania and Wisconsin.

New York: Found along the Delaware River in Delaware, Sullivan, and Orange counties. Also found along the Upper Hudson River in Warren County.

UDSRR:

Historical Records: None

Field Survey: Found at six sites along the Upper Delaware River.

THREATS TO LOCAL POPULATIONS: The threats to local populations include canoeists/boaters using the sites as a picnic areas and/or campsites.

LAND PROTECTION SPECIFICATIONS: Protection of the high-water level or strand area would adequately protect this species.

RECOVERY POTENTIAL: Sites that have been damaged or disturbed should be protected from additional trampling. Once left undisturbed, the species should be able to spread and re-establish itself.

MANAGEMENT: No active management programs are required to maintain this species.

Sisyrinchium mucronatum Michx.

Blue-eyed Grass

SYNONYM: None

FAMILY: Iridaceae (Iris Family)

STATUS:

NY Natural Heritage Program: G5,SH

Federal: Not listed

NJ/PA Natural Heritage Programs: Not listed

NYS Other: Not listed

DESCRIPTION: Herbaceous, dark green, perennial with a slender winged stem, 1-4 dm tall. The leaves are narrow and grass like. The flower is bright violet and approximately 1 cm long.

IDENTIFICATION PROBLEMS: May be confused with Sisyrinchium montanum.

HABITAT AND ECOLOGY: Meadows, fields, sandy places and woodlands. Flowering in May through June.

DISTRIBUTION:

Total: From Maine to British Columbia, south to North Carolina, and west to Michigan and Minnesota.

New York: Historically found in only eight counties in the state. These sites ranged from Erie, east to Rensselaer and south to Westchester counties.

UDSRR:

Historical Records:

1. Sparrowbush and vicinity,
Orange Co., 1916.

Field Survey: Not found during the 1985-1986 field seasons.

B. Natural Communities

1. Overview

Based on the Natural Heritage Program Natural Communities List (Reschke 1986), eleven natural communities were observed on the New York side of the Upper Delaware River corridor. A summary of these findings is presented in Table 4. Based on the NYNHP ranking, three of these communities are considered quite rare in New York State. They are Riverside ice meadow (G2G3,S1), Floodplain forest (G3G4,S1S2), and Major river (G5,S2). These community types are primarily limited to large free-flowing rivers in the state however, the Floodplain forest type does occur on smaller river systems and along the margins of large lakes. A fourth somewhat rare community type, a Black spruce-tamarack swamp (G4G5,S3), was observed just outside the proposed UDSRR boundaries. The most common community type found was the Appalachian oak-hickory forest which is nearly continuous on the south and south-west facing slopes of the New York side of the UDSRR corridor.

2. River Management Recommendations

The three rare natural community types within the proposed UDSRR boundaries are the result of natural river processes; flooding, ice pack development, scouring and deposition of silt and sand. Any conservation practices, land protection specifications or management plans should take these processes into account. To ensure the continued existence of these communities the river should be allowed to remain in a natural state. These natural processes have already been altered to some degree by the two large reservoirs on the east and west branches of the Delaware. Severe flooding and the runoff of silt and sand have been partially controlled by the dams constructed on these two branches. Any further construction of dams, levees, or flow regulation and bank stabilization projects could eliminate the remaining good examples of these communities. Floodplain forests are also threatened by clearing for farming as they typically exist on the richest soil in the river valley. Years of flooding and the deposition of nutrient rich silt on the banks and islands of the Delaware river where floodplain forests grow, have created the best crop-land in the valley. Most of the historical locations for these forests were or are cultivated fields.

3. Natural Community Accounts

Natural community descriptions and species lists were compiled for all the community types. A list of these communities, along with a brief description, follows.

Table 4: Summary of the Natural Communities* of the New York Side of the Upper Delaware Scenic and Recreational River.

COMMUNITY	TYPE	NYNHP RANK**
Acidic Cliff	Terrestrial-open canopy uplands	G5,S4
Appalachian Oak-Hickory Forest	Terrestrial-forested uplands	G4G5,S4S5
Black Spruce-Tamarack Swamp	Palustrine-forested wetland	G4G5,S3
Floodplain Forest	Palustrine-forested wetland	G3G4,S1S2
Hemlock-Northern Hardwood Forest	Terrestrial-forested upland	G4G5,S5
Major River	Riverine	G5,S2
Poor Hemlock-Hardwoods Swamp	Palustrine-forested wetland	G4G5,S4
Riverside Ice Meadow	Terrestrial-open canopy upland	G2G3,S1
Riverside Sand/Gravel Bar	Terrestrial-open canopy upland	G5,S5
Sedge Meadow	Palustrine-open canopy wetland	G5,S4
Waterfall and Plunge Pool	Riverine	G5,S4S5

* Natural Communities classified by the NYNHP (Reschke 1986).

** See Table 1, page 9, for explanation of ranks.

ACIDIC CLIFF G5,S4

A sparsely vegetated, dry, rocky community with vertical exposures of rock. Vascular plants, including stunted trees, grow primarily in cracks and crevices while mosses and lichens grow on the bare rock surfaces. The bedrock substrate could be a variety of acidic types and in the UDSRR corridor consists of red or blue sandstone. Tree species in this community exhibit a stunted growth pattern, the dominant species include Quercus alba (white oak), Quercus prinus (chestnut oak), and Quercus rubra (red oak). There is also a sparse shrub layer with Rosa virginiana (rose), Rhus glabra (smooth sumac), Physocarpus opulifolius (ninebark), and Gaylussacia baccata (huckleberry). Herbaceous vegetation includes ferns such as Polypodium virginianum (rock polypody), and Dryopteris marginalis (marginal wood fern).

SPECIES LIST

Tree-low

Acer pennsylvanica
Acer rubrum
Betula lenta
Carya glabra
Fraxinus americana
Prunus pensylvanica
Quercus prinus
Quercus rubra
Tsuga canadensis
Ulmus americana

Shrub-high

Amelanchier sp.
Hamamelis virginiana
Rhus glabra

Shrub-low

Gaylussacia baccata
Physocarpus opulifolius
Ribes sp.
Rosa virginiana

Vines

Parthenocissus quinquefolia
Vitis riparia

Forbs

Aster divaricatus
Aster sp.
Comptonia peregrina
Dianthus deltoides
Eupatorium rugosum

Linaria vulgaris

Potentilla canadensis
Smilax rotundifolia
Solidago canadensis
Solidago concolor
Solidago sp.
Thalictrum sp.

Graminoids

Danthonia spicata
Panicum sp.

Ferns

Asplenium platyneuron
Cheilanthes sp.
Dryopteris marginalis
Polypodium vulgare

Mosses/lichens

Cladonia cristellata
 Variety of unidentified lichen species

APPALACHIAN OAK-HICKORY FOREST

G4G5, S4S5

A mixed deciduous forest with few scattered conifers occurring on well-drained upland sites. This community is dominated by several oak species such as Quercus alba (white oak), Quercus rubra (red oak), and Quercus prinus (chestnut oak) as well as several hickory species including Carya glabra (shagbark hickory) and Carya ovata (pignut hickory). The dominant species of the sub-canopy tree layer include Sassafras albidum (sassafras) and Castanea dentata (American chestnut). A dense low shrub layer of ericaceous plant species such as Gaylussacia baccata (huckleberry) and Kalmia latifolia (mountain laurel) can also occur. Generally, there is a very sparse herbaceous layer.

This community is nearly continuous on the south and southwest facing slopes of the New York side of the UDSRR corridor.

SPECIES LIST

Tree-high

Acer rubrum
Acer saccharum
Betula lenta
Carya glabra
Carya ovata
Fagus grandifolia
Juglans cinerea
Liriodendron tulipifera
Pinus strobus
Quercus alba
Quercus prinus
Quercus rubra
Tilia americana
Tsuga canadensis

Tree-low

Acer pensylvanicum
Amelanchier sp.
Castanea dentata
Cornus florida
Nyssa sylvatica
Ostrya virginiana
Prunus virginiana
Sassafras albidum
Sorbus americana

Shrub-high

Hamamelis virginiana
Quercus ilicifolia
Rhododendron maximum
Rhus glabra

Vaccinium corymbosum

Shrub-low

Gaylussacia baccata
Kalmia angustifolia
Ribes sp.
Rubus alleghaniensis
Rubus odoratus
Vaccinium angustifolium
Vaccinium stramineum
Vaccinium vacillans
Viburnum acerifolium
Viburnum alnifolium

Vines

Parthenocissus quinquefolia
Smilax rotundifolia
Vitis sp.

Forbs

Amphicarpa bracteata
Anaphalis margaritacea
Aralia nudicaulis
Aster sp.
Comptonia peregrina
Cypripedium acaulis
Epigea repens
Eupatorium rugosum
Galium triflorum
Geranium maculatum
Hieracium venosum
Maianthemum canadense

Mitchella repens
Monotropa uniflora
Polygonatum pubescens
Polygonum sagittatum
Potentilla simplex
Rubus sp.
Scrophularia marilandica
Smilicina racemosa
Solidago concolor
Solidago sp.
Thalictrum sp.
Toxicodendron radicans
Trientalis borealis
Uvularia sessilifolia

Graminoids

Carex sp.
Juncus sp.
Luzula multiflora

Ferns

Pteridium aquilinum

BLACK SPRUCE-TAMARACK SWAMP G4G5,S3

A forested wetland community dominated by Larix laricina (tamarack or larch) and Picea mariana (black spruce) on an organic (peat) substrate with a water table at or near the surface. The surface cover of this community is primarily Sphagnum mosses in a hummock and hollow pattern. The organic substrate is the result of years of accumulation of this moss vegetation and could be quite deep. This community has the appearance of a more northern bog or swamp and many species commonly seen in more northern wetlands occur here. These species include Drosera rotundifolia (round-leaved sundew), Sarracenia purpurea (pitcher plant), and Eriophorum tenellum (cotton grass).

SPECIES LIST

Tree-high

Larix laricina

Picea mariana

Shrub-high

Vaccinium corymbosum

Shrub-low

Chamaedaphne calyculata

Kalmia polifolia

Forbs

Calla palustris

Drosera rotundifolia

Sarracenia purpurea

Vaccinium macrocarpon

Graminoids

Carex sp.

Carex trisperma

Eriophorum tenellum

Panicum sp.

Typha latifolia

Mosses/lichens

Sphagnum sp.

FLOODPLAIN FOREST

G3G4,S1S2

A forested, riverside community composed of plant species capable of withstanding temporary inundation by seasonal flooding. Dominant tree species include Acer saccharinum (silver maple), Platanus occidentalis (sycamore), Salix nigra (black willow), and Carya cordiformis (swamp hickory). The shrub layer is sparse but does contain Hamamelis virginiana (witch hazel) and Ilex verticillata (American holly). The herbaceous layer is usually quite dense and contains a diverse group of plant species including, Impatiens capensis (jewelweed), Tovara virginiana (jumpseed) and Onoclea sensibilis (sensitive fern).

SPECIES LIST

Tree-high

Acer rubrum
Acer saccharinum
Acer saccharum
Betula lenta
Betula lutea
Carya cordiformis
Carya sp.
Fraxinus americana
Juglans cinerea
Pinus strobus
Platanus occidentalis
Prunus serotina
Quercus rubra
Robinia pseudoacacia
Tilia americana

Tree-low

Acer negundo
Betula nigra
Betula populifolia
Carpinus caroliniana
Celtis sp.
Crateagus sp.
Nyssa sylvatica
Ostrya virginiana
Populus tremuloides
Prunus sp.
Sassafras albidum
Ulmus americana

Shrub-high

Amelanchier sp.
Cornus alternifolia
Hamamelis virginiana
Ilex verticillata

Lindera benzoin

Polygonum persicaria
Rhododendron maximum
Salix nigra
Salix sp.
Vaccinium corymbosum
Viburnum sp.

Shrub-low

Berberis thunbergii
Phytolaca americana
Rhus typhina
Ribes hirsuta
Rosa sp.
Rubus alleghenensis
Rubus odoratus
Sambucus canadensis
Spirea latifolia
Vaccinium angustifolium
Vaccinium sp.

Vines

Clematis virginiana
Parthenocissus quinquefolia
Smilax rotundifolia
Vitis riparia

Forbs

Achillea millifolia
Allaria officinalis
Ambrosia trifida
Amphicarpa bracteata
Aralia nudicaulis
Arisaema atrorubens
Aster sp.
Boehmeria cylindrica

Chelidonium majus
Epilobium coloratum
Equisetum sp.
Eupatorium maculatum
Eupatorium perfoliatum
Eupatorium rugosum
Galium aparine
Galium asprellum
Geranium maculatum
Geum sp.
Helenium autumnale
Hemerocaulis fulva
Hydrocotyle americana
Impatiens capensis
Impatiens pallida
Lactuca sp.
Laportea canadensis
Lilium canadense
Linaria vulgaris
Lobelia cardinalis
Lysimachia ciliata
Lythrum salicaria
Oxalis europea
Polygonum sagittatum
Polygonum sp.
Rudbeckii lacinata
Rumex crispus
Silene stellata
Smilicina racemosa
Solanum dulcamara
Solidago canadensis
Solidago sp.
Stellaria pubera
Thalictrum dioicum
Tovara virginiana
Toxicodendron radicans
Urtica dioica
Veratrum viride
Verbina hastata

Graminoids

Carex sp.
Elymus sp.
Panicum clandestinum

Ferns

Onoclea sensibilis
Pteretis pensylvanica

HEMLOCK-NORTHERN HARDWOOD FOREST G4G5,S5

An upland forest dominated by deciduous hardwoods and hemlock trees that occurs in New York on slopes in the Appalachian Plateau, the Catskills, and the eastern Adirondacks. Dominant trees include Fagus grandifolia (American beech), Acer saccharum (sugar maple), and Tsuga canadensis (hemlock). Characteristic shrubs include Viburnum alnifolium (hobblebush) and Viburnum acerifolium (maple-leaved viburnum).

SPECIES LIST

Tree-high

Acer rubrum
Acer saccharum
Betula alleghaniensis
Betula lenta
Fagus grandifolia
Liriodendron tulipifera
Prunus serotina
Quercus prinus
Tilia americana
Tsuga canadensis

Tree-low

Acer pennsylvanica
Carpinus caroliniana
Pinus strobus

Shrub-high

Hamamelis virginiana
Rhododendron maximum

Shrub-low

Berberis thunbergii

Vines

Parthenocissus quinquefolia
Vitis riparia

Forbs

Arisaema atrorubens

Aster divaricatus
Aster sp.
Eupatorium rugosum
Geranium robertiana
Hydrocotyl americana
Impatiens capensis
Maianthemum canadense
Pilea pumila
Polygonatum pubescens
Prenanthes altissima
Prenanthes sp.
Senecio aureus
Symplocarpus foetidus
Thalictrum sp.
Trillium sp.
Urtica dioica
Uvularia sessilifolia
Viola sp.

Graminoids

Carex intumescens
Carex sp.
Scirpus expansus

Ferns

Adiantum pedatum
Dennstedtia punctilobula
Onoclea sensibilis
Polystichum acrosticoides

MAJOR RIVER G5,S2

The aquatic community of large rivers. The velocity and depth of water and substrate material (sand, cobble, bedrock etc.) could vary considerable from river to river or between sections of the same river. Many species in this community require the energy and force of moving water. This community includes fish species such as Alosa sapidissima (American shad) and Acipenser brevirostrum (short-nosed sturgeon) as well as plant species such as Potamogeton spp. (many species of pond weeds), Sagittaria rigida (arrowhead), and Isoetes riparia (river quill-wort).

The Upper Delaware river is classified as this type of natural community.

SPECIES LIST

Forbs-aquatic

Isoetes riparia
Justicia americana
Potamogeton spp.
Sagittaria rigida
Sparganium sp.

POOR HEMLOCK-HARDWOODS SWAMP

G4G5,S4

A wetland forest community with a mix of deciduous and coniferous trees occurring in shallow depressions in the landscape where the water table is at or near the soil surface. The soil or substrate in this community type is organic, composed of years of accumulation of decaying vegetation. Dominant tree species in this community type include Acer rubrum (red maple), Tsuga canadensis (hemlock), and Betula alleghaniensis (yellow birch). Shrub layer dominants include Vaccinium corymbosum (high bush blueberry), Lindera benzoin (spice bush) and Rhododendron maximum (great laurel). The herbaceous layer in this community type can often be a continuous carpet of Osmunda cinnamomea (cinnamon fern) and may also contain Onoclea sensibilis (sensitive fern), Calla palustris (wild calla) and Symplocarpus foetidus (skunk cabbage).

SPECIES LIST

Tree-high

Acer rubrum
Betula alleghaniensis
Fagus grandifolia
Pinus strobus
Quercus rubra
Tsuga canadensis

Tree-low

Betula alleghaniensis
 (saplings)
Juglans cinerea
Picea mariana
Sassafras albidum

Shrub-high

Hamamelis virginiana
Lindera benzoin
Rhododendron maximum
Rhus vernix
Vaccinium corymbosum

Shrub-low

Kalmia angustifolia
Viburnum alnifolium

Vines

Parthenocissus quinquefolia

Forbs

Aralia nudicaulis
Aster sp.
Bidens sp.

Calla palustris

Clintonia borealis
Coptis groenlandica
Cornus canadensis
Epilobium coloratum
Equisetum sp.
Eupatorium perfoliatum
Galium sp.
Impatiens capensis
Iris versicolor
Lycopus americanus
Lycopus uniflorus
Maianthemum canadense
Oxalis europea
Platanthera psycodes
Polygonum sagittatum
Polygonum sp.
Rubus sp.
Solidago sp.
Symplocarpus foetidus
Toxicodendron radicans
Trientalis borealis
Trillium sp.
Veratrum viride

Graminoids

Carex flava
Carex lurida
Carex sp.

Ferns

Aquilinum pteridinum
Onoclea sensibilis

Osmunda cinnamomea
Osmunda claytonia
Thelypteris palustris

Mosses/lichens

Sphagnum sp.

RIVERSIDE ICE MEADOW G2G3,S1

A meadow composed of grasses, sedges, forbs, and low shrubs that occurs on cobble or sandy shores and in crevices of rock outcrops. Winter ice-packs are pushed up onto the river's shoreline in these areas and remain until late spring. Ice scouring in the winter prevents any tall shrubs or trees from growing in the meadow and late melting ice creates cool moist conditions and deposits additional nutrients to the community. Tree or shrub species that do occur there are usually limited to sprouts representing only one seasons growth. Dominant species include, Andropogon gerardii (big blue-stem), Sorghastrum nutans (indian grass), and Prunus pumila var. depressa (prostrate sand cherry).

SPECIES LIST

Tree-low

Fraxinus americana (sapling)

Shrub-high

Alnus serrulata

Betula nigra (sapling)

Carya sp. (sapling)

Nyssa sylvatica (sapling)

Platanus occidentalis
(sapling)

Populus tremuloides (sapling)

Vaccinium corymbosum

Shrub-low

Aronia melanocarpa

Lyonia ligustrina

Physocarpus opulifolius

Prunus pumila var. depressa

Quercus ilicifolia

Rosa sp.

Salix petiolaris

Salix rigida

Salix sericea

Salix sp.

Spirea latifolia

Toxicodendron radicans

Vines

Clematis virginiana

Cuscuta gronovii

Parthenocissus quinquefolia

Vitis sp.

Forbs

Acalypha rhomboidea

Agalinis purpurea

Agalinis tenuifolia

Ambrosia trifida

Amphicarpa bracteata

Apocynum cannabinum

Aster dumosa

Aster puniceus

Aster sp.

Aster umbellata

Baptisia tinctoria

Bidens connata

Blephila hirsuta

Cardamine pratensis

Chelone glabra

Chrysanthemum leucanthemum

Commelina sp.

Conoselinum chinense

Convolvulus arvensis

Cuscuta sp.

Daucus carota

Drosera rotundifolia

Elymus canadensis

Epilobium coloratum

Eupatorium maculatum

Eupatorium perfoliatum

Galium asprellum

Galium palustre

Galium sp.

Geranium maculatum

Gnaphilium uliginosum

Gratiola aureus

Hesperis matronalis

Hydrocotyle americana

Hypericum canadense

Hypericum ellipticum

Hypericum perforatum
 Hypericum ascyron
 Hypericum sp.
 Impatiens capensis
 Impatiens pallida
 Iris versicolor
 Krigia biflora
 Laportea canadensis
 Lespedeza capitata
 Linaria vulgaris
 Lupinus perenis
 Lychnis flos-cuculi
 Lysimachia ciliata
 Lythrum salicaria
 Lythrum salicaria
 Myosotis laxa
 Myosotis scorpiodes
 Oenothera biennis
 Oenothera fruticosa
 Oenothera perenis
 Oxalis europea
 Pastinaca sativa
 Physalis sp.
 Plantago sp.
 Polygala sp.
 Polygonum sp.
 Potentilla canadensis
 Prunella vulgaris
 Ranunculus acris
 Rubus alleghenensis
 Rumex crispus
 Sagina procumbens
 Saponaria officinalis
 Saxifraga pennsylvanica
 Sedum purpureum
 Sedum ternatum
 Solidago canadensis
 Solidago graminifolia
 Spiranthes cernua
 Stellaria alsine
 Stellaria graminea
 Stellaria pubera
 Trifolium arvense
 Trifolium repens
 Verbena hastata
 Viola sp.

Graminoid

Andropogon gerardii
 Anthoxanthum odoratum
 Cyperus dentatus
 Cyperus diandrus

Cyperus strigosus
 Dicanthelium sp.
 Juncus acuminatus
 Juncus debilis
 Juncus diffusissimus
 Juncus effusus
 Juncus sp.
 Juncus tenuis
 Muhlenbergia sp.
 Panicum clandestinum
 Phalaris arundinaceae
 Poa compressa
 Rhynchospora sp.
 Rhynchospora capitellata
 Scirpus cyperinus
 Sorghastrum nutans

Ferns

Onoclea sensibilis

Mosses/lichens

various bryophyte species.

RIVERSIDE SAND/GRAVEL BAR G5,S5

A meadowlike community composed primarily of a diverse group of perennial and annual herbaceous plant species that occurs on riverside sand and gravel deposits that are scoured by spring floods and by occasional high water due to heavy rains. Dominant species include Eupatorium maculatum (joe-pye weed), Eupatorium perfoliatum (bone-set), Lobelia cardinalis (cardinal flower) and grasses such as Andropogon gerardi (big blue-stem) and Sorghastrum nutans (Indian grass). This community contains few woody plants.

This natural community type is located on nearly all river banks along the Upper Delaware River.

SPECIES LIST

Shrub-high

Rhus glabra
Sambucus canadensis
Viburnum sp.

Shrub-low

Apocynum androsaemifolium
Apocynum cannabinum
Betula nigra
Platanus occidentalis
(sapling)
Prunus pumila v. *depressa*
Rosa virginiana
Rubus alleghenensis
Rubus sp.
Salix sp.
Spirea latifolia
Ulmus rubra

Vines

Clematis virginiana
Cuscuta gronovii
Vitis riparia

Forbs

Ambrosia trifida
Asclepias syriaca
Aster sp.
Aster umbellatus
Baptisia tinctoria
Blephila hirsuta
Centaurea maculosa
Chrysanthemum leucanthemum
Convolvulus sepium
Daucus carota

Dianthus armeria
Epilobium coloratum
Equisetum arvense
Equisetum fluviatile
Eupatorium maculatum
Eupatorium perfoliatum
Galium mollugo
Galium sp.
Gratiola aureus
Helenium autumnale
Hydrocotyl americana
Hypericum mutilum
Hypericum perforatum
Hypericum punctatum
Hypericum ascyron
Impatiens capensis
Impatiens pallida
Lespedeza capitata
Linaria vulgaris
Lobelia cardinalis
Lobelia inflata
Lotus corniculata
Lychnis alba
Lysimachia ciliata
Lysimachia quadrifolia
Lythrum salicaria
Melilotus alba
Myosotis scorpiodes
Oenothera biennis
Oenothera linifolia
Oxalis europea
Polygonum cuspidatum
Polygonum sagittatum
Polygonum sp.
Potentilla erecta

Sagina procumbens
Saponaria officinalis
Silene cucubalus
Solanum sp.
Solidago canadensis
Solidago graminifolia
Stellaria graminea
Stellaria pubera
Tovara virginiana
Verbascum thaspus
Verbena hastata

Graminoids

Andropogon gerardi
Carex sp.
Cyperus strigosus
Juncus effusus
Panicum clandestinum
Scirpus americanus
Scirpus cyperinus
Scirpus expansus
Scirpus fluviatilis
Sorghastrum nutans

Ferns

Onoclea sensibilis

SEDGE MEADOW G5,S4

A wetland community dominated by sedges and grasses occurring in depressions in the landscape, surrounding ponds or along slow moving streams. The dominant species is generally Carex stricta (tussock sedge) although it may be co-dominant with others. Soils are usually mineral types with a sedgy peat developing. Other species common to this community type include Calamagrostis canadensis (blue-joint grass), Carex rostrata (a sedge), Juncus effusus (soft rush), Iris versicolor (blue-flag) and possibly Acer rubrum (red maple) saplings.

SPECIES LIST

Shrub-high

Acer rubrum

Alnus rugosa

Salix sp.

Shrub-low

Chamaedaphne calyculata

Spirea latifolia

Forb

Galium sp.

Iris versicolor

Lysimachia terrestris

Myosotis scorpiodes

Graminoids

Carex rostrata

Carex scabrata

Carex sp.

Carex stricta

Eleocharis sp.

Juncus effusus

Scirpus sp.

Sparganium sp.

Typha latifolia

Ferns

Onoclea sensibilis

Mosses/lichens

Sphagnum sp.

WATERFALL and PLUNGE POOL G5,S4S5

A community inhabiting a section of a watercourse where a vertical drop greater than 1.5 m occurs. This community generally occurs on a variety of bedrock types. In the UDSRR corridor this is a blue or red sandstone. Water flow over the bedrock is permanent although may be greatly reduced during dry periods. This community is dominated by a variety of mosses, liverworts, and herbaceous plant species clinging to the bedrock surfaces and in crevices with a constant flow of water dripping over them. The continual flow of cool water down through a bedrock ravine creates a cool moist environment. Herbaceous plant species include Chelone glabra (turtle head), Impatiens capensis (jewelweed) and Hydrocotyl americana (pennywort).

SPECIES LIST

Tree-low

Acer pennsylvanica
Betula lenta
Fraxinus americana
Tsuga canadensis

Shrub-high

Acer spicatum
Rhododendron maximum

Shrub-low

Salix sp.

Forbs

Chelone glabra
Epilobium coloratum
Eupatorium maculatum
Galium sp
Hydrocotyl americana
Hypericum ellipticum
Impatiens capensis

Graminoids

Panicum sp.

Mosses/lichens

Variety of unidentified bryophyte species

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APPENDIX A: New York State's Rare and Protected Plants-
Explanations of Ranking Systems.

Federal Status

The Federal Status was taken from the Federal Register (U. S. Fish and Wildlife Service 1985).

- N = No Status
- LE = Taxa formally listed as endangered.
- LT = Taxa formally listed as threatened.
- C1 = Candidate, category 1-Taxa with sufficient information to list as endangered or threatened.
- C1* = Candidate, category 1-Taxa with sufficient information to list but no known extant sites (believed extinct).
- C2 = Candidate, category 2-Taxa which may be appropriate for listing but for which more data are needed.
- 3B = Taxa no longer considered taxonomically distinct by the U. S. Fish and Wildlife Service and thus not appropriate for listing.
- 3C = Taxa shown to be more abundant, widespread, or better protected than previously thought and therefore not in need of official listing.

New York State Museum (NYS) Rarity Rank

- E = Endangered (the species is in danger of extirpation from New York).
 - T = Threatened (the species is threatened with endangerment in New York).
 - X = Extirpated (the species is probably extirpated from New York).
 - C = Commercially exploited (the species is threatened by collecting for profit).
 - R = Rare. Recorded 15 times or fewer in the state (or up to 20 times with known cases of extirpation).
-
- 1 = The highest recommended priority for protection, based on overall rarity and endangerment in the nation.
 - 2 = The second highest priority, based on the above criteria.
 - 3 = The third priority list: native plants known to have occurred in New York State five times or fewer (up to nine historical sites where some are known to be extirpated); sites harboring these species should be preserved if possible, especially in cases where more than one rarity is present.

The New York State Protected Native Plant List **

The list was enacted into State law in 1974 as a result of the efforts of a committee formed by the Department of Environmental Conservation. This committee was chaired primarily by Stanley J. Smith, at that time Curator of Botany at the New York State Museum. It sought the opinions of members of the State garden clubs, State agencies, universities and botanical institutions to determine which plants should be protected from gathering and commercial exploitation. The list should not be mistaken for a rare plant list, though some rarities are protected by it. Rather, it lists wild flowers and other plants (such as Dogwood, Azaleas and Trilliums) which are frequently gathered indiscriminately for flower arrangements, cultivation, or for momentary pleasure, and are then discarded. It was intended to discourage the gathering of plants on State and private land without permission. It underlines the fact that the plant life on a piece of land is the property and responsibility of the landowner, unlike wildlife which is managed by government agencies.

Protected Native Plants

Effective September 1, 1974, no one may knowingly pick, pluck, sever, remove or carry away, without the consent of the owner thereof, any protected plant. Violations of the law are punishable by fines of up to \$25 each (Environmental Conservation Law § 9-1503). The following are native plants which shall be protected pursuant to the above law and state regulation (NYCRR § 193.3). Such list shall apply statewide.

COMMON NAME	SCIENTIFIC NAME	COMMON NAME	SCIENTIFIC NAME
Green-dragon (Dragonroot)	<i>Arisaema dracontium</i>	American Bee-balm; Oswego Tea (Indian-heads; Scarlet Bee-balm)	<i>Monarda didyma</i>
Butterfly-weed (Chigger-flower; Orange Milkweed (Pluvisy-root))	<i>Asclepias tuberosa</i>	Bayberry (Candleberry)	<i>Myrica pensylvanica</i>
Bluebell-of-Scotland (Harebell)	<i>Campanula rotundifolia</i>	Lotus (Lotus Lily; Nelumbo; Pond-nuts; Water Chinquapin; Wonkapin; Yellow Lotus)	<i>Nelumbo lutea</i>
American Bittersweet (Waxwork)	<i>Celastrus scandens</i>	Prickly Pear (Wild Cactus; Indian Fig)	<i>Opuntia humifusa</i> (O. compressa, p.p.)
Pipsissewa (Prince's-pine; Waxflower) Spotted Evergreen (Spotted Wintergreen)	<i>Chimaphila</i> spp.		<i>Orchidaceae</i>
Flowering Dogwood	<i>Cornus florida</i>	All Native Orchids, including: Adder's-mouth (Malaxis); Arethusa (Dragon's-mouth; Swamp-pink); Bog-candle (Scent-bottle); Calopogon (Grass-pink; Swamp-pink); Calypso (Fairy-slipper); Coral-root; Cypripedium (Lady's-slipper; Moccasin-flower; nerve root); Goodyera (Lattice-leaf; Rattlesnake-plantain); Kirtle-pink; Ladies'-tresses (Pearl-twist; Screw-auger); Orange-plume; Orchis; Pogonia (Beard-flower; Snake-mouth); Putty-root (Adam-and-Eve); Soldier's-plume; Three-birds. Twayblade; Whipperwill-shoe	
Sundew (Daily-dew; Dewthread)	<i>Drosera</i> spp.		
Trailing Arbutus (Ground Laurel; Mayflower)	<i>Epigaea repens</i>		
Burning-bush (Wahoo) Strawberry-bush (Bursting-heart)	<i>Euonymus</i> spp. (Native)		
All ferns, including: Adder's-tongue, Azolla, Buckhorn, Cliff Brake, Curly-Grass, Fiddle-heads, Hart's-tongue, Maidenhair, Moonwort, Polypody, Rock Brake, Salvinia, Spleenwort, Walking-leaf, Wall-rue, Water-spangle, Wood-sia.			
But excluding Bracken (<i>Pteridium aquilinum</i>); Hay-scented Fern (<i>Dennstaedtia punctilobula</i>); Sensitive Fern (<i>Onoclea sensibilis</i>), which are not protected.	<i>Filices</i> (Filicinae: <i>Ophioglossales</i> and <i>Filicales</i>) (Native)	Golden-club	<i>Orontium aquaticum</i>
Ague-weed, Blue-Bottles, Gentian (Gall-of-the-earth)	<i>Gentiana</i> spp.	Ginseng (Sang)	<i>Panax quinquefolius</i>
Golden Seal (Orange-root; Yellow Puccoon)	<i>Hydrastis canadensis</i>	Wild Crabapple	<i>Pyrus coronaria</i>
Holly (Hulver); Inkberry (Bitter Gallberry); Winterberry (Black Alder)	<i>Ilex</i> spp. (Native)	Azalea; Great Laurel (White Laurel); Honey-suckle; Pinxter (Election-pink; Pinxter-bloom); Rhododendron (Rosebay); Rhodora	<i>Rhododendron</i> spp. (Native)
Laurel, Spoonwood (Calico-bush) Wicky (Lambkill)	<i>Kalmia</i> spp.	Bitterbloom (Marsh-pink; Rose-pink; Sabatia; Sea-pink)	<i>Sabatia</i> spp.
Lily, Turk's cap	<i>Lilium</i> spp. (Native)	Bloodroot (Puccoon-root; Red Puccoon)	<i>Sanguinaria</i>
Cardinal-flower (Red Lobelia)	<i>Lobelia cardinalis</i>	Pitcher-plant (Huntsman's-cup; Sidesaddle-flower)	<i>Sarracenia purpurea</i>
All Clubmosses, including: Bear's-bed (Christmas-green, Running Evergreen; (Trailing Evergreen; Ground Pine); Bunch Evergreen; Festoon Pine (Coral Evergreen; Buckhorn; Staghorn Evergreen; Wolf's-claws); Ground Cedar (Creeping Jenny); Ground Fir; Heath Cypress	<i>Lycopodium</i> spp.	Wild Pink	<i>Silene caroliniana</i>
Bluebell (Roanoke-bells; Tree Lungwort; Virginia Bluebell; Virginia Lungwort; Virginia Cow-slip)	<i>Mertensia virginica</i>	Bethroot (Birthroot; Squawroot; Stinking Benjamin; Wake-robin); Toadshade, Trillium	<i>Trillium</i> spp.
		Globe-flower (Trollius)	<i>Trollius laxus</i>
		Bird's-foot Violet	<i>Viola pedata</i>

** From: Mitchell, R.S. and C.J. Sheviak. 1981. Rare Plants of New York State. Bull. No. 445. New York State Museum. State Education Dept. Albany, NY.