

ENVIRONMENTAL ANALYSIS OF THE LANDS AT THE HEADWATERS OF GILBERT LAKE AND BIG CEDAR LAKE

WASHINGTON COUNTY WISCONSIN

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MEMORANDUM REPORT
NUMBER 131

**ENVIRONMENTAL ANALYSIS OF THE LANDS AT THE HEADWATERS
OF GILBERT LAKE AND BIG CEDAR LAKE
WASHINGTON COUNTY, WISCONSIN**

Prepared by the

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Chapter I

INTRODUCTION

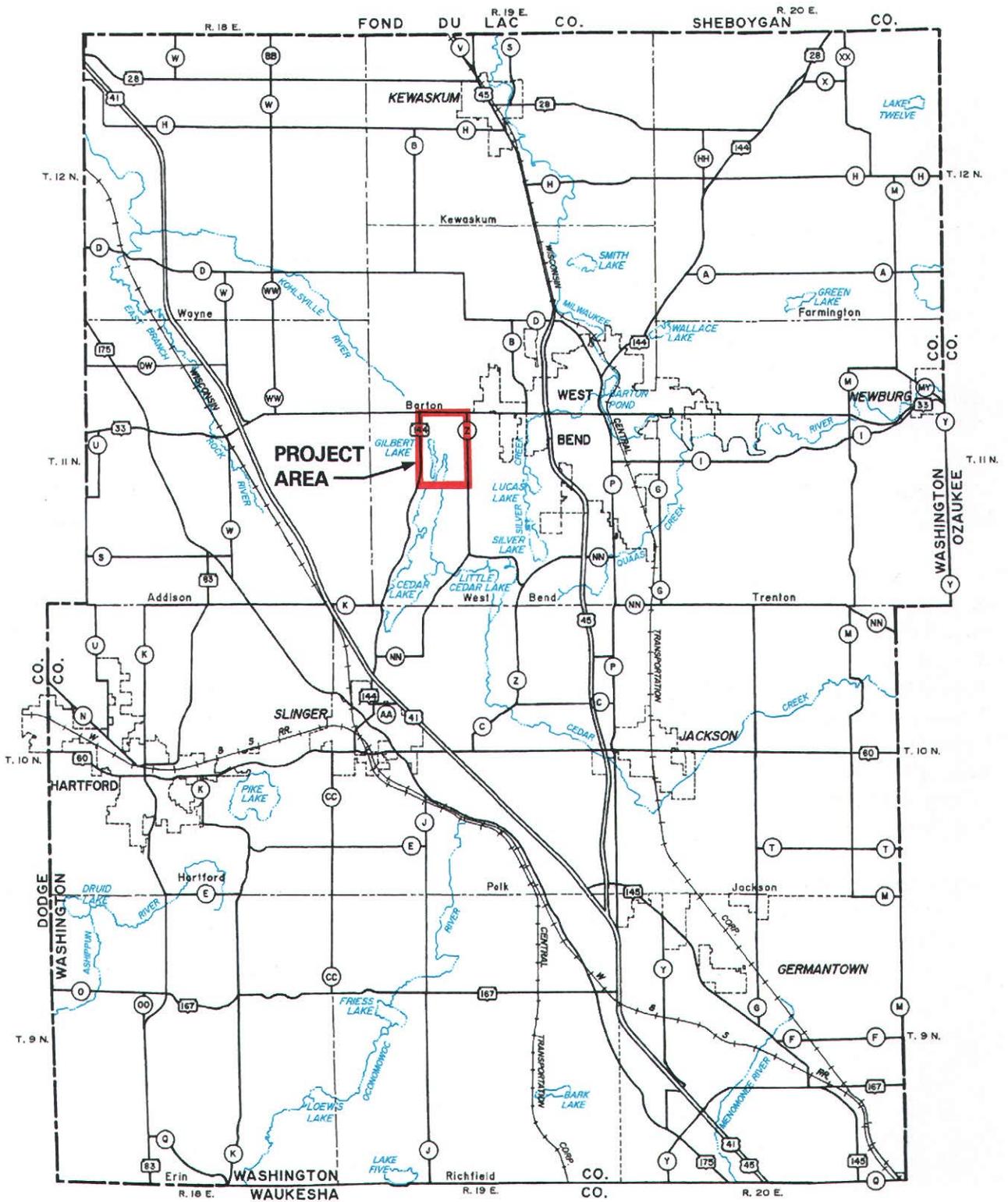
Gilbert Lake, located in the Town of West Bend, Washington County, Wisconsin (see Map 1), is a valuable resource offering recreational and aesthetic opportunities to the neighboring community and visitors. Undeveloped lakes are very rare in Southeastern Wisconsin. Gilbert Lake is an exception—unaltered natural plant communities encompass almost the entire 2.1 mile lakeshore, except for three excavated and filled areas on the east and west sides of the lake to accommodate access piers. Maintenance of a good quality fish habitat is important not only for the Lake itself, but also for downstream Big Cedar Lake. However, the recreational, visual, and natural value of the lake is perceived to be threatened by changing land use conditions in the drainage area tributary to Gilbert Lake and the north part of Big Cedar Lake.

With these concerns in mind, on March 25, 1998, the Town of West Bend formally requested the Southeastern Wisconsin Regional Planning Commission to undertake an environmental analysis of the lands at the headwaters of both Gilbert and Big Cedar Lakes. As shown on Map 1, the Gilbert Lake Project Area includes the area bounded by STH 33-144 on the north, CTH Z on the east, STH 144 on the west, and Hacker Drive extended on the south. More specifically, it includes U.S. Public Land Survey Section 17, and the north one-half of U.S. Public Land Survey Section 20, Township 11 North, Range 19 East, Town of West Bend, Washington County, Wisconsin. The scope of the requested study included an inventory of the existing plant communities in and adjacent to Gilbert Lake; delineation of any natural areas and critical species habitat areas as identified in the Commission's Planning Report No. 42, *A Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin*; identification of regionally significant wildlife habitat areas; mapping of significant water resource areas, including spring heads and seepages; identification of soils and soils limitations; identification of environmental corridors and isolated natural resource features; and preparation of a final map identifying the sensitive lands within the study area worthy of protection and management.

This study is intended to help the Town of West Bend Plan Commission and Town Board make fully informed decisions relative to use of these lands. The findings and recommendations of the requested study are presented in this report.

Map 1

LOCATION OF THE GILBERT LAKE PROJECT AREA IN WASHINGTON COUNTY, WISCONSIN



Source: SEWRPC.

Chapter II

INVENTORY FINDINGS

DESCRIPTION OF THE GILBERT LAKE PROJECT AREA

The Gilbert Lake Project Area lies within the Eastern Ridges and Lowlands physiographic region. It is located within the interlobate Kettle Moraine, with abrupt topographic relief between ridges and lowlands suggestive of a glacial end moraine interspersed with kettle holes. Elevation ranges from 1,033 feet National Geodetic Vertical Datum (NGVD) at lake level to about 1,125 feet NGVD on the higher uplands. Part of the Milwaukee River watershed, the Gilbert Lake Project Area encompasses about 968 acres, of which about 102 acres consists of open water, primarily Gilbert Lake itself and the north portion of Big Cedar Lake. Springs tributary to Gilbert Lake form the headwaters of the 3,600 acre Big Cedar Lake watershed. Gilbert Lake is connected to Big Cedar Lake by a 600 foot long channel. These lakes give rise to Cedar Creek, a major watercourse of Washington and Ozaukee Counties. Cedar Creek flows eastward 31.5 miles to its confluence with the Milwaukee River, which flows south to Lake Michigan.

Vegetationally, the Gilbert Lake Project Area lies north of the climatic Tension Zone, that southeast-northwest band that divides the State into two distinct areas: the northern hardwoods—conifer forest floristic province and the southern prairie—oak forest floristic province, each with their associated soils. Analysis of the records of the U. S. Public Land Survey carried out in the Region in 1835-36 reveals the following pre-European-settlement vegetation patterns within the project area:

1. Uplands were covered by southern mesic forest, which was dominated by such mesophytic species as sugar maple, basswood, white ash, red oak, and, occasionally, beech. These trees produce a dense canopy, resulting in low interior light levels and a sparse shrub understory. Fortunately, fires were not a common occurrence as they would have been damaging to this vegetation type. The ground was typically covered by a rich flora, especially in the spring.
2. In general, lowlands were probably similar to present-day vegetation in terms of floristic composition and areal extent. However, it is impossible to determine the exact boundaries of the various lowland vegetation types. Wetlands probably included the following types:
 - a. Northern wet forest (tamarack relict)—This was a wetland dominated by tamaracks, with many herbs and shrubs typical of northern bogs, lowland forests, and mesic forests. This vegetation type is assumed to be a relict outlier of an earlier post-glacial period. With continually wet soils, succession is typically slow, so these swamps may persist for centuries. These wet forests are often severely affected by changing water levels, as frequently occurs with highway construction. Individual tamarack trees were probably larger, and tamarack swamp likely covered more area, than in today's landscape.
 - b. Shrub-carr/sedge meadow/deep and shallow marsh complex—This treeless mix of seasonally and continually flooded plant communities may have included a lush layer of ferns, herbs, sedges, grasses, and low shrubs.
 - c. Open bog—As in today's Gilbert Lake landscape, this vegetation type was probably of limited extent. Very acid conditions gave rise to a community dominated by sphagnum moss, low ericaceous shrubs, insectivorous herbs, and tamaracks.

THE EXISTING NATURAL RESOURCE AND LAND USE BASE

The term "natural resources" refers to anything required by organisms, populations, or ecosystems for their continued survival. Humankind makes use of these natural resources, which become vital to the economic development of an area and for the ability of an area to provide a pleasant and habitable environment. This section describes the existing natural resource base and land use pattern in the Gilbert Lake Project Area.

Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface water or groundwater at a frequency and with a duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include deep and shallow marshes, sedge meadows, fresh (wet) meadows, shrub-carrs, alder thickets, low prairies, fens, bogs, lowland hardwoods, and conifer swamps.

Wetlands are a significant part of the landscape in that they perform an important set of natural functions that make them ecologically and environmentally invaluable resources. These functions may be summarized as follows:

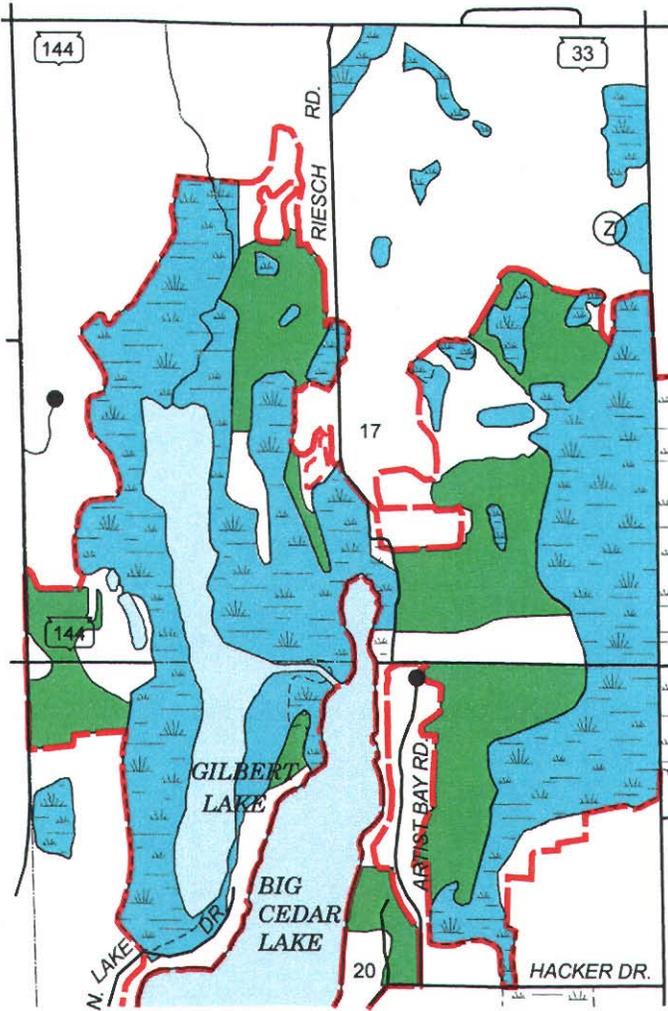
1. Wetlands enhance surface water quality. The aquatic plants which grow in wetlands change inorganic nutrients, such as phosphorus and nitrogen, into organic material, storing it in their leaves and in peat (the remains of the plant). In addition, the stems, leaves, and roots of these plants slow the flow of water through the wetlands, allowing silt and other sediment with the attached nutrients and other water pollutants to settle out. In this way, wetlands help protect surface water courses and bodies from siltation and pollution.
2. Wetlands help to regulate surface water flows and stages. Wetlands act to release water during periods of drought and hold it back during periods of wet weather, thereby stabilizing streamflows and controlling flooding. At a depth of 12 inches, one acre of wetland is capable of holding more than 300,000 gallons of water.
3. Wetlands which are located along the shoreline of lakes and streams help protect the shoreline from erosion.
4. Wetlands may serve as groundwater recharge or discharge areas.
5. Wetlands are important resources for overall ecological health and diversity. They provide essential breeding and feeding grounds, as well as shelter and escape cover, for many forms of fish and wildlife. The water present in a wetland is also attractive to upland birds and other animals. These functions give wetlands recreational, research, and educational values; support activities such as hunting, trapping, and fishing; and add aesthetic value to the community.

Wetlands have severe limitations for residential, commercial, and industrial development. Generally, these limitations are due to the erosive character, high compressibility and instability, high water table, low bearing capacity, and high shrink-swell potential of wetland soils. In addition, the use of metal conduits in some wetland soil types is constrained because of high corrosion potential. If ignored in the land use planning and development process, these limitations may result in flooding, wet basements, unstable foundations, failing pavements, and excessive infiltration of clear water into sanitary sewer lines. In addition, there are significant onsite preparation and maintenance costs associated with the development of wetland soils, particularly as they relate to roads, foundations, and public utilities.

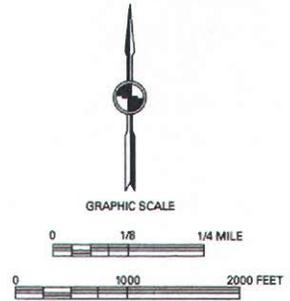
As shown on Map 2, wetlands within the Gilbert Lake Project Area in 1995 occupied about 279 acres, or about 32 percent of the total area exclusive of water. Of that total, 98 acres, or about 35 percent, are adjacent to Gilbert Lake and constitute an important element of the local natural resource base. The specific wetland types include deep and shallow marsh, shrub-carr, fresh (wet) meadow, sedge meadow, bog, lowland hardwoods, and northern lowland forest (tamarack relict).

Map 2

**ENVIRONMENTAL CORRIDORS IN
THE GILBERT LAKE STUDY AREA**



-  WETLANDS
-  UPLAND WOODS
-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SURFACE WATER



Source: SEWRPC.

Woodlands

Woodlands have both economic and ecologic value and under good management can serve a variety of uses. Located primarily on ridges and slopes and along streams and lake shores, woodlands provide an attractive natural resource of immeasurable value. In addition to contributing to clean air and water, reducing stormwater runoff and flooding, and promoting groundwater recharge, woodlands contribute to the maintenance of a diversity of plant and animal life in association with human life and can thereby provide important recreational and educational opportunities. Valuable woodlands can be destroyed through mismanagement in a short time, thereby contributing to the siltation of lakes and streams and the destruction of wildlife habitat. Thus, woodlands should be maintained for their scenic, wildlife habitat, educational, recreational, and watershed protection values as well as for their commercial value in producing forest products and contributing to the increased values of residential and other types of urban development.

Woodlands, as the term is used herein, are defined as those areas one acre or more in size having 17 or more deciduous trees per acre, each measuring at least four inches in diameter at breast height and having 50 percent or more tree canopy coverage. In addition, coniferous tree plantations and reforestation projects are classified as woodlands by the Regional Planning Commission. As shown on Map 2, woodlands within the Gilbert Lake Project Area in 1995 occupied about 133 acres, or about 15 percent of the total area exclusive of water. This woodland cover is classified as southern dry-mesic and mesic forest. It should be noted that all lowland wooded areas such as tamarack swamps have been classified as wetlands, and have not been classified as woodlands.

Soils

Soil properties exert a strong influence on the manner in which land is used. Soils are an irreplaceable resource, and development pressures upon land continue to make this resource even more valuable. Therefore, any planning program needs to examine not only how land and soils are presently used, but how they can best be used and managed. This requires a detailed soil survey which maps the geographic location of various types of soils; identifies their physical, chemical, and biological properties; and interprets these properties for land use and public facilities planning. Such a survey of the entire Southeastern Wisconsin Region was completed in 1965.

Twenty-six specific soil types occur within the Gilbert Lake Project Area: Brookston silt loam, Casco loam, Casco-Fox loam, Casco-Rodman complex, Dresden silt loam, Drummer silt loam, Fabius loam, Fox silt loam, Gravel pit, Hochheim loam, Hochheim soils, Houghton mucky peat, Juneau silt loam, Kendall silt loam, Lamartine silt loam, Marsh, Mayville silt loam, Mundelein silt loam, Palms mucky peat, Pella silt loam, Radford silt loam, St. Charles silt loam, Sandy and gravelly land, Sisson-Casco-Hochheim complex, Theresa silt loam, and Wallkill silt loam. Of the 26 soil types present, 12 are considered to be nonhydric or upland soils, two are anthropogenic soils, and 12 are considered to be hydric or wetland soils. As discussed above, the hydric soils have severe limitations for most urban uses. As shown on Map 3, approximately 327 acres, or 38 percent of the Project Area exclusive of water area, are covered by soils that are poorly suited for onsite soil absorption sewage disposal systems. The majority of this soil area is located in or near the Gilbert Lake wetland complex and the County Highway Z wetland complex. In addition, many of the soils within the study area have a high erosive potential due, in part, to the high relief topography which dominates the landscape. Such erodible soils, if improperly managed, can contribute significant silt and sediment loads to Gilbert Lake. Table 1 indicates the suitability of these 26 soil types for various recreation-related and wildlife-related uses and also sets forth the limitations of the soil types for various land uses.

Agricultural Lands

Agricultural lands offer locations proximal to urban centers for the production of certain food commodities which may require nearby population concentrations for an efficient production-distribution relationship; support the agricultural and agricultural-related economy of the surrounding area; and provide open space lands. In addition to providing food and fiber, properly managed agricultural lands can enhance wildlife habitat. This is especially true for those farms that maintain small fields and associated fencerows and which grow a variety of crops. By utilizing the underlying agricultural resource base in a manner consistent with wildlife habitat needs, important nesting and feeding habitat for many forms of wildlife can be supplied and local conditions for the management of resident or migratory wildlife can be substantially improved. However, if not properly managed, agricultural lands can contribute to the decline of local surface water quality. Commonly, stormwater runoff and snowmelt discharges carry sediment and chemical substances which act as water pollutants. The result of the accumulation of these substances on local surface waters may be a decrease in water clarity and an undesirable increase in the abundance of aquatic macrophytes, both of which are early warning signs of a decline in water quality.

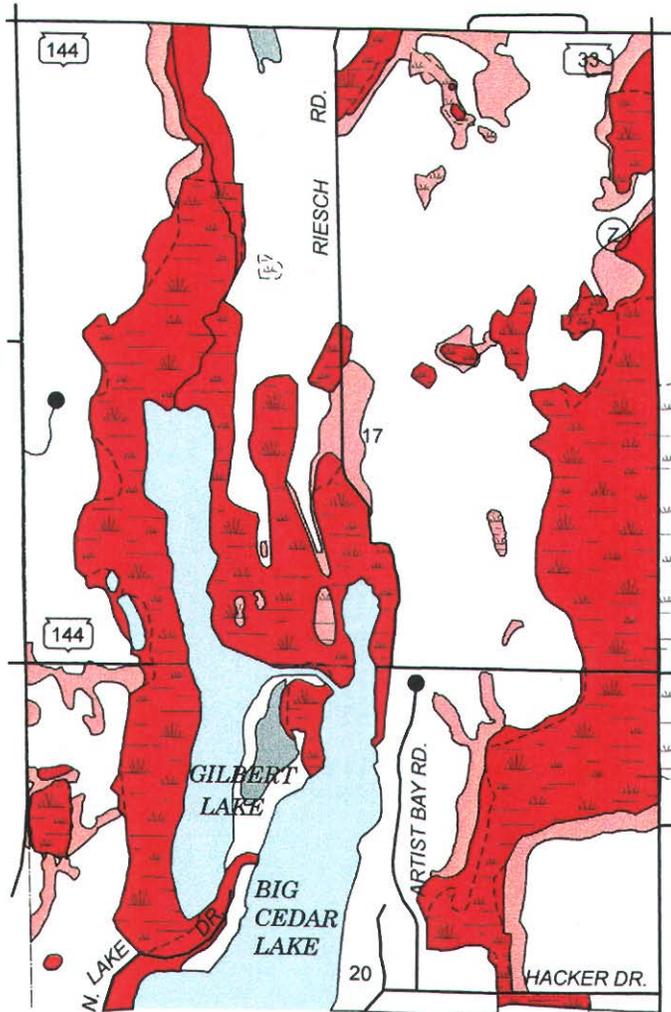
Practices to abate the non-point source pollution potential of agricultural lands within the Gilbert Lake subwatershed basin have been initiated. Specifically, such techniques include the construction of a diversion and the implementation of stripcropping as a soil conservation technique. Control of nutrient and sediment loading by improving watershed runoff management is an important step toward the maintenance of good water quality in Gilbert Lake. In 1995, approximately 168 acres, or about 17 percent, of the Gilbert Lake Project Area were in agricultural use. This amounts to about 19 percent of the Gilbert Lake Project Area exclusive of water.

Surface Water Resources

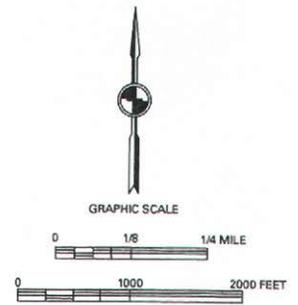
Surface water resources consisting of lakes, creeks, springs, and associated floodlands form a particularly important element of the natural resource base of the Gilbert Lake Project Area. Surface water resources contribute to the economic development and enhance the aesthetic quality of the area, and provide recreational opportunities for the surrounding community.

Lakes constitute the focal point for water-related recreational activities; provide an attractive setting for properly planned residential development; and, when viewed in the context of open space, greatly enhance the aesthetic quality

Map 3
HYDRIC SOILS IN THE
GILBERT LAKE STUDY AREA



- POORLY / VERY POORLY DRAINED SOILS
- SOMEWHAT POORLY DRAINED SOILS
- NONHYDRIC SOILS
- OTHER - CONSISTING MOSTLY OF DISTURBED SOILS
- SURFACE WATER



Source: SEWRPC.

of the environment. Small lakes, such as Gilbert Lake, are highly susceptible to deterioration through improper land use development and management. Water quality can degenerate as a result of excessive pollutant loads—including nutrient loads—from improperly placed and malfunctioning onsite sewage disposal systems, and careless urban and rural land management practices. Small lakes are also readily and adversely affected by the excessive development of lakeshore and riverine areas in combination with the filling of peripheral wetlands, which removes valuable nutrient and sediment traps while adding nutrient and sediment sources and which may destroy fish spawning and rearing areas.

About 102 acres, or about 10 percent, of the Gilbert Lake Project Area is covered by water. This includes Gilbert Lake proper, about 43 acres, and about 50 acres of Big Cedar Lake. Smaller permanent ponds comprise the remainder, about nine acres.

Gilbert Lake is of glacial origin and was created, in part, by the retreat of the Green Bay lobe of the Wisconsin glacier. At that time, Gilbert Lake was still a part of the larger, adjacent Big Cedar Lake, and separated from the main body by two small islands. Currents in Big Cedar Lake formed sand bars between the islands, thereby creating a distinctly different lake. Gilbert Lake presently joins Big Cedar Lake at its northern end by a narrow, but navigable channel. Characteristic of regional groundwater arising from a limestone substrate, the water of Gilbert Lake

Table 1

SOIL TYPES OF THE GILBERT LAKE PROJECT AREA

Soil type	Native Vegetation	Limitations of Soil				
		Limitations for Nature and Hiking Trails	Cultivated Crop, Pasture, and Trees	Limitations for Onsite Sewage Disposal	Acreage	Percent of Coverage
Casco Loam	Upland woods: red oak, white oak, sugar maple	Moderate: subject to soil blowing and water erosion; poor stability on slopes; difficult to maintain	Few on nearly level land for crops; moderate to severe on steeper slopes for pasture and woodlands	Very slight: free draining below depth of about 20"; periodic high water table on low terraces in places	71	8.2
Casco-Fox Loam	Upland woods: sugar maple, red oak, basswood	Slight on 0-12% slopes; moderate on 12-20% slopes; severe on 20-30% slopes; subject to erosion where not protected	Moderate; severe limitations if cropped intensively	Slight: free draining below depth of about 30"	13	1.5
Casco-Rodman Complex	Upland woods: red oak, white oak, sugar maple	Moderate: subject to soil blowing and water erosion; poor stability on slopes; difficult to maintain	Few on nearly level land for crops; moderate on steeper slopes for pasture and woodlands, severe for crops	Very slight: free drainage; cobblestones may interfere with installation of tile seepage bed in places	72	8.4
Dresden Silt Loam	Upland woods: sugar maple, red oak, basswood	Moderate	Few on nearly level land for crops; moderate to severe on steeper slopes for pasture and woodland	Slight: free draining below depth of about 30"; periodic high water table on lower terraces in places	13	1.5
Fox Silt Loam	Upland woods: sugar maple, red oak, basswood	Moderate; muddy and slippery when wet; sloping soils erodible	Few on nearly level land for crops; moderate on steeper slopes for pasture and woodlands	Slight: free draining below depth of about 30"	42	4.8
Hochheim Loam	Upland woods: red oak, white oak, sugar maple	Moderate: difficult to maintain on slopes	Level: slight; most in trees or pasture Slopes: moderate to severe for crops	Slight: moderate permeability	162	18.7
Hochheim Loam	Upland woods: red oak, white oak, sugar maple	Moderate: difficult to maintain on slopes	Level: slight; most in trees or pasture Slopes: moderate to severe for crops	Slight: moderate permeability	39	4.5
Juneau Silt Loam	Upland woods: sugar maple, red oak, basswood	Moderate	Few for crops	Severe: due to fluctuating water table	16	1.8
Mayville Silt Loam	Upland woods: sugar maple, red oak, basswood	Moderate on 0-12% slopes and severe on 12-20% slopes; muddy and slippery when wet; subject to erosion; may need surfacing	Few on nearly level land for crops; moderate (erosion) on steeper slopes	Slight: moderate permeability; periodic high water table in low areas adjacent to wetlands	22	2.5
St. Charles Silt Loam	Upland woods: red oak, white oak, sugar maple	Moderate on 0-12% slopes and severe on 12-20% slopes; muddy and slippery when wet; subject to erosion; may need surfacing	Moderate for intensive cultivation; crops grow well where management is good	Slight, except in the more poorly drained areas	8	0.9

Table 1 (continued)

Soil type	Native Vegetation	Limitations of Soil				Acreage	Percent of Coverage
		Limitations for Nature and Hiking Trails	Cultivated Crop, Pasture, and Trees	Limitations for Onsite Sewage Disposal			
Sisson-Casco-Hochheim Complex	Upland woods: red oak, white oak, sugar maple		Level: few Sloping: moderate to severe	Slight	9	1.0	
Theresa Silt Loam	Upland woods: sugar maple, red oak, basswood	Moderate; muddy and slippery when wet; sloping soils erodible	Few on level land; moderate to severe on steeper slopes	Slight: moderate permeability	67	7.7	
Marsh	Marsh: small shrubs, grasses, scattered small trees, cattails	Very severe; high water table; poor trafficability; difficult to maintain	Not suited to cultivation	Very severe	3	0.3	
Brookston Silt Loam	Swamp hardwoods: elm, ash	Severe: high water table; wet for long periods; muddy and slippery when wet; occasional overflow; difficult to maintain	Drained: small grains Undrained: severe; woodland or pasture	Very severe: high water table or ponding	26	3.0	
Drummer Silt Loam	Swamp hardwoods: elm, black ash	Severe: high water table; wet for long periods; muddy and slippery when wet; occasional overflow; difficult to maintain	When adequately drained: small grains Undrained: severe; pasture or woodland	Very severe: high water table	31	3.6	
Fabius Loam	Swamp hardwoods: elm, black ash	Moderate	Drained and managed: few Undrained: moderate	Severe: seasonal high water table	1	0.1	
Houghton Mucky Peat	Swamp: elm, black ash, white cedar, marsh grasses	Very severe: high water table; poor trafficability; difficult to maintain	Drained and managed well: moderate Undrained: very severe	Severe: seasonal high water table	121	14.0	
Kendall Silt Loam	Swamp hardwoods: elm, ash	Moderate	Drained: slight	Severe: fluctuating water table	8	0.9	
Lamartine Silt Loam	Swamp hardwoods: elm, ash	Moderate	Drained and managed: few Undrained: moderate	Severe: fluctuating water table	12	1.4	
Mundelein Silt Loam	Swamp hardwoods: elm, black ash	Moderate	Drained and managed: few	Severe: fluctuating water table; silt and sand may enter the lines	10	1.2	
Palms Mucky Peat	Swamp: elm, black ash, white cedar, marsh grasses	Very severe: high water table; poor trafficability; difficult to maintain	Drained: moderate Undrained: pasture, woodland, wildlife	Very severe: high water table	57	6.6	
Pella Silt Loam	Swamp hardwoods: elm, black ash	Severe: high water table; wet for long periods; muddy and slippery when wet; occasional overflow; difficult to maintain	Drained: well-suited to crops Undrained: severe limitations	Very severe: high water table	19	2.2	
Radford Silt Loam	Swamp hardwoods: elm, ash	Moderate	Adequately drained: slight for crops Undrained: frequent overflow; pasture or woodland	Very severe: seasonal high water table	31	3.6	

Table 1 (continued)

Soil type	Native Vegetation	Limitations of Soil				
		Limitations for Nature and Hiking Trails	Cultivated Crop, Pasture, and Trees	Limitations for Onsite Sewage Disposal	Acreage	Percent of Coverage
Walkkill Silt Loam	Swamp: elm, black ash, white cedar, marsh grasses	Moderate: high water table; frequent flooding; wet for short periods; muddy and slippery when wet	Drained: well-suited for crops Undrained: severe; pasture, woodland, wildlife	Very severe: high water table	6	0.7
Sandy and Gravelly Land	Small shrubs, grasses, scattered small trees	Moderate: difficult to maintain on slopes	Not suited for cultivation		6	0.7
Gravel Pit	None	Not assigned to a capability subclass	Not suited for cultivation	Not assigned to a capability subclass	1	0.1

has high alkalinity (240 ppm) and is considered fertile.¹ However, this groundwater is relatively low in phosphorus, an essential limiting nutrient for plant growth. Though the fertility of the water and sediment resulted in the luxuriant growths of submergent and emergent aquatic plants, there is no evidence of excessive fertility, since algae blooms rarely occur in Gilbert Lake. Precipitation entering the Big Cedar Lake watershed is more than balanced by losses to evapotranspiration. The total groundwater contribution to the Big Cedar Lake proper is estimated at 6.0 cubic feet per second (c.f.s.). The Gilbert Lake outlet contribution of 1.5 c.f.s. could be as high as 20 percent of the available “flushing” water entering the system.

Gilbert Lake averages only 2.5 feet in depth; it perhaps is more properly described as a deep marsh. Only the northernmost eight acres, which reach a maximum depth of nine feet, have the depth characteristics of a lake. Most of the remainder of the lake is less than two feet deep. Total volume of Gilbert Lake is 108.1 acre-feet.² Six distinct spring heads, plus numerous seepage areas, have been located within the Project Area; these provide the major source of water for the lake. They are located on the north, west, and east sides of the lake, and along the edge of the main channel connecting the two lakes, and form the headwaters of the 3600 acre Big Cedar Lake watershed. Gilbert Lake is considered unique for Southeastern Wisconsin, in that most of the immediate shoreline has unaltered natural wetland plant communities. This vegetation functions to control shoreline erosion, maintain water quality by assimilating excess nutrients, and provides spawning habitat for game fish. Waterfowl hunting and furbearer trapping is currently limited on Gilbert Lake. They are estimated to generate about 50 annual participant days each.³ Gilbert Lake receives heavy fishing pressure in winter and during the month of May. An average of 550 annual participant days of fishing is estimated to occur.⁴

Wildlife Habitat

Wildlife occurring in and adjacent to the Gilbert Lake Project Area lands include upland game such as deer, rabbit, and squirrel; predators such as fox and raccoon; game birds, including pheasant; nongame birds such as yellow warbler, belted kingfisher, and black tern; and marsh furbearers such as mink and muskrat. In addition, waterfowl, such as mallard and

¹E. Randy Schumacher, Dale E. Katsma, and William L. Carlson, “Proposed Gilbert Lake Fishery Areas, Washington County—Master Plan Concept Element,” *Wisconsin Department of Natural Resources, Madison, Wisconsin, n.d.*

²*Ibid.*

³*Ibid.*

⁴*Ibid.*

Table 2

PRELIMINARY LIST OF THE MAMMALS, BIRDS, REPTILES, AND AMPHIBIANS
REPORTED FROM THE GILBERT LAKE PROJECT AREA*

MAMMALS	
SCIENTIFIC NAME	COMMON NAME
<u>Mephitis mephitis</u>	Striped skunk
<u>Mustela vison</u>	Mink
<u>Odocoileus virginiana</u>	White-tailed deer
<u>Ondatra zibethicus</u>	Muskrat
<u>Procyon lotor</u>	Raccoon
<u>Sciurus carolinensis</u>	Gray squirrel
<u>Sciurus niger</u>	Fox squirrel
<u>Sylvilagus floridanus</u>	Eastern cottontail
<u>Tamias striatus</u>	Eastern chipmunk
<u>Tamiasciurus hudsonicus</u>	Red squirrel
<u>Vulpes fulva</u>	Red fox

BIRDS	
SCIENTIFIC NAME	COMMON NAME
<u>Agelaius phoeniceus</u>	Red-winged blackbird
<u>Aix sponsa</u>	Wood duck
<u>Anas discors</u>	Blue-winged teal
<u>Anas platyrhynchos</u>	Mallard
<u>Anas rubripes</u>	Black duck
<u>Ardea herodias</u>	Great blue heron
<u>Bartramia longicauda</u>	Upland plover
<u>Bombycilla cedrorum</u>	Cedar waxwing
<u>Bonasa umbellus</u>	Ruffed grouse
<u>Botaurus lentiginosus</u>	American bittern
<u>Branta canadensis</u>	Canada goose
<u>Bubo virginianus</u>	Great horned owl
<u>Bucephala clangula</u>	Goldeneye
<u>Buteo jamaicensis</u>	Red-tailed hawk
<u>Buteo platypterus</u>	Broad-winged hawk
<u>Butorides striatus</u>	Green heron
<u>Capella gallinago</u>	Snipe
<u>Cardinalis cardinalis</u>	Cardinal
<u>Carduelis tristis</u>	American goldfinch
<u>Charadrius semipalmatus</u>	Semi-palmated plover
<u>Charadrius vociferus</u>	Killdeer
<u>Chlidonias niger</u>	Black tern
<u>Colaptes auratus</u>	Common flicker
<u>Corvus brachyrhynchos</u>	Crow
<u>Cyanocitta cristata</u>	Blue jay
<u>Dendroica castanea</u>	Bay-breasted warbler
<u>Dendroica petechia</u>	Yellow warbler
<u>Dumatella carolinensis</u>	Gray catbird

Table 2 (continued)

BIRDS (continued)	
SCIENTIFIC NAME	COMMON NAME
<u>Fulica americana</u>	American coot
<u>Geothlypis trichas</u>	Common yellowthroat
<u>Grus canadensis</u>	Sandhill crane
<u>Hirundo rustica</u>	Barn swallow
<u>Hylocichla fuscescens</u>	Veery
<u>Icterus galbula</u>	Baltimore oriole
<u>Iridoprocne bicolor</u>	Tree swallow
<u>Ixobrychus exilis</u>	Least bittern
<u>Larus argentatus</u>	Herring gull
<u>Larus delawarensis</u>	Ring-billed gull
<u>Larus philadelphia</u>	Bonaparte's gull
<u>Megaceryle alcyon</u>	Belted kingfisher
<u>Melanerpes carolinus</u>	Red-bellied woodpecker
<u>Melanerpes erythrocephalus</u>	Red-headed woodpecker
<u>Melospiza georgiana</u>	Swamp sparrow
<u>Melospiza melodia</u>	Song sparrow
<u>Mergus serrator</u>	Red-breasted merganser
<u>Mniotilta varia</u>	Black-and-white warbler
<u>Myiarchus crinitus</u>	Crested flycatcher
<u>Otus asio</u>	Screech owl
<u>Parus atricapillus</u>	Black-capped chickadee
<u>Passerina cyanea</u>	Indigo bunting
<u>Perdix perdix</u>	Gray partridge
<u>Phasianus colchicus</u>	Ring-necked pheasant
<u>Pheucticus ludovicianus</u>	Rose-breasted grosbeak
<u>Philohela minor</u>	Woodcock
<u>Picoides villosus</u>	Hairy woodpecker
<u>Podilymbus podiceps</u>	Pied-billed grebe
<u>Porzana carolina</u>	Sora rail
<u>Progne subis</u>	Purple martin
<u>Quiscalus quiscula</u>	Grackle
<u>Rallus elegans</u>	Virginia rail
<u>Setophaga ruticilla</u>	Redstart
<u>Sialia sialis</u>	Eastern bluebird
<u>Spatula clypeata</u>	Shoveler
<u>Stelgidopteryx ruficollis</u>	Rough-winged swallow
<u>Strix varia</u>	Barred owl
<u>Sturnella magna</u>	Eastern meadowlark
<u>Sturnus vulgaris</u>	Starling
<u>Troglodytes aedon</u>	House wren
<u>Turdus migratorius</u>	American robin
<u>Tyrannus tyrannus</u>	Eastern kingbird

Table 2 (continued)

HERPTILES	
SCIENTIFIC NAME	COMMON NAME
<u>Chelydra serpentina</u>	Snapping turtle
<u>Chrysemys picta</u>	Eastern painted turtle
<u>Emydoidea blandingii</u>	Blanding's turtle
<u>Rana catesbeiana</u>	Bullfrog
<u>Rana palustris</u>	Pickereel frog
<u>Rana clamitans</u>	Green frog
<u>Thamnophis sauritis</u>	Northern ribbon snake

^aList incomplete; no exhaustive inventory done.

Source: SEWRPC, Wisconsin Department of Natural Resources, and others.

blue-winged teal, are present. Nongame animals include a variety of marsh birds, raptors, reptiles, and amphibians. The area could also provide a staging area for migratory waterfowl and songbirds. This wildlife habitat area provides valuable recreational opportunities and constitutes an immeasurable aesthetic asset to the area. Table 2 lists the mammal, bird, reptile, and amphibian species that have been observed within the Gilbert Lake Project Area.

The complete spectrum of wildlife species originally native to the Gilbert lake area has, along with its habitat, undergone significant change in terms of diversity and population size since settlement of the area by Europeans. This change is a direct result of conversion of the land from natural to agricultural and urban uses, beginning with the clearing of the forest and the draining of the wetlands, and ending with the development of intensive urban land uses. This process, begun early in the nineteenth century, is still operative today. Successive cultural uses and attendant management practices, both rural and urban, have been superimposed on the overall land use changes, and have also affected the wildlife and wildlife habitat. In agricultural areas, these cultural management practices include draining land by ditching and tiling; expanding the use of fertilizers, herbicides, and pesticides; and introducing domestic animals. In urban areas, these cultural management practices include the use of fertilizers, herbicides, and pesticides; road salting; heavy motor vehicle traffic, which produces disruptive noise levels and damaging air pollution; and the introduction of pets. Settlement by Europeans also introduced alien species of plants and animals. The protection and preservation of the remaining wildlife areas in and adjacent to the Gilbert Lake Project Area is warranted by the remaining environmental, recreational, and aesthetic value of the area.

In a broad sense, "wildlife" has come to also include those animal species that are nondomesticated but not normally hunted. For example, nongame bird species would include migratory songbirds and raptors, while nongame mammals include bobcats, skunks, and voles. Reptiles, amphibians, and even invertebrates are included in the Region's wildlife resources. What they require for survival is protection and appropriate management of their habitats. For example, certain species of native, nongame birds, such as bobolinks, meadowlarks, and upland plovers, require relatively large, undisturbed expanses of open grassland for nesting, regardless of whether the grasses are native or not. Within woodlands, the presence of standing dead trees, or snags, and fallen dead wood is important because they provide denning, nesting, roosting, sheltering, and foraging habitats and territory markers for many wildlife species. In addition, dead fallen debris may constitute a major component of the forest floor, and, as such, provides an important source of recycled soil nutrients and substrates for a variety of organisms.

All wildlife habitat areas remaining in Southeastern Wisconsin were identified and inventoried by the Regional Planning Commission in 1970, and updated in 1985 and 1995. The wildlife habitat areas are categorized as Class I, Class II, or Class III wildlife habitat. Class I wildlife habitat areas contain a good diversity of wildlife, are adequate in size to meet all of the habitat requirements for the species concerned, and are generally located in proximity to other wildlife areas. Class II wildlife habitat areas generally lack one or more of the criteria for a Class I wildlife habitat; however, they do retain a good plant and animal diversity. Class III wildlife habitat areas are remnant in nature in that they generally lack two or more of the three criteria for a Class I wildlife habitat, but may, nevertheless, be important if located in proximity to Class I or Class II wildlife habitat areas, if they provide corridors linking higher value wildlife habitat areas, or if they provide the only available range in the area. The major factors considered in assigning value ratings to wildlife habitat areas are diversity, territorial requirements, vegetative composition and structure, proximity to other wildlife habitat areas, and disturbance.

As shown on Map 4, wildlife habitat areas in and adjacent to the Gilbert Lake Project Area lands generally occur in association with existing surface water, wetland, and woodland resources. Existing wildlife areas cover about 559 acres, or about 64 percent of the project area exclusive of water. Of this total habitat acreage, 409 acres, or about 73 percent, were classified in 1995 as Class I wildlife habitat; 91 acres, or about 16 percent, were classified as Class II wildlife habitat; and about 59 acres, or 11 percent, were classified as Class III wildlife habitat.

Fisheries Resources

Gilbert Lake supports a relatively diverse fish community that is important to the local sport fishery in both Gilbert Lake and Big Cedar Lake. Surveys conducted by the Wisconsin Department of Natural Resources and the Regional Planning Commission⁵ found that 22 species of fish occur in the lake. A complete list of all species recorded during the fish surveys is shown in Table 3. Among the notable gamefish identified during the surveys include northern pike (*Esox lucius*), largemouth bass (*Micropterus salmoides*), and walleye (*Stizostedion vitreum vitreum*). Gilbert Lake and the north bay of Big Cedar Lake are extremely important in meeting the spawning requirements of resident Big Cedar Lake northern pike. Annually, at least 50 percent of the northern pike in Big Cedar Lake spawn either in Gilbert Lake or the north bay of Big Cedar Lake. The Gilbert Lake—Big Cedar Lake system is known regionally as an excellent producer of trophy-size northern pike and largemouth bass. Walleyes are infrequent in the fishery, but attain very large size. Large numbers of panfish were also observed, including bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), and yellow perch (*Perca flavescens*). In addition, a Department of Natural Resources survey conducted in Gilbert Lake recorded the presence of pugnose shiner (*Notropis anogenus*), a Wisconsin-designated threatened fish species, and lake chubsucker (*Erimyzon sucetta*), a Wisconsin-designated special concern fish species.

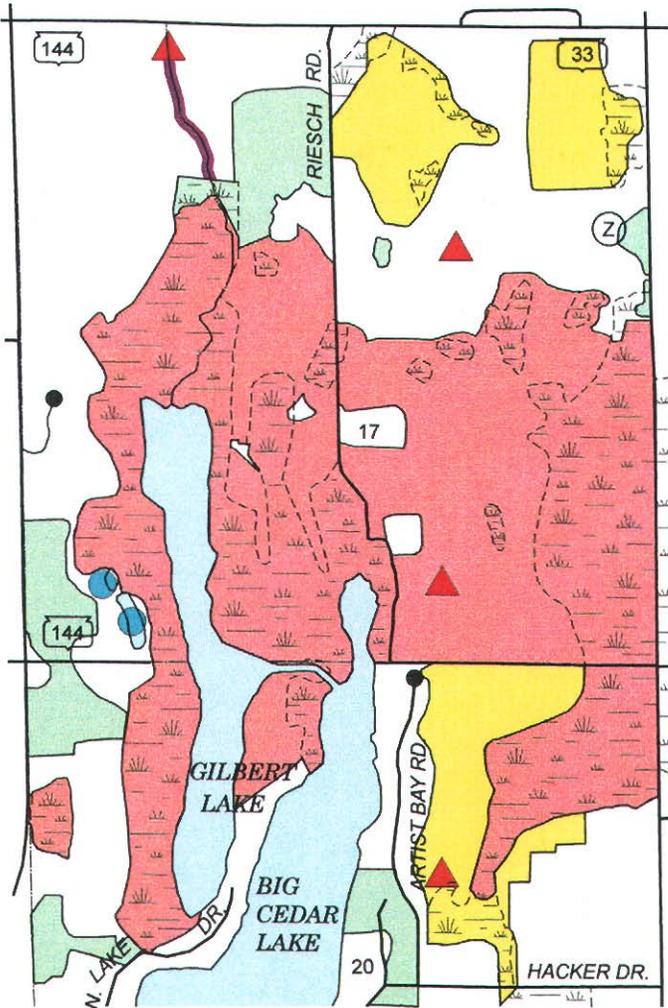
Environmental Corridors

One of the most important tasks undertaken by the Commission as part of its regional planning effort was the identification and delineation of those areas of the Region having high concentrations of natural, recreational, historic, aesthetic, and scenic resources and which, therefore, should be preserved and protected in order to maintain the overall quality of the environment. Such areas normally include one or more of the following seven elements of the natural resource base which are essential to the maintenance of both ecological balance and the natural beauty of the Region: 1) lakes, rivers, and streams and their associated undeveloped shorelands and floodlands; 2) wetlands; 3) woodlands; 4) prairies; 5) wildlife areas; 6) wet, poorly drained, and organic soils; and 7) rugged terrain and high-relief topography. While these seven elements constitute integral parts of the natural resource base, there are five additional elements which, although not a part of the natural resource base per se, are closely related to or centered on that base and therefore are important considerations in identifying and delineating areas with scenic, recreational, and educational value. These additional elements are: 1) existing outdoor recreation sites; 2) potential outdoor recreation and related open space sites; 3) historic, archaeological, and other cultural sites; 4) significant scenic areas and vistas; and 5) natural and scientific areas.

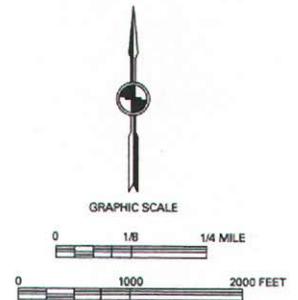
⁵SEWRPC Staff Memorandum Report No. 85-22, "An Aquatic Macrophyte Management Plan for Gilbert Lake," Waukesha, Wisconsin, August 1985.

Map 4

**WILDLIFE HABITATS AND VEGETATION
IN THE GILBERT LAKE STUDY AREA**



- CLASS 1 WILDLIFE HABITAT
- CLASS 2 WILDLIFE HABITAT
- CLASS 3 WILDLIFE HABITAT
- DRAINAGE DITCH
- WETLAND LESS THAN 2 ACRES
- POND LESS THAN 2 ACRES
- SURFACE WATER



Source: SEWRPC.

The delineation of these 12 natural resource and resource-related elements on a map results in an essentially linear pattern of relatively narrow, elongated areas which have been termed “environmental corridors” by the Commission.

Primary environmental corridors include a wide variety of the aforementioned resource and resource-related elements and are at least 400 acres in size, two miles long, and 200 feet wide. The preservation of these corridors in an essentially open, natural state will avoid the creation of costly environmental problems, such as flooding and water pollution, and will serve to maintain a high level of environmental quality in the Gilbert Lake Project Area, protect natural beauty, and provide invaluable outdoor recreation opportunities. As indicated on Map 2, about 494 acres, or 51 percent of the project area, are located within a primary environmental corridor. A significant portion of these corridor lands lie within the Gilbert Lake watershed, and as such, not only provide important wildlife habitat, but assist in maintaining and enhancing surface water quality conditions within the drainage basin.

Regional Natural Areas Protection and Management Plan

Due largely to urbanization and widespread agricultural activity, only remnants of the pre-European-settlement landscape presently exist in Southeastern Wisconsin. The continued urbanization of the Region may be expected to further disturb or destroy many of the remaining natural areas and associated critical plant and animal habitats unless a concerted effort is made to ensure their protection and permanent preservation.

Table 3

FISH SPECIES IDENTIFIED DURING GILBERT LAKE SURVEYS: 1978, 1984, AND 1985

SCIENTIFIC NAME	COMMON NAME
<u>Ambloplites rupestris</u>	Rock bass
<u>Catostomus commersoni</u>	White sucker
<u>Coregonus sp.</u>	Cisco
<u>Cyprinus carpio</u>	Carp
<u>Erimyzon sucetta</u>	Lake chubsucker
<u>Esox lucius</u>	Northern pike
<u>Etheostoma exile</u>	Iowa darter
<u>Etheostoma nigrum</u>	Johnny darter
<u>Ictalurus melas</u>	Black bullhead
<u>Ictalurus natalis</u>	Yellow bullhead
<u>Lepomis cyanellus</u>	Green sunfish
<u>Lepomis gibbosus</u>	Pumpkinseed
<u>Lepomis macrochirus</u>	Bluegill
<u>Micropterus dolomieu</u>	Smallmouth bass
<u>Micropterus salmoides</u>	Largemouth bass
<u>Moxostoma sp.</u>	Redhorse
<u>Notemigonus crysoleucas</u>	Golden shiner
<u>Notropis anogenus</u>	Pugnose shiner
<u>Perca flavescens</u>	Yellow perch
<u>Pimephales notatus</u>	Bluntnose minnow
<u>Pomoxis nigromaculatus</u>	Black crappie
<u>Stizostedion vitreus vitreus</u>	Walleye

Source: Wisconsin Department of Natural Resources and SEWRPC.

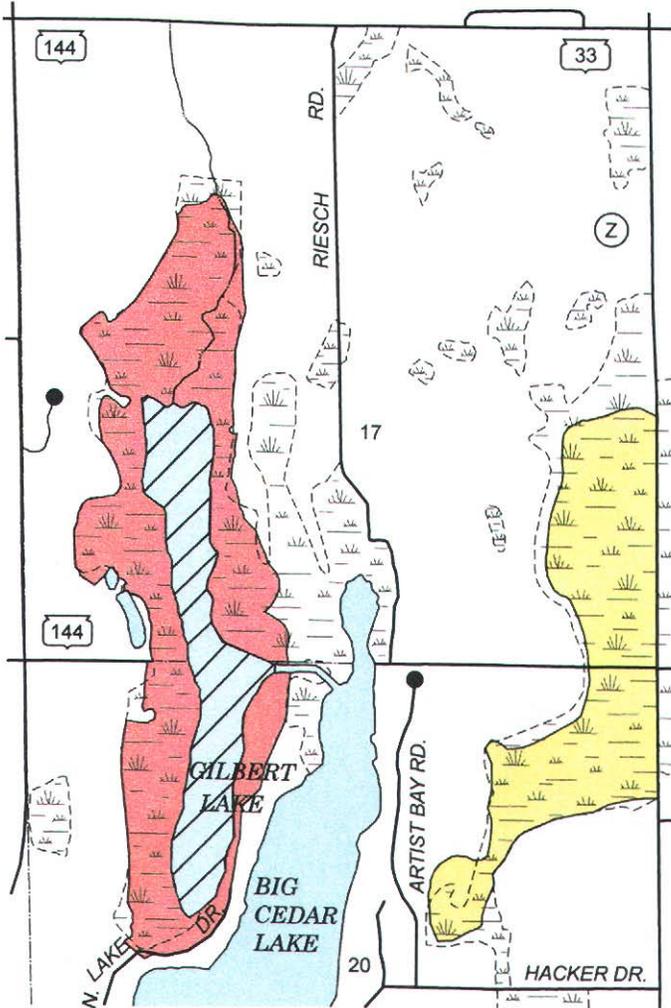
In 1997, SEWRPC Planning Report No. 42, *A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin*, was completed. The plan was undertaken to identify the most significant remaining natural areas—essentially, remnants of the pre-European-settlement landscape—as well as other areas vital to the maintenance of endangered, threatened, and rare plant and animal species in the Southeastern Wisconsin Region. The plan represents an important additional element of the evolving comprehensive plan for the Region.

The primary purpose of the plan was to identify and make recommendations for the protection and management of the most significant remaining “natural areas” and “critical species habitats” in the Southeastern Wisconsin Region. For purposes of the plan, “natural areas” were defined as those tracts of land or water so little modified by human activity, or which have sufficiently recovered from the effects of such activity, that they contain intact native plant and animal communities believed to be representative of the pre-European-settlement landscape. “Critical species habitats” were defined as those additional tracts of land or water which support endangered, threatened, or rare plant or animal species.

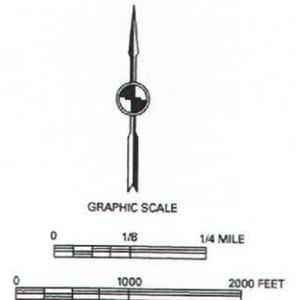
In addition, significant aquatic areas and geological and archaeological features were identified. The plan was further intended to increase the dissemination of information regarding such sites to State, county, and local units and agencies of government and to private interests, in order that the preservation of these sites may be properly considered as proposals for development within the Region are advanced.

Map 5

**IDENTIFIED NATURAL AREAS
AND CRITICAL SPECIES HABITAT AREAS
IN THE GILBERT LAKE STUDY AREA**



Source: SEWRPC.



The plan identified a total of 447 natural areas in Southeastern Wisconsin, encompassing about 90 square miles. Using a classification system originally developed by the Wisconsin Department of Natural Resources and refined by the Regional Planning Commission, each of the identified natural areas was classified as being of Statewide or greater significance, or an “NA-1” site; of countywide or regional significance, or an “NA-2” site; or of local significance, or an “NA-3” site. The plan also identified a total of 142 critical species habitat sites. These consist of areas which are located outside designated natural areas, yet which support one or more endangered, threatened, or rare plant or animal species. Habitat capable of supporting endangered, threatened, or rare herptile species were identified as general range areas.

Map 5 indicates those natural areas and critical species habitat areas identified in Planning Report No. 42 as occurring within the Gilbert Lake Project Area. The “Gilbert Lake Tamarack Swamp” has been identified as a natural area of county or regional significance (NA-2); the “CTH Z Upland Woods and Wetlands,” a portion of which lies within the project boundary, has been identified as a natural area of local significance (NA-3); and the entire Gilbert Lake has been identified as a critical bird species habitat area (CSH). In addition, Gilbert Lake was identified as an aquatic area of Statewide or greater significance (AQ-1).

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Chapter III

RESULTS OF THE 1998 VEGETATION SURVEY

The existing vegetative cover of the Gilbert Lake Project Area was inventoried in the field by the Commission staff between May 5 and August 11, 1998. The results of the inventory, including an evaluation of each plant community area, are described below.

EVALUATION SCHEMES

SEWRPC Evaluation Scheme

An evaluation scheme was developed by the Commission to evaluate and rank natural areas and critical species habitat areas based on several pertinent scientific criteria, including: 1) natural area quality/human impact; 2) size and buffer lands, to be applied to forested areas only; 3) species diversity; 4) community significance; 5) species significance; and 6) maturity of community, which is applied to forested areas only. A percentage of the maximum possible score was then calculated for each area. On the basis of the Commission's experience in ranking natural areas within the Region, it was determined that, in general, those sites achieving percentage scores of 70 or greater were of high ecological value; those areas achieving percentage scores of 40-70 were of moderate-to-good value; and those areas achieving percentage scores of less than 40 were of marginal or low value. The exact criteria of the evaluation scheme are published in SEWRPC Planning Report No. 42, *A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for Southeastern Wisconsin*, September, 1997.

Swink and Wilhelm Floristic Quality Assessment¹

This index is a quantitative measure of site quality. Sites, including natural areas and disturbed areas, can be ranked based on presence of vascular plant species, and thus compared. Each species in the regional flora was assigned a numerical rating, from 0 to 10, expressing its relative ecological value with respect to all other species:

0: nearly ubiquitous, weedy species, found under a broad set of environmental conditions

10: found typically in stable, mature communities; exhibit a high degree of fidelity to a narrow range of ecological parameters

Since Washington County lies slightly outside of the "Chicago Region" as defined by the authors, some modification to individual species rankings were deemed necessary to accurately portray the native flora.

In general, the methodology follows a simple procedure, described as follows: 1) complete inventory of the vascular plant species of a site; 2) assign evaluation rankings for each species inventoried; 3) total the individual species evaluation rankings (R); 4) divide the total number of species (N) by the R value to obtain a mean value (C); and 5) prepare a Rating Index (I) by multiplying the C value by the square root of N.

Using this measure of floristic quality, weedy communities will tend to have a low Index value of usually no higher than 20; communities with some natural quality will score values in the 30s; and sites with score values of 40 or more are essentially natural communities and worthy of protection of the existing floral diversity under this evaluation method.

¹Floyd Swink and Gerould Wilhelm, "Floristic Quality Assessment," in *Plants of the Chicago Region*, 4th ed., Indiana Academy of Science, Indianapolis, Indiana, 1994, pp. 11-18.

PLANT COMMUNITY AREA EVALUATIONS AND DESCRIPTIONS

Table 4 lists the Gilbert Lake plant community areas, ranked by both the SEWRPC and Swink and Wilhelm scores. Then, using the evaluation scores as a guide, the 40 Plant Community Areas were grouped into three classes according to ecological quality. This distribution is shown in Map 6. Class I stands include high and good quality plant community areas. This total area is 232 acres, or 24 percent of the Project Area, and 46 percent of the total plant community area. All of the Class I plant community areas are wetlands, either associated directly with Gilbert Lake, or with the large wetland complex adjacent to CTH Z. Class II includes moderate quality plant community areas. This total area is 145 acres, or 15 percent of the Project Area, and 29 percent of the total plant community area. Included in Class II are many of the smaller, more disturbed wetlands, plus a significant acreage of wooded uplands. These latter areas reflect the land use history of the Project Area, wherein uplands were more intensively used in the past, but now have recovered from these past disturbances to at least a semi-natural condition. Class III includes low or marginal quality plant community areas. This total area is 126 acres, or 13 percent of the Project Area, and 25 percent of the total plant community area. Class III includes old fields that are slowly reverting back to upland forest, and disturbed lowlands. The ecological value of these areas lies primarily in watershed protection and as buffers for higher quality areas. The remainder of the Project Area that was not included in any plant community area, 465 acres, or 48 percent, consists of the north portion of Big Cedar Lake, artificial ponds, and intensively used areas, such as agricultural fields and residences.

A brief description of each of the 40 plant community areas identified within the Gilbert Lake Project Area boundary in 1998 is set forth in Table 5.

CRITICAL SPECIES AND THEIR HABITATS WITHIN THE GILBERT LAKE PROJECT AREA

Categories of Critical Species

The following terms are used by the Wisconsin Department of Natural Resources to classify critical plant and animal species:

1. **Endangered (E):** This is a legal category that includes any species that is in danger of extinction throughout all or a significant portion of its Wisconsin range. These are species in trouble, whose continued existence as part of Wisconsin's biodiversity is in jeopardy, and which may become extirpated without help.
2. **Threatened (T):** This is a legal category that includes any species likely to become endangered within the foreseeable future throughout all or a significant portion of its Wisconsin range. It usually applies to species whose populations are declining due to destruction either of the organism or its habitat.
3. **Special Concern/Watch/Rare (SC):** This nonlegal category includes those species not designated as "endangered" or "threatened" but about which some problem of abundance or distribution in Wisconsin is suspected but not yet proved. The main purpose of this category is to focus attention on certain species prior to their becoming threatened or endangered.

Critical Species

The following critical animal and plant species have been observed in the Gilbert Lake Project Area:

Herptiles

The northern ribbon snake (*Thamnophis sauritus*), identified as an endangered species in Wisconsin, is a 2.5- to 3-foot long semi-aquatic garter snake found in isolated pockets in eastern Wisconsin. Its habitat includes tamarack swamps, shrub-carr, alder thickets, marshy ponds, lake shores, edges of sphagnum bogs, damp woods, and swampy meadows along streams. It is active from April to October, feeding on small fish, tadpoles, frogs, earthworms, and salamanders. It is very sensitive to habitat disturbance. It is also listed as an endangered species in the State of Illinois.

Table 4

GILBERT LAKE PLANT COMMUNITY AREA EVALUATIONS

A. RANKED BY SEWRPC COMMUNITY EVALUATION SCHEME							B. RANKED BY SWINK AND WILHELM INDEX						
PCA	Swink and Wilhelm					Community Type	PCA	Swink and Wilhelm					Community Type
	N	R	C	I	SEWRPC			N	R	C	I	SEWRPC	
28	74	547	7.4	64	84	Bog	20	121	810	6.7	74	64	Tamarack Swamp
39	24	160	6.7	33	77	Lake	03	94	692	7.4	72	59	Tamarack Swamp
20	121	810	6.7	74	64	Tamarack Swamp	31	123	797	6.5	72	56	Tamarack Swamp
03	94	692	7.4	72	59	Tamarack Swamp	37	89	666	7.5	71	48	Tamarack Swamp
29	57	449	7.9	60	59	Sedge-Bog	28	74	547	7.4	64	84	Bog
31	123	797	6.5	72	56	Tamarack Swamp	29	57	449	7.9	60	59	Sedge-Bog
25	26	172	6.6	34	54	Sedge Mat	07	86	469	5.4	50	52	Swamp, Marsh, Shrub-Carr
07	86	469	5.4	50	52	Swamp, Marsh, Shrub-Carr	18	95	435	4.6	45	37	Mesic Woods
37	89	666	7.5	71	48	Tamarack Swamp	04	35	252	7.2	42	44	Marsh
04	35	252	7.2	42	44	Marsh	05	82	379	4.6	42	36	Mesic Woods
34	53	294	5.5	40	42	Mesic Woods	08	78	363	4.6	41	30	Upland Woods
06	50	237	4.7	33	39	Wet Meadow	40	86	375	4.4	41	28	Woods
38	27	169	6.2	32	38	Sedge Meadow	34	53	294	5.5	40	42	Mesic Woods
18	95	435	4.6	45	37	Mesic Woods	25	26	172	6.6	34	54	Sedge Mat
05	82	379	4.6	42	36	Mesic Woods	06	50	237	4.7	33	39	Wet Meadow
21	30	144	4.8	26	36	Lake	26	37	205	5.5	33	32	Disturbed Swamp
26	37	205	5.5	33	32	Disturbed Swamp	39	24	160	6.7	33	77	Lake
09	18	79	4.4	19	31	Woodland Pond	16	53	236	4.4	32	28	Wet Woods
10	20	82	4.1	18	31	Woodland Pond	38	27	169	6.2	32	38	Sedge Meadow
11	18	74	4.1	17	31	Woodland Pond	33	65	238	3.7	30	14	Old Field
12	29	127	4.4	24	31	Woodland Pond	02	42	181	4.3	28	30	Willow Thicket
13	22	120	5.4	25	31	Woodland Pond	30	43	182	4.2	28	24	Pond
22	2	8	4.0	6	31	Woodland Pond	21	30	144	4.8	26	36	Lake
23	15	75	5.0	19	31	Woodland Pond	35	55	191	3.5	26	14	Old Field, Woods
24	18	96	5.3	22	31	Woodland Pond	13	22	120	5.4	25	31	Woodland Pond
02	42	181	4.3	28	30	Willow Thicket	15	43	162	3.8	25	24	Wet Meadow, Hardwood Swamp
08	78	363	4.6	41	30	Upland Woods	12	29	127	4.4	24	31	Woodland Pond
16	53	236	4.4	32	28	Wet Woods	24	18	96	5.3	22	31	Woodland Pond
40	86	375	4.4	41	28	Woods	19	33	124	3.8	22	24	Upland Woods, Old Field
15	43	162	3.8	25	24	Wet Meadow, Hardwood Swamp	14	37	135	3.6	22	14	Old Field, Upland Woods
19	33	124	3.8	22	24	Upland Woods, Old Field	36	41	145	3.5	22	14	Old Field
27	30	116	3.9	21	24	Disturbed Wet Meadow	27	30	116	3.9	21	24	Disturbed Wet Meadow
30	43	182	4.2	28	24	Pond	09	18	79	4.4	19	31	Woodland Pond
32	4	16	4.0	8	24	Woodland Pond	23	15	75	5.0	19	31	Woodland Pond
01	28	77	2.8	15	17	Old Field	10	20	82	4.1	18	31	Woodland Pond
14	37	135	3.6	22	14	Old Field, Upland Woods	11	18	74	4.1	17	31	Woodland Pond
17	15	45	3.0	12	14	Old Field	01	28	77	2.8	15	17	Old Field
33	65	238	3.7	30	14	Old Field	17	15	45	3.0	12	14	Old Field
35	55	191	3.5	26	14	Old Field, Woods	32	41	6	4.0	8	24	Woodland Pond
36	41	145	3.5	22	14	Old Field	22	2	8	4.0	6	31	Woodland Pond

Spearman rank-order test:

$\rho(p) = 0.77$

$p_{.05} = 0.364$

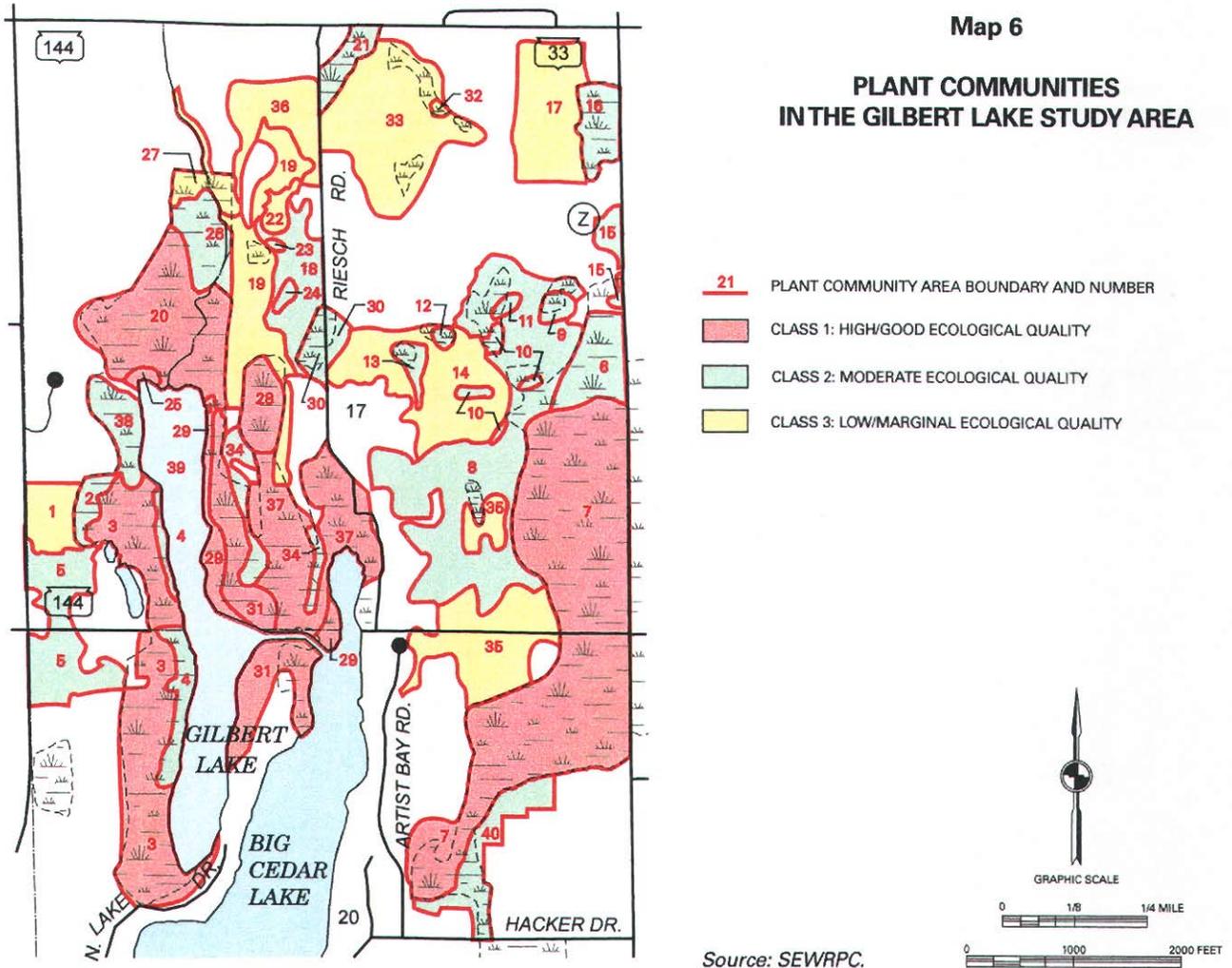
$p_{.01} = 0.478$

$N = 40$

reject H_0 ; therefore, there is significant correlation between ranks

Map 6

**PLANT COMMUNITIES
IN THE GILBERT LAKE STUDY AREA**



Blanding's turtle (*Emydoidea blandingii*), identified as a threatened species in Wisconsin, is a medium-sized, semi-aquatic turtle. Largely a species of the prairie region of southern and western Wisconsin, it does occur Statewide, however, except in the north-central portion of Wisconsin. Its habitat includes grassy marshes, mesic prairies, prairie potholes, shallow slow-moving rivers, shallow lakes, and small ponds and adjacent wetlands. It requires a minimum of twelve years to become reproductively mature. Blanding's turtle is considered threatened by overcollection, draining of marshes, and nest predation by small mammals; it is also very vulnerable to roadkill.

The bullfrog (*Rana catesbeiana*), identified as a special concern species in Wisconsin, prefers undisturbed permanent ponds and lakes with large, dense beds of aquatic plants. Long a favorite for eating and scientific study, it is slow to mature. These factors, along with habitat disturbance, have contributed to its significant decline.

The pickerel frog (*Rana palustris*), identified as a special concern species in Wisconsin, is a medium-sized frog, found throughout Wisconsin in isolated localities of suitable habitat, except in the north-central portion of the state. Its habitat

Table 5

PLANT COMMUNITY AREAS OF THE GILBERT LAKE PROJECT AREA

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
1	On an east-facing slope, this old field is located on the west side of Gilbert Lake, adjacent to STH 144. It is dominated by exotic species and common, weedy natives, with significant plantings of conifers, such as white spruce (<i>Picea glauca</i>), white pine (<i>Pinus strobus</i>), and white cedar (<i>Thuja occidentalis</i>). The stand has been evaluated as an area of low or marginal floristic value (Class III). Soils are all well-drained, including Fox silt loam, 2-6 percent slopes; Juneau silt loam, 1-3 percent slopes; Casco loam, 6-12 percent slopes (eroded); and Casco loam, 12-20 percent slopes (eroded). The Swink and Wilhelm Index value is 15 while the SEWRPC community evaluation score is 17. The entire area is under the ownership of the Cedar Lakes Conservation Foundation, and is significant in that it acts as a buffer to protect the Gilbert Lake watershed from development	5.1	Upland Woods	Allow plant community area to reforest naturally.
2	This combination of willow thicket and second-growth southern lowland hardwoods is part of the Gilbert Lake wetland complex, located immediately to the east of, and down slope of, Plant Community Area No. 1. The canopy is dominated by black willow (<i>Salix nigra</i>), with a thick shrub stratum of sandbar willow (<i>S. exigua</i>) and red-osier dogwood (<i>Cornus stolonifera</i>). Skunk cabbage (<i>Symplocarpos foetidus</i>) is frequent in the ground layer. The stand has been evaluated as an area of moderate floristic quality (Class II). Soils are composed entirely of the periodically flooded Drummer silt loam (gravelly substratum), poorly drained with very slow internal drainage. The Swink and Wilhelm Index value is 28, while the SEWRPC community evaluation score is 30	3.3	Lowland Hardwoods	Maintain existing conditions, monitor for exotic species.
3	This is an approximately 32.2-acre wetland complex consisting of southern tamarack swamp, shrub-carr, and shallow marsh. Springs and seepage areas are located throughout the area. This stand is located immediately east of Plant Community Area No. 2, and continues southward along the west side of Gilbert Lake. Species richness is high, with few exotics noted. Dominant trees include tamarack (<i>Larix laricina</i>), paper birch (<i>Betula papyrifera</i>), and black ash (<i>Fraxinus nigra</i>). The shrub layer includes a significant amount of poison sumac (<i>Rhus vernix</i>). The rich ground flora includes a number of species with more northern affinities, such as blue-bead lily (<i>Clintonia borealis</i>), three-leaved Solomon's plume (<i>Smilacina trifolia</i>), bunchberry (<i>Cornus canadensis</i>), sundew (<i>Drosera rotundifolia</i>), and partridgeberry (<i>Mitchella repens</i>). Also present are three species of orchids—green twayblade (<i>Liparis loeselii</i>), northern bog orchid (<i>Platanthera hyperborea</i>), and small yellow lady's-slipper (<i>Cypripedium parviflorum</i>), a State-designated Special Concern species. Another Special Concern species is cuckoo flower (<i>Cardamine pratensis</i>). The presence of a number of calciphiles, such as ciliated brome grass (<i>Bromus ciliatus</i>), sage willow (<i>Salix candida</i>), swamp lousewort (<i>Pedicularis lanceolata</i>), swamp goldenrod (<i>Solidago patula</i>), and swamp thistle (<i>Cirsium muticum</i>) demonstrate the circum-neutral nature of the substrate. Exotic species are not common; however, mention should be made of several maturing stems of glossy buckthorn (<i>Rhamnus frangula</i>) which are reaching fruit-bearing age. The danger is that these individuals will then begin reproducing within the swamp and, as has occurred in many swampy wetlands in southeastern Wisconsin, eventually dominate the shrub layer and alter the ecology of the site. Considering the high quality of the community, it is recommended that a search be made for this species and that any individuals be eliminated. The stand has been evaluated as of good or high floristic quality (Class I). Soils are the very poorly drained Houghton mucky peat. The Swink and Wilhelm Index is 72, while the SEWRPC community evaluation score is 59. Part of the north end is owned by the Cedar Lakes Conservation Foundation; the remainder is private	32.2	Tamarack Swamp, shrub-carr, and shallow marsh	Control deer population; search for, and eliminate, glossy buckthorn (<i>Rhamnus frangula</i>)

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
4	This wetland is located on the west side of Gilbert Lake, and consists of shrub-carr and cattail marsh. Dominant species include cattail (<i>Typha latifolia</i> and <i>T. angustifolia</i>), beaked willow (<i>Salix bebbiana</i>), and bog birch (<i>Betula pumila</i>). Tamaracks are invading the drier portions from the adjacent swamp. Water-willow (<i>Decodon verticillatus</i>) is particularly dense along the lake shore. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 42, while the SEWRPC community evaluation score is 44	6.2	Shrub-carr and cattail marsh	Control glossy buckthorn
5	This upland consists of second-growth southern mesic hardwoods on rough terrain, located adjacent to STH 144. Most trees are small- or medium-size, and evidence of local use, such as fire rings, stumps, and footpaths, is present. However, the native species richness is relatively good. The canopy is dominated by sugar maple (<i>Acer saccharum</i>), ironwood (<i>Ostrya virginiana</i>), and basswood (<i>Tilia americana</i>), while there is a significant amount of prickly-ash (<i>Zanthoxylum americanum</i>) in the shrub layer. The ground flora is representative of southern Wisconsin mesic woods. This stand is important in protecting the Gilbert Lake watershed from development. This stand has been evaluated as of moderate floristic quality (Class II). Soils are predominantly Casco loam, 12-20 percent slopes (eroded), with inclusions of Radford silt loam, 0-3 percent slopes, along intermittent drainageways. The Swink and Wilhelm Index is 42, while the SEWRPC community evaluation score is 36. A portion of the woods is owned by the Cedar Lakes Conservation Foundation; the remainder is private, and includes driveways and residences	15.4	Southern mesic hardwoods	Allow forest to mature; minimize paths and other local disturbances; restrict development of remainder of woods; monitor for exotic species.
6	This wetland consists of shallow marsh and sedge meadow. The stand is located at the north end of a much larger wetland adjacent to CTH Z. Apparently, there were previous attempts to convert this wetland to agricultural use, but most of the area has been reclaimed by native wetland vegetation. Dominant species include cattails, willows, and sedges, particularly tussock sedge (<i>Carex stricta</i>) and woolly sedge (<i>C. lanuginosa</i>). Reed canary grass (<i>Phalaris arundinacea</i>) is also relatively common. This stand has been evaluated as of moderate floristic quality (Class II). Soils are primarily Pella silt loam, a soil of lowlands with a high water table that is subject to periodic flooding. The Swink and Wilhelm Index is 33, while the SEWRPC community evaluation score is 39	7.1	Shallow marsh and sedge meadow	Restrict filling and dumping around edges; control runoff from highway and agricultural fields.
7	This wetland complex consists of shallow marsh, sedge meadow, cattail marsh, and shrub-carr. The stand lies adjacent to CTH Z, and is actually part of a much larger natural area that extends beyond the project boundary, identified as the "CTH Z Upland Woods and Wetlands" in the Commission's Planning Report No. 42, "A Regional Natural Areas and Critical Species Habitat Protection and Management Plan for South-eastern Wisconsin," where it is ranked as a natural area of local significance (NA-3). Construction of the highway has apparently altered the water level, so that most of the trees are dead or dying. Dominant species include beaked willow, pipes (<i>Equisetum fluviatile</i>), cattails, tussock sedge, and silky dogwood (<i>Cornus amomum</i>). Species richness is relatively high, and includes the small yellow lady's-slipper, a State-designated Special Concern species, a small population of which was located beneath a relatively intact canopy along the western edge at the upland border. Near the south portion of the area is a long raised driveway that further divides the area. This stand has been evaluated as of good or high floristic quality (Class I). Soils consist primarily of the very poorly drained Palms mucky peat, which is subject to frequent flooding. The Swink and Wilhelm Index is 50, while the SEWRPC community evaluation score is 52	74.4	Shallow marsh, sedge meadow, and shrub-carr	Restrict filling and dumping around edges; control runoff from highway and agricultural fields by maintaining undeveloped buffer

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
8	<p>This upland consists of disturbed second-growth southern mesic woods on rough morainal topography. When cows grazed this area as part of a dairy farm, the woods were much more open and scattered into smaller fragments. With cessation of grazing, these fragments have coalesced into a more contiguous, albeit irregular, woods with a more-or-less complete canopy. The thick stratum of prickly-ash and the depauperate ground flora are the result of former grazing. Although there are a few trees of mature size, the abundance of such successional species as aspens (<i>Populus grandidentata</i> and <i>P. tremuloides</i>) and paper birch demonstrate the former openness of much of the woods. At present, the area is progressing to a woods dominated by sugar maple, basswood, and white ash (<i>Fraxinus americana</i>). The ground flora is sparse, dominated by such common natives as May-apple (<i>Podophyllum peltatum</i>), Jack-in-the-pulpit (<i>Arisaema triphyl-lum</i>), and wild geranium (<i>Geranium maculatum</i>). This stand has been evaluated as of moderate floristic quality (Class II). Soils are a well-drained complex, including Hochheim loam, 6-12 percent and 12-20 percent slopes (eroded); Theresa silt loam, 6-12 percent slopes (eroded); and Sisson-Casco-Hochheim complex, 20-30 percent slopes. The Swink and Wilhelm Index is 41, while the SEWRPC community evaluation score is 30</p>	52.1	Southern mesic hardwoods	<p>Allow woods to mature; control deer population; search for, and eliminate, any garlic mustard (<i>Alliaria officinalis</i>) that becomes established.</p>
9	<p>This area consists of an ephemeral pond and bordering second-growth lowland hardwoods and lowland shrubs. It is located in a depression within Plant Community Area No. 8. There was standing water at the time of the initial survey in May; this had dried up by August. The white water-crowfoot (<i>Ranunculus longirostris</i>), flowering in May, provided a white covering of the water's surface. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Walkkill silt loam, poorly drained with a high water table and subject to flooding. The Swink and Wilhelm Index is 19, while the SEWRPC community evaluation score is 31</p>	1.2	Ephemeral pond and lowland hardwoods.	Maintain wooded buffer.
10	<p>This wetland consists of two separate ephemeral ponds and bordering second-growth lowland hardwoods and shrubs. It is located in depressions within Plant Community Area No. 8. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 18, while the SEWRPC community evaluation score is 31</p>	1.8	Ephemeral ponds and lowland hardwoods.	Maintain wooded buffer.
11	<p>This wetland consists of open water and shallow marsh. It is located in a depression within Plant Community Area No. 8. This stand has been evaluated as of moderate ecological quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 17, while the SEWRPC community evaluation score is 31</p>	0.7	Open water and shallow marsh.	Maintain wooded buffer.
12	<p>This wetland consists of shallow marsh, sedge meadow, and second-growth lowland hardwoods. It is located in a depression within Plant Community Area No. 14. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 24, while the SEWRPC community evaluation score is 31</p>	0.6	Shallow marsh, sedge meadow, and lowland hardwoods.	Maintain wooded buffer.
13	<p>This wetland consists of open water, fresh (wet) meadow, and second-growth lowland hardwoods. It is located in a depression within Plant Community Area No. 14. Both the white water-crowfoot and yellow water-crowfoot (<i>Ranunculus flabellaris</i>) provided color upon the water's surface. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 25, while the SEWRPC community evaluation score is 31</p>	1.9	Open water, fresh (wet) meadow, and lowland hardwoods.	Maintain wooded buffer.

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
14	This upland consists of old field with young, second-growth dry-mesic upland woods. Formerly grazed by dairy cows, the old field and woods are slowly reverting to closed woodland. Young, invading tree species include basswood, American elm (<i>Ulmus americana</i>), black cherry (<i>Prunus serotina</i>), and green ash (<i>Fraxinus pennsylvanica</i>). In places, the shrub layer of prickly-ash and staghorn sumac (<i>Rhus typhina</i>) is dense. The ground flora consists primarily of exotics and weedy natives typical of former pasture, with a few native woodland species present. Consequently, native species richness is low. This stand has been evaluated as of low or marginal floristic quality (Class III). Soils are a complex, including Theresa silt loam, 2-6 percent slopes, and Hochheim loam, 6-12 percent (eroded). The Swink and Wilhelm Index is 22, while the SEWRPC community evaluation score is 14	21.5	Southern mesic and dry-mesic hardwoods.	Allow to re-forest naturally.
15	This wetland complex consists of fresh (wet) meadow, old field, and young, second-growth southern lowland hardwoods. The stand lies adjacent to CTH Z, immediately north of the West Bend Town Hall. It has obviously been disturbed by the surrounding land use activities. Young American elms dominate the broken canopy, while the ground flora contains a mix of exotics and weedy natives. This stand has been evaluated as of moderate ecological quality (Class II). Soils are primarily poorly drained Pella silt loam. The Swink and Wilhelm Index is 25, while the SEWRPC community evaluation score is 24	.0	Fresh (wet) meadow and lowland hardwoods.	Allow succession to proceed naturally.
16	This moderate quality wetland consists of sedge meadow, shrub-carr, and second-growth southern lowland hardwoods. It lies adjacent to CTH Z, extending west to the base of an upland old field (Plant Community Area No. 17). The shrub layer is dense in places, dominated by beaked willow and boxelder (<i>Acer negundo</i>). This stand has been evaluated as of moderate floristic quality (Class II). Soils are Brookston silt loam, 0-3 percent slopes, that is periodically flooded and has a seasonally high water table, and Radford silt loam, 0-3 percent slopes, along drainageways. The Swink and Wilhelm Index is 32, while the SEWRPC community evaluation score is 28	5.8	Sedge meadow, shrub-carr, and lowland hardwoods.	Maintain existing conditions.
17	This old field is dominated by exotic and native species typical of old pastures. Some native woody species, such as black cherry (<i>Prunus serotina</i>), green ash, and quaking aspen (<i>Populus tremuloides</i>), are becoming established. Also present are some scattered plantings of conifers. This stand has been evaluated as of low or marginal floristic quality (Class III). The soil complex is a mix of Hochheim loam, 6-12 percent slopes (eroded); Theresa silt loam, 2-6 percent slopes (eroded); and Hochheim soils, 12-20 percent slopes, where severe erosion has exposed the brownish subsoil. The Swink and Wilhelm Index is 12, while the SEWRPC community evaluation score is 14	16.8	Southern mesic and dry-mesic hardwoods.	Allow to re-forest naturally.
18	This second-growth southern mesic woods occupies the crest and side slopes of a north-south trending esker just to the west of Riesch Road. A footpath runs the length of the esker. Though suffering from past grazing and selective cutting, the woods remains relatively rich in native species. The canopy is dominated by ironwood, sugar maple, and white ash, while the ground flora contains much curly-styled wood sedge (<i>Carex rosea</i>) and white snakeroot (<i>Eupatorium rugosum</i>). At the time of the May survey, several large individual trees had been toppled by a recent strong windstorm. This stand has been evaluated as of moderate floristic quality (Class II). Soils are predominantly of the Casco-Rodman complex, 20-35 percent slopes. These soils are thin and droughty, frequently with exposed pebbles and cobblestones. The Swink and Wilhelm Index is 45, while the SEWRPC community evaluation score is 37. Much of this area is owned by the Cedar Lakes Conservation Foundation. The stand is important in that it acts as a buffer to protect the Gilbert Lake watershed	10.8	Southern mesic hardwoods.	Control deer population; search for, and eliminate, any garlic mustard infestation.

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
19	This upland consists of regenerating second-growth southern mesic woods scattered throughout a matrix of old field. A maintained dirt road runs north-south through the western portion of the stand. Tree species are typical of native upland woods, but the ground flora of exotics and weedy natives is more characteristic of former pasture. This stand has been evaluated as of low or marginal floristic quality (Class III). Soils are of the Casco-Rodman complex, 20-35 percent slopes, and Fox silt loam, 2-6 percent slopes. The Swink and Wilhelm Index is 22, while the SEWRPC community evaluation score is 24. Much of this stand is owned by the Cedar Lakes Conservation Foundation, and is important in that it acts as a buffer to protect the Gilbert Lake watershed, especially as, over time, the canopy matures and becomes more complete	17.6	Southern mesic hardwoods*	Control deer population; allow to reforest naturally.
20	This wetland complex consists of mature tamarack swamp, shrub-carr, and second-growth southern lowland hardwoods. Included in this area are several springs, seepage areas, and streams which feed Gilbert Lake. The springs are the source of extremely clear, deep-water pools. The north-south dirt roadway mentioned under Plant Community Area 19 borders the east side of this community. This high quality area is identified in the Commission's Planning Report No. 42 as "Gilbert Lake Tamarack Swamp," ranked as a natural area of county or regional significance (NA-2). The flora is very species-rich; over 130 have been identified to date. It includes a number of species with more northern affinities, such as three-leaved Solomon's plume, northern bog orchid, yellow birch (<i>Betula allegheniensis</i>), bunchberry, Canada blueberry (<i>Vaccinium myrtilloides</i>), and red honeysuckle (<i>Lonicera dioica</i>). Also observed were two State-designated Special Concern species: yellow lady's-slipper and showy lady's-slipper (<i>Cypripedium reginae</i>). Poison sumac is common in the shrub layer. The circum-neutral nature of the substrate is attested to by the presence of a number of calciphiles, such as swamp goldenrod, swamp thistle, swamp lousewort, and sage willow. A future threat is posed by the presence of a number of stems of the exotic glossy buckthorn, which has the capability of dominating the understory to the detriment of natives. A search should be conducted and the species eradicated. This stand has been evaluated as of good or high floristic quality (Class I). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 74, while the SEWRPC community evaluation score is 64	25.4	Tamarack swamp, shrub-carr, and lowland hardwoods.	Control deer population; search for, and eliminate, glossy buckthorn; minimize traffic on bordering dirt road.
21	This wetland consists of a small lake and bordering deep and shallow marsh. It is located at the corner of STH 33 and Riesch Road, and drains southward into the Gilbert Lake—Big Cedar Lake basin. Apparently, this is an artificially enhanced lake, since the Allenton 7.5 minute USGS topographic map indicates only a wetland symbol, not open water, present in 1971. This stand has been evaluated as of moderate floristic quality (Class II). The USDA Soil Survey shows primarily Wallkill silt loam, with Radford silt loam, 0-3 percent slopes, and Mayville silt loam, 2-6 percent slopes, around the perimeter. The Swink and Wilhelm Index is 26, while the SEWRPC community evaluation score is 36	4.0	Lake and deep and shallow marsh	Minimize development around perimeter.
22	This area consists of a woodland pond located in a deep kettle hole at the northern border of Plant Community No. 18. Its steep sides offer little opportunity for wetland species to become established; consequently, only two species were tallied. This is presumably an artificial impoundment, as the 1971 Allenton 7.5 minute USGS topographic map does not show any body of water, and the USDA Soil Survey does not indicate wetland soils. This stand has been evaluated as of low or marginal floristic quality (Class III), The Swink and Wilhelm Index is 6, while the SEWRPC community evaluation score is 31	1.9	Woodland pond	Maintain wooded buffer.
23	This area consists of an ephemeral woodland pond and shallow marsh located in a deep kettle hole within Plant Community Area No. 18. There was standing water at the time of the survey in June. This stand has been evaluated as of moderate floristic quality (Class II). Soils are not indicated on the USDA Soil Survey. The Swink and Wilhelm Index is 19, while the SEWRPC community evaluation score is 31	0.2	Woodland pond and shallow marsh	Maintain wooded buffer.

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
24	This area consists of an ephemeral woodland pond and shallow marsh located in a deep kettle hole within Plant Community No. 18. There was standing water at the time of the survey in June. This stand has been evaluated as of moderate floristic quality (Class II). Soils are not indicated on the USDA Soil Survey. The Swink and Wilhelm Index is 22, while the SEWRPC community evaluation score is 31	0.6	Woodland pond and shallow marsh	Maintain wooded buffer.
25	This wetland consists of an open sedge mat at the north end of Gilbert Lake. Sedges, rushes, bulrushes, and cattails dominate the vegetation, but some woody species, such as tamarack, willows, bog birch, and poison sumac have become established. The substrate is unsure and "potholes" are frequent. This stand has been evaluated as of good or high floristic quality (Class I). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 34, while the SEWRPC community evaluation score is 54. Part of this area is owned by the Cedar Lakes Conservation Foundation	1.0	Sedge mat	Eliminate glossy buckthorn.
26	This wetland complex consists of second-growth southern lowland hardwoods, shrub-carr, and tamarack relict. Seepage areas are common throughout. This area is more disturbed and of lower quality than the Commission-designated natural area (Plant Community Area No. 20) just to the south, but it retains its importance by protecting some of the water sources of Gilbert Lake. The seepages and slowly-moving boggy streams make foot passage difficult to impossible. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat and Drummer silt loam, gravelly substratum, that is periodically flooded. The Swink and Wilhelm Index is 33, while the SEWRPC community evaluation score is 32. Part of this area is owned by the Cedar Lakes Conservation Foundation	8.2	Lowland hard woods, shrub-carr, and tamarack swamp	Allow to mature and recover from past disturbance; restrict runoff from adjacent uplands; eliminate glossy buckthorn.
27	This combination of sedge meadow and fresh (wet) meadow is recovering from past agricultural activities. A drainageway feeding Gilbert Lake passes through the area. This stand is dominated by a number of sedges, rushes, and other herbaceous wetland species, plus remnants of former agriculture. Of note is the large amount of Greene's rush (<i>Juncus greenii</i>). This stand has been evaluated as of low or marginal floristic quality (Class III) Soils are primarily Drummer silt loam, gravelly substratum. The Swink and Wilhelm Index is 21, while the SEWRPC community evaluation score is 24	3.2	Sedge meadow and fresh (wet) meadow	Maintain existing conditions.
28	This wetland complex consists of good quality acidic northern bog, tamarack swamp, and bordering shrub-carr located in a basin within the upland forest matrix. Around the perimeter is a shallow, mucky moat making passage to the interior difficult. An outlet drains into the forested wetlands to the south. This area is unique among those in the Gilbert Lake Project Area because of the acidic conditions and consequent presence of species typical of northern bogs, such as leatherleaf (<i>Chamaedaphne calyculata</i>), blueberry (<i>Vaccinium angustifolium</i>), cranberries (<i>V. macrocarpon</i> and <i>V. oxycoccos</i>), huckleberry (<i>Gaylussacia baccata</i>), cotton-grass (<i>Eriophorum angustifolium</i>), mocassin flower (<i>Cypripedium acaule</i>), snake-mouth orchid (<i>Pogonia ophioglossoides</i>), bog rosemary, and two insectivorous species—sundew and pitcher plant (<i>Sarracenia purpurea</i>). Widely scattered small-to medium-size tamaracks are the dominant trees within the bog; beneath is a carpet of sphagnum moss (<i>Sphagnum</i> spp.). Small poison sumac stems are scattered throughout. There is no open water. This stand has been evaluated as of good or high floristic quality (Class I). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 64, while the SEWRPC community evaluation score is 84	5.2	Northern bog, tamarack swamp, and shrub-carr	Control deer population; eliminate glossy buckthorn; restrict nutrient runoff from adjacent, developed uplands; restrict foot traffic that could affect native species and allow exotics and weedy natives to invade.

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
29	<p>This wetland complex, consisting of bog, shrub-carr, and sedge meadow, forms a relatively narrow band of herbaceous and low shrub vegetation between the east shore of Gilbert Lake and the swamp forest to the interior. This area also extends along the northern bay of Big Cedar Lake. Springs and seepage areas are common, making travel difficult. Dominant species include, in addition to the numerous sedge species, marsh fern (<u><i>Thelypteris palustris</i></u>), dwarf raspberry (<u><i>Rubus pubescens</i></u>), bog birch, and poison sumac. A good population of the showy lady's-slipper, a State-designated Special Concern species, was observed. Another Special Concern species is fen bluejoint grass (<u><i>Calamagrostis inexpansa</i></u>). Occasional pitcher plants and sundews were encountered, as was bog rosemary. Northern fly honeysuckle (<u><i>Lonicera villosa</i></u>), a northern species very rare in southern Wisconsin, was observed here; this is believed to be a county record. Two boat launches extend through this community to the lake, but their effect appears to be limited to their immediate surroundings. This stand has been evaluated as of good or high floristic quality (Class I). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 60, while the SEWRPC community evaluation score is 59</p>	6.5	Bog, shrub-carr, and sedge meadow	Control deer population; eliminate glossy buckthorn; prevent establishment of more boat docks.
30	<p>This wetland complex consists of willow thicket, open water, and second-growth southern lowland hardwoods. It is bisected by Riesch Road. It receives water from the north (see Plant Community Area No. 21) and apparently drains into the wetland complex at the north end of Big Cedar Lake. Black willow (<u><i>Salix nigra</i></u>) and American elm dominate the scattered tree layer, while the exotic reed canary grass (<u><i>Phalaris arundinacea</i></u>) is common among the herbs. This pond is apparently of recent origin, as the 1971 Allenton 7.5 minute USGS topographic map merely indicates a wetland symbol, not open water. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 28, while the SEWRPC community evaluation score is 24</p>	3.1	Open water, willow thicket, and lowland hardwoods	Maintain existing conditions.
31	<p>This wetland consists of southern tamarack swamp and shrub-carr. The tree stratum is dominated by tamaracks and yellow birch, while poison sumac is common in the shrub layer. The rich ground flora includes spikenard (<u><i>Aralia racemosa</i></u>), pitcher plant, many sedges, blue-bead lily, and bunchberry. Three orchid species were observed—northern bog orchid, green twayblade, and showy lady's-slipper, a State-designated Special Concern species. Also of note is the State-designated Threatened slender bog arrow-grass (<u><i>Triglochin palustre</i></u>). This stand has been evaluated as of good or high floristic quality (Class I). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 72, while the SEWRPC community evaluation score is 56. This area protects much of the drainage into Gilbert Lake</p>	20.0	Tamarack swamp and shrub-carr	Control deer population; eliminate glossy buckthorn.
32	<p>This wetland consists of second-growth southern lowland hardwood swamp with areas of open water. It is located partially within a much larger old field—disturbed woods complex (Plant Community No. 33). Trees surrounding the pond include American elm, green ash, and black willow. This stand has been evaluated as of low or marginal floristic quality (Class III). Soils are Walkkill silt loam. The Swink and Wilhelm Index is 8, while the SEWRPC community evaluation score is 24</p>	0.3	Lowland hardwoods and open water	Maintain wooded buffer.

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
33	This upland consists of old field with scattered patches of second-growth southern dry-mesic woods. Most of the herbs are typical of old pastures, such as smooth brome grass (<i>Bromus inermis</i>), Canada bluegrass (<i>Poa compressa</i>), Timothy (<i>Phleum pratense</i>), clovers (<i>Trifolium</i> spp.), sweet-clovers (<i>Melilotus alba</i> and <i>M. officinalis</i>), and alfalfa (<i>Medicago sativa</i>). Trees and shrubs are beginning to invade the old fields. The best patch of woodland is located on steep slopes around depressions on the east side of the area; here the dominant trees are sugar maple, basswood, ironwood, and shagbark hickory (<i>Carya ovata</i>), but the ground flora is very sparse. Of interest are several patches of purple twayblade (<i>Liparis lilifolia</i>). This stand has been evaluated as of low or marginal floristic quality (Class III). Soils are a well-drained upland complex of Juneau silt loam, 1-3 percent slopes; Hochheim loam, 6-12 percent slopes (eroded); and Hochheim soils, 12-20 percent slopes (severely eroded). The Swink and Wilhelm Index is 30, while the SEWRPC community evaluation score is 14	24.9	Southern dry-mesic hardwoods	Allow woods to expand and regenerate naturally.
34	This area is an isolated low upland "island" of southern mesic hardwoods located within the lowland matrix of tamarack swamp and lowland hardwoods of Plant Community Areas Nos. 31 and 37. It is dominated by species typical of mesic woods, such as sugar maple, basswood, paper birch, and large-leaf aster (<i>Aster macrophyllus</i>). This stand has been evaluated as of moderate floristic quality (Class II). Soils are Fabius loam, 1-3 percent slopes. The Swink and Wilhelm Index is 40, while the SEWRPC community evaluation score is 42	5.8	Southern mesic hardwoods	Control deer population.
35	This upland consists of old field and disturbed second-growth mesic and dry-mesic woods. Formerly grazed by dairy cows, this area is slowly reverting to upland woods while retaining many of the species characteristic of old pastures. American elm and aspens dominate the tree stratum; in places, prickly-ash and smooth sumac (<i>Rhus glabra</i>) provide a dense thicket. The native ground flora is rather depauperate. However, note should be made of two orchid species present in low numbers—green twayblade and large yellow lady's-slipper (<i>Cypripedium pubescens</i>). Over time, this area should revert to closed canopy forest, albeit with a limited flora. This stand has been evaluated as of low or marginal floristic quality (Class III). Soils are an upland complex of Theresa silt loam, 2-6 percent slopes; Theresa silt loam, 6-12 percent slopes (eroded); and Hochheim loam, 12-20 percent slopes (eroded). The Swink and Wilhelm Index is 26, while the SEWRPC community evaluation score is 14	23.6	Southern mesic and dry-mesic hardwoods	Allow to re-forest naturally.
36	This upland consists of old field with patches of disturbed second-growth mesic and dry-mesic woods extending down protected slopes. A maintained dirt road, a driveway, and a residence fragment the area. Most of the herbs are typical of old fields and former pasture. Trees are mostly successional, such as redcedar (<i>Juniperus virginiana</i>) and aspens, with a few oaks (<i>Quercus alba</i> and <i>Q. rubra</i>), basswoods, and sugar maples interspersed. The native ground flora is depauperate, even beneath the native trees. This stand has been evaluated as of low or marginal floristic quality (Class III). Soils are mostly Casco-Rodman complex, 20-35 percent slopes. The Swink and Wilhelm Index is 22, while the SEWRPC community evaluation score is 14	10.8	Southern mesic and dry-mesic hardwoods	Allow to re-forest naturally.
37	This wetland consists of southern tamarack swamp, shrub-carr, and second-growth lowland hardwoods. This area abuts the northern bay of Cedar Lake and the channel to Gilbert Lake. Floristically, it is similar to the other southern tamarack-dominated swamps in the project boundary. There is a good complement of native species, including several with northern affinities. Other common species include beaked willow, yellow birch, tag alder, and black ash. The standing water, thick shrub layer, and weak vegetation mat make passage difficult. This stand has been evaluated as of good or high floristic quality (Class I). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 71, while the SEWRPC community evaluation score is 48	23.7	Tamarack swamp, shrub-carr, and lowland hardwoods	Control deer population; eliminate glossy buckthorn; limit use of, and runoff from, adjacent dirt access roads.

Table 5 (continued)

Plant Community Area Number	Plant Community Description	Size (Acres)	Recommended Future Goal	Management Recommendations
38	This wetland complex is located along the northwest shore of Gilbert Lake. It consists of bog, shrub-carr, shallow marsh, sedge meadow, and tamarack swamp. Dominant species include tamarack, bog birch, cattail, aquatic sedge (<i>Carex aquatilis</i>), and, along the lake edge, water-willow. The area is very wet and footing is treacherous. Of note are green twayblade and the State-Threatened slender bog arrow-grass. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Houghton mucky peat. The Swink and Wilhelm Index is 32, while the SEWRPC community evaluation score is 57	5.0	Bog, shrub-carr, sedge meadow, and tamarack swamp	Monitor for exotic species.
39	This area encompasses Gilbert Lake, a shallow lake and deep marsh of high quality. The deepest part of the lake, at the northern end, is about 6 feet. Submergent, floating, and emergent aquatic plants are common, including hard-stem bulrush (<i>Scirpus acutus</i>), yellow water lily (<i>Nuphar advena</i>), white water lily (<i>Nymphaea tuberosa</i>), various species of pondweed (<i>Potamogeton</i> spp.), and, along the lake edge, water-willow. A channel has been maintained through the vegetation to provide access for boats. The stand has been evaluated as of good or high ecological quality (Class I). The Swink and Wilhelm Index is 33, while the SEWRPC community evaluation score is 77	43.2	Shallow lake and deep marsh	Prohibit further shore development; retain current restrictions on lake use; monitor lake shore for purple loosestrife (<i>Lythrum salicaria</i>) and eliminate immediately.
40	This area consists of second-growth mesic woods with areas of lowland hardwoods. The woods have been disturbed by typical farmland activities, including dumping, selective cutting, and a dirt roadway. Dominant trees include sugar maple, basswood, black cherry, and red oak. The area is bounded on the south and east by agricultural fields, and by a large wetland (Plant Community Area No. 7) on the north and west. Overall native species diversity is relatively low. This stand has been evaluated as of moderate floristic quality (Class II). Soils are Brookston silt loam, 0-3 percent slopes; Hochheim loam, 2-6 percent slopes (eroded); and Hochheim loam, 6-12 percent (eroded). The Swink and Wilhelm Index is 41, while the SEWRPC community evaluation score is 28	8.8	Southern mesic hardwoods and lowland hardwoods	Retain as wetland buffer; eliminate garlic mustard, (<i>Alliaria officinalis</i>)

includes marshes, sedge meadows and shores near shallow open water. It requires cold spring water for breeding and remains near springs through summer. It is extremely sensitive to pollution and changes in water quality.

Birds

The black tern (*Chlidonias niger*), identified as a special concern species in Wisconsin, is an insectivorous bird of ponds and deep marshes that is slowly declining in numbers.

Fish

The pugnose shiner (*Notropis anogenus*), identified as a threatened species in Wisconsin, is found in only about 24 localities in the State. It has been extirpated or declining over much of its original range. Its decline appears to be a response to accelerated eutrophication of southeastern Wisconsin waters. The pugnose shiner prefers quiet, clear shallows in glacial lakes or slow-moving streams with abundant aquatic vegetation. It is extremely intolerant of turbidity and siltation.

The lake chubsucker (*Erimyzon sucetta*), identified as a special concern species in Wisconsin, is confined to the southeastern part of the State, where it has never been common. Its habitat includes lakes and slow-moving streams, often with dense vegetation. It is highly intolerant of siltation and sedimentation within its habitat.

Plants

The slender bog arrow-grass (Triglochin palustre), identified as a threatened species in Wisconsin, is a small, grasslike plant that prefers calcareous sites, either marly—as seen in some fens—or wet, sandy habitats, such as beach swales or wet prairies. In Wisconsin, this threatened plant is restricted to the eastern counties.

Cuckoo flower (Cardamine pratensis), identified as a special concern species in Wisconsin, is a circumpolar species of bogs and swamps that is occasionally found in eastern Wisconsin.

The small yellow lady's-slipper (Cypripedium parviflorum), identified as a special concern species in Wisconsin, is less common than the large yellow lady's-slipper orchid. It is found in open calcareous swales, bogs, and wet woods, mostly in southeastern and northwestern Wisconsin, where such suitable habitats are rapidly disappearing.

The showy lady's-slipper (Cypripedium reginae), identified as a special concern species in Wisconsin, prefers conifer swamps and bogs, usually alkaline in nature. With the largest and probably the showiest flower of any of the Wisconsin orchids, it is overly susceptible to picking and digging. It inhabits open, relative sunny tamarack swamps. In the absence of disturbance, these swamps mature, producing dense shade to which the orchid is intolerant.

NATURAL HABITAT MANAGEMENT NEEDS

Identification and protection of natural communities alone will not assure the perpetuation of the natural attributes of the sites concerned. The basic ecological processes that have helped shape natural areas have often been disrupted by human activity—if not in the areas concerned, then in the surrounding environs of those areas. Without proper management, natural areas may be significantly altered over time, with the resultant loss of natural values. Therefore, the areas must be managed to ensure that native species and natural communities can flourish.

The management of natural areas and associated habitats may be defined as any activity directed toward maintaining a given condition in the plant or animal populations concerned or in their habitats in accordance with a preservation plan. Here, management is intended to allow natural processes to function as fully as possible and to minimize the impacts of human-induced changes. Management should thus, ideally, restore and maintain conditions that will assure the long-term preservation of native species and communities. Human influence has interrupted many of the natural processes which, from a human perspective, may seem to be destructive, but are, in fact, vital forces in the formation and continuation of natural communities. For example, natural flooding of wetlands reduces the density of trees and shrubs. Where a regular flooding regime has been controlled by artificial structures such as dams, ditches, and dikes, the absence of a seasonal flooding regime may lead to wetlands overgrown with woody plants, frequently including exotic species. Naturally fluctuating water levels may aid plant reproduction in wetlands, but excessive water manipulation may destroy natural vegetation.

For some community types, a policy of noninterference, or passive management, may be sufficient. Such an approach generally is adequate for such self-sustaining types as the upland mesic forest, which requires only protection from outside forces for continued existence. In most cases, however, human activities may continue. Therefore, for the majority of natural community types, some form of active management is essential for long-term protection of the ecological systems concerned; such management is an important tool to help preserve biodiversity.

At Gilbert Lake, management measures should be designed to support the plant and animal communities for which the protection of the natural area is being sought. This involves preserving the integrity of the component communities, that is, their native species complement, vegetational structure, and ecological processes. A problem is presented by the fact that biological communities are constantly changing through ecological succession. This process may cause the desirable features for which a natural area was originally protected to disappear. In certain cases, then, natural succession must be retarded to allow particular species to exist as does, for example, the showy lady's-slipper orchid in semi-open tamarack swamps.

MANAGEMENT NEEDS

The Regional Planning Commission considers pressure from residential development on the natural resource base as a major issue in Southeastern Wisconsin. All lands constituting the upland fringe within the Gilbert Lake Project Area are zoned for construction of single family residences: A-1 residential. It is probable that lands not protected will one day become subdivided. Considering the proximity of the lake to the majority of Wisconsin's population, the possibility of overuse in the form of fishing, hunting, or excessive foot and boat traffic is possible. Trespass is a concern of private landowners in the area.

The shoreline controls erosion; maintains water quality by assimilating excess nutrients; and provides spawning habitat for gamefish. Shorelands within 300 feet of either lake are also affected by county shoreland zoning. Without protection through direct acquisition, such as by the Department of Natural Resources or the Cedar Lakes Conservation Foundation, the remaining unprotected wetlands and uplands will be protected from development only by landowner decisions and local regulations through zoning. Zoning will not, however, prevent development along the wetland-upland interface. Moreover, when dwellings are constructed, the wetland fringe may be viewed as an impediment to lake access.

In general, management of the plant community areas that constitute the Gilbert Lake Project Area should involve the following approaches:

- 1) control of local deer population
- 2) control of exotic plant species
- 3) preserve upland wooded cover to act as buffer for wetlands and lake
- 4) revegetation of disturbed plant community areas.

IMPACT OF LOCAL DEER POPULATION

There is increasing concern that the artificially maintained high deer density is adversely affecting Wisconsin's forests. Deer populations are larger today than those of pre-settlement conditions, due to favorable habitat changes and elimination of large predators. As a result, there is the danger of an ecological imbalance threatening natural quality. High deer densities can have a severe impact on some plant species and natural communities. In many areas, it has been shown that forest regeneration has been reduced by deer browsing; in some areas, numbers are so great that browsing has eliminated local populations of some plant species and reduced reproduction of oak and maple. In general, plant diversity has been shown to be reduced. Selective twig browsing could shift tree species composition of the forest understory. Deer may change the structure of plant communities in areas where deer use is concentrated. High densities of deer have caused spring ephemerals to disappear, destroyed woody saplings, and created extensive browse lines. The severe decline of orchids (such as *Cypripedium* spp.) has been attributed to overgrazing by deer. Deer have also been shown to negatively affect cover for ground nesting birds. In addition, forest recovery may be slow in areas where deer numbers are high.

CONTROL OF EXOTIC PLANT SPECIES

Invasive, exotic plant species have become recognized as a major threat to the integrity of natural areas. Exotic species are nonnative species that have become naturalized, or established in an area and capable of reproducing. Such species can aggressively invade natural plant communities. In extreme situations, they displace native species, thereby reducing biodiversity and simplifying community structure. Rare native species are particularly at risk. Introduced species may compete directly with native species for light, water, nutrients, and space, and indirectly by altering the food web or the physical environment. Native animal species may also suffer as a result.

Many species-specific control measures have been developed. Whatever the method, the control efforts must balance the resultant improvement in the natural area with damage done by the control method itself, while also being cost-effective and having a minimal impact on the environment. Certain control measures are intrinsically more cost-effective than others. Whichever appropriate control measures are used, they must be site-specific, and they must depend upon the community type and the exotic species involved.

This section discusses some of the measures suitable to control the major exotic species within the Gilbert Lake Project Area. Much of the background information concerning management techniques, especially chemical control methods, has been taken from "Wisconsin Manual of Control Recommendations for Ecologically Invasive Plants," Bureau of Endangered Resources, Wisconsin Department of Natural Resources, Madison, Wisconsin, May, 1997. While the control recommendations have been reported to work, success is not guaranteed. Different techniques may have to be attempted to determine which work best under certain conditions. It should be emphasized that prevention through maintenance of healthy ecosystems, in conjunction with early detection, are always the best, most economical, and least ecologically injurious methods of control.

Methods of Prevention and Control

Methods designed to prevent or control invasive species may be separated into four categories: cultural, biological, mechanical, and chemical. Determination of the most suitable control method will depend on several variables, including the species involved, the nature of the invasion, surrounding environmental conditions, and the management objectives. Several control methods may be combined for best results. Whatever the control method, it should be tailored to fit the environment, the targeted plant species, and the management goals. Because disturbance provides fertile ground for invasive species, it should be minimized.

Cultural Control

Cultural control involves the modification of human behavior both within and around the natural area. Recreational and economic land uses that contribute to the introduction and proliferation of invasive species should be discouraged. A monitoring program should be implemented to identify species invasions before they become a significant problem.

Mechanical Control

Mechanical methods include prescribed burning, mowing, cutting, girdling, and other methods that physically remove the target species. Control methods that imitate natural processes (such as prescribed burning in a fire-adapted community) are preferable to other tactics. However, since none of the plant community types in the Gilbert Lake Project Area is considered to be fire-adapted, burning has not been recommended as a control method in any plant community area.

Chemical Control

Chemical use may be justified when invasive species are severely degrading the natural community, and when effective nonchemical control methods are not known or do not adequately curb invasive species populations.

General Herbicide Information

Neither SEWRPC nor the Wisconsin Department of Natural Resources endorses any particular herbicide or manufacturer; therefore, trade names are usually not used in the control recommendations. The chemicals mentioned in the text are listed in Table 6. Examples of trade names associated with each chemical are provided in the table, although other products with similar formulations may be available. Mixture percentages listed in the report refer to percentage of active ingredient, not percentage of herbicide straight from the container. Calculate the required mixture based on the percentage of active ingredient listed on the label.

Some herbicides come in amine and ester formulations. Amine formulations are less volatile (likely to vaporize and drift) than ester formulations. As ester compounds generally have a higher volatility, any use during warmer weather months should involve extreme caution to avoid damaging nontarget plants or endangering other humans. Esters are best used during the late fall, winter, or very early spring (before buds break) when temperatures are cool. Ester formulations used at this time are more effective than amines, as they are more readily absorbed by plant tissue.

Table 6

HERBICIDE INFORMATION

Chemical Name	Trade Name	Formulation	Application	Comments
Glyphosate	Roundup, Accord	Water Soluble	Nonselective	For foliar, cut stump, basal bark; minimal soil residual
Glyphosate (aquatic)	Rodeo	Water Soluble	Nonselective, for aquatic environments	For foliar spray, cut stump, basal bark; minimal soil residual
Triclopyr	Garlon 3A	Water Soluble	Broadleaf-specific	For foliar, cut stump, basal bark
Fosamine	Krenite	Water Soluble	Diocot-specific bud-inhibitor	Foliar spray

By law, herbicides must always be applied according to label instructions. In some instances, recommendations in this section suggest a concentration lower than that recommended on product labeling. It is legal to dilute herbicides with an appropriate dilutant—refer to the label. Herbicide application at a concentration lower than that recommended on the label is recommended herein based on reported successes in the field. However, this does not ensure that a lower concentration will be effective in every situation.

General Application Procedures

Herbicides are most often either sprayed, brushed, or wicked onto foliage, basal bark, or cut stumps or stems of target plants. Always apply herbicide working away from areas already treated. Viable native plants will be important in recolonizing the site after invasive plants are controlled. Therefore, to avoid contacting nontarget plants, do not over-apply chemicals to the point of run-off from foliage, stems, or stumps. Do not spray chemicals under windy conditions.

Foliar spot applications of herbicide should be done uniformly with a hand sprayer, sponge applicator, or wick to ensure that the entire leaf is wetted. Spray application will usually involve mixing a surfactant/dispersal agent with the herbicide—follow label instructions. Colorants or marker dyes may also be added to assist in proper herbicide application, as per label instructions.

When applying herbicide to cut stumps, apply soon after cutting. Trees and shrubs should generally be cut at the end of the growing season so that chemicals will be actively absorbed into the stump, although many species may be treated in winter—follow specific suggestions for individual species. Basal bark application should encircle the trunk within six inches to 12 inches of the base, and normally consists of a band of herbicide approximately six inches wide.

Herbicide Licensing and Certification

The State of Wisconsin in many cases requires individuals involved in the application of pesticides to be certified and licensed. Certification involves learning about and passing a written exam on the safe and effective handling and application of pesticides in specific use categories. Certification alone does not qualify an individual to apply all pesticides. An annual license must be obtained in most cases, as outlined below.

Pesticides are categorized as either Restricted-Use or General-Use, and may be differentiated by labeling on the container. Wisconsin State certification and licensing requirements differ depending on the status of the applicator. Any individual who purchases, mixes, loads, applies, disposes, or directs the use of a Restricted-Use pesticide must be certified and licensed.

Any person involved in the application of pesticides to land other than their own is by law considered a **Commercial Applicator**. An individual applying pesticides for a customer who is charged for the application is considered a **Commercial Applicator For Hire**. Commercial Applicators For Hire must be certified and licensed for both Restricted-Use and General-Use pesticides.

An individual applying pesticides to land controlled by that individual or his/her employer and not receiving compensation beyond normal wages is considered a **Commercial Applicator Not-For-Hire**. This category includes almost all employees of government or educational institutions, and individuals volunteering for nonprofit organizations and government agencies. Commercial Applicators Not-For-Hire must be certified and licensed for any Restricted-Use pesticides that are applied. Although Commercial Applicators Not-For-Hire may apply General-Use pesticides without certification and licensing, the Wisconsin Department of Extension strongly encourages certification for anyone who uses pesticides. In this case, licensing would not be necessary.

For more information on pesticide certification and licensing, contact:

Program Manager, Pesticide Certification and Licensing
Wisconsin Department of Agriculture, Trade, and Consumer Protection
P.O. Box 8911, Madison, Wisconsin 53708
Office: (608) 224-4551 or 224-4548
FAX: (608) 224-4656

HERBICIDE USE PROCEDURES

Transportation and Storage

1. Herbicide concentrations must be stored in their original container in good condition, with an attached legible label, preferably in locked storage.
2. Do not store herbicides with food, feed, or personal protective equipment. Transport secured containers outside the passenger compartment of a vehicle.
3. Always carry spill response equipment in the event of an accidental spill during transportation or use.

Mixing and Loading Procedures

1. Before using any pesticide, **READ THE ENTIRE LABEL FIRST!** The label is a legal document which you must read and obey. The pesticide label provides important information such as: Precautionary Statements, Directions for Use, and Environmental Hazards.
2. When mixing or loading herbicides you are required to wear protective clothing to reduce your risk of exposure. Read the label of the herbicide(s) you are mixing for the Personal Protective Equipment (PPE) required. The following PPE is required for mixing all concentrate pesticides in addition to any other PPE listed on the label:
 - long pants
 - long-sleeved shirt
 - goggles
 - rubber or neoprene boots and gloves
 - either a chemical-resistant apron, coveralls, or rainsuit
3. Keep drinking water, decontamination water, and rinsate and mixing water in separate containers.
4. Mix and load on an impermeable surface such as concrete or blacktop, or by placing the application equipment into a chemical-resistant tub or basin for containment. Do not mix within 100 feet of a well, storm drain, or surface water. Should a spill occur, recover it immediately and report it to the appropriate spill response agency. In Wisconsin, the Emergency Response Number for pesticide incidents is answered by the DNR. **SPILL HOTLINE: (800) 943-0003**

Pesticide Application and PPE

1. Use appropriate PPE—READ THE LABEL!
2. Wash your hands frequently during pesticide applications. Always wash your hands before eating or smoking. Avoid touching your bare skin with contaminated equipment or PPE.
3. Try to use all of the herbicide solution that you mix. Storage of mixed solutions can reduce the effectiveness of some herbicides. If you must store mixed solutions, use within a few days, storing in an appropriate container labeled with the common name, concentration, EPA registration number, and the words, "DILUTE PESTICIDE SOLUTION."

Equipment Clean-up

1. All empty pesticide concentrate containers must be triple-rinsed, using 10 percent of the container volume for each rinse. Empty the container completely and puncture to prevent other use. The rinsate should be used for future mixes. Unless it is stated on the label or requested by your waste disposal contractor, "empty, triple-rinsed, clean pesticide containers" can be disposed of through normal waste disposal channels in sanitary landfills. Pesticide containers cannot be recycled unless it is through an agrichemical container recycle program.
2. At the end of the day, all PPE should be washed with mild soap and water. This water can be used with future mixes or sprayed through equipment as a rinse treatment.
3. Shower and change into clean clothing as soon as possible following application duties. Do not wear application clothing again without washing it first.
4. If concentrate is spilled on your clothing, discard the items. Wash pesticide application clothing separate from other laundry.

EXOTIC PLANT SPECIES IN THE GILBERT LAKE PROJECT AREA

Table 7 lists the 62 exotic, nonnative plant species that were observed in the Gilbert Lake Project Area in 1998, along with their frequencies of occurrence. Six of these—Norway spruce (*Picea abies*), white spruce (*Picea glauca*), red pine (*Pinus resinosa*), white pine (*Pinus strobus*), lilac (*Syringa vulgaris*), and white cedar (*Thuja occidentalis*)—were planted in situ and are not reproducing. Thirty-one other species were recorded in three or fewer plant community areas. Only seven species occurred in as many as 11 plant community areas. The following section and Table 8 discuss some of the more serious (at least potentially) invasive species.

Glossy Buckthorn

Glossy buckthorn (*Rhamnus frangula*) is a serious invader of fens, bogs, and sedge meadows, often forming impenetrable thickets and shading out native herbaceous species. At high densities it tends to simplify the vegetation, decreasing biodiversity. During 1998, it was found in only 8, or 20 percent, of the plant community areas, but these include the highest-quality sites in the Project Area. Also, while it was not overly abundant in any one Gilbert Lake plant community area, several of the PCA's have a number of maturing individuals which will cause future problems once they reach fruit-bearing age. Once this occurs, recruitment can rely on an internal seed source, rather than random dispersal by birds bringing seed in from outside. There are other exotic species that are more frequent in the project area, but they are either found more commonly in disturbed, low-quality PCAs, or else are unlikely to become problems in higher quality areas. The time to control glossy buckthorn at Gilbert Lake is now, while numbers are relatively low, not in the future when the problem has gotten out of hand.

Common Buckthorn

Common, or European, buckthorn (*Rhamnus cathartica*) is a tall shrub which may form a dense, thick understory layer, especially in the more-or-less open and disturbed oak woods and savannas in southern Wisconsin. While it is most abundant south of the Tension Zone, it still occurs in 11 (27.5 percent) of the 40 Gilbert Lake plant community

Table 7

EXOTIC PLANT SPECIES OF THE GILBERT LAKE PROJECT AREA

Species (N = 61)	Frequency ^a	Percent	
		Frequency ^a	Frequency ^b
<u>Phalaris arundinacea</u> (reed canary grass)	18	45.0	
<u>Taraxacum officinale</u> (dandelion)	17	42.5	
<u>Arctium minus</u> (burdock)	13	32.5	
<u>Lonicera x bella</u> (shrub honeysuckles)	13	32.5	
<u>Solanum dulcamara</u> (deadly nightshade)	13	32.5	
<u>Plantago major</u> (plantain)	11	27.5	
<u>Rhamnus cathartica</u> (common buckthorn)	11	27.5	
<u>Achillea millefolium</u> (yarrow)	9	22.5	
<u>Rhamnus frangula</u> (glossy buckthorn)	8	20.0	
<u>Bromus inermis</u> (smooth brome)	6	15.0	
<u>Cirsium vulgare</u> (bull thistle)	6	15.0	
<u>Linaria vulgaris</u> (butter-and-eggs)	6	15.0	
<u>Medicago lupulina</u> (black medick)	6	15.0	
<u>Trifolium pratense</u> (red clover)	6	15.0	
<u>Barbarea vulgaris</u> (winter cress)	5	12.5	
<u>Cirsium arvense</u> (Canada thistle)	5	12.5	
<u>Lactuca serriola</u> (prickly lettuce)	5	12.5	
<u>Medicago sativa</u> (alfalfa)	5	12.5	
<u>Melilotus officinalis</u> (yellow sweet clover)	5	12.5	
<u>Poa compressa</u> (Canada bluegrass)	5	12.5	
<u>Tragopogon pratensis</u> (goat's-beard)	5	12.5	
<u>Epipactis helleborine</u> (helleborine)	4	10.0	
<u>Nasturtium officinale</u> (watercress)	4	10.0	
<u>Phelum pratense</u> (Timothy)	4	10.0	
<u>Trifolium repens</u> (white clover)	4	10.0	
<u>Viburnum opulus</u> (European highbush-cranberry)	4	10.0	
<u>Convolvulus arvensis</u> (field bindweed)	3	7.5	
<u>Leonurus cardiaca</u> (motherwort)	3	7.5	
<u>Picea abies</u> (Norway spruce)	3	7.5	
<u>Pyrus malus</u> (apple)	3	7.5	
<u>Rumex crispus</u> (curly dock)	3	7.5	
<u>Verbascum thapsus</u> (mullein)	3	7.5	

Species (N = 61)	Percent	
	Frequency ^a	Frequency ^b
<u>Agropyron repens</u> (quackgrass)	2	5.0
<u>Agrostis alba</u> (redtop)	2	5.0
<u>Daucus carota</u> (Queen Anne's lace)	2	5.0
<u>Hieracium aurantiacum</u> (orange hawkweed)	2	5.0
<u>Melilotus alba</u> (white sweet clover)	2	5.0
<u>Ranunculus acris</u> (tall buttercup)	2	5.0
<u>Alliaria officinalis</u> (garlic mustard)	1	2.5
<u>Berberis thunbergii</u> (barberry)	1	2.5
<u>Berteroa incana</u> (hoary alyssum)	1	2.5
<u>Cerastium arvense</u> (field chickweed)	1	2.5
<u>Cerastium vulgatum</u> (mouse-ear chickweed)	1	2.5
<u>Chrysanthemum leucanthemum</u> (ox-eye daisy)	1	2.5
<u>Cichorium intybus</u> (chicory)	1	2.5
<u>Convallaria majalis</u> (lily-of-the-valley)	1	2.5
<u>Elaeagnus angustifolia</u> (Russian-olive)	1	2.5
<u>Glechoma hederacea</u> (creeping Charlie)	1	2.5
<u>Hesperis matronalis</u> (dame's rocket)	1	2.5
<u>Lysimachia nummularia</u> (moneywort)	1	2.5
<u>Morus alba</u> (white mulberry)	1	2.5
<u>Nepeta cataria</u> (catnip)	1	2.5
<u>Pastinaca sativa</u> (wild parsnip)	1	2.5
<u>Picea glauca</u> (white spruce)	1	2.5
<u>Pinus resinosa</u> (red pine)	1	2.5
<u>Pinus strobus</u> (white pine)	1	2.5
<u>Potamogeton crispus</u> (curly pondweed)	1	2.5
<u>Potentilla recta</u> (sulphur cinquefoil)	1	2.5
<u>Silene cucubalus</u> (bladder campion)	1	2.5
<u>Stellaria media</u> (common chickweed)	1	2.5
<u>Syringa vulgaris</u> (lilac)	1	2.5
<u>Thuja occidentalis</u> (white cedar)	1	2.5
<u>Veronica serpyllifolia</u> (thyme-leaved speedwell)	1	2.5

^aNumber of Plant Community Areas in which species was observed

^bPercent of occurrence in 40 Plant Community Areas

areas. Considering the types of plant community areas in which it occurs, common buckthorn probably does not pose as serious a threat to the Gilbert Lake ecosystem as Rhamnus frangula, yet it would be foolish to ignore it as a potential problem species in light of its effect elsewhere. Therefore, as the occasion warrants, maturing individuals should be eradicated on a case-by-case basis.

Shrub Honeysuckles

The shrub honeysuckles are actually a complex of Lonicera tatarica, L. morrowii, and their hybrid, L. x bella. Native to Eurasia, they were introduced into the U. S. in the late 1700s and 1800s to provide food and cover for wildlife in rural areas, and as ornamentals in urban and suburban areas. They have become naturalized and widespread in the northeastern U. S., including Wisconsin; in southern and eastern Wisconsin, their proliferation is due largely to horticultural plantings. They were found in 13 (32.5 percent) of the plant community areas in the project boundary.

Garlic Mustard

Garlic mustard (Alliaria officinalis or A. petiolata) is a cool-season biennial herb that is native to Eurasia, now widely distributed in the northeastern and midwestern U. S. and southern Canada, and as far west as Colorado and Utah. In Wisconsin, it is concentrated in the southeast and northeast, but it occurs Statewide, and appears to be increasing. It has recently become all too abundant in many of the upland woodlands of the midwestern U. S., including some

Table 8

RECOMMENDED CONTROL MEASURES FOR SERIOUS AND POTENTIALLY SERIOUS EXOTIC PLANT SPECIES IN THE GILBERT LAKE PROJECT AREA

Species Name	Description and Life History	Control Measures	
		Mechanical	Chemical
Glossy buckthorn (<u>Rhamnus frangula</u>)	<p>Glossy buckthorn is a tall shrub or small tree, up to 20 feet tall. The fruit is a dark-purple berry with three to four seeds, produced from early July through September. Leaves are alternate, thin, ovate to elliptic, with no teeth around the edges. Glossy buckthorn should not be confused with the native alder buckthorn (<u>Rhamnus alnifolia</u>), a low shrub of wetlands which is relatively common in the Gilbert Lake Project Area, but which has elongated, toothed leaves</p> <p>Glossy buckthorn is Eurasian in origin, with cultivars commonly planted as ornamentals, and is now naturalized in the northeastern U. S. and southern Canada. It is well established in southern Wisconsin. It is an aggressive invader of wet soils (though not confined to wetlands), such as acidic bogs, calcareous fens, sedge meadows, and southern tamarack swamps, and can grow well in both full sun and deep shade. It is a prolific producer of seeds, which are capable of dispersal (by birds) over long distances. Growing in full sun, an individual plant can produce seed in a few years after establishment; in deeper shade, it may take 10-20 years</p> <p>Seedlings grow best under high light conditions, but can germinate and grow in shade; growth is rapid. Leaf out is early, and leaves are retained late. This habit helps give glossy buckthorn a competitive advantage over native species. Once established, glossy buckthorn has the potential to spread very aggressively in large numbers. As it matures, it casts dense shade which eventually has a detrimental effect on native herbs and low shrubs, and may also prevent establishment of tree seedlings</p>	<p>As with all invasive species, glossy buckthorn in natural areas is most effectively controlled by recognizing its appearance early and removing isolated plants before they begin to produce seeds. With large infestations, the largest seed-producing plants should be removed first. Glossy buckthorn resprouts vigorously when cut. In high quality natural areas where the use of chemicals is a concern, small patches of plants up to 0.5 inch diameter can be pulled when the soil is moist. Larger plants 0.5 inch to 1.5 inch in diameter can be dug or pulled using a weed wrench. Disturbed soil will result from these techniques, and should be tamped down to minimize reseeding. Girdling (removing phloem connection of roots to shoots while retaining the xylem connection of shoots to roots) or cutting stems between December and March may not be very effective unless followed by an application of glyphosate herbicide</p>	<p>Chemical control methods are best done during the fall when most native plants are dormant yet buckthorns are still actively growing. This lessens the risk of affecting nontarget plants. The buckthorns' green leaves will provide easy recognition and allow for a thorough treatment at this time. Control treatments are also effective in the growing season, but there is more risk of affecting nontarget plants, and the effectiveness of the treatment is generally lower. Winter application of chemicals has proven to be successful as well, and further lessens the risk of damaging nontarget species</p> <p>During the growing season, cutting stems off near ground level and treating them with glyphosate curbs sprouting. Immediately after cutting, a 20-25 percent active ingredient (a.i.) glyphosate should be applied to the stumps. Resprouts should be cut and treated again, or sprayed with a hand sprayer of 1.5 percent a.i. glyphosate (approved for use over water) solution to the foliage. Foliar applications of glyphosate herbicide using a backpack sprayer is effective, but less selective</p> <p>For severely disturbed sites, a 25-50 percent a.i. triclopyr solution diluted in water can be sprayed with a low pressure hand sprayer, a spray bottle, or sponge applicator to freshly cut stumps. A 12.5 percent a.i. triclopyr (formulated for oil dilution) solution is also effective as a cut stump treatment. Basal bark application of 6 percent a.i. triclopyr (formulated for oil dilution) solution or 2-4-D (12.5 percent a.i.) in diesel fuel also effectively controls buckthorn</p> <p>Fosamine, a nonselective bud inhibitor for woody species, can be applied as a basal bark treatment in the fall at 3 percent a.i. concentration in water</p> <p>In wetlands with artificially lowered water tables, restoring the water to its historical levels will often kill glossy buckthorn. Standard formulations of glyphosate cannot be used in standing water; glyphosate formulated for use over water must be used</p>
Common, or European buckthorn (<u>Rhamnus cathartica</u>)	<p>Common buckthorn is a tall shrub or small tree, up to 20 feet tall and 10 inches in diameter, with a spreading, loosely-branched crown that stems from a few to several branches near the base. The bark is dark gray, with prominent, elongate, light-colored lenticels, and is scaly in older individuals. Flowers are a nonshowy yellow-green. Plants are usually dioecious (producing either male or female flowers), although individuals bearing both sexes are not uncommon. The distinctive dark purple berry-like fruits contain 3-4 seeds. Leaves are dull-green, elliptic to nearly round, with numerous rounded teeth on the margins, and are opposite or alternate (both may occur on the same twig). Twigs frequently have thornlike spurs</p> <p>Native to Eurasia, common buckthorn was originally imported into this country as a hedge plant, but eventually it became naturalized into native woodlands where it aggressively competes with local flora. As with glossy buckthorn, this species has a wide habitat tolerance, it reproduces prolifically by seed, and has long distance dispersal capability by birds. It is more commonly found on well-drained soils, but is not confined to them. It tends to avoid the deeply-shaded sugar maple-dominated woods. It resprouts vigorously when cut. Common buckthorn leaves out early and retains green leaves late into fall</p>	See control methods for glossy buckthorn (<u>Rhamnus frangula</u>)	See control methods for glossy buckthorn (<u>Rhamnus frangula</u>)

Table 8 (continued)

Species Name	Description and Life History	Control Measures	
		Mechanical	Chemical
Garlic mustard (<i>Alliaria officinalis</i> or <i>A. petiolata</i>)	<p>Garlic mustard is a tall (12-48 inches) herb, in which the leaves and stem have a faint, but distinctive odor of garlic when crushed. First-year plants produce a cluster of three or four dark-green leaves in a basal rosette; the second-year plants produce one or two flowering stems, with numerous small, white, four-petaled flowers. These then mature into slender capsules, 1-2½ inches long. Stem leaves are alternate, triangular, 2-3 inches across, with prominent teeth. Seeds germinate in early April, growing as a basal rosette the first year, and remaining green through winter; plants then grow vegetatively early the next spring, flowering (in southern Wisconsin) from May through early June. Fruits ripen in mid-July and are disseminated in August</p> <p>Hundreds of seeds are produced per plant, and are believed to be spread on the fur of animals, by flowing water, and by humans. In Wisconsin, seeds remain dormant for 20 months before germination, and can remain viable in the soil for up to five years</p> <p>Garlic mustard is usually found in at least partial shade—it does not do well in full sun—and grows in both upland and floodplain woods, savannas, as well as yards and roadsides. It does not tolerate acidic soils</p>	<p>Minor infestations can be eradicated by hand-pulling at or before the onset of flowering, or by cutting the flower stalk as close to the soil surface as possible just as flowering begins (cutting a couple inches above ground level is not quite as effective). Cutting prior to this time may promote resprouting. Cutting flowering plants at the ground level has resulted in 99 percent mortality and eliminates seed production. A scythe, monofilament weed whip, or power brush cutter may be helpful if the infestation covers a large area. When pulling, the upper half of the root must be removed in order to stop buds at the root crown from sending up new flower stalks. Pulling is very labor intensive, and can result in soil disturbance, damaging desirable species, and bringing up seeds from the seed bank. These results can be partially prevented by thoroughly tamping soil after pulling. If, however, seed bank depletion is desired, leave the soil in a disturbed state to encourage further germination, and return annually to remove plants. In general, cutting is less destructive than pulling as a control method, but can be done only during flower stalk elongation. Pulling can be done at any time when the soil is not frozen. If flowering has progressed to the point that viable seed exists, remove the cut or pulled plants from the area. Because seeds remain viable for five years, it is essential that an area be monitored and plants removed for at least five years after the initial control effort</p>	<p>Severe infestations can be controlled by applying a 1-2 percent active ingredient (a.i.) solution of glyphosate to the foliage of individual plants and dense patches during the late fall or early spring. At these times, most native plants are dormant, but garlic mustard is green and vulnerable. Glyphosate is a nonselective herbicide that will kill nontarget plants if it comes into contact with them. Managers should exercise caution during application, and not spray so heavily that herbicide drips off the target species. Herbicide use is safest for native plants if done during the dormant season, as garlic mustard will grow as long as there is no snow cover and the temperature is greater than 35° F. An early spring application of triclopyr at a 1 percent a.i. concentration in solution with water has been used, resulting in a 92 percent rosette mortality rate</p>
Purple loosestrife (<i>Lythrum salicaria</i>)	<p>Purple loosestrife is a perennial wetland herb, three to seven feet tall, with a dense, bushy growth of one to 50 stems. The stems die back each year. Showy spikes of five- or six-petaled magenta flowers bloom from July through September. Leaves are opposite, nearly linear, on a square stem. Care should be taken not to confuse this species with the related native wing-angled loosestrife (<i>L. alatum</i>) of prairies and wet meadows but which is a much smaller plant, nor with other natives which produce showy rosy/pink/magenta flowers, such as the Joe-Pye weeds (<i>Eupatorium</i> spp.)</p> <p>Suitable habitats include marshes, streambanks, alluvial floodplains, sedge meadows, and wet prairies. It has a wide tolerance of the physical and chemical conditions present in disturbed habitats. It can germinate on substrates with a wide range of pH, though its optimum is open, moist soil with a neutral to slightly acidic pH. It prefers sunny or partly-shaded wetlands, and requires high temperatures for germination</p> <p>Purple loosestrife is able to reproduce prolifically, both vegetatively by root or stem segments, and by seed, its primary means of dispersal. A single stalk can produce up to 300,000 seeds per year, resulting in an extensive seed bank; a mature plant can produce over 2 million seeds per year, which may remain viable in the soil for years. Thus, as wetlands are invaded, the problem compounds itself. Seeds can be transported long distances by water, animals, boats, and humans. Seedlings are established in late spring or early summer, when temperatures are high</p> <p>Disturbances such as drawdowns or exposed soil provide ideal conditions for germination. Invasion begins with a few pioneers, which build up the soil seed bank for several years. When the right disturbance occurs, the population can explode. Its tolerance of a wide range of environmental conditions, plus its fecundity, give purple loosestrife a competitive advantage, enabling it to create monotypic stands that reduce biodiversity. Its effect is to displace native vegetation and degrade wildlife habitat; rare species are often the first to disappear</p>	<p>Small young plants can be hand pulled. Older plants can be removed with a shovel. Avoid leaving any of the root behind because it may resprout. Use caution when pulling, as disturbance of soil favors the regeneration of loosestrife via seedling establishment</p> <p>Control plants prior to the onset of seeds (usually before the first week of August), or cut and bag the heads to avoid spreading. Plant parts should be dried and disposed of accordingly. Follow-up treatments are recommended for at least three years after removal</p> <p>Mowing has not been effective with loosestrife unless the plants can be mowed to a height where the remaining stems will be covered with water for a full twelve months. Mowing and flooding are not encouraged because they can contribute to further dispersal by disseminating seeds and stems. The U. S. Fish and Wildlife Service (FWS) has found water level manipulation to be effective: reduce the water level until loosestrife has sprouted, then increase the level to drown the stems</p>	<p>Currently, glyphosate is the most commonly used chemical for killing loosestrife. Generally, the formula designed for use on wet or standing water sites should be used. Glyphosate must be applied in late July or August to be most effective. It should be applied to loosestrife foliage in a 1 percent active ingredient (a.i.) solution; only 25 percent of the foliage of each plant need be covered. Glyphosate mixed to 20-40 percent a.i. can also be used on freshly-cut stems; this is especially effective on larger plants in areas of low loosestrife densities. Remove cut stems from the site and dispose. Be aware that glyphosate is nonselective and will kill any green foliage with which it comes into contact</p> <p>Triclopyr formulated for water dilution may be the most effective herbicide for loosestrife. Triclopyr is broadleaf-specific—it does not harm sedges or other monocots. Foliar application must cover nearly all of the foliage</p>

Table 8 (continued)

Species Name	Description and Life History	Control Measures	
		Mechanical	Chemical
<p>Reed canary grass (<i>Phalaris arundinacea</i>)</p>	<p>Reed canary grass is a large coarse grass, up to nine feet tall. Leaves are up to 10" long and 3/4" wide, with a prominent ligule</p> <p>It is a cool-season, sod-forming perennial wetland grass native to temperate regions of the northern hemisphere. It is believed that two ecotypes exist in North America—the native strain and a more aggressive Eurasian one; however, the two cannot be reliably differentiated. It is thought that the vast majority of the reed canary grass in nature is the Eurasian ecotype, which, selected for its vigor, has been planted throughout this country since the 1800s for forage and erosion control. It has now been naturalized in much of the northern half of the U. S.</p> <p>While it can grow on upland soils, and under partial shade, reed canary grass does best on fertile, moist organic soils in full sun. It prefers disturbed areas, but can invade native communities, such as marshes, wet prairies, sedge meadows, fens, streambanks, and seasonally wet areas. Invasion may be aggressive, particularly when associated with wetland disturbances, such as ditching, stream channelization, deforestation of swamps, and sedimentation</p> <p>Reed canary grass sprouts early in spring, forming a thick rhizome system that dominates the subsoil. After germination, it produces leaves and stalks for five to seven weeks, peaking in mid-June; a second-growth spurt occurs in fall. Seeds ripen in late June, and are spread to other wetlands by water, animals, humans, or machines. Plants may also spread via the rhizomes. In mid to late summer the upright shoots collapse, forming a dense, impenetrable mat of stems and leaves, beneath which little can grow. It establishes a large seedbank that makes control difficult; over time, it can form large, monotypic stands that include few other plant species, and that are therefore of little value to wildlife</p>	<p>Small, discrete patches may be covered by black plastic for at least one growing season; the bare spot can then be reseeded with native species. This method is not always effective and must be monitored because rhizomes can spread beyond the edge of the plastic</p> <p>Mowing twice yearly (early to mid-June and again in early October) may help control reed canary grass by removing seed heads before the seed matures and exposing the ground to sunlight, which promotes the growth of native wetland species. Discing the soil in combination with a mowing regime may help by opening the soil to other species</p> <p>Hand-pulling or digging may work on small stands in the early stages of invasion. Although grazing cannot control reed canary grass, it can enhance diversity. A bulldozer can be used to remove reed canary grass and rhizomes (12-18" deep), after which native species should be seeded. Discing or plowing can also be employed in this manner</p> <p>In small areas with few natives, another method involves repeated cultivation for one full growing season followed by dormant seeding near the first-frost date. Disrupting the plant roots every two to three weeks weakens the remaining plants and depletes the seed bank. When combined with spot herbicide application in sections too wet for early or late cultivation, results after two years have been good. Frequent and continued cultivation is important since one or two cultivations would simply cut the roots up and increase the number of individual plants</p>	<p>Small, scattered clones (two feet in diameter) can be controlled by tying the stems together just before flowering, cutting them, and applying glyphosate in a 33 percent active ingredient (a.i.) solution to cut stems</p> <p>A formulation of glyphosate designed for use in wetlands will kill reed canary grass (especially young plants) when applied to foliage. Apply in early spring when most native plant species are dormant. Any herbicide application should be done only after removing dead leaves from the previous year in order to maximize growing shoot exposure and to minimize herbicide use</p> <p>A 5 percent a.i. solution of glyphosate formulated for use over water applied as a foliar spray will kill reed canary grass. Two herbicidal applications may be necessary to ensure complete coverage. Herbicide applied with a wick applicator attached to a tractor affects taller stands of reed canary grass without affecting the shorter vegetation. A late mowing in mid-September, followed by the application of 5 percent glyphosate a.i. in October (after big bluestem is dormant) can help control reed canary grass)</p> <p>Because reed canary grass productivity is reduced by shade, planting native shrubs or wetland trees in areas of chemically treated grass may be effective</p> <p>While herbicide kills reed canary grass, the seed bank may germinate and recolonize the site. Several herbicidal applications may be necessary to inhibit seed bank recolonization. After the first application has killed living plants, disturbance of the soil can encourage seed bank germination. When this occurs, the site can again be treated with herbicide to deplete the seed bank</p> <p>In nonaquatic environments, Dalpon™ and trichloroacetic effectively treat reed canary grass when applied in late fall or early winter. Both are soil sterilizing herbicides that must be sprayed on dried foliage at a rate of 20 to 40 lbs. per acre. Aquatic systems may also be treated with Dalpon™ for control for up to two years. Dalpon™ is weakly cationic and is not absorbed by substrates the way most herbicides are</p>
<p>Shrub honeysuckles (<i>Lonicera tatarica</i>, <i>L. morrowii</i>, and <i>L. x bella</i>)</p>	<p>These honeysuckle species are dense, upright, deciduous shrubs (three to 10 feet tall), with numerous stems and shallow roots. Leaves are opposite, simple, oval to oblong; the different members of this group differ in the amount of hairiness of the leaves. Flowers, produced in pairs in May and June, are fragrant, tubular, and usually yellowish or pink. Fruits are yellow, orange, or red watery berries with many seeds. Branches are often hollow, and the bark of older stems is shaggy</p> <p>The shrub honeysuckles are easy to find early in spring because they begin leaf development one to two weeks before native shrubs; similarly, they hold leaves later into fall. They can be discerned from a distance during their flower and fruit periods in late spring and midsummer</p>	<p>Since honeysuckle roots are fairly shallow, small-to medium-sized plants can often be dug or pulled. Plants are particularly easy to remove in spring when the soil is moist. A shovel or grubbing hoe will often loosen the roots enough to allow a fairly large plant to be pulled. A mattock or weed wrench can also be used. In sensitive areas, this type of physical removal may disturb the soil and lead to more invasions, in which case it should be avoided. Soil should be tamped down to discourage further establishment of honeysuckle seedlings</p>	<p>Shrub honeysuckles can be controlled by cutting the stems at the base with a brush-cutter, chain saw, or other tools. After cutting, stumps should be treated immediately with a 20 percent active ingredient (a.i.) glyphosate solution using a low-pressure, hand-held sprayer, sponge applicator, or contact solution bottle. Stumps can be treated later after cutting with the same herbicidal solution, although this may not be as effective. Two cuts per year—the first in early spring, followed by one in early autumn—are recommended. If not followed by herbicide treatment, cuts made in winter will encourage vigorous resprouting when the plant comes out of dormancy. Triclopyr formulated for winter dilution is not effective on this</p>

Table 8 (continued)

Species Name	Description and Life History	Control Measures	
		Mechanical	Chemical
Shrub honeysuckles (<u>Lonicera tatarica</u> , <u>L. morrowii</u> , and <u>L. x bella</u>) (continued)	<p>Shrub honeysuckles can live in a broad range of plant communities under varying moisture and light levels. Most natural communities are susceptible to invasion, with disturbed, open woodlands being most affected. They thrive in sunny, upland habitats, including forest edges, roadsides, pastures, and old fields; they can also be found in fens, bogs, and lake shores</p> <p>Distribution is aided by birds, which disperse the seeds over long distances. Seeds require a period of cold stratification to break dormancy. Seedlings are usually found growing under tall trees or shrubs. Growth is vigorous, which inhibits development of native shrubs and herbaceous species; eventually, they may entirely replace the native flora by shading and depleting soil moisture and nutrients. Their habit of early leafing is particularly injurious to spring ephemerals that have evolved to bloom before trees and shrubs leaf out</p>		<p>species; triclopyr formulated for dilution in diesel fuel can be used for applications on cut stumps throughout the year, although winter application has in some cases proven to be 100 percent effective, whereas spring treatment has shown 70-80 percent effectiveness. If stump treatment is not done at the time of cutting, foliage on the resprouts may be sprayed, taking care to avoid nontarget plants</p> <p>A 1.5 percent a.i. glyphosate solution can be sprayed to cover the foliage. Spraying after the plant blooms may kill mature and seedling plants. Spraying prior to the emergence of native shrubs and ground flora is the safest time to spray without affecting native species. In wetlands, glyphosate formulated for use over water must be used</p>

Source: SEWRPC.

of the higher quality woodlands of southeastern Wisconsin. It is relatively shade-tolerant and is apparently spread primarily by anthropogenic means, particularly in disturbed portions of woods, such as along trails and roads.

Garlic mustard is a rapidly spreading woodland plant that displaces native woodland wildflowers. Invasion usually begins along woodland edges, progressing via streams, trails, and roads into a forest interior. In extreme cases it can dominate the forest floor and displace most native herbs within 10 years. It has been known to spread into high-quality forests. As such, it is a major threat to Wisconsin's woodland herbaceous flora and the wildlife that depends on it.

During the current study, garlic mustard was found at only one plant community area (PCA Number 40). However, in portions of the northern Kettle Moraine, in northern Washington County, it has become abundant in good-quality woods, and the threat exists that it could increase in the Gilbert Lake area. Thus, despite its infrequent occurrence within the project boundary, it is important to periodically monitor the upland woods for this species and eliminate any populations encountered while they are still small enough to make control feasible.

Plans for research on biological control of garlic mustard are currently underway at Cornell University, but funding is still being sought at this time.

Purple Loosestrife

Purple loosestrife (Lythrum salicaria) was not observed during the 1998 field season in any of the plant community areas within the Gilbert Lake Project Area. Nevertheless, because of the great potential damage that this species can cause to wetland ecosystems, a discussion is included in this section. It should be periodically searched for during the flowering season when the tall magenta spikes are obvious, and eliminated immediately. At Gilbert Lake, the most likely habitat would be the open marsh/sedge meadow/bog complex forming a narrow band around much of the lake (PCA Numbers 4, 25, 29, and 38).

Purple loosestrife is a native of Europe, introduced into this country in the 1800s as a garden perennial. It is now aggressively invasive, found throughout most of the temperate parts of the U. S. and Canada. It is widely distributed in Wisconsin, in some areas at high densities. It is illegal to cultivate purple loosestrife in Wisconsin.

Early detection through periodic monitoring is the best way to control the spread of purple loosestrife. Plants are most easily located when flowering. Unfortunately, plants may be quite large and several years old before they bloom, and it is quite difficult to locate nonflowering plants. Monitoring for new invasions should be done at the beginning of the flowering period, in mid-summer. Find pioneering plants or isolated small colonies, especially in areas otherwise free of loosestrife. It is believed that once flowering has begun, viable seed can be produced. Remove pioneering plants immediately, taking care not to leave stems or cuttings that can resprout or disperse viable seed. Follow-up is critical for all loosestrife control methods.

Rinse all equipment used in infested areas before moving into uninfested areas, including boats, trailers, clothing, and footwear. Remove and destroy purple loosestrife found in lawns and gardens.

Conventional control methods like hand pulling, cutting, flooding, herbicides, and plant competition have only been effective in controlling purple loosestrife on a local basis; biological control is now considered the most viable option for more complete control of heavy infestations. The Wisconsin Department of Natural Resources, in cooperation with the U. S. Fish and Wildlife Service, is introducing several natural insect enemies of purple loosestrife from Europe. A species of weevil (*Hylobius transversovittatus*) has been identified that lays eggs in the stem and upper root system of the plant; as larvae develop, they feed on root tissue. In addition, two species of leaf-eating beetles (*Galerucella calmariensis* and *G. pusilla*) are being raised and released in the State, and another weevil that feeds on flowers (*Nanophyes marmoratus*) is being used to stress the plant in multiple ways. Research has shown that most of these insects are almost exclusively dependent upon purple loosestrife and do not threaten native plants, although one species showed some crossover to native loosestrife. These insects will not eradicate loosestrife, but may significantly reduce the population so coexistence with native species is possible. In a test area, 90 percent of the treated area saw a 90 percent reduction in loosestrife. Three additional species are also known to feed on purple loosestrife. At present, all of these species remain experimental.

Reed Canary Grass

Though the most frequent exotic in the Gilbert Lake project area (found at 18 PCAs, or 45.0 percent), reed canary grass (*Phalaris arundinacea*) was not particularly abundant at any single area. It probably won't become a serious problem as long as disturbance to wetlands is minimized, which includes maintaining natural water levels.

Reed canary grass is difficult to eradicate; no single control method is universally applicable. In natural communities, mechanical control practices are recommended. In buffer areas and severely disturbed sites, chemical and mechanical controls may be used. If herbicide is used, care should be taken to prevent contact with nontarget species. Any control technique to reduce or eliminate reed canary grass should be followed by planting native species adapted to the site.

As reed canary grass can enter a wetland area from eroding hillslopes, erosion control and catch-basins around a preserved wetland are appropriate preventative measures.

Other Species

Many of the exotic species listed in Table 7 as being present in the Gilbert Lake Project Area are ruderal species of old fields, former pastures, and other disturbed communities, and are not invasive, that is, they do not invade natural areas to any great extent. They should actually decrease in cover as these disturbed areas are allowed to mature, and even those species that do occasionally make their way into "natural" plant community areas are unlikely to cause ecological damage. However, as with all exotic species, periodic monitoring is the most effective way to ensure that none of these minor exotics become problems.

MANAGEMENT PRACTICES APPLICABLE TO GENERAL COMMUNITY TYPES

Management techniques appropriate for one type of plant community area may not be appropriate for others. The type of management, and the degree of management intensity, should depend upon the specific characteristics of the target community, and the management objective. Generic management activities for the various plant community areas located within the Gilbert Lake Project Area are described as follows:

Upland Mesic Forest

When in good condition, a mesic forest is a low-maintenance community type. The dense canopy of maples, basswood, white ash, and other mesophytic species produces deep shade on the forest floor, preventing establishment of most exotic species. Keys to proper management include maintenance of a closed canopy; maximization of forest interior by maximizing forest area and minimizing forest edge; providing for adequate buffer areas, including allowing the surrounding forest to mature and attain old-growth status; preservation of mature, old-growth forests wherever found; reducing width and extent of interior trails which may fragment the forest into smaller habitat areas, thus creating more edge and facilitating the introduction of exotics; controlling the local deer population to help preserve native plant species, especially such browse-sensitive species as lady's-slipper orchids (Cypripedium spp.); and removing exotics as they appear.

Lowland Forest–Lowland Hardwoods

Management measures for lowland hardwood forests are similar to those used for mesic forests, except that any artificial drainage may have to be reversed to maintain seasonal water-level regimes and help eliminate reed canary grass (Phalaris arundinacea).

Lowland Forest–Conifer Swamps

Management measures for conifer swamps are similar to those for lowland hardwoods. However, it is especially important to control the size of deer populations in these habitats because of browse damage to tree seedlings and endangered and threatened species, such as orchids.

Wetlands–Bogs

Specific management points include maintenance of natural water levels; maintenance of adequate buffer areas; minimalization of trampling of sensitive vegetation; removal of exotics, such as glossy buckthorn (Rhamnus frangula); and reduction and control of nutrient runoff from adjacent agricultural areas.

Wetlands–Sedge Meadows and Shrub-Carr

Management techniques should control invasion by certain tree species, including green ash (Fraxinus pennsylvanica) and willows (Salix spp.), that tend to increase, especially with artificially lowered water levels. Specific management points include removal of exotic species, such as glossy buckthorn, and maintenance of natural water regimes.

Aquatic Communities

The management of aquatic communities depends on maintenance of the hydrologic regime supporting the system and the type of habitat desired. Specific management measures include control of any exotic species that may become established, such as purple loosestrife (Lythrum salicaria) and Eurasian water milfoil (Myriophyllum spicatum); maintenance of natural water levels; control of pollution and excessive nutrient loadings; and prohibition and removal of artificial structures. The next section describes specific practices recommended to control aquatic macrophytes.

Chapter IV

RECOMMENDED MANAGEMENT PLAN

AQUATIC MACROPHYTE MANAGEMENT

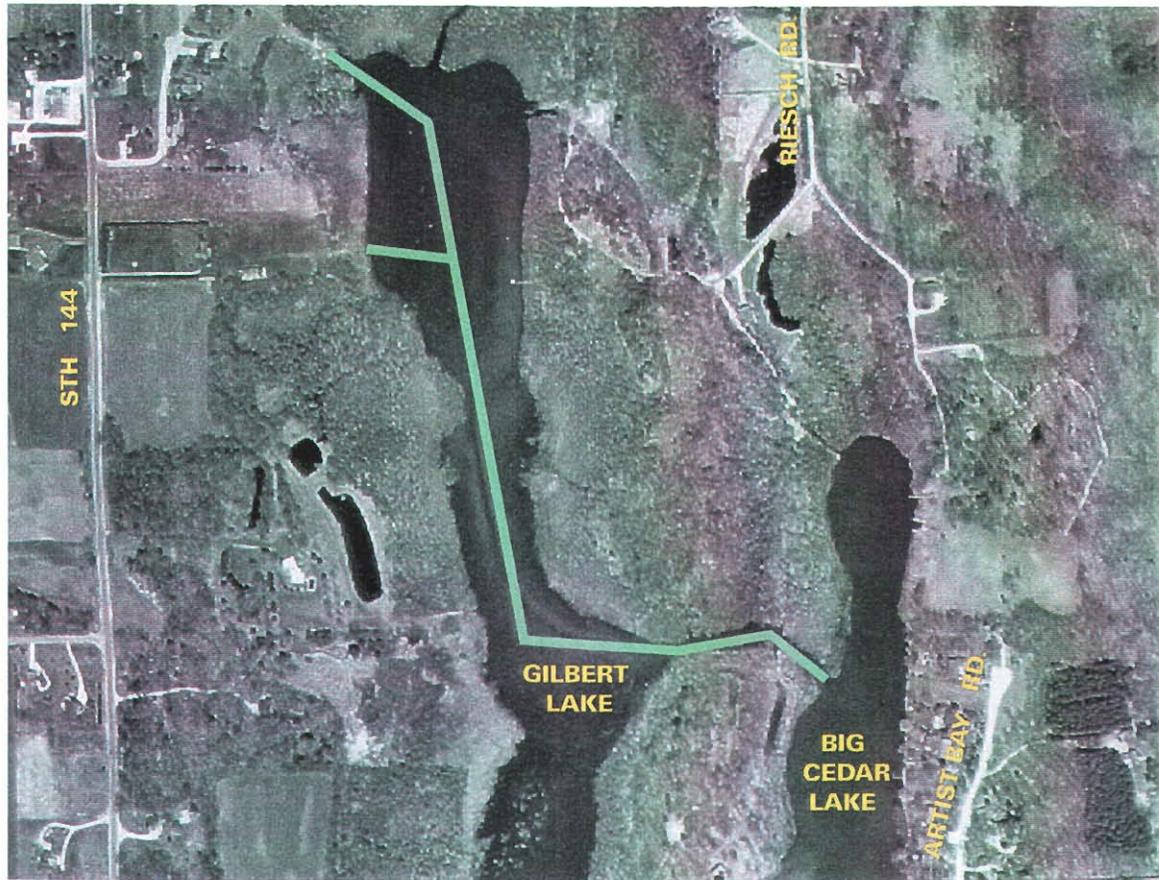
In August, 1985, the Regional Planning Commission prepared *An Aquatic Macrophyte Management Plan for Gilbert Lake*. This plan was intended to guide the harvest and disposal of aquatic macrophytes in Gilbert Lake. The harvest recommendations put forth should allow the maintenance of a healthy warm-water fishery while providing adequate open water to permit desired small boat access to private riparian lands. Based upon the findings presented therein, the Commission recommended that the following aquatic macrophyte management guidelines be adopted for Gilbert Lake:

1. Aquatic macrophyte control measures should be restricted to aquatic removal by mechanical harvesting. Because chemical control measures tend not to be target-species specific, desirable aquatic life forms may be adversely affected by herbicides and toxicants, thereby adversely affecting the health and diversity of the Gilbert Lake biota. Therefore, aquatic macrophyte management measures using chemical controls are not recommended.
2. The aquatic macrophyte harvest zone should be restricted to the approximately 3.0-acre area delineated in Map 7. The width of the harvest zone should be kept approximately equal to the effective cutting width of the harvesting equipment—approximately 20 feet.
3. The depth of the harvest cut should be carefully controlled to prevent removal or disruption of lake bottom sediments.
4. A single harvest should be made annually no earlier than the beginning of the third week in July and not later than the second week in August.
5. Disposal of the harvested aquatic macrophytes should be restricted to suitable upland sites. No harvested material should be deposited in the Gilbert Lake wetland complex.
6. While harvesting, barge operators should carefully monitor harvested weeds for excessive incidental fish catches and modify harvesting operations if a substantial number of fish are observed being trapped in the harvested weeds.

Careful compliance with these recommended guidelines should minimize any adverse impacts of the aquatic macrophyte harvesting on the local fishery, while facilitating convenient boat access to the existing riparian piers along the shoreline of Gilbert Lake. The late July—early August harvest date is intended to reduce the accidental capture of juvenile largemouth bass (*Micropterus salmoides*) by giving the fish additional time to mature and disperse. Earlier harvest dates have the potential to remove substantial numbers of juvenile largemouth bass since, during June and early July, they are very small and often in large cohesive schools that frequent beds of aquatic macrophytes for protective cover. If, during harvest, large numbers of fish are inadvertently being harvested along with aquatic macrophytes, barge operators should immediately modify harvesting operations to reduce incidental catches of fish. The modification of harvesting operations can be of two types. First, the rate at which macrophytes are harvested may be reduced to allow fish that are temporarily trapped in macrophyte beds time to escape. Second, the depth of the cut can be adjusted to allow trapped fish opportunities to escape. Cutting at depths of two-to-three feet is apt to be most injurious to local fish populations in terms of incidental capture and subsequent mortality of juvenile fish. If the capture of juvenile fish is significant at the two-to-three-foot depth, the cutting depth should be adjusted to take place above that level.

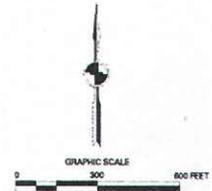
Map 7

FINAL RECOMMENDED AQUATIC MACROPHYTE HARVESTING AREA



 AREA TO BE HARVESTED

Source: SEWRPC.



PRESERVATION OF WOODED BUFFERS

In their natural state, wetlands function as flood storage and reduction areas—that is, they are able to slow flood waters as they approach lakes and streams, thus lowering flood peaks. Surface waters from fields or other disturbed sites often are muddy or carry heavy nutrient loads. The reduction of runoff velocities allows the settling of sediment and other contaminants from the entering stormwater.

Wetlands may also act as temporary or permanent nutrient traps, collecting topsoil, fertilizers, and other materials running off agricultural and urban lands before waters enter streams or lakes. Such nonpoint sources of pollution are extremely difficult to control by artificial means. However, the ability of wetlands to maintain water quality by assimilating excess nutrients is not infinite. Research findings regarding the nutrient-uptake capabilities of wetland vegetation are mixed.¹ Some evidence indicates that although wetland vegetation is able to absorb certain nutrients and prevent them from entering surface water bodies, much of this uptake is seasonal, that is, nutrients may be released upon death and decay of plant material in the fall. Only peatlands such as sphagnum bogs or groundwater-fed sedge meadows or fens are capable of permanently locking up nutrients in the form of undecayed plant material. Other wetlands such as shallow marshes may contain peat in more decayed form or organic mucks that may only temporarily detain the flow of nutrients or wastes such as phosphorus or heavy metals. The addition of nutrients from nonpoint sources increases the nutrient loading of the lakes and artificially accelerates the eutrophication process. Once a lake is overloaded with nutrients, they are hard to remove, since the nutrients are continually recycled during spring and fall overturn. Water quality can degenerate as a result of excessive pollutant loads, including nutrient loads.

The resulting deterioration of surface water quality of lakes and streams may cause heavy silting, algal blooms, increased growth of undesirable aquatic macrophytes, and lowering of oxygen levels. Excessive increases in plant growth are often dominated by a few species, reducing plant species diversity. The proliferation of macrophytes leads to loss of small openings for fish spawning and creates an extreme amount of escape cover for young-of-the-year fish, which can become overpopulated and stunted. The resulting competition for limited food resources can adversely affect fish species and benthic organisms that may be either a food source or a competitor for food. Decay of the increased plant biomass when it dies can result in decreased dissolved oxygen levels and kills of fish and other aquatic organisms.²

Vegetational changes in a wetland may result from a combination of poor water quality, unnatural hydroperiods, and introduction of aggressive exotic plant species. Silting associated with stormwater floods may smother sedges and allow the more tolerant reed canary grass to invade. Eutrophication from nutrient-carrying sediments favors cattail, which behaves as an aggressive native weed, outcompeting other native species and often resulting in monocultures.

Although at present there is no evidence of excessive fertility at Gilbert Lake,³ many of the soils within the study area have a high erosive potential due, in part, to the high relief topography which dominates the landscape. Such erodible soils, if improperly managed, can contribute significant silt and sediment loads to Gilbert Lake, which, in turn, contribute to aquatic macrophyte problems. It is important to note that small lakes, such as Gilbert Lake, are highly susceptible to deterioration through improper land use development and management. Water quality can degenerate as a result of excessive pollutant loads—including nutrient loads—from improperly placed and malfunctioning onsite sewage disposal systems, and careless urban and rural land management practices. Lakeshore development and filling of peripheral wetlands removes valuable nutrient and sediment traps while adding sources of nutrient and sediment and which may destroy fish spawning and rearing areas.

¹University of Wisconsin, Institute for Environmental Studies, Urban Wetlands in the Yahara-Monona Watershed: Functional Classification and Management Alternatives, *Water Resources Management Program Workshop, Madison, Wisconsin, 1990.*

²Wisconsin Department of Natural Resources, Wisconsin's Biodiversity as a Management Issue: A Report to Department of Natural Resources Managers, *Madison, Wisconsin, May 1995.*

³E. Randy Schumacher, Dale E. Katsma, and William L. Carlson, Proposed Gilbert Lake Fishery Area, Washington County—Master Plan Concept Element, *Wisconsin Department of Natural Resources, Madison, Wisconsin, n.d.*

Effects of Agriculture

There is a relationship between the capability of wetlands to perform functions and the surrounding uplands. Activities throughout the entire watershed—all those areas from which the surface water drains into the wetland—will affect the wetland. For example, agricultural lands, if not properly managed, can contribute to the decline of local surface water quality. Aquatic systems are simplified by direct habitat destruction, erosion and sedimentation, eutrophication, and water quality degradation. Of particular concern are plowing and tilling of erodible soils (particularly in areas of steep terrain), concentrated runoff from barnyards and feedlots, and pesticide and fertilizer runoff from fields. Almost all the agricultural chemicals in use are water soluble, resulting in high mobility by water transport and thus a significant water pollution problem with the potential for chronic effects on aquatic organisms.⁴ Commonly, stormwater runoff and snowmelt discharges carry sediment and chemical substances, which act as water pollutants. The result of the accumulation of these substances on local surface waters may be a decrease in water clarity and an undesirable increase in the abundance of aquatic macrophytes, both of which are early warning signs of a decline in water quality.

Land use practices that minimize soil erosion and runoff of fertilizers and other nutrients will benefit wetlands. Careful farming practices include contour plowing, grassed waterways, and exclusion of tillage from steep slopes and cows from woodlots. Practices to abate nonpoint source pollution potential of agricultural lands within the Gilbert Lake subwatershed basin have been initiated. Such techniques include the construction of a diversion and the implementation of stripcropping for soil conservation.⁵ Control of nutrient and sediment loading by improving watershed runoff management is an important step toward the maintenance of good water quality in Gilbert Lake.

Loss of Woodland Cover

Woodland cover of uplands benefits wetlands within the watershed in several ways. Woodlands improve water quality by helping keep topsoil and excess nutrients from washing into surface water bodies. Woodlands serve to hold and store water, contributing significantly to groundwater recharge, and thus to the maintenance of water tables and streamflows and lake levels. Upland woodlands are also vital to the reduction of soil erosion and stream sedimentation, and thus to the maintenance of abundant aquatic life in lakes and streams.

Loss of upland vegetation when forests are brought under cultivation results in accelerated runoff rates and volumes of stormwater and snowmelt, causing flash floods, soil erosion, and lake and stream siltation. It also results in less storage of water in topsoil in summer and groundwater in winter. Timber harvest within watersheds has been shown to affect water quality through increased temperature, and by reducing primary productivity and dissolved oxygen.

Effects of Urbanization

Not all nonpoint source pollution comes from agricultural activities. Increasingly, the threats to the wetlands of Southeastern Wisconsin have shifted from poor agricultural practices to widespread urbanization. Loss of terrestrial vegetation in the watershed, proliferation of impermeable surfaces such as pavement and rooftops, and routine exposure of soil during construction site activities increases the amount and variability of runoff events contributing to flooding and

⁴*Wisconsin Department of Natural Resources, Wisconsin's Biodiversity as a Management Issue: A Report to Department of Natural Resources Managers, Madison, Wisconsin, May 1995.*

⁵*SEWRPC Staff Memorandum Report No. 85-22, An Aquatic Macrophyte Management Plan for Gilbert Lake, Waukesha, Wisconsin, August 1985.*

erosion in downstream areas. Sediment loading to wetlands is greatly increased.⁶ Poorly designed and leaking septic systems can lead to water quality problems in unsewered residential areas. Flashy hydroperiods overload wetlands and flood peripheral areas, and encourage the breeding of mosquitoes and the deposition of mineral soils. Colloids derived from mineral soil erosion remain in suspension for long periods. These fine sediments muddy waters, prevent aquatic plant growth, promote rough fish populations, and absorb and deliver great amounts of nutrients to wetlands. Wetlands are especially vulnerable to leakage of pollutants applied to uplands, such as petroleum, pesticides, road salt, heavy metals, domestic lawn fertilizers, yard wastes, animal feces, and automotive fluids such as drain oil, de-icers, and brake fluid.

Since intense urbanization is a relatively recent phenomenon in most of Wisconsin, it is probable that urban nonpoint source pollution has only recently been affecting aquatic ecosystems on a Statewide scale. The overall trend in wetland change in urbanizing areas in Wisconsin has been a loss in species diversity, lowered habitat quantity and quality, and a degradation of the ability of wetlands to absorb, disperse, and filter surface-water inputs. Runoff volumes and drainage areas have increased tremendously. The proximity of wetlands to urban land uses has decreased the effectiveness of many wetland functions in the watershed.

REVEGETATION OF DISTURBED PLANT COMMUNITY AREAS

Several of the Plant Community Areas within the Gilbert Lake Project Area, including PCA Numbers 1, 14, 17, 19, 33, 35, and 36, consist of old fields, that is, former pastures or cultivated fields. Most of these have small patches of woodland interspersed within the old field matrix. Through natural succession, native woody shrub and tree species are invading, using the seed source provided by the adjacent woodlands. To increase the woodland wildlife habitat, and to maintain the wooded cover of the uplands for erosion control, the natural revegetation process should be allowed to continue.

The reforestation process may be accelerated by artificial plantings of native upland trees and shrubs. This should be accompanied by removing non-native shrubs and small trees, such as the alien honeysuckles and buckthorns. The removal of these more aggressive, non-native species will reduce competition with, and shading of, the more desirable native forest plant species. Appropriate control measures are described in the previous section. Artificial reforestation should include the reintroduction of the tree, shrub, and forb species native to the area. In order to help maintain genetic diversity, it is strongly recommended that any introductions of native species be done with plants of local origin. In areas of heavy, weedy or nonnative vegetation, the application of a herbicide may be made during one or more seasons prior to planting. A list of upland trees, shrubs, and forbs which may be used in desirable reforestation efforts are identified in Table 9.

Following site preparation, it is recommended that the tree and shrub species be established on the reforestation site before any herbaceous species are introduced. This will allow the establishment of the forest canopy before the introduction of the forbs. Failure to establish the canopy prior to such introduction will likely result in the more aggressive native pioneer species, such as smooth sumac or prickly-ash, and nonnative species, such as burdock and garlic mustard, outcompeting the more desirable native forest forbs. Once a canopy is established, however, the more aggressive species should be naturally controlled. In the ongoing woodland management activities, dead trees with cavities should be allowed to remain standing. Such snags provide shelter and nesting places for a number of forest wildlife species.

It is recommended that two-year old deciduous shrub and tree seedlings between 14 and 16 inches high be planted in any reforestation efforts. Many such tree and shrub species are available through the Wisconsin Department of Natural

⁶University of Wisconsin, Institute for Environmental Studies, Urban Wetlands in the Yahara-Monona Watershed: Functional Classification and Management Alternatives, *Water Resources Management Program Workshop, Madison, Wisconsin, 1990.*

Table 9

TREE, SHRUB, AND HERBACEOUS PLANT SPECIES WHICH MAY BE TRANSPLANTED ONTO UPLAND FOREST ENHANCEMENT AND REFORESTATION SITES ON THE GILBERT LAKE PROJECT AREA LANDS

<p>Cupressaceae <u>Juniperus communis</u>–Creeping juniper <u>Juniperus virginiana</u>–Eastern red cedar</p> <p>Araceae <u>Arisaema triphyllum</u>–Jack-in-the-pulpit</p> <p>Liliaceae <u>Allium tricoccum</u>–Wild leek <u>Maianthemum canadense</u>–Canada Mayflower <u>Polygonatum biflorum</u>–Solomon's seal <u>Smilacina racemosa</u>–Solomon's plume <u>Trillium grandiflorum</u>–White trillium <u>Uvularia grandiflora</u>–Bellwort</p> <p>Salicaceae <u>Populus grandidentata</u>–Large-toothed aspen <u>Populus tremuloides</u>–Quaking aspen</p> <p>Juglandaceae <u>Carya cordiformis</u>–Yellowbud hickory <u>Carya ovata</u>–Shagbark hickory <u>Juglans cinerea</u>–Butternut <u>Juglans nigra</u>–Black walnut</p> <p>Betulaceae <u>Betula papyrifera</u>–Paper birch <u>Carpinus caroliniana</u>–Musclewood <u>Corylus americana</u>–Hazelnut <u>Ostrya virginiana</u>–Ironwood</p> <p>Fagaceae <u>Fagus grandifolia</u>–American beech <u>Quercus alba</u>–White oak <u>Quercus macrocarpa</u>–Bur oak <u>Quercus rubra</u>–Red oak</p> <p>Ulmaceae <u>Celtis occidentalis</u>–Hackberry <u>Ulmus rubra</u>–Slippery elm</p> <p>Ranunculaceae <u>Actaea pachypoda</u>–White baneberry <u>Actaea rubra</u>–Red baneberry <u>Anemone quinquefolia</u>–Wood anemone <u>Aquilegia canadensis</u>–Columbine <u>Hepatica americana</u>–Round-lobed hepatica <u>Thalictrum dioicum</u>–Woodland meadow rue</p>	<p>Berberidaceae <u>Caulophyllum thalictroides</u>–Blue cohosh <u>Podophyllum peltatum</u>–Mayapple</p> <p>Papaveraceae <u>Sanguinaria canadensis</u>–Bloodroot</p> <p>Hamamelidaceae <u>Hamamelis virginiana</u>–Witchhazel</p> <p>Rosaceae <u>Agrimonia gryposepala</u>–Agrimony <u>Crataegus sp.</u>–Hawthorn <u>Prunus americana</u>–Wild plum <u>Prunus virginiana</u>–Chokecherry <u>Prunus serotina</u>–Black cherry</p> <p>Geraniaceae <u>Geranium maculatum</u>–Wild geranium</p> <p>Aceraceae <u>Acer rubrum</u>–Red maple <u>Acer saccharum</u>–Sugar maple</p> <p>Vitaceae <u>Parthenocissus quinquefolia</u>–Virginia creeper</p> <p>Tiliaceae <u>Tilia americana</u>–Basswood</p> <p>Violaceae <u>Viola pubescens</u>–Yellow violet <u>Viola sororia</u>–Woolly blue violet</p> <p>Cornaceae <u>Cornus alternifolia</u>–Alternate-leaved dogwood <u>Cornus racemosa</u>–Gray dogwood</p> <p>Oleaceae <u>Fraxinus americana</u>–White ash</p> <p>Caprifoliaceae <u>Viburnum acerifolium</u>–Maple-leaf viburnum <u>Viburnum lentago</u>–Nannyberry <u>Viburnum rafinesquianum</u>–Downy arrowwood</p> <p>Asteraceae <u>Aster macrophyllus</u>–Large-leaf aster <u>Helianthus strumosus</u>–Woodland sunflower</p>
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Source: SEWRPC.

Table 10

**REFORESTATION PLANTING DENSITIES
FOR THE GILBERT LAKE AREA UPLANDS**

Description	Spacing	Number to be Planted per Acre
Shrubs	5 feet by 5 feet	425
Medium Trees ^a	8 feet by 8 feet	165
Large Trees ^b	18 feet by 18 feet	75
Evergreens	12 feet by 12 feet	35
Maximum Planting Density per Acre	--	700

^aBetween 15 and 50 feet tall.

^bBetween 50 and 100 feet tall.

Source: Wisconsin Department of Natural Resources and SEWRPC.

Resources, although some species may be available only through commercial nurseries. Shrubs and trees should be over-planted by up to 10 percent, thereby allowing for normal losses of seedlings to disease and to animal predation. Other solutions to the disease and predation problems may be considered, such as protecting individual seedlings by fencing or planting additional stock in a protected nursery plot set aside from the restoration area before later replanting of the now older and more resistant stock. Recommended shrub and tree planting densities and spacings are provided in Table 10.

Planting of the shrubs and trees is best done between the time the frost leaves the ground in the spring and May 15. Cultivation may be needed for up to five years following planting in order to control unwanted weedy vegetation. Cultivation must be shallow and far enough from the plantings to avoid root damage. Additional help in this regard may be obtained from the local Department of Natural Resources forester, UW-Extension agent, or commercial nurseryman.

There is no evidence to suggest that prairies historically occurred anywhere within the Gilbert Lake Project Area; in fact, prairies were at most only a minor community type anywhere in Washington County. Therefore, in the interest of perpetuating native vegetation types, it is not recommended that prairies be established in the Gilbert Lake Project Area.

CONCLUDING RECOMMENDATIONS

Management Recommendations

Upland mesic forests at Gilbert Lake occur in Plant Community Area Numbers 5, 8, 18, 19, 34, and 40. These areas should be managed to maintain the canopy and should also be merged wherever possible. In Plant Community Area Number 40, garlic mustard has become established and should be eliminated as soon as possible. Other upland forest Plant Community Areas should be periodically monitored for this species.

Lowland forest and conifer swamps at Gilbert Lake occur in Plant Community Area Numbers 2, 3, 20, 26, 28, 31, and 37. These should be managed to control the local deer population. In Plant Community Area Numbers 3, 20, 26, 28, 31, and 37, glossy buckthorn is a particular problem and should be controlled immediately. Plant Community Area Number 2 is not presently having problems with exotic species, but should be monitored annually.

Table 11

PLANT COMMUNITY AREAS RECOMMENDED FOR ACQUISITION IN THE GILBERT LAKE PROJECT AREA

Plant Community Area Number	Area (acres)	Community Type
2	3.3	Willow Thicket, Lowland Hardwoods
3	32.2	Tamarack Swamp, Shrub-Carr, Shallow Marsh
4	6.2	Shrub-Carr, Cattail Marsh
6	7.1	Shallow Marsh, Sedge Meadow
7	74.4	Shallow Marsh, Sedge Meadow, Shrub-Carr
18	10.8	Southern Mesic Hardwoods
19	17.6	Southern Mesic Hardwoods
20	25.4	Tamarack Swamp, Shrub-Carr, Lowland Hardwoods
22	1.9	Woodland Pond
23	0.2	Woodland Pond, Shallow Marsh
24	0.6	Woodland Pond, Shallow Marsh
25	1.0	Sedge Mat
26	8.2	Lowland Hardwoods, Shrub-Carr, Tamarack Swamp
28	5.2	Northern Bog, Tamarack Swamp, Shrub-Carr
29	6.5	Bog, Shrub-Carr, Sedge Meadow
30	3.1	Pond, Willow Thicket, Lowland Hardwoods
31	20.0	Tamarack Swamp, Shrub-Carr
37	23.7	Tamarack Swamp, Shrub-Carr, Lowland Hardwoods
38	5.0	Bog, Shrub-Carr, Sedge Meadow, Tamarack Swamp
39	43.2	Shallow Lake, Deep Marsh
Total	295.6	--

Source: SEWRPC.

Open, nonforested wetlands at Gilbert Lake occur in Plant Community Area Numbers 4, 7, 25, and 29. These should be managed to maintain water levels and minimize disturbance. At present, purple loosestrife has not been observed in any of these Plant Community Areas; however, considering the potentially detrimental effects of this species upon native wetland ecosystems, monitoring should be conducted annually.

Urban development of the uplands within the Gilbert Lake Project Area should be minimized. Wherever possible, the old fields should be allowed to re-forest, either naturally or artificially, with native species in order to provide a more continuous forest habitat and to prevent erosion and pollution from contaminating the Gilbert Lake wetlands.

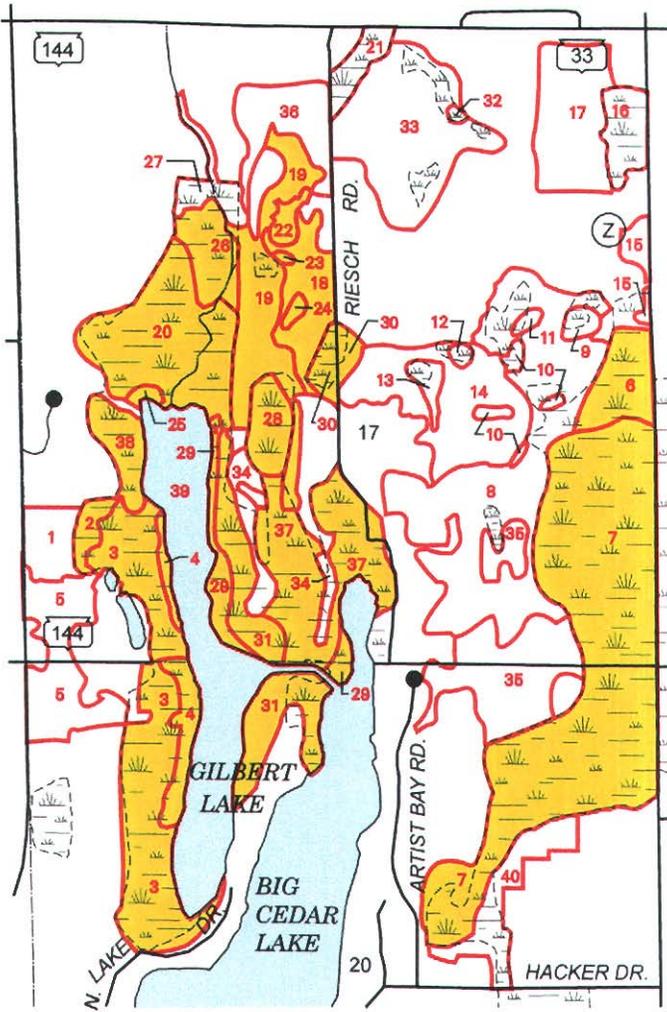
Purchase Recommendations

Table 11 lists those Plant Community Areas within the Gilbert Lake Project Area that are recommended for purchase by an appropriate protective agency (see Map 8). These 20 plant community areas primarily include wetlands, but also include natural areas, open water, and important buffer lands. All such areas are located within primary environmental corridor. The total area recommended for acquisition is approximately 295.6 acres.

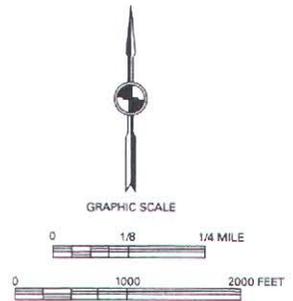
It is recommended that all such proposed acquisitions be on a willing seller—willing buyer basis. The plan further recognizes that certain landowners within the Gilbert Lake Project Area are presently managing their lands in a manner consistent with the plan, and should therefore be encouraged to continue to do so. The acquisition recommendations of the Commission are intended to ensure the long-term protection of sensitive Gilbert Lake lands.

Map 8

**PLANT COMMUNITY AREAS
IN THE GILBERT LAKE STUDY AREA
PROPOSED FOR ACQUISITION**



- 21 PLANT COMMUNITY AREA BOUNDARY AND NUMBER
- PLANT COMMUNITY AREAS PROPOSED FOR ACQUISITION



Source: SEWRPC.

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APPENDIX

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Appendix A

PRELIMINARY VEGETATION SURVEY FOR GILBERT LAKE

Dates: May 5, 18, 20, 29, 1998
June 1, 5, 6, 8, 10, 15, 19, 1998
July 8, 9, 23, 31, 1998
August 11, 1998

Observers: Lawrence A. Leitner, Ph.D., Senior Specialist-Biologist
Christopher J. Jors, Research Analyst
Kathleen I. Griswold, Research Analyst
Southeastern Wisconsin Regional Planning Commission

Location: Town of West Bend in parts of U.S. Public Land Survey Sections
17 and 20, Township 11 North, Range 19 East, Washington County
Wisconsin.

Species List: Plant Community Area No. 1

EQUISETACEAE

Equisetum arvense--Common horsetail

PINACEAE

Picea glauca¹--White spruce

Pinus strobus¹--White pine

CUPRESSACEAE

Thuja occidentalis¹--White cedar

Juniperus virginiana--Red-cedar

GRAMINEAE

Bromus inermis¹--Smooth brome grass

Poa pratensis--Kentucky bluegrass

CYPERACEAE

Carex sp. --Sedge

LILIACEAE

Smilacina racemosa--Solomon's plume

SALICACEAE

Salix exigua--Sand-bar willow

Salix discolor--Pussy willow

BETULACEAE

Corylus americana--Hazelnut

FAGACEAE

Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Geum aleppicum--Yellow avens

Rubus occidentalis--Black raspberry

Rubus strigosus--Red raspberry
Prunus serotina--Black cherry
 OXALIDACEAE
Oxalis stricta--Common wood sorrel
 ACERACEAE
Acer saccharinum--Silver maple
Acer negundo--Boxelder
 VITACEAE
Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper
 ONAGRACEAE
Epilobium coloratum--Willow herb
Circaea quadrisulcata--Enchanter's nightshade
 CORNACEAE
Cornus stolonifera--Red osier dogwood
 OLEACEAE
Fraxinus pennsylvanica--Green ash
Syringa vulgaris¹--Lilac
 ASCLEPIADACEAE
Asclepias syriaca--Common milkweed
 SOLANACEAE
Solanum dulcamara¹--Deadly nightshade
 SCROPHULARIACEAE
Linaria vulgaris¹--Butter-and-eggs
 PLANTAGINACEAE
Plantago major¹--Common plantain
 RUBIACEAE
Galium asprellum--Rough bedstraw
 COMPOSITAE
Solidago altissima--Tall goldenrod
Erigeron philadelphicus--Marsh fleabane
Arctium minus¹--Common burdock
Cirsium vulgare¹--Bull thistle
Taraxacum officinale¹--Common dandelion
Lactuca serriola¹--Prickly wild lettuce

Total number of plant species: 40

Number of alien, or non-native, plant species: 12 (30 percent)

This approximately 5.1-acre plant community area is part of the Gilbert Lake project boundary and consists of old field with planted conifers. Disturbances to the plant community area include past clearing of native vegetation for agricultural uses. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 2

EQUISETACEAE

Equisetum arvense--Common horsetail

Equisetum fluviatile--Pipes

POLYPODIACEAE

Athyrium filix-femina--Lady fern

GRAMINEAE

Glyceria striata--Fowl manna grass

Poa pratensis--Kentucky bluegrass

CYPERACEAE

Carex rosea--Curly-styled wood sedge

Carex stipata--Sedge

Carex lacustris--Lake sedge

Carex sp. --Sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus¹--Skunk cabbage

LILIACEAE

Smilacina racemosa--Solomon's plume

Smilax ecirrhata--Low carrion flower

SALICACEAE

Salix nigra¹--Black willow

Salix exigua¹--Sand-bar willow

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Rumex crispus²--Curly dock

RANUNCULACEAE

Ranunculus recurvatus--Hooked buttercup

BERBERIDACEAE

Podophyllum peltatum--Mayapple

CRUCIFERAE

Barbarea vulgaris²--Yellow rocket

SAXIFRAGACEAE

Saxifraga pensylvanica--Swamp saxifrage

Ribes missouriense--Missouri gooseberry

Ribes americanum--Wild black currant

ROSACEAE

Geum canadense--White avens

Geum aleppicum--Yellow avens

Rubus occidentalis--Black raspberry

Rubus strigosus--Red raspberry

Rubus pubescens--Dwarf raspberry

Agrimonia gryposepala--Agrimony

FABACEAE

Lathyrus palustris--Marsh vetchling

ACERACEAE
Acer negundo--Boxelder

BALSAMINACEAE
Impatiens biflora--Jewelweed

RHAMNACEAE
Rhamnus cathartica²--Common buckthorn

VITACEAE
Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

VIOLACEAE
Viola cucullata--Blue marsh violet

ONAGRACEAE
Circaea quadrisulcata--Enchanter's nightshade

CORNACEAE
Cornus stolonifera¹--Red osier dogwood

PRIMULACEAE
Lysimachia ciliata--Fringed loosestrife
Lysimachia thyrsiflora--Tufted loosestrife

BORAGINACEAE
Hackelia virginiana--Stickseed

RUBIACEAE
Galium asprellum--Rough bedstraw

COMPOSITAE
Solidago gigantea--Giant goldenrod
Solidago altissima--Tall goldenrod
Aster sp. --Aster
Arctium minus²--Common burdock
Taraxacum officinale²--Common dandelion

Total number of plant species: 47

Number of alien, or non-native, plant species: 5 (2 percent)

This approximately 3.3-acre plant community area is part of the Gilbert Lake wetland complex and consists of willow thicket and second growth, lowland hardwood swamp. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 3

SPHAGNACEAE

Sphagnum sp.--Sphagnum

EQUISETACEAE

Equisetum arvense--Common horsetail

Equisetum fluviatile--Pipes

OSMUNDACEAE

Osmunda cinnamomea--Cinnamon fern

Osmunda claytoniana--Interrupted fern

POLYPODIACEAE

Athyrium filix-femina--Lady fern

Thelypteris palustris--Marsh fern

Cystopteris fragilis--Fragile fern

PINACEAE

Larix laricina¹--Tamarack

CUPRESSACEAE

Juniperus communis--Common juniper

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

ALISMATACEAE

Sagittaria latifolia--Common arrowhead

GRAMINEAE

Bromus ciliatus--Ciliated brome grass

Poa palustris--Marsh bluegrass

Hystrix patula--Bottle brush grass

Agrostis alba²--Redtop grass

CYPERACEAE

Eleocharis sp. --Spike rush

Carex stipata--Sedge

Carex leptalea--Bristly-stalked sedge

Carex aurea--Golden-fruit sedge

Carex lasiocarpa--Woolly sedge

Carex stricta--Tussock sedge

Carex hystericina--Bottlebrush sedge

ARACEAE

Symplocarpus foetidus¹--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

LILIACEAE

Clintonia borealis--Blue bead-lily

Smilacina stellata--Starry solomon's plume

Smilacina trifolia--Three-leaved Solomon's-plume

Maianthemum canadense--Canada mayflower

Polygonatum biflorum--Solomon's seal

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Cypripedium parviflorum³--Yellow lady-slipper
Platanthera hyperborea--Northern bog orchid
Liparis loeselii--Green twayblade

SALICACEAE

Populus tremuloides--Quaking aspen
Salix pedicellaris--Bog willow
Salix bebbiana--Beaked willow
Salix candida--Sage willow

BETULACEAE

Betula alleghaniensis--Yellow birch
Betula papyrifera¹--Paper birch
Betula pumila--Bog birch
Alnus rugosa--Tag alder

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Polygonum amphibium--Smartweed

CARYOPHYLLACEAE

Stellaria longifolia--Stitchwort

RANUNCULACEAE

Caltha palustris--Marsh marigold
Thalictrum dasycarpum--Tall meadow rue

CRUCIFERAE

Cardamine bulbosa--Cardamine
Cardamine pratensis³--Cuckoo flower
Nasturtium officinale²--Water-cress

DROSERACEAE

Drosera rotundifolia--Sundew

SAXIFRAGACEAE

Mitella diphylla--Mitrewort
Ribes americanum--Wild black currant

ROSACEAE

Potentilla palustris--Bog cinquefoil
Geum aleppicum--Yellow avens
Geum rivale--Water avens
Rubus strigosus--Red raspberry
Rubus pubescens--Dwarf raspberry
Aronia melanocarpa--Black chokeberry

FABACEAE

Lathyrus palustris--Marsh vetchling

ANACARDIACEAE

Rhus vernix¹--Poison sumac
Rhus glabra--Smooth sumac

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer rubrum--Red maple
Acer saccharinum--Silver maple

RHAMNACEAE

Rhamnus alnifolia--Alder buckthorn
Rhamnus frangula²--Glossy buckthorn

VITACEAE

Parthenocissus sp. --Virginia creeper

VIOLACEAE

Viola cucullata--Blue marsh violet
Viola pallens--Smooth white violet

LYTHRACEAE

Decodon verticillatus--Water-willow

ONAGRACEAE

Epilobium leptophyllum--Linear-leaf willow herb

ARALIACEAE

Aralia nudicaulis--Wild sarsaparilla

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

CORNACEAE

Cornus canadensis--Bunchberry
Cornus stolonifera--Red osier dogwood

ERICACEAE

Andromeda glaucophylla--Bog-rosemary
Vaccinium myrtilloides--Canada blueberry

PRIMULACEAE

Lysimachia thyrsiflora--Tufted loosestrife
Trientalis borealis--Starflower

OLEACEAE

Fraxinus nigra¹--Black ash

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Lycopus uniflorus--Northern bugleweed
Lycopus americanus--Cutleaf bugleweed

SOLANACEAE

Solanum dulcamara²--Deadly nightshade

SCROPHULARIACEAE

Chelone glabra--Turtlehead
Pedicularis lanceolata--Swamp lousewort

RUBIACEAE

Mitchella repens--Partridge-berry
Galium boreale--Northern bedstraw
Galium asprellum--Rough bedstraw
Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE

Viburnum trilobum--High-bush cranberry

Viburnum lentago--Nannyberry

Lonicera dioica--Red honeysuckle

CAMPANULACEAE

Campanula aparinoides--Marsh bellflower

COMPOSITAE

Solidago uliginosa--Bog goldenrod

Solidago patula--Swamp goldenrod

Eupatorium perfoliatum--Boneset

Cirsium muticum--Swamp thistle

Total number of plant species: 99

Number of alien, or non-native, plant species: 4 (4 percent)

This approximately 32.2-acre plant community area is part of the Gilbert Lake wetland complex and consists of Southern tamarack swamp, shrub-carr, shallow marsh, and springs. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Threatened, or Endangered species were observed during the field inspection. However, Yellow lady-slipper (Cypripedium parviflorum) and Cuckoo flower (Cardamine pratensis), State of Wisconsin Special Concern plant species, were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

³ State of Wisconsin Special Concern plant species.

Plant Community Area No. 4

POLYPODIACEAE

Thelypteris palustris--Marsh fern
Dryopteris cristata--Crested wood fern

PINACEAE

Larix laricina--Tamarack

TYPHACEAE

Typha latifolia¹--Broad-leaved cat-tail
Typha angustifolia¹--Narrow-leaved cat-tail

GRAMINEAE

Calamagrostis canadensis--Canada bluejoint

ARACEAE

Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

SALICACEAE

Salix pedicellaris--Bog willow
Salix bebbiana¹--Beaked willow
Salix candida--Sage willow

BETULACEAE

Betula papyrifera--Paper birch
Betula pumila--Bog birch

URTICACEAE

Urtica dioica--Stinging nettle

POLYGONACEAE

Rumex verticillatus--Water dock
Polygonum amphibium--Smartweed
Polygonum lapathifolium--Smartweed

DROSERACEAE

Drosera rotundifolia--Sundew

ROSACEAE

Potentilla palustris--Bog cinquefoil
Rubus pubescens--Dwarf raspberry
Aronia melanocarpa--Black chokeberry

ANACARDIACEAE

Rhus vernix--Poison sumac

RHAMNACEAE

Rhamnus alnifolia--Alder buckthorn
Rhamnus franqula²--Glossy buckthorn

VIOLACEAE

Viola cucullata--Blue marsh violet

LYTHRACEAE

Decodon verticillatus--Water-willow

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

ERICACEAE

Vaccinium macrocarpon--Large cranberry

PRIMULACEAE

Lysimachia thyrsiflora--Tufted loosestrife

Trientalis borealis--Starflower

GENTIANACEAE

Menyanthes trifoliata--Bog bean

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LENTIBULARIACEAE

Utricularia sp.--Bladderwort

RUBIACEAE

Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE

Lonicera dioica--Red honeysuckle

Total number of plant species: 36

Number of alien, or non-native, plant species: 1 (3 percent)

This approximately 6.2-acre plant community area is part of the Gilbert Lake wetland complex and consists of shrub-carr and cat-tail marsh. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 5

OPHIOGLOSSACEAE

Botrychium virginianum--Rattlesnake fern

POLYPODIACEAE

Onoclea sensibilis--Sensitive fern

Dryopteris spinulosa--Wood fern

CUPRESSACEAE

Juniperus virginiana--Red-cedar

CYPERACEAE

Carex cephalophora--Oval-leaf sedge

Carex rosea--Curly-styled wood sedge

Carex deweyana--Sedge

Carex pennsylvanica--Pennsylvania sedge

Carex hirtifolia--Sedge

Carex blanda--Wood sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

LILIACEAE

Allium tricoccum--Wild leek

Smilacina racemosa¹--Solomon's plume

Maianthemum canadense--Canada Mayflower

Uvularia grandiflora--Bellwort

Polygonatum biflorum--Solomon's seal

Trillium grandiflorum--Trillium

Smilax ecirrhata--Low carrion flower

DIOSCOREACEAE

Dioscorea villosa--Wild yam

JUGLANDACEAE

Carya cordiformis--Yellow-bud hickory

Carya ovata--Shagbark hickory

BETULACEAE

Ostrya virginiana¹--Ironwood

Betula papyrifera--Paper birch

FAGACEAE

Fagus grandifolia--American beech

Quercus alba--White oak

Quercus rubra¹--Northern red oak

ULMACEAE

Ulmus americana--American elm

RANUNCULACEAE

Actaea pachypoda--White baneberry

Aquilegia canadensis--Columbine

Ranunculus recurvatus--Hooked buttercup

Thalictrum dioicum--Woodland meadow rue

Anemone quinquefolia--Wood anemone

BERBERIDACEAE

Podophyllum peltatum¹--Mayapple

Caulophyllum thalictroides--Blue cohosh

MENISPERMACEAE

Menispermum canadense--Moonseed

CRUCIFERAE

Barbarea vulgaris²--Yellow rocket

Hesperis matronalis²--Dame's rocket

SAXIFRAGACEAE

Mitella diphylla--Mitrewort

Ribes cynosbati--Pasture gooseberry

ROSACEAE

Fragaria virginiana--Wild strawberry

Potentilla simplex--Old field cinquefoil

Geum canadense--White avens

Rubus allegheniensis--Common blackberry

Rubus occidentalis--Black raspberry

Prunus serotina--Black cherry

Prunus virginiana--Choke-cherry

Pyrus malus²--Apple

FABACEAE

Lathyrus sp.--Wild pea

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum¹--Prickly-ash

ANACARDIACEAE

Rhus radicans--Poison ivy

Rhus typhina--Staghorn sumac

ACERACEAE

Acer saccharum¹--Sugar maple

Acer rubrum--Red maple

Acer negundo--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus cathartica²--Common buckthorn

VITACEAE

Parthenocissus sp.--Virginia creeper

Vitis riparia--River-bank grape

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

Viola pubescens--Downy yellow violet

THYMELAEACEAE

Dirca palustris--Leatherwood

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

UMBELLIFERAE

Sanicula sp.--Snakeroot

Osmorhiza claytoni--Sweet cicely

Osmorhiza longistylis--Anise-root

CORNACEAE

Cornus alternifolia--Pagoda dogwood

ERICACEAE

Pyrola elliptica--Large-leaved shinleaf

OLEACEAE

Fraxinus americana--White ash

POLEMONIACEAE

Polemonium reptans--Jacob's ladder

BORAGINACEAE

Hackelia virginiana--Stickseed

LABIATAE

Glechoma hederacea²--Creeping Charlie

SCROPHULARIACEAE

Scrophularia marilandica--Late figwort

PLANTAGINACEAE

Plantago major²--Common plantain

RUBIACEAE

Galium aparine--Annual bedstraw

Galium boreale--Northern bedstraw

Galium triflorum--Sweet-scented bedstraw

Galium concinnum--Shining bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Lonicera dioica--Red honeysuckle

Lonicera X bella²--Hybrid honeysuckle

Triosteum aurantiacum--Wild coffee

COMPOSITAE

Helianthus strumosus--Pale-leaved wood sunflower

Erigeron strigosus--Daisy fleabane

Eupatorium rugosum--White snakeroot

Arctium minus²--Common burdock

Prenanthes alba--White lettuce

Taraxacum officinale²--Common dandelion

Total number of plant species: 90

Number of alien, or non-native, plant species: 8 (9 percent)

This approximately 15.4-acre plant community area is part of the Gilbert Lake Southern upland forest complex and consists of second-growth mesic hardwoods. Disturbances to the plant community area include past selective cutting of timber and driveways to residences. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 6

EQUISETACEAE

Equisetum arvense--Common horsetail
Equisetum fluviatile--Pipes

POLYPODIACEAE

Thelypteris palustris--Marsh fern
Dryopteris cristata--Crested wood fern

TYPHACEAE

Typha latifolia¹--Broad-leaved cat-tail
Typha angustifolia--Narrow-leaved cat-tail

GRAMINEAE

Poa pratensis--Kentucky bluegrass
Calamagrostis canadensis--Canada bluejoint grass
Phalaris arundinacea^{1,2}--Reed canary grass

CYPERACEAE

Carex stricta¹--Tussock sedge
Carex lanuginosa¹--Woolly sedge
Carex lacustris¹--Lake sedge

ARACEAE

Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

LILIACEAE

Lilium michiganense--Michigan lily
Smilacina stellata--Starry solomon's plume

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Salix nigra--Black willow
Salix bebbiana¹--Beaked willow
Salix discolor--Pussy willow
Salix sp.¹--Willow

BETULACEAE

Corylus americana--Hazel-nut
Betula papyrifera--Paper birch

FAGACEAE

Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Rumex orbiculatus--Great water dock
Rumex verticillatus--Water dock

RANUNCULACEAE

Caltha palustris--Marsh-marigold

BERBERIDACEAE

Podophyllum peltatum--Mayapple

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Rubus strigosus--Red raspberry

Pyrus malus^c--Apple

Crataegus sp. --Hawthorn

Spiraea alba--Meadow sweet

FABACEAE

Vicia sp. --Vetch

GERANIACEAE

Geranium maculatum--Wild geranium

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus franqula²--Glossy buckthorn

VITACEAE

Parthenocissus sp. --Virginia creeper

UMBELLIFERAE

Cicuta maculata--Spotted water-hemlock

Oxypolis riqidior--Cowbane

CORNACEAE

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

PRIMULACEAE

Lysimachia thyrsiflora--Tufted loosestrife

OLEACEAE

Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

COMPOSITAE

Helianthus sp. --Sunflower

Rudbeckia hirta--Black-eyed Susan

Achillea millefolium^c--Yarrow

Solidago altissima--Tall goldenrod

Solidago graminifolia--Grassleaf goldenrod

Aster sagittifolius--Arrowleaf aster

Aster lucidulus--Swamp aster

Total number of plant species: 54

Number of alien, or non-native, plant species: 4 (7 percent)

This approximately 7.1-acre plant community area is part of the Gilbert Lake wetland complex and consists of shallow marsh and sedge meadow. Disturbances to the plant community area include past agricultural uses. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 7

EQUISETACEAE

Equisetum arvense--Common horsetail
Equisetum fluviatile¹--Pipes

POLYPODIACEAE

Onoclea sensibilis--Sensitive fern
Cystopteris fragilis--Fragile fern
Thelypteris palustris--Marsh fern
Dryopteris cristata--Crested wood fern

PINACEAE

Larix laricina--Tamarack

CUPRESSACEAE

Juniperus virginiana--Red-cedar

TYPHACEAE

Typha latifolia¹--Broad-leaved cat-tail

ALISMACEAE

Alisma plantago-aquatica--Water plantain

GRAMINEAE

Glyceria canadensis--Rattlesnake grass
Calamagrostis canadensis--Canada bluejoint
Phalaris arundinacea²--Reed canary grass
Leersia oryzoides--Rice cut grass

CYPERACEAE

Scirpus atrovirens--Green bulrush
Carex stipata--Sedge
Carex gracillima--Sedge
Carex stricta¹--Tussock sedge
Carex lacustris--Lake sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit
Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

LILIACEAE

Smilacina stellata--Starry solomon's plume
Maianthemum canadense--Canada Mayflower
Polygonatum biflorum--Solomon's seal
Trillium grandiflorum--Trillium

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Cypripedium parviflorum³--Yellow lady-slipper

SALICACEAE

Populus tremuloides--Quaking aspen
Salix bebbiana¹--Beaked willow
Salix sp. --Willow

BETULACEAE

Betula alleghaniensis--Yellow birch

Betula papyrifera--Paper birch

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Laportea canadensis--Wood nettle

Pilea pumila--Clearweed

POLYGONACEAE

Rumex verticillatus--Water dock

Polygonum amphibium--Smartweed

RANUNCULACEAE

Caltha palustris--Marsh-marigold

Ranunculus recurvatus--Tall buttercup

Anemone quinquefolia--Wood anemone

CRUCIFERAE

Cardamine pennsylvanica--Cardamine

SAXIFRAGACEAE

Mitella diphylla--Mitrewort

Ribes hirtellum--Smooth gooseberry

Ribes americanum--Wild black currant

ROSACEAE

Geum aleppicum--Yellow avens

Rubus strigosus--Red raspberry

Rubus pubescens--Dwarf raspberry

FABACEAE

Amphicarpa bracteata--Hog peanut

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE

Rhus vernix--Poison sumac

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer saccharum--Sugar maple

Acer rubrum--Red maple

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus cathartica²--Common buckthorn

VITACEAE

Vitis riparia--River-bank grape

VIOLACEAE

Viola cucullata--Blue marsh violet

ONAGRACEAE

Epilobium coloratum--Willow herb

UMBELLIFERAE

Sanicula sp.--Snakeroot

Cicuta bulbifera--Water-hemlock

Cicuta maculata--Spotted water-hemlock

Oxypolis rigidior--Cowbane

CORNACEAE

Cornus amomum¹--Silky dogwood

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

PRIMULACEAE

Lysimachia ciliata--Fringed loosestrife

Lysimachia thyrsoflora--Tufted loosestrife

OLEACEAE

Fraxinus pennsylvanica--Green ash

Fraxinus nigra--Black ash

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Scutellaria lateriflora--Sideflower skullcap

Prunella vulgaris--Selfheal

Lycopus uniflorus--Northern bugleweed

Lycopus americanus--Cutleaf bugleweed

SOLANACEAE

Solanum dulcamara²--Deadly nightshade

SCROPHULARIACEAE

Chelone glabra--Turtlehead

Pedicularis lanceolata--Swamp lousewort

RUBIACEAE

Galium trifidum--Small bedstraw

Galium sp. --Cleavers

CAPRIFOLIACEAE

Viburnum trilobum--High-bush cranberry

Viburnum lentago--Nannyberry

COMPOSITAE

Bidens sp. --Beggar's-ticks

Senecio aureus--Golden ragwort

Solidago patula--Swamp goldenrod

Aster lucidulus--Swamp aster

Eupatorium maculatum--Joe-pye weed

Eupatorium rugosum--White snakeroot

Prenanthes alba--White lettuce

Taraxacum officinale²--Common dandelion

Total number of plant species: 90

Number of alien, or non-native, plant species: 4 (4 percent)

This approximately 74.4-acre plant community area is part of the Gilbert Lake wetland complex and consists of shallow marsh, sedge meadow, cat-tail marsh, and shrub-carr. Disturbances to the plant community area include past water level changes created by construction of County Highway Z, with the subsequent death of most tamaracks and lowland hardwood trees. No Federal- or State-designated Threatened, or Endangered species were observed during the field inspection. However, Yellow lady-slipper (Cypripedium parviflorum), a State of Wisconsin Special Concern plant species, was observed during the field inspection.

-
- 1 Dominant or co-dominant plant species.
 - 2 Alien, or non-native, plant species.
 - 3 State of Wisconsin Special Concern plant species.

Plant Community Area No. 8

POLYPODIACEAE

Onoclea sensibilis--Sensitive fern
Athyrium filix-femina--Lady fern

CUPRESSACEAE

Juniperus virginiana--Red-cedar

GRAMINEAE

Hystrix patula--Bottle brush grass

CYPERACEAE

Carex rosea--Curly-styled wood sedge
Carex deweyana--Sedge
Carex pennsylvanica--Pennsylvania sedge
Carex hirtifolia--Sedge
Carex blanda--Wood sedge
Carex gracillima--Sedge

ARACEAE

Arisaema triphillum¹--Jack-in-the-pulpit

LILIACEAE

Allium canadense--Wild garlic
Smilacina racemosa--Solomon's plume
Smilacina stellata--Starry solomon's plume
Maianthemum canadense--Canada Mayflower
Convallaria majalis²--Lily-of-the-valley
Trillium grandiflorum--Trillium
Smilax ecirrhata--Low carrion flower

DIOSCOREACEAE

Dioscorea villosa--Wild yam

ORCHIDACEAE

Epipactis helleborine²--Helleborine orchid

SALICACEAE

Populus grandidentata¹--Large-toothed aspen
Populus tremuloides--Quaking aspen

JUGLANDACEAE

Juglans cinerea--Butternut
Carya cordiformis--Yellow-bud hickory
Carya ovata--Shagbark hickory

BETULACEAE

Ostrya virginiana¹--Ironwood
Betula papyrifera--Paper birch

FAGACEAE

Quercus alba--White oak
Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

RANUNCULACEAE

Actaea sp.--Baneberry
Ranunculus abortivus--Small-flowered buttercup
Ranunculus recurvatus--Hooked buttercup
Thalictrum dioicum--Woodland meadow rue
Anemone quinquefolia--Wood anemone
Hepatica americana--Round-lobed hepatica

BERBERIDACEAE

Podophyllum peltatum¹--Mayapple

CRUCIFERAE

Barbarea vulgaris²--Yellow rocket

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Fragaria virginiana--Wild strawberry
Potentilla simplex--Old field cinquefoil
Geum canadense--White avens
Rubus allegheniensis--Common blackberry
Rubus occidentalis--Black raspberry
Agrimonia gryposepala--Agrimony
Rosa sp. --Wild rose
Prunus serotina--Black cherry
Prunus virginiana--Choke-cherry

FABACEAE

Vicia sp. --Vetch

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum¹--Wild geranium

RUTACEAE

Zanthoxylum americanum¹--Prickly-ash

ANACARDIACEAE

Rhus radicans--Poison ivy

CELASTRACEAE

Celastrus scandens--Bittersweet

ACERACEAE

Acer saccharum¹--Sugar maple
Acer negundo--Boxelder

RHAMNACEAE

Rhamnus cathartica²--Common buckthorn

VITACEAE

Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana¹--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

UMBELLIFERAE

Sanicula sp.--Snakeroot

CORNACEAE

Cornus alternifolia--Pagoda dogwood

Cornus racemosa¹--Grey dogwood

OLEACEAE

Fraxinus americana¹--White ash

Fraxinus nigra--Black ash

APOCYNACEAE

Apocynum androsaemifolium--Dogbane

SCROPHULARIACEAE

Scrophularia marilandica--Late figwort

Veronica serpyllifolia²--Thyme-leaved speedwell

RUBIACEAE

Galium aparine--Annual bedstraw

Galium circaezans--Wild licorice

Galium concinnum--Shining bedstraw

CAPRIFOLIACEAE

Viburnum opulus²--High-bush cranberry

Viburnum lentago--Nannyberry

Viburnum rafinesquianum--Downy arrow-wood

Lonicera prolifera--Yellow honeysuckle

Lonicera X bella²--Hybrid honeysuckle

Triosteum aurantiacum--Wild coffee

COMPOSITAE

Helianthus strumosus--Pale-leaved wood sunflower

Solidago flexicaulis--Zig-zag goldenrod

Aster macrophyllus--Large-leaved aster

Erigeron strigosus--Daisy fleabane

Arctium minus²--Common burdock

Prenanthes alba--White lettuce

Taraxacum officinale²--Common dandelion

Total number of plant species: 86

Number of alien, or non-native, plant species: 8 (9 percent)

This approximately 52.1-acre plant community area is part of the Gilbert Lake upland forest complex and consists of disturbed second-growth mesic woods on rough morainal topography. Disturbances to the plant community area include past selective cutting of timber and grazing by dairy cows. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 9

CYPERACEAE

Carex stipata--Sedge

Carex sp. --Sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

LEMNACEAE

Lemna minor--Lesser duckweed

IRIDACEAE

Iris virginica--Virginia blueflag

ULMACEAE

Ulmus americana--American elm

RANUNCULACEAE

Ranunculus longirostris¹--White water-crowfoot

Ranunculus recurvatus--Hooked buttercup

SAXIFRAGACEAE

Ribes americanum--Wild black currant

BALSAMINACEAE

Impatiens biflora--Jewelweed

VITACEAE

Parthenocissus sp.--Virginia creeper

Vitis riparia--River-bank grape

UMBELLIFERAE

Sanicula sp.--Snakeroot

CORNACEAE

Cornus amomum¹--Silky dogwood

Cornus stolonifera¹--Red osier dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

RUBIACEAE

Galium triflorum--Sweet-scented bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Total number of plant species: 18

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 1.2-acre plant community area consists of second-growth lowland hardwoods and ephemeral pond. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

Plant Community Area No. 10

EQUISETACEAE

Equisetum arvense--Common horsetail

CYPERACEAE

Carex stipata--Sedge

Carex lanuginosa--Wooly sedge

Carex tuckermanii--Tuckerman's sedge

IRIDACEAE

Iris virginica--Virginia blueflag

ULMACEAE

Ulmus americana--American elm

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Geum canadense--White avens

Geum aleppicum--Yellow avens

RHAMNACEAE

Rhamnus cathartica¹--Common buckthorn

VITACEAE

Vitis riparia--River-bank grape

Parthenocissus sp. --Virginia creeper

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

UMBELLIFERAE

Sium suave--Water parsnip

CORNACEAE

Cornus amomum--Silky dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

LABIATAE

Lycopus americanus--Cutleaf bugleweed

SOLANACEAE

Solanum dulcamara¹--Deadly nightshade

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Sambucus canadensis--Elderberry

COMPOSITAE

Bidens sp. --Beggar's-ticks

Solidago gigantea--Giant goldenrod

Total number of plant species: 22

Number of alien, or non-native, plant species: 2 (9 percent)

This approximately 1.8-acre plant community area consists of second growth, Southern lowland hardwoods and ephemeral ponds. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 11

EQUISETACEAE

Equisetum arvense--Common horsetail
Equisetum fluviatile--Pipes

TYPHACEAE

Typha latifolia¹--Broad-leaved cat-tail

CYPERACEAE

Carex lacustris¹--Lake sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

LEMNACEAE

Lemna minor--Lesser duckweed

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Salix sp.¹--Willow

ULMACEAE

Ulmus americana--American elm

SAXIFRAGACEAE

Ribes americanum--Wild black currant

BALSAMINACEAE

Impatiens biflora--Jewelweed

VITACEAE

Vitis riparia--River-bank grape

TILIACEAE

Tilia americana--Basswood

ONAGRACEAE

Epilobium coloratum--Willow herb

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

CORNACEAE

Cornus amomum¹--Silky dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

CAPRIFOLIACEAE

Viburnum rafinesquianum--Downy arrow-wood

Total number of plant species: 18

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 0.7-acre plant community area consists of open water, deep marsh, and shallow marsh. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species

Plant Community Area No. 12

EQUISETACEAE

Equisetum fluviatile--Pipes

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

ALISMACEAE

Alisma plantago-aquatica--Water plantain

GRAMINEAE

Glyceria striata--Fowl manna grass

CYPERACEAE

Carex bebbii--Sedge

Carex granularis--Sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

LILIACEAE

Smilacina stellata--Starry solomon's plume

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Salix nigra--Black willow

Salix bebbiana--Beaked willow

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Urtica dioica--Stinging nettle

POLYGONACEAE

Polygonum amphibium--Smartweed

CRUCIFERAE

Barbarea vulgaris¹--Yellow rocket

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ANACARDIACEAE

Rhus radicans--Poison ivy

ACERACEAE

Acer negundo--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus frangula¹--Glossy buckthorn

VITACEAE

Vitis riparia--River-bank grape

UMBELLIFERAE

Sium suave--Water parsnip

Cicuta maculata--Spotted water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

Fraxinus nigra--Black ash

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Mentha arvensis--Wild mint

SOLANACEAE

Solanum dulcamara¹--Deadly nightshade

Total number of plant species: 32

Number of alien, or non-native, plant species: 3 (9 percent)

This approximately 0.6-acre plant community area consists of shallow marsh, Southern sedge meadow, and second growth, Southern lowland hardwoods. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 13

EQUISETACEAE

Equisetum fluviatile--Pipes

POLYPODIACEAE

Onclea sensibilis--Sensitive fern

GRAMINEAE

Glyceria striata--Fowl manna grass

Phalaris arundinacea'--Reed canary grass

CYPERACEAE

Carex stipata--Sedge

Carex sp. --Sedge

ARACEAE

Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Salix bebbiana--Beaked willow

ULMACEAE

Ulmus americana--American elm

NYMPHAEACEAE

Nuphar advena--Yellow water lily

RANUNCULACEAE

Ranunculus longirostris--White water-crowfoot

Ranunculus flabellaris--Yellow water-crowfoot

SAXIFRAGACEAE

Ribes americanum--Wild black currant

VITACEAE

Vitis riparia--River-bank grape

TILIACEAE

Tilia americana--Basswood

UMBELLIFERAE

Cicuta maculata--Spotted water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

Fraxinus nigra--Black ash

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Total number of plant species: 23

Number of alien, or non-native, plant species: 1 (4 percent)

This approximately 1.9-acre plant community area consists of open water, fresh (wet) meadow, and second growth, Southern lowland hardwoods. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 14

CUPRESSACEAE

Juniperus virginiana--Red-cedar

GRAMINEAE

Poa pratensis--Kentucky bluegrass

Agropyron repens¹--Quack grass

Phleum pratense¹--Timothy grass

Phalaris arundinacea¹--Reed canary grass

CYPERACEAE

Carex blanda--Wood sedge

Carex gracillima--Sedge

LILIACEAE

Allium canadense--Wild garlic

Smilacina racemosa--Solomon's plume

Smilax ecirrhata--Low carrion flower

DIOSCOREACEAE

Dioscorea villosa--Wild yam

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Rumex crispus¹--Curly dock

RANUNCULACEAE

Anemone virginiana--Canada anemone

ROSACEAE

Fragaria virginiana--Wild strawberry

Geum aleppicum--Yellow avens

Rubus allegheniensis--Common blackberry

Rubus occidentalis--Black raspberry

Rubus pubescens--Dwarf raspberry

Prunus serotina--Black cherry

Crataegus sp. --Hawthorn

FABACEAE

Trifolium repens¹--White clover

Melilotus officinalis¹--Yellow sweet clover

Medicago lupulina¹--Black medick

Vicia americana--American vetch

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE

Rhus typhina--Staghorn sumac

RHAMNACEAE

Rhamnus cathartica¹--Common buckthorn

VITACEAE

Vitis riparia--River-bank grape

Parthenocissus quinquefolia--Virginia creeper

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

CORNACEAE

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE

Asclepias syriaca--Common milkweed

CONVOLVULACEAE

Convolvulus arvensis¹--Field bindweed

Convolvulus spithameus--Low bindweed

LABIATAE

Monarda fistulosa--Wild bergamot

SCROPHULARIACEAE

Linaria vulgaris¹--Butter-and-eggs

RUBIACEAE

Galium triflorum--Sweet-scented bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Lonicera X bella¹--Hybrid honeysuckle

Triosteum aurantiacum--Wild coffee

COMPOSITAE

Achillea millefolium¹--Yarrow

Solidago altissima--Tall goldenrod

Aster sagittifolius--Arrowleaf aster

Erigeron strigosus--Daisy fleabane

Arctium minus¹--Common burdock

Cirsium arvense¹--Canada thistle

Prenanthes alba--White lettuce

Taraxacum officinale¹--Common dandelion

Lactuca serriola¹--Prickly wild lettuce

Tragopogon pratensis¹--Common goat's beard

Total number of plant species: 54

Number of alien, or non-native, plant species: 17 (31 percent)

This approximately 21.5-acre plant community area is part of the Gilbert Lake upland forest complex and consists of young, second-growth Southern dry-mesic woods and old field. Disturbances to the plant community area include past clearing of native vegetation for agricultural uses and grazing by dairy cows. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 15

EQUISETACEAE

Equisetum arvense--Common horsetail

POLYPODIACEAE

Onoclea sensibilis--Sensitive fern

PINACEAE

Picea abies¹--Norway spruce

CUPRESSACEAE

Juniperus virginiana--Red-cedar

TYPHACEAE

Typha angustifolia--Narrow-leaved cat-tail

GRAMINEAE

Bromus inermis¹--Smooth brome grass

Glyceria striata--Fowl manna grass

Poa compressa¹--Canada bluegrass

Phalaris arundinacea¹--Reed canary grass

CYPERACEAE

Carex stipata--Sedge

Carex bebbii²--Sedge

Carex granularis--Sedge

Carex lanuginosa--Wooly sedge

Carex stricta--Tussock sedge

JUNCACEAE

Juncus sp. --Rush

SALICACEAE

Salix exigua--Sand-bar willow

Salix bebbiana--Beaked willow

ULMACEAE

Ulmus americana²--American elm

POLYGONACEAE

Polygonum amphibium--Smartweed

CARYOPHYLLACEAE

Stellaria media¹--Common chickweed

RANUNCULACEAE

Ranunculus acris¹--Tall buttercup

Thalictrum dasycarpum--Tall meadow rue

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Fragaria virginiana--Wild strawberry

Geum canadense--White avens

Rubus strigosus²--Red raspberry

Agrimonia gryposepala--Agrimony

Rosa sp. --Wild rose

Crataegus sp. --Hawthorn

FABACEAE
Vicia sp. --Vetch

OXALIDACEAE
Oxalis stricta--Common wood sorrel

ANACARDIACEAE
Rhus radicans--Poison ivy

ACERACEAE
Acer saccharum--Sugar maple

VITACEAE
Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

UMBELLIFERAE
Daucus carota¹--Queen Anne's lace
Cicuta maculata--Spotted water-hemlock

CORNACEAE
Cornus stolonifera--Red osier dogwood

OLEACEAE
Fraxinus pennsylvanica--Green ash

APOCYNACEAE
Apocynum androsaemifolium--Dogbane

LABIATAE
Monarda fistulosa--Wild bergamot
Lycopus uniflorus--Northern bugleweed
Lycopus americanus--Cutleaf bugleweed

PLANTAGINACEAE
Plantago major¹--Common plantain

RUBIACEAE
Galium aparine--Annual bedstraw

CAPRIFOLIACEAE
Viburnum lentago--Nannyberry
Lonicera X bella¹--Hybrid honeysuckle

COMPOSITAE
Rudbeckia hirta--Black-eyed Susan
Achillea millefolium¹--Yarrow
Solidago gigantea²--Giant goldenrod
Aster sagittifolius--Arrowleaf aster
Erigeron strigosus--Daisy fleabane
Eupatorium perfoliatum--Boneset
Cirsium vulgare¹--Bull thistle
Lactuca serriola¹--Prickly wild lettuce

Total number of plant species: 55

Number of alien, or non-native, plant species: 12 (22 percent)

This approximately 3.0-acre plant community area consists of shallow marsh, fresh (wet) meadow, old field, and young second growth, Southern lowland hardwoods. Disturbances to the plant community area include past clearing of native vegetation for agricultural uses and selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

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- ¹ Alien, or non-native, plant species.
² Co-dominant plant species.

Plant Community Area No. 16

EQUISETACEAE

Equisetum arvense--Common horsetail

OSMUNDACEAE

Osmunda claytoniana--Interrupted fern

CUPRESSACEAE

Juniperus virginiana--Red-cedar

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

GRAMINEAE

Glyceria grandis--Reed manna grass

Phalaris arundinacea¹--Reed canary grass

CYPERACEAE

Carex stipata--Sedge

Carex lanuginosa--Wooly sedge

Carex stricta--Tussock sedge

Carex comosa--Bristly sedge

Carex lacustris²--Lake sedge

ARACEAE

Symplocarpus foetidus--Skunk cabbage

SALICACEAE

Populus tremuloides--Quaking aspen

Populus deltoides--Cottonwood

Salix nigra--Black willow

Salix bebbiana²--Beaked willow

FAGACEAE

Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Urtica dioica--Stinging nettle

POLYGONACEAE

Polygonum amphibium--Smartweed

RANUNCULACEAE

Caltha palustris--Marsh-marigold

Ranunculus acris¹--Tall buttercup

SAXIFRAGACEAE

Saxifraga pennsylvanica--Swamp saxifrage

Ribes americanum--Wild black currant

ROSACEAE

Fragaria virginiana--Wild strawberry

Geum canadense--White avens

Geum aleppicum--Yellow avens

Rubus strigosus--Red raspberry

FABACEAE

Vicia sp. --Vetch
Amphicarpa bracteata--Hog peanut

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ACERACEAE

Acer negundo²--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

VITACEAE

Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

VIOLACEAE

Viola cucullata--Blue marsh violet

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

UMBELLIFERAE

Sium suave--Water parsnip

CORNACEAE

Cornus stolonifera--Red osier dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

LABIATAE

Scutellaria lateriflora--Sideflower skullcap
Stachys hispida--Marsh hedgenettle
Lycopus uniflorus--Northern bugleweed
Lycopus americanus--Cutleaf bugleweed

SOLANACEAE

Solanum dulcamara¹--Deadly nightshade

SCROPHULARIACEAE

Pedicularis lanceolata--Swamp lousewort

PLANTAGINACEAE

Plantago major¹--Common plantain

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry
Lonicera X bella¹--Hybrid honeysuckle

COMPOSITAE

Solidago gigantea--Giant goldenrod
Solidago graminifolia--Grassleaf goldenrod
Aster lucidulus--Swamp aster
Erigeron strigosus--Daisy fleabane

Eupatorium maculatum--Joe-pye weed
Eupatorium perfoliatum--Boneset
Arctium minus¹--Common burdock
Cirsium arvense¹--Canada thistle
Taraxacum officinale¹--Common dandelion

Total number of plant species: 61

Number of alien, or non-native, plant species: 8 (13 percent)

This approximately 5.8-acre plant community area consists of Southern sedge meadow, shrub-carr, and second growth, Southern lowland hardwoods. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

² Co-dominant plant species.

Plant Community Area No. 17

PINACEAE

Picea abies¹--Norway spruce
Pinus resinosa¹--Red pine

CUPRESSACEAE

Juniperus virginiana--Red-cedar

GRAMINEAE

Bromus inermis¹--Smooth brome grass
Poa compressa¹--Canada bluegrass
Agropyron repens¹--Quack grass
Phalaris arundinacea¹--Reed canary grass

CYPERACEAE

Carex granularis--Sedge

SALICACEAE

Populus tremuloides--Quaking aspen

ULMACEAE

Ulmus americana--American elm

RANUNCULACEAE

Anemone virginiana--Thimbleweed

ROSACEAE

Rubus strigosus--Red raspberry
Prunus serotina--Black cherry

FABACEAE

Trifolium pratense¹--Red clover
Melilotus officinalis¹--Yellow sweet clover
Medicago lupulina¹--Black medick
Medicago sativa¹--Alfalfa

CELASTRACEAE

Celastrus scandens--Bittersweet

RHAMNACEAE

Rhamnus frangula¹--Glossy buckthorn

VITACEAE

Vitis riparia--River-bank grape

ELAEAGNACEAE

Elaeagnus angustifolia¹--Russian-olive

UMBELLIFERAE

Daucus carota¹--Queen Anne's lace
Pastinaca sativa¹--Wild parsnip

CORNACEAE

Cornus stolonifera--Red osier dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE

Asclepias syriaca--Common milkweed

CONVOLVULACEAE

Convolvulus arvensis¹--Field bindweed

LABIATAE

Monarda fistulosa--Wild bergamot

SCROPHULARIACEAE

Linaria vulgaris¹--Butter-and-eggs

PLANTAGINACEAE

Plantago major¹--Common plantain

CAPRIFOLIACEAE

Lonicera x bella¹--Hybrid honeysuckle

COMPOSITAE

Rudbeckia hirta--Black-eyed Susan

Achillea millefolium¹--Yarrow

Chrysanthemum leucanthemum¹--Ox-eye daisy

Erigeron strigosus--Daisy fleabane

Taraxacum officinale¹--Common dandelion

Lactuca serriola¹--Prickly wild lettuce

Tragopogon pratensis¹--Common goat's beard

Total number of plant species: 38

Number of alien, or non-native, plant species: 23 (60 percent)

This approximately 16.8-acre plant community area consists of old field. Disturbances to the plant community area include grazing and past clearing of vegetation for agricultural uses. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 18

OPHIOGLOSSACEAE

Botrychium virginianum--Rattlesnake fern

POLYPODIACEAE

Athyrium filix-femina--Lady fern

Cystopteris fragilis--Fragile fern

Dryopteris spinulosa--Wood fern

CUPRESSACEAE

Juniperus virginiana--Red cedar

GRAMINEAE

Festuca obtusa--Nodding fescue

Poa compressa¹--Canada bluegrass

CYPERACEAE

Carex cephalophora--Oval-leaf sedge

Carex rosea⁴--Curly-styled wood sedge

Carex stipata--Sedge

Carex deweyana--Sedge

Carex normalis--Larger straw sedge

Carex pennsylvanica--Pennsylvania sedge

Carex hirtifolia--Sedge

Carex blanda--Wood sedge

Carex granularis--Sedge

Carex gracillima--Sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus--Skunk cabbage

LILIACEAE

Allium canadense--Wild garlic

Smilacina racemosa--Solomon's plume

Maianthemum canadense--Canada Mayflower

Polygonatum biflorum--Solomon's seal

Trillium grandiflorum--Trillium

Smilax herbacea--Carrion flower

Smilax ecirrhata--Low carrion flower

Smilax hispida--Bristly green brier

DIOSCOREACEAE

Dioscorea villosa--Wild yam

ORCHIDACEAE

Epipactis helleborine¹--Helleborine orchid

SALICACEAE

Populus grandidentata--Large-toothed aspen

JUGLANDACEAE

Juglans nigra--Black walnut

Carya cordiformis--Yellow-bud hickory

Carya ovata--Shagbark hickory

BETULACEAE

Ostrya virginiana²--Ironwood

FAGACEAE

Quercus alba--White oak
Quercus macrocarpa--Bur oak
Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm
Celtis occidentalis--Hackberry

URTICACEAE

Parietaria pennsylvanica--Pellitory

RANUNCULACEAE

Actaea pachypoda--White baneberry
Aquilegia canadensis--Columbine
Ranunculus abortivus--Small-flowered buttercup
Ranunculus recurvatus--Hooked buttercup
Thalictrum dioicum--Woodland meadow rue
Anemone quinquefolia--Wood anemone
Hepatica americana--Round-lobed hepatica

BERBERIDACEAE

Podophyllum peltatum--Mayapple
Caulophyllum thalictroides--Blue cohosh

PAPAVERACEAE

Sanquinaria canadensis--Bloodroot

CRUCIFERAE

Barbarea vulgaris¹--Yellow rocket

SAXIFRAGACEAE

Ribes cynosbati--Pasture gooseberry

ROSACEAE

Fragaria virginiana--Wild strawberry
Potentilla simplex--Old field cinquefoil
Geum canadense--White avens
Geum aleppicum--Yellow avens
Rubus occidentalis--Black raspberry
Agrimonia gryposepala--Agrimony
Prunus serotina--Black cherry
Prunus virginiana--Choke-cherry

FABACEAE

Vicia americana--American vetch
Lathyrus palustris--Marsh vetchling
Amphicarpa bracteata--Hog peanut

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ACERACEAE

Acer saccharum²--Sugar maple

RHAMNACEAE

Rhamnus cathartica¹--Common buckthorn

VITACEAE

Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

UMBELLIFERAE

Sanicula sp.--Snakeroot
Osmorhiza claytoni--Sweet cicely
Osmorhiza longistylis--Anise-root

CORNACEAE

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus americana²--White ash

POLEMONIACEAE

Polemonium reptans--Jacob's ladder

LABIATAE

Prunella vulgaris--Selfheal
Leonurus cardiaca¹--Motherwort
Monarda fistulosa--Wild bergamot

SCROPHULARIACEAE

Scrophularia lanceolata--Early figwort
Linaria vulgaris¹--Butter-and-eggs

PHRYMACEAE

Phryma leptostachya--Lopseed

PLANTAGINACEAE

Plantago major¹--Common plantain

RUBIACEAE

Galium aparine--Annual bedstraw
Galium circaezans--Wild licorice
Galium triflorum--Sweet-scented bedstraw
Galium concinnum--Shining bedstraw

CAPRIFOLIACEAE

Viburnum acerifolium--Maple-leaf viburnum
Viburnum lentago--Nannyberry
Diervilla lonicera--Bush-honeysuckle
Lonicera prolifera--Yellow honeysuckle
Lonicera X bella¹--Hybrid honeysuckle
Triosteum aurantiacum--Wild coffee

COMPOSITAE

Helianthus strumosus--Pale-leaved wood sunflower
Achillea millefolium¹--Yarrow
Aster macrophyllus--Large-leaved aster
Aster sagittifolius--Arrowleaf aster
Aster lateriflorus--Calico aster
Erigeron strigosus--Daisy fleabane
Antennaria plantaginifolia--Pussy-toes
Eupatorium rugosum²--White snakeroot
Arctium minus¹--Common burdock
Cirsium vulgare¹--Bull thistle
Taraxacum officinale¹--Common dandelion

Total number of plant species: 107

Number of alien, or non-native, plant species: 12 (11 percent)

This approximately 10.8-acre plant community area is part of the Gilbert Lake upland forest complex and consists of second-growth Southern mesic hardwoods situated on an esker. Disturbances to the plant community area include footpaths and past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

² Co-dominant plant species.

Plant Community Area No. 19

EQUISETACEAE

Equisetum arvense--Common horsetail

CUPRESSACEAE

Juniperus communis--Common juniper

Juniperus virginiana--Red-cedar

GRAMINEAE

Poa compressa¹--Canada bluegrass

Phalaris arundinacea¹--Reed canary grass

LILIACEAE

Smilax ecirrhata--Low carrion flower

JUGLANDACEAE

Juglans nigra--Black walnut

Carya ovata--Shagbark hickory

BETULACEAE

Betula papyrifera--Paper birch

FAGACEAE

Fagus grandifolia--American beech

Quercus alba--White oak

Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

CARYOPHYLLACEAE

Cerastium vulgatum¹--Mouse-ear chickweed

RANUNCULACEAE

Aquilegia canadensis--Columbine

SAXIFRAGACEAE

Ribes cynosbati--Pasture gooseberry

ROSACEAE

Fragaria virginiana--Wild strawberry

Potentilla simplex--Old field cinquefoil

Rubus strigosus--Red raspberry

Agrimonia gryposepala--Agrimony

Rosa sp. --Wild rose

FABACEAE

Trifolium pratense¹--Red clover

Medicago lupulina¹--Black medick

Medicago sativa¹--Alfalfa

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ACERACEAE

Acer saccharum--Sugar maple

VITACEAE

Vitis riparia--River-bank grape

Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana--Basswood

CORNACEAE

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus americana--White ash

Fraxinus pennsylvanica--Green ash

LABIATAE

Monarda fistulosa--Wild bergamot

SCROPHULARIACEAE

Verbascum thapsus¹--Mullein

Linaria vulgaris¹--Butter-and-eggs

PLANTAGINACEAE

Plantago major¹--Common plantain

RUBIACEAE

Galium aparine--Annual bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Lonicera X bella¹--Hybrid honeysuckle

COMPOSITAE

Rudbeckia hirta--Black-eyed Susan

Achillea millefolium¹--Yarrow

Solidago altissima--Tall goldenrod

Erigeron strigosus--Daisy fleabane

Hieracium aurantiacum¹--Orange hawkweed

Taraxacum officinale¹--Common dandelion

Tragopogon pratensis¹--Common goat's beard

Total number of plant species: 47

Number of alien, or non-native, plant species: 14 (30 percent)

This approximately 17.6-acre plant community area is part of the Gilbert Lake upland forest complex and consists of second growth, Southern mesic hardwoods and old field. Disturbances to the plant community area include past selective cutting of trees; mowing; grazing; past agricultural practices; and a roadway. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 20

SPHAGNACEAE

Sphagnum spp. --Sphagnum

EQUISETACEAE

Equisetum arvense--Common horsetail

Equisetum fluviatile--Pipes

OSMUNDACEAE

Osmunda cinnamomea--Cinnamon fern

POLYPODIACEAE

Pteridium aquilinum--Bracken fern

Matteuccia struthiopteris--Ostrich fern

Onoclea sensibilis--Sensitive fern

Cystopteris bulbifera--Bulblet fern

Thelypteris palustris--Marsh fern

Dryopteris cristata--Crested wood fern

PINACEAE

Larix laricina¹--Tamarack

CUPRESSACEAE

Juniperus communis--Common juniper

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

ALISMACEAE

Sagittaria latifolia--Common arrowhead

GRAMINEAE

Glyceria striata--Fowl manna grass

Glyceria grandis--Reed manna grass

Poa palustris--Marsh bluegrass

Hystrix patula--Bottle brush grass

Calamagrostis canadensis--Canada bluejoint

Phalaris arundinacea⁴--Reed canary grass

CYPERACEAE

Scirpus subterminalis--Bulrush

Scirpus validus--Soft-stemmed bulrush

Carex diandra--Lesser panicled sedge

Carex stipata--Sedge

Carex trisperma--Three-seed sedge

Carex interior--Sedge

Carex leptalea--Bristly-stalked sedge

Carex aurea--Golden-fruit sedge

Carex granularis--Sedge

Carex limosa--Mud sedge

Carex stricta--Tussock sedge

Carex comosa--Bristly sedge

Carex pseudo-cyperus--Sedge

Carex lacustris--Lake sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus¹--Skunk cabbage

Calla palustris--Water arum

LEMNACEAE

Lemna sp. --Lemna

LILIACEAE

Smilacina trifolia--Three-leaved Solomon's plume

Maianthemum canadense--Canada mayflower

Polygonatum biflorum--Solomon's seal

Smilax hispida--Bristly green brier

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Cypripedium parviflorum³--Yellow lady-slipper

Cypripedium reginae³--Showy lady-slipper

Platanthera hyperborea--Northern bog orchid

SALICACEAE

Salix exigua--Sand-bar willow

Salix bebbiana--Beaked willow

Salix candida--Sage willow

Salix sp. --Willow

BETULACEAE

Betula alleghaniensis¹--Yellow birch

Betula papyrifera--Paper birch

Alnus rugosa--Tag alder

FAGACEAE

Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Pilea pumila--Clearweed

POLYGONACEAE

Rumex verticillatus--Water dock

CARYOPHYLLACEAE

Stellaria longifolia--Stitchwort

RANUNCULACEAE

Aquilegia canadensis--Columbine

Caltha palustris--Marsh marigold

Ranunculus sceleratus--Cursed crowfoot

Ranunculus recurvatus--Hooked buttercup

Thalictrum dasycarpum--Tall meadow rue

CRUCIFERAE

Cardamine bulbosa--Cardamine

Nasturtium officinale²--Water-cress

SAXIFRAGACEAE

Saxifraga pennsylvanica--Swamp saxifrage

Mitella diphylla--Mitrewort

Ribes hirtellum--Smooth gooseberry

Ribes americanum--Wild black currant

ROSACEAE

Fragaria virginiana--Wild strawberry
Potentilla fruticosa--Shrubby cinquefoil
Geum rivale--Water avens
Rubus occidentalis--Black raspberry
Rubus strigosus--Red raspberry
Rubus pubescens¹--Dwarf raspberry
Rosa palustris--Swamp rose
Aronia melanocarpa--Black chokeberry

FABACEAE

Lathyrus palustris--Marsh vetchling
Apios americana--Ground nut

ANACARDIACEAE

Rhus radicans--Poison ivy
Rhus vernix¹--Poison sumac

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer saccharum--Sugar maple
Acer rubrum¹--Red maple

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus alnifolia--Alder buckthorn
Rhamnus frangula²--Glossy buckthorn

VITACEAE

Vitis riparia--River-bank grape

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola cucullata--Blue marsh violet
Viola pallens--Smooth white violet

ONAGRACEAE

Epilobium coloratum--Willow herb

HIPPURIDACEAE

Hippuris vulgaris--Mare's-tail

ARALIACEAE

Aralia nudicaulis--Wild sarsaparilla

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock
Cicuta maculata--Spotted water-hemlock
Oxypolis rigidior--Cowbane

CORNACEAE

Cornus canadensis--Bunchberry
Cornus alternifolia--Pagoda dogwood
Cornus stolonifera¹--Red osier dogwood
Cornus racemosa--Grey dogwood

ERICACEAE

Vaccinium myrtilloides--Canada blueberry

PRIMULACEAE

Lysimachia thyrsiflora--Tufted loosestrife

Trientalis borealis--Starflower

OLEACEAE

Fraxinus nigra¹--Black ash

GENTIANACEAE

Menyanthes trifoliata--Bog bean

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Lycopus uniflorus--Northern bugleweed

Mentha arvensis--Wild mint

SOLANACEAE

Solanum dulcamara²--Deadly nightshade

SCROPHULARIACEAE

Chelone glabra--Turtlehead

Pedicularis lanceolata--Swamp lousewort

PHRYMACEAE

Phryma leptostachya--Lopseed

RUBIACEAE

Mitchella repens--Partridge-berry

Galium boreale--Northern bedstraw

Galium asprellum--Rough bedstraw

Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE

Viburnum opulus²--High-bush cranberry

Viburnum trilobum--High-bush cranberry

Viburnum lentago--Nannyberry

Lonicera dioica--Red honeysuckle

COMPOSITAE

Bidens sp. --Beggar's-ticks

Senecio aureus--Golden ragwort

Solidago patula--Swamp goldenrod

Aster puniceus--Red-stemmed aster

Eupatorium maculatum--Joe-pye weed

Eupatorium perfoliatum--Boneset

Eupatorium rugosum--White snakeroot

Cirsium muticum--Swamp thistle

Taraxacum officinale²--Common dandelion

Total number of plant species: 131

Number of alien, or non-native, plant species: 6 (5 percent)

This approximately 25.4-acre plant community area is part of the Gilbert Lake tamarack swamp-wetland complex and consists of mature tamarack swamp, shrub-carr, second growth, Southern wet to wet-mesic lowland hardwoods, streams, and springs. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Threatened or Endangered species were observed during the field inspection. However, Yellow lady-slipper (Cypripedium parviflorum) and Showy lady-slipper (Cypripedium reginae), State of Wisconsin Special Concern plant species, were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

³ State of Wisconsin Special Concern plant species.

Plant Community Area No. 21

CUPRESSACEAE

Juniperus virginiana--Red-cedar

TYPHACEAE

Typha latifolia¹--Broad-leaved cat-tail

Typha angustifolia¹--Narrow-leaved cat-tail

GRAMINEAE

Phalaris arundinacea²--Reed canary grass

CYPERACEAE

Carex stipata--Sedge

Carex stricta--Tussock sedge

Carex comosa--Bristly sedge

LEMNACEAE

Lemna minor--Lesser duckweed

DIOSCOREACEAE

Dioscorea villosa--Wild yam

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Populus tremuloides--Quaking aspen

Salix nigra--Black willow

Salix exigua--Sand-bar willow

Salix bebbiana--Beaked willow

ULMACEAE

Ulmus americana--American elm

MORACEAE

Morus alba²--White mulberry

RANUNCULACEAE

Thalictrum dasycarpum--Tall meadow rue

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Spiraea alba--Meadow sweet

FABACEAE

Vicia sp. --Vetch

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE

Rhus typhina--Staghorn sumac

VITACEAE

Vitis riparia--River-bank grape

Parthenocissus sp. --Virginia creeper

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

PRIMULACEAE

Lysimachia thyrsoiflora--Tufted loosestrife

LABIATAE

Lycopus uniflorus--Northern bugleweed

RUBIACEAE

Galium asprellum--Rough bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Lonicera X bella²--Hybrid honeysuckle

COMPOSITAE

Aster lucidulus--Swamp aster

Eupatorium maculatum--Joe-pye weed

Cirsium arvense²--Canada thistle

Total number of plant species: 34

Number of alien, or non-native, plant species: 4 (12 percent)

This approximately 4.0-acre plant community area consists of open water, deep marsh, and shallow marsh. Disturbances to the plant community area include siltation from surrounding land use activities, and construction of a roadway on the west side of the wetland. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 22

IRIDACEAE

Iris virginica--Virginia blueflag

ULMACEAE

Ulmus americana--American elm

Total number of plant species: 2

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 1.9-acre plant community area consists of a woodland pond with open water. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

Plant Community Area No. 23

ALISMATACEAE

Sagittaria latifolia--Common arrowhead

GRAMINEAE

Calamagrostis canadensis--Canada bluejoint

Phalaris arundinacea¹--Reed canary grass

CYPERACEAE

Eleocharis sp. --Spike rush

Carex lacustris--Lake sedge

LEMNACEAE

Lemna minor--Lesser duckweed

IRIDACEAE

Iris virginica--Blue flag iris

SALICACEAE

Salix exigua--Sandbar willow

Salix sp. --Willow

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Polygonum sagittatum--Arrow-leaved tear-thumb

ROSACEAE

Spiraea alba--Meadow sweet

BALSAMINACEAE

Impatiens biflora--Jewelweed

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

LABIATAE

Physostegia virginiana--False dragonhead

SCROPHULARIACEAE

Chelone glabra--Turtlehead

Total number of plant species: 16

Number of alien, or non-native, plant species: 1 (6 percent)

This approximately 0.2-acre plant community area consists of open water, deep marsh, and shallow marsh. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 24

POLYPODIACEAE

Onoclea sensibilis--Sensitive fern

ALISMATACEAE

Alisma plantago-aquatica--Water plantain

GRAMINEAE

Glyceria striata--Fowl manna grass

Phalaris arundinacea--Reed canary grass

CYPERACEAE

Carex lacustris--Common lake sedge

Carex stipata--Sedge

LEMNACEAE

Lemna minor--Lesser duckweed

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Pilea pumila--Clearweed

SAXIFRAGACEAE

Ribes americanum--Wild black currant

BALSAMINACEAE

Impatiens biflora--Jewelweed

VITACEAE

Vitis riparia--River-bank grape

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

PRIMULACEAE

Lysimachia ciliata--Fringed loosestrife

Lysimachia thyrsiflora--Tufted loosestrife

SOLANACEAE

Solanum dulcamara¹--Deadly nightshade

SCROPHULARIACEAE

Chelone glabra--Turtlehead

RUBIACEAE

Galium asprellum--Rough bedstraw

Galium sp. --Cleavers

COMPOSITAE

Bidens sp. --Beggar's-ticks

Total number of plant species: 20

Number of alien, or non-native, plant species: 2 (10 percent)

This approximately 0.6-acre plant community area consists of an ephemeral woodland pond with open water and shallow marsh. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 25

POLYPODIACEAE

Thelypteris palustris--Marsh fern

PINACEAE

Larix laricina--Tamarack

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

CYPERACEAE

Eleocharis sp. --Spike rush

Scirpus acutus--Hard-stemmed bulrush

Carex interior--Sedge

Carex leptalea--Bristly-stalked sedge

Carex lasiocarpa--Woolly sedge

Carex aquatilis--Aquatic sedge

Carex lacustris--Lake sedge

SALICACEAE

Salix exigua--Sand-bar willow

Salix candida--Sage willow

Salix sp. --Willow

BETULACEAE

Betula pumila--Bog birch

RANUNCULACEAE

Caltha palustris--Marsh marigold

ROSACEAE

Potentilla palustris--Bog cinquefoil

Rubus pubescens--Dwarf raspberry

ANACARDIACEAE

Rhus vernix--Poison sumac

HYPERICACEAE

Triadenum fraseri--Marsh St. John's wort

LYTHRACEAE

Decodon verticillatus--Water-willow

CORNACEAE

Cornus stolonifera--Red osier dogwood

LABIATAE

Stachys palustris--Hedge-nettle

RUBIACEAE

Galium trifidum--Small bedstraw

COMPOSITAE

Eupatorium maculatum--Joe-pye weed

Eupatorium perfoliatum--Boneset

Total number of plant species: 26

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 1.0-acre plant community area is part of the Gilbert Lake wetland complex and consists of open sedge mat with scattered shrubs. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

Plant Community Area No. 26

EQUISETACEAE

Equisetum fluviatile--Pipes

PINACEAE

Larix laricina¹--Tamarack

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

ALISMACEAE

Sagittaria latifolia--Common arrowhead

GRAMINEAE

Phalaris arundinacea²--Reed canary grass

CYPERACEAE

Carex stipata--Sedge

Carex stricta--Tussock sedge

Carex pseudo-cyperus--Sedge

Carex lacustris--Lake sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Salix nigra--Black willow

BETULACEAE

Betula alleghaniensis--Yellow birch

Betula papyrifera--Paper birch

Alnus rugosa--Tag alder

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Rumex verticillatus--Water dock

RANUNCULACEAE

Caltha palustris--Marsh marigold

CRUCIFERAE

Nasturtium officinale^{1,2}--Water-cress

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Rubus occidentalis--Black raspberry

Rubus strigosus--Red raspberry

ANACARDIACEAE

Rhus vernix--Poison sumac

ACERACEAE

Acer negundo--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

VITACEAE

Vitis riparia--River-bank grape

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

OLEACEAE

Fraxinus pennsylvanica--Green ash

Fraxinus nigra--Black ash

SOLANACEAE

Solanum dulcamara²--Deadly nightshade

RUBIACEAE

Galium asprellum--Rough bedstraw

Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE

Viburnum trilobum--Highbush-cranberry

Viburnum lentago--Nannyberry

COMPOSITAE

Bidens sp. --Beggar's-ticks

Eupatorium maculatum--Joe-pye weed

Eupatorium perfoliatum--Boneset

Total number of plant species: 40

Number of alien, or non-native, plant species: 3 (8 percent)

This approximately 8.2-acre plant community area is part of the Gilbert Lake wetland complex and consists of second-growth lowland hardwoods, shrub-carr, tamarck relict, and seepage areas. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 27

EQUISETACEAE

Equisetum arvense--Common horsetail

POLYPODIACEAE

Onoclea sensibilis--Sensitive fern

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

ALISMACEAE

Alisma plantago-aquatica--Water plantain

GRAMINEAE

Bromus inermis¹--Smooth brome grass

Glyceria striata--Fowl manna grass

Poa pratensis--Kentucky bluegrass

Phleum pratense¹--Timothy grass

Phalaris arundinacea^{1,2}--Reed canary grass

CYPERACEAE

Eleocharis erythropoda--Spike-rush

Scirpus cyperinus²--Wool-grass

Carex vulpinoidea²--Fox sedge

Carex stipata²--Sedge

Carex lanuginosa²--Woolly sedge

Carex stricta--Tussock sedge

Carex hystericina--Bottlebrush sedge

JUNCACEAE

Juncus Greenei²--Greene's rush

SALICACEAE

Salix exigua--Sand-bar willow

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Urtica dioica--Stinging nettle

POLYGONACEAE

Polygonum amphibium--Smartweed

CARYOPHYLLACEAE

Cerastium arvense¹--Mouse-ear chickweed

ROSACEAE

Rubus occidentalis--Black raspberry

Spiraea alba--Meadow sweet

FABACEAE

Trifolium pratense¹--Red clover

Trifolium repens¹--White clover

Medicago lupulina¹--Black medick

Medicago sativa¹--Alfalfa

Vicia sp. --Vetch

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE

Rhus radicans--Poison ivy

VIOLACEAE

Viola cucullata--Blue marsh violet

CORNACEAE

Cornus stolonifera--Red osier dogwood

PLANTAGINACEAE

Plantago major¹--Common plantain

COMPOSITAE

Solidago gigantea--Giant goldenrod

Eriqeron strigosus--Daisy fleabane

Arctium minus¹--Common burdock

Cirsium vulgare¹--Bull thistle

Taraxacum officinale¹--Common dandelion

Total number of plant species: 42

Number of alien, or non-native, plant species: 12 (28 percent)

This approximately 3.2-acre plant community area is part of the Gilbert Lake wetland complex and consists of Southern sedge meadow and fresh (wet) meadow. Disturbances to the plant community area include past clearing of vegetation for agricultural uses. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

² Co-dominant plant species.

Plant Community Area No. 28

SPHAGNACEAE

Sphagnum spp. --Sphagnum

EQUISETACEAE

Equisetum fluviatile--Pipes

OSMUNDACEAE

Osmunda cinnamomea¹--Cinnamon fern

POLYPODIACEAE

Cystopteris bulbifera--Bulblet fern

Thelypteris palustris--Marsh fern

Dryopteris cristata--Crested wood fern

PINACEAE

Larix laricina¹--Tamarack

GRAMINEAE

Glyceria striata--Fowl manna grass

Calamagrostis canadensis--Canada bluejoint

CYPERACEAE

Scirpus cyperinus--Wool-grass

Eriophorum angustifolium--Narrow-leaved cotton-grass

Carex stipata--Sedge

Carex trisperma--Three-seed sedge

Carex interior--Sedge

Carex leptalea--Bristly-stalked sedge

Carex limosa--Mud sedge

Carex aquatilis--Aquatic sedge

Carex pseudo-cyperus--Sedge

Carex lacustris--Lake sedge

ARACEAE

Symplocarpus foetidus--Skunk cabbage

LEMNACEAE

Lemna minor--Lesser duckweed

LILIACEAE

Clintonia borealis--Blue bead-lily

Smilacina trifolia¹--Three-leaved Solomon's plume

Maianthemum canadense--Canada Mayflower

Polygonatum biflorum--Solomon's seal

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Cypripedium acaule--Moccasin flower

Pogonia ophioglossoides--Snake-mouth orchid

SALICACEAE

Salix nigra--Black willow

Salix exigua--Sand-bar willow

Salix bebbiana--Beaked willow

Salix petiolaris--Petioled willow

BETULACEAE

Betula alleghaniensis--Yellow birch

Betula papyrifera--Paper birch

Alnus rugosa--Tag alder

FAGACEAE

Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana--American elm

POLYGONACEAE

Rumex verticillatus--Water dock

RANUNCULACEAE

Coptis trifolia--Goldthread

Caltha palustris--Marsh marigold

SARRACENIACEAE

Sarracenia purpurea--Pitcher plant

DROSERACEAE

Drosera rotundifolia--Sundew

ROSACEAE

Potentilla palustris--Bog cinquefoil

Rubus strigosus--Red raspberry

Rubus pubescens--Dwarf raspberry

Aronia melanocarpa--Black chokeberry

Amelanchier laevis--Allegheny serviceberry

FABACEAE

Apios americana--Ground nut

ANACARDIACEAE

Rhus vernix--Poison sumac

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer rubrum--Red maple

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus alnifolia--Alder buckthorn

VITACEAE

Parthenocissus sp. --Virginia creeper

VIOLACEAE

Viola cucullata--Blue marsh violet

ONAGRACEAE

Epilobium leptophyllum--Linear-leaf willow herb

ARALIACEAE

Aralia nudicaulis--Wild sarsaparilla

UMBELLIFERAE
 Cicuta bulbifera--Water-hemlock

CORNACEAE
 Cornus stolonifera--Red osier dogwood

ERICACEAE
 Chamaedaphne calyculata¹--Leatherleaf
 Gaylussacia baccata--Huckleberry
 Vaccinium angustifolium--Blueberry
 Vaccinium macrocarpon--Large cranberry
 Vaccinium oxycoccos--Small cranberry

PRIMULACEAE
 Lysimachia thyrsiflora--Tufted loosestrife
 Trientalis borealis--Starflower

OLEACEAE
 Fraxinus pennsylvanica--Green ash
 Fraxinus nigra--Black ash

GENTIANACEAE
 Menyanthes trifoliata--Bog bean

LABIATAE
 Lycopus uniflorus--Northern bugleweed

SOLANACEAE
 Solanum dulcamara²--Deadly nightshade

SCROPHULARIACEAE
 Chelone glabra--Turtlehead

RUBIACEAE
 Galium asprellum--Rough bedstraw

CAPRIFOLIACEAE
 Viburnum lentago--Nannyberry
 Lonicera X bella²--Hybrid honeysuckle

COMPOSITAE
 Bidens sp. --Beggar's-ticks
 Aster umbellatus--Flat-top aster

Total number of plant species: 77

Number of alien, or non-native, plant species: 2 (3 percent)

This approximately 5.2-acre plant community area consists of good quality acidic northern bog, shrub-carr, and tamarack swamp. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 29

SPHAGNACEAE

Sphagnum spp. --Sphagnum

POLYPODIACEAE

Thelypteris palustris¹--Marsh fern

PINACEAE

Larix laricina--Tamarack

CUPRESSACEAE

Juniperus communis--Common juniper

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

GRAMINEAE

Phragmites communis--Tall reed grass

Calamagrostis inexpansa²--Fen bluejoint

CYPERACEAE

Eleocharis erythropoda--Spike-rush

Scirpus validus--Soft-stemmed bulrush

Scirpus acutus--Hard-stemmed bulrush

Carex diandra--Lesser paniced sedge

Carex lasiocarpa--Woolly sedge

Carex limosa--Mud sedge

Carex stricta--Tussock sedge

Carex aquatilis--Aquatic sedge

Carex lacustris--Lake sedge

Carex vesicaria--Inflated sedge

Carex retrorsa--Retorse sedge

ARACEAE

Symplocarpus foetidus--Skunk cabbage

Calla palustris--Water arum

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Cypripedium reginae²--Showy lady-slipper

SALICACEAE

Salix petiolaris--Petioloed willow

Salix candida--Sage willow

BETULACEAE

Betula papyrifera--Paper birch

Betula pumila¹--Bog birch

Alnus rugosa--Tag alder

POLYGONACEAE

Rumex verticillatus--Water dock

NYMPHAEACEAE

Nuphar variegatum--Yellow water lily

SARRACENIACEAE
Sarracenia purpurea--Pitcher plant

DROSERACEAE
Drosera rotundifolia--Sundew

ROSACEAE
Potentilla palustris--Bog cinquefoil
Rubus pubescens¹--Dwarf raspberry
Aronia melanocarpa--Black chokeberry
Amelanchier laevis--Allegheny serviceberry

ANACARDIACEAE
Rhus vernix¹--Poison sumac

ACERACEAE
Acer rubrum--Red maple

BALSAMINACEAE
Impatiens biflora--Jewelweed

RHAMNACEAE
Rhamnus alnifolia--Alder buckthorn

HYPERICACEAE
Triadenum fraseri--Marsh St. John's wort

LYTHRACEAE
Decodon verticillatus--Water-willow

ONAGRACEAE
Epilobium leptophyllum--Linear-leaf willow herb

CORNACEAE
Cornus stolonifera--Red osier dogwood

ERICACEAE
Andromeda glaucophylla--Bog-rosemary
Gaylussacia baccata--Huckleberry
Vaccinium oxycoccos--Small cranberry

PRIMULACEAE
Trientalis borealis--Starflower

OLEACEAE
Fraxinus nigra--Black ash

GENTIANACEAE
Menyanthes trifoliata--Bog bean

SCROPHULARIACEAE
Pedicularis lanceolata--Swamp lousewort

RUBIACEAE
Galium boreale--Northern bedstraw
Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE
Lonicera dioica--Red honeysuckle
Lonicera villosa--Northern fly honeysuckle

COMPOSITAE

Solidago uliginosa--Bog goldenrod
Eupatorium maculatum--Joe-pye weed
Cirsium muticum--Swamp thistle

Total number of plant species: 58

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 6.5-acre plant community area is part of the Gilbert Lake wetland complex and consists of bog, shrub-carr, and sedge meadow. Disturbances to the plant community area include construction of boat launches and lake access corridors. No Federal- or State-designated Threatened, or Endangered species were observed during the field inspection. However, Showy lady-slipper (Cypridpedium reginae) and Fen blue-joint (Calamagrostis inexpansa), State of Wisconsin Special Concern plant species, were observed during the field inspection.

¹ Co-dominant plant species.

² State of Wisconsin Special Concern plant species.

Plant Community Area No. 30

EQUISETACEAE

Equisetum arvense--Common horsetail

ALISMATACEAE

Alisma plantago-aquatica--Water plantain

GRAMINEAE

Glyceria striata--Fowl manna grass

Calamagrostis canadensis--Canada bluejoint

Phalaris arundinacea^{1,2}--Reed canary grass

CYPERACEAE

Carex vulpinoidea--Fox sedge

Carex hystericina--Bottlebrush sedge

Carex comosa--Bristly sedge

Carex lacustris--Lake sedge

LEMNACEAE

Lemna minor--Lesser duckweed

LILIACEAE

Smilax herbacea--Carrion flower

IRIDACEAE

Iris virginica--Virginia blueflag

SALICACEAE

Salix nigra¹--Black willow

Salix exigua--Sand-bar willow

Salix bebbiana--Beaked willow

ULMACEAE

Ulmus americana¹--American elm

URTICACEAE

Urtica dioica--Stinging nettle

RANUNCULACEAE

Thalictrum dasycarpum--Tall meadow rue

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Geum canadense--White avens

Rubus strigosus--Red raspberry

Rosa palustris--Swamp rose

FABACEAE

Lathyrus palustris--Marsh vetchling

Amphicarpa bracteata--Hog peanut

ANACARDIACEAE

Rhus radicans--Poison ivy

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer negundo--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

VITACEAE

Vitis riparia--River-bank grape

Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana--Basswood

UMBELLIFERAE

Sanicula sp.--Snakeroot

Cicuta maculata--Spotted water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

PRIMULACEAE

Lysimachia thyrsiflora--Tufted loosestrife

Lysimachia nummularia²--Moneywort

OLEACEAE

Fraxinus pennsylvanica--Green ash

Fraxinus nigra--Black ash

SOLANACEAE

Solanum dulcamara²--Deadly nightshade

RUBIACEAE

Galium asprellum--Rough bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Sambucus canadensis--Elderberry

COMPOSITAE

Rudbeckia laciniata--Green-headed coneflower

Helenium autumnale--Sneezeweed

Solidago gigantea--Giant goldenrod

Arctium minus¹--Common burdock

Total number of plant species: 47

Number of alien, or non-native, plant species: 4 (8 percent)

This approximately 3.1-acre plant community area consists of open water, willow thicket, and second growth, Southern lowland hardwoods. Disturbances to the plant community area include past selective cutting of trees and construction of a roadway that bisects the plant community area. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 31

SPHAGNACEAE

Sphagnum spp. --Sphagnum

EQUISETACEAE

Equisetum arvense--Common horsetail

OSMUNDACEAE

Osmunda cinnamomea¹--Cinnamon fern

POLYPODIACEAE

Adiantum pedatum--Maidenhair fern

Onoclea sensibilis--Sensitive fern

Cystopteris bulbifera--Bulblet fern

Thelypteris palustris--Marsh fern

Dryopteris crinata--Crested wood fern

PINACEAE

Larix laricina¹--Tamarack

CUPRESSACEAE

Juniperus communis--Common juniper

Juniperus virginiana--Red-cedar

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

JUNCAGINACEAE

Triglochin palustre²--Slender bog arrow-grass

ALISMACEAE

Sagittaria latifolia--Common arrowhead

GRAMINEAE

Glyceria striata--Fowl manna grass

Poa palustris--Marsh bluegrass

Phragmites communis--Tall reed grass

Leersia oryzoides--Rice cut grass

CYPERACEAE

Cyperus englemannii--False rusty nut sedge

Cyperus diandrus--Umbrella flat sedge

Carex stipata--Sedge

Carex interior--Sedge

Carex leptalea--Bristly-stalked sedge

Carex gracillima--Sedge

Carex lasiocarpa--Woolly sedge

Carex stricta--Tussock sedge

Carex aquatilis--Aquatic sedge

Carex lacustris--Lake sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus¹--Skunk cabbage

LILIACEAE

Clintonia borealis--Blue bead-lily

Smilacina stellata--Starry Solomon's plume

Smilacina trifolia--Three-leaved Solomon's plume

Maianthemum canadense--Canada Mayflower
Polygonatum biflorum--Solomon's seal
Smilax herbacea--Carrion flower

DIOSCOREACEAE

Dioscorea villosa--Wild yam

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Cypripedium reginae³--Showy lady-slipper
Platanthera hyperborea--Northern bog orchid
Liparis loeselii--Green twayblade

SALICACEAE

Populus tremuloides--Quaking aspen
Salix nigra--Black willow
Salix candida--Sage willow
Salix bebbiana--Beaked willow
Salix petiolaris--Petioled willow
Salix sp. --Willow

BETULACEAE

Carpinus caroliniana--Musclewood
Betula alleghaniensis¹--Yellow birch
Betula papyrifera--Paper birch
Betula pumila--Bog birch
Alnus rugosa--Tag alder

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Boehmeria cylindrica--False nettle
Pilea pumila--Clearweed

POLYGONACEAE

Rumex verticillatus--Water dock

RANUNCULACEAE

Ranunculus recurvatus--Hooked buttercup
Anemone quinquefolia--Wood anemone

CRUCIFERAE

Cardamine bulbosa--Cardamine

SARRACENIACEAE

Sarracenia purpurea--Pitcher plant

SAXIFRAGACEAE

Mitella diphylla--Mitrewort
Ribes missouriense--Missouri gooseberry

ROSACEAE

Fragaria virginiana--Woodland strawberry
Potentilla palustris--Bog cinquefoil
Rubus pubescens--Dwarf raspberry
Aronia melanocarpa--Black chokeberry

FABACEAE

Lathyrus palustris--Marsh vetchling
Apios americana--Ground nut

ANACARDIACEAE

Rhus radicans--Poison ivy
Rhus vernix¹--Poison sumac

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer rubrum--Red maple

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus alnifolia--Alder buckthorn
Rhamnus frangula⁴--Glossy buckthorn

VITACEAE

Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

VIOLACEAE

Viola cucullata--Blue marsh violet

LYTHRACEAE

Decodon verticillatus--Water-willow

ONAGRACEAE

Epilobium leptophyllum--Linear-leaf willow herb

ARALIACEAE

Aralia nudicaulis--Wild sarsaparilla
Aralia racemosa--Spikenard

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock
Cicuta maculata--Spotted water-hemlock
Oxypolis rigidior--Cowbane

CORNACEAE

Cornus canadensis--Bunchberry
Cornus alternifolia--Pagoda dogwood
Cornus stolonifera--Red osier dogwood
Cornus racemosa--Grey dogwood

ERICACEAE

Vaccinium myrtilloides--Canada blueberry

PRIMULACEAE

Lysimachia ciliata--Fringed loosestrife
Lysimachia thysiflora--Tufted loosestrife
Trientalis borealis--Starflower

OLEACEAE

Fraxinus pennsylvanica--Green ash
Fraxinus nigra--Black ash

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Scutellaria epilobiifolia--Marsh skullcap

Lycopus uniflorus--Northern bugleweed

SCROPHULARIACEAE

Pedicularis lanceolata--Swamp lousewort

RUBIACEAE

Mitchella repens--Partridge-berry

Galium boreale--Northern bedstraw

Galium asprellum--Rough bedstraw

Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE

Viburnum trilobum--Highbush-cranberry

Viburnum lentago--Nannyberry

Lonicera dioica--Red honeysuckle

CAMPANULACEAE

Campanula aparinoides--Marsh bellflower

COMPOSITAE

Helenium autumnale--Sneezeweed

Bidens sp. --Beggar's-ticks

Senecio aureus--Golden ragwort

Solidago uliginosa--Bog goldenrod

Solidago patula--Swamp goldenrod

Aster junciformis--Rush aster

Aster umbellatus--Flat-top aster

Erigeron annuus--Annual fleabane

Eupatorium maculatum--Joe-pye weed

Eupatorium purpureum--Purple Joe-pye weed

Eupatorium perfoliatum--Boneset

Eupatorium rugosum--White snakeroot

Cirsium muticum--Swamp thistle

Prenanthes alba--White lettuce

Taraxacum officinale⁴--Common dandelion

Total number of plant species: 125

Number of alien, or non-native, plant species: 2 (2 percent)

This approximately 20.0-acre plant community area is part of the Gilbert Lake wetland complex and consists of tamarack swamp and shrub-carr. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Endangered species were observed during the field inspection. However, Slender bog-arrow-grass (Triglochin palustre), a State of Wisconsin Threatened plant species, and Showy lady-slipper (Cypripedium reginae), a State of Wisconsin Special Concern plant species, were both observed during the field inspection.

¹ Co-dominant plant species.

² State of Wisconsin Threatened plant species.

³ State of Wisconsin Special Concern plant species.

⁴ Alien, or non-native, plant species.

Plant Community Area No. 32

GRAMINEAE

Phalaris arundinacea¹--Reed canary grass

LEMNACEAE

Lemna minor--Lesser duckweed

SALICACEAE

Salix exigua--Sand-bar willow

ULMACEAE

Ulmus americana--American elm

OLEACEAE

Fraxinus pennsylvanica--Green ash

LABIATAE

Leonurus cardiaca¹--Motherwort

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Total number of plant species: 6

Number of alien, or non-native, plant species: 2 (33 percent)

This approximately 0.3-acre plant community area is part of the Gilbert Lake wetland complex and consists of second growth, Southern lowland hardwoods with areas of open water. Disturbances to the plant community area include past selective cutting of timber and siltation from adjacent agricultural activities. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

Plant Community Area No. 33

CUPRESSACEAE

Juniperus communis--Common juniper
Juniperus virginiana--Red-cedar

GRAMINEAE

Bromus inermis^{1,2}--Smooth brome grass
Poa compressa¹--Canada bluegrass
Phleum pratense¹--Timothy grass
Phalaris arundinacea¹--Reed canary grass
Leersia oryzoides--Rice cut grass

CYPERACEAE

Carex cephalophora--Oval-leaf sedge
Carex rosea--Curly-styled wood sedge
Carex hirtifolia--Sedge
Carex blanda--Wood sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

LILIACEAE

Smilacina racemosa--Solomon's plume
Maianthemum canadense--Canada Mayflower
Polygonatum biflorum--Solomon's seal
Trillium grandiflorum--Trillium
Smilax ecirrhata--Low carrion flower
Smilax hispida--Bristly green brier

ORCHIDACEAE

Epipactis helleborine¹--Helleborine
Liparis lilifolia--Purple twayblade

SALICACEAE

Populus grandidentata--Large-toothed aspen

JUGLANDACEAE

Juglans nigra--Black walnut
Carya cordiformis--Yellow-bud hickory
Carya ovata--Shagbark hickory

BETULACEAE

Ostrya virginiana--Ironwood

ULMACEAE

Ulmus americana²--American elm

RANUNCULACEAE

Ranunculus abortivus--Small-flowered buttercup
Ranunculus recurvatus--Hooked buttercup
Thalictrum dioicum--Woodland meadow rue
Anemone virginiana--Canada anemone
Anemone quinquefolia--Wood anemone
Clematis virginiana--Virgin's bower

BERBERIDACEAE

Podophyllum peltatum--Mayapple

SAXIFRAGACEAE

Ribes cynosbati--Pasture gooseberry

ROSACEAE

Fragaria virginiana--Wild strawberry

Geum canadense--White avens

Rubus allegheniensis--Common blackberry

Rubus occidentalis--Black raspberry

Prunus serotina--Black cherry

Prunus virginiana--Choke-cherry

FABACEAE

Trifolium pratense¹--Red clover

Trifolium repens¹--White clover

Melilotus officinalis¹--Yellow sweet clover

Medicago lupulina¹--Black medick

Medicago sativa¹--Alfalfa

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum²--Prickly-ash

ANACARDIACEAE

Rhus radicans--Poison ivy

Rhus glabra--Smooth sumac

CELASTRACEAE

Celastrus scandens--Bittersweet

ACERACEAE

Acer saccharum--Sugar maple

Acer negundo--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus cathartica¹--Common buckthorn

Rhamnus frangula¹--Glossy buckthorn

VITACEAE

Vitis riparia--River-bank grape

Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

CORNACEAE

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus americana--White ash
Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE

Asclepias verticillata--Whorled milkweed
Asclepias exaltata--Poke milkweed
Asclepias syriaca--Common milkweed

CONVOLVULACEAE

Convolvulus arvensis¹--Field bindweed

LABIATAE

Nepeta cataria¹--Catnip
Leonurus cardiaca¹--Motherwort
Monarda fistulosa--Wild bergamot

SCROPHULARIACEAE

Verbascum thapsus¹--Mullein
Linaria vulgaris¹--Butter-and-eggs

PLANTAGINACEAE

Plantago major¹--Common plantain

RUBIACEAE

Galium aparine--Annual bedstraw
Galium concinnum--Shining bedstraw

CAPRIFOLIACEAE

Viburnum opulus¹--Highbush-cranberry
Viburnum lentago--Nannyberry
Lonicera prolifera--Yellow honeysuckle
Lonicera X bella¹--Hybrid honeysuckle

COMPOSITAE

Achillea millefolium¹--Yarrow
Solidago altissima--Tall goldenrod
Aster sagittifolius--Arrowleaf aster
Aster lateriflorus--Calico aster
Erigeron strigosus--Daisy fleabane
Arctium minus¹--Common burdock
Cirsium arvense¹--Canada thistle
Prenanthes alba--White lettuce
Hieracium aurantiacum¹--Orange hawkweed
Taraxacum officinale¹--Common dandelion
Lactuca serriola¹--Prickly wild lettuce
Tragopogon pratensis¹--Common goat's beard

Total number of plant species: 92

Number of alien, or non-native, plant species: 27 (29 percent)

This approximately 24.9-acre plant community area consists of old field and second-growth Southern dry-mesic woods. Disturbances to the plant community area include past selective cutting of trees; clearing of native vegetation; and past agricultural land management activities including grazing.

No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

² Co-dominant plant species.

Plant Community Area No. 34

EQUISETACEAE

Equisetum arvense--Common horsetail

POLYPODIACEAE

Adiantum pedatum--Maidenhair fern

Cystopteris fragilis--Fragile fern

Dryopteris spinulosa--Wood fern

TAXACEAE

Taxus canadensis--Canada yew

CUPRESSACEAE

Juniperus communis--Common juniper

GRAMINEAE

Festuca obtusa--Nodding fescue grass

Glyceria striata--Fowl manna grass

Poa sp.--Bluegrass

CYPERACEAE

Carex rosea--Curly-styled wood sedge

Carex granularis--Sedge

Carex gracillima--Sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus--Skunk cabbage

LILIACEAE

Smilacina racemosa--Solomon's plume

Maianthemum canadense--Canada Mayflower

Polygonatum biflorum--Solomon's seal

Trillium grandiflorum--Trillium

DIOSCOREACEAE

Dioscorea villosa--Wild yam

JUGLANDACEAE

Carya ovata--Shagbark hickory

BETULACEAE

Ostrya virginiana--Ironwood

Carpinus caroliniana¹--Musclewood

Betula alleghaniensis--Yellow birch

Betula papyrifera¹--Paper birch

FAGACEAE

Quercus rubra--Northern red oak

RANUNCULACEAE

Actaea sp.--Baneberry

Anemone quinquefolia--Wood anemone

BERBERIDACEAE

Podophyllum peltatum--Mayapple

ROSACEAE

Fragaria virginiana--Wild strawberry

Agrimonia gryposepala--Agrimony

Prunus virginiana¹--Choke-cherry

FABACEAE

Lathyrus palustris--Marsh vetchling
Apios americana--Ground nut

GERANIACEAE

Geranium maculatum--Wild geranium

ACERACEAE

Acer saccharum¹--Sugar maple

VITACEAE

Vitis riparia--River-bank grape

TILIACEAE

Tilia americana¹--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

ARALIACEAE

Aralia nudicaulis--Wild sarsaparilla

UMBELLIFERAE

Sanicula sp.--Snakeroot
Zizia aurea--Golden Alexanders

OLEACEAE

Fraxinus americana--White ash

LABIATAE

Prunella vulgaris--Selfheal

RUBIACEAE

Galium aparine--Annual bedstraw

CAPRIFOLIACEAE

Viburnum acerifolium--Maple-leaf viburnum
Viburnum lentago--Nannyberry
Lonicera dioica--Red honeysuckle

COMPOSITAE

Solidago patula--Swamp goldenrod
Aster macrophyllus¹--Large-leaved aster
Aster umbellatus--Flat-top aster
Aster lateriflorus--Calico aster
Eupatorium rugosum--White snakeroot
Cirsium muticum--Swamp thistle

Total number of plant species: 53

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 5.8-acre plant community area is an isolated "island" of Southern mesic hardwoods within a matrix of tamarack swamp and lowland hardwoods. Disturbances to the plant community area include past selective cutting of timber and ad hoc establishment of footpaths. No Federal or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

Plant Community Area No. 35

OPHIOGLOSSACEAE

Botrychium virginianum--Rattlesnake fern

POLYPODIACEAE

Athyrium filix-femina--Lady fern

CUPRESSACEAE

Juniperus communis--Common juniper

Juniperus virginiana--Red-cedar

GRAMINEAE

Poa sp.--Bluegrass

Phleum pratense'--Timothy grass

CYPERACEAE

Carex cephalophora--Oval-leaf sedge

Carex blanda--Wood sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

LILIACEAE

Smilacina racemosa--Solomon's plume

Smilax ecirrhata--Low carrion flower

ORCHIDACEAE

Cypripedium pubescens--Large yellow lady-slipper

Liparis loeselii--Green twayblade

SALICACEAE

Populus grandidentata--Large-toothed aspen

Populus tremuloides--Quaking aspen

JUGLANDACEAE

Carya cordiformis--Yellow-bud hickory

ULMACEAE

Ulmus americana²--American elm

CARYOPHYLLACEAE

Arenaria lateriflora--Wood sandwort

Silene cucubalus¹--Bladder campion

RANUNCULACEAE

Ranunculus abortivus--Small-flowered buttercup

Ranunculus recurvatus--Hooked buttercup

Anemone virginiana--Thimbleweed

SAXIFRAGACEAE

Ribes cynosbati--Pasture gooseberry

ROSACEAE

Potentilla simplex--Old field cinquefoil

Potentilla recta¹--Sulfur cinquefoil

Geum canadense--White avens

Rubus allegheniensis--Common blackberry

Rubus occidentalis--Black raspberry

Agrimonia gryposepala--Agrimony
Prunus serotina--Black cherry
Pyrus malus¹--Apple
Crataegus sp. --Hawthorn

FABACEAE

Trifolium pratense¹--Red clover
Trifolium repens¹--White clover
Melilotus alba¹--White sweet clover
Melilotus officinalis¹--Yellow sweet clover
Medicago sativa¹--Alfalfa
Desmodium glutinosum--Pointed tick trefoil

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE

Rhus glabra²--Smooth sumac

CELASTRACEAE

Celastrus scandens--Bittersweet

ACERACEAE

Acer saccharum--Sugar maple
Acer negundo--Boxelder

RHAMNACEAE

Rhamnus cathartica¹--Common buckthorn

VITACEAE

Vitis riparia--River-bank grape
Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola sororia--Woolly blue violet

ONAGRACEAE

Circaea quadrisulcata--Enchanter's nightshade

CORNACEAE

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus americana--White ash
Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE

Asclepias verticillata--Whorled milkweed

CONVOLVULACEAE

Convolvulus spithameus--Low bindweed

LABIATAE

Monarda fistulosa--Wild bergamot

RUBIACEAE

Galium aparine--Annual bedstraw

Galium triflorum--Sweet-scented bedstraw

CAPRIFOLIACEAE

Viburnum lentago--Nannyberry

Lonicera x bella'--Hybrid honeysuckle

CAMPANULACEAE

Campanula americana--Tall bellflower

COMPOSITAE

Ambrosia artemisiifolia--Common ragweed

Achillea millefolium¹--Yarrow

Solidago gigantea--Giant goldenrod

Aster sagittifolius--Arrowleaf aster

Erigeron annuus--Annual fleabane

Arctium minus¹--Common burdock

Cirsium vulgare¹--Bull thistle

Taraxacum officinale¹--Common dandelion

Tragopogon pratense¹--Goat's beard

Total number of plant species: 71

Number of alien, or non-native, plant species: 16 (22 percent)

This approximately 23.6-acre plant community area consists of old field and disturbed second-growth mesic and dry-mesic woods. Disturbances to the plant community area include past selective cutting of timber, establishment of a roadway, and past grazing by dairy cows. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Alien, or non-native, plant species.

² Co-dominant plant species.

Plant Community Area No. 36

CUPRESSACEAE

Juniperus communis--Common juniper
Juniperus virginiana¹--Red-cedar

GRAMINEAE

Bromus inermis²--Smooth brome grass
Agrostis alba²--Redtop grass
Phalaris arundinacea²--Reed canary grass

LILIACEAE

Smilacina racemosa--Solomon's plume

DIOSCOREACEAE

Dioscorea villosa--Wild yam

SALICACEAE

Populus tremuloides¹--Quaking aspen

JUGLANDACEAE

Juglans cinerea--Butternut
Carya cordiformis--Yellow-bud hickory
Carya ovata--Shagbark hickory

BETULACEAE

Betula papyrifera--Paper birch

FAGACEAE

Quercus alba--White oak
Quercus rubra--Northern red oak

ULMACEAE

Ulmus americana¹--American elm

POLYGONACEAE

Rumex crispus²--Curly dock

RANUNCULACEAE

Ranunculus abortivus--Small-flowered buttercup

BERBERIDACEAE

Podophyllum peltatum--Mayapple

CRUCIFERAE

Berteroa incana²--Hoary alyssum

SAXIFRAGACEAE

Ribes americanum--Wild black currant

ROSACEAE

Geum canadense--White avens
Rubus strigosus--Red raspberry
Rosa sp. --Wild rose
Prunus serotina--Black cherry
Prunus virginiana--Choke-cherry

FABACEAE

Trifolium pratense²--Red clover
Melilotus officinalis²--Yellow sweet clover
Melilotus alba²--White sweet clover
Medicago lupulina²--Black medick

GERANIACEAE
Geranium maculatum--Wild geranium

RUTACEAE
Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE
Rhus glabra--Smooth sumac

ACERACEAE
Acer saccharum--Sugar maple

RHAMNACEAE
Rhamnus cathartica²--Common buckthorn

VITACEAE
Vitis riparia--River-bank grape
Parthenocissus quinquefolia--Virginia creeper

TILIACEAE
Tilia americana--Basswood

ONAGRACEAE
Oenothera biennis--Evening-primrose
Circaea quadrisulcata--Enchanter's nightshade

CORNACEAE
Cornus stolonifera--Red osier dogwood

OLEACEAE
Fraxinus pennsylvanica--Green ash

ASCLEPIADACEAE
Asclepias syriaca--Common milkweed

LABIATAE
Monarda fistulosa--Wild bergamot

SOLANACEAE
Solanum dulcamara²--Deadly nightshade

SCROPHULARIACEAE
Verbascum thapsus²--Mullein
Linaria vulgaris²--Butter-and-eggs

PLANTAGINACEAE
Plantago major²--Common plantain

RUBIACEAE
Galium aparine--Annual bedstraw

CAPRIFOLIACEAE
Viburnum lentago--Nannyberry
Sambucus canadensis--Elderberry
Lonicera x bella²--Hybrid honeysuckle

COMPOSITAE
Ambrosia artemisiifolia--Common ragweed
Achillea millefolium²--Yarrow
Solidago altissima--Tall goldenrod
Solidago juncea--Early goldenrod

Solidago gigantea--Giant goldenrod
Erigeron strigosus--Daisy fleabane
Arctium minus²--Common burdock
Cirsium vulgare²--Bull thistle
Cirsium arvense²--Canada thistle
Taraxacum officinale²--Common dandelion
Cichorium intybus¹--Chicory

Total number of plant species: 62

Number of alien, or non-native, plant species: 21 (34 percent)

This approximately 10.8-acre plant community area consists of old field and disturbed second-growth mesic and dry-mesic woods. Disturbances to the plant community area include past selective cutting of trees and past grazing by dairy cows. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 37

SPHAGNACEAE

Sphagnum spp. --Sphagnum

EQUISETACEAE

Equisetum fluviatile--Pipes

OSMUNDACEAE

Osmunda cinnamomea--Cinnamon fern

POLYPODIACEAE

Matteuccia struthiopteris--Ostrich fern

Cystopteris bulbifera--Bulblet fern

Thelypteris palustris--Marsh fern

Dryopteris crinata--Crested wood fern

PINACEAE

Larix laricina¹--Tamarack

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

GRAMINEAE

Glyceria sp. --Manna Grass

Hystrix patula--Bottle brush grass

Leersia virginica--White grass

CYPERACEAE

Scirpus atrovirens--Green bulrush

Carex stricta--Tussock sedge

Carex lacustris--Lake sedge

Carex rostrata--Beaked sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

Symplocarpus foetidus--Skunk cabbage

Calla palustris--Water arum

LILIACEAE

Clintonia borealis--Blue bead-lily

Smilacina trifolia--Three-leaved Solomon's plume

Maianthemum canadense--Canada Mayflower

Trillium grandiflorum--Trillium

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Platanthera hyperborea--Northern bog orchid

SALICACEAE

Salix exigua--Sand-bar willow

Salix bebbiana¹--Beaked willow

Salix petiolaris--Petioled willow

Salix candida--Sage willow

BETULACEAE

Betula alleghaniensis¹--Yellow birch

Betula papyrifera--Paper birch

Alnus rugosa¹--Tag alder

ULMACEAE

Ulmus americana--American elm

URTICACEAE

Urtica dioica--Stinging nettle

Laportea canadensis--Wood nettle

Pilea pumila--Clearweed

POLYGONACEAE

Rumex orbiculatus--Great water dock

Polygonum amphibium--Smartweed

RANUNCULACEAE

Caltha palustris--Marsh marigold

Ranunculus recurvatus--Hooked buttercup

CRUCIFERAE

Nasturtium officinale²--Water-cress

SAXIFRAGACEAE

Mitella diphylla--Mitrewort

Ribes hirtellum--Smooth gooseberry

ROSACEAE

Geum rivale--Water avens

Rubus pubescens--Dwarf raspberry

Aronia melanocarpa--Black chokeberry

FABACEAE

Lathyrus palustris--Marsh vetchling

Apios americana--Ground nut

Amphicarpa bracteata--Hog peanut

ANACARDIACEAE

Rhus vernix--Poison sumac

AQUIFOLIACEAE

Ilex verticillata--Winterberry

ACERACEAE

Acer rubrum--Red maple

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus alnifolia--Alder buckthorn

VITACEAE

Parthenocissus inserta--Virginia creeper

TILIACEAE

Tilia americana--Basswood

VIOLACEAE

Viola pallens--Smooth white violet

ONAGRACEAE

Epilobium leptophyllum--Linear-leaf willow herb

Epilobium coloratum--Willow herb

HIPPURIDACEAE

Hippuris vulgaris--Mare's-tail

ARALIACEAE

Aralia nudicaulis--Wild sarsaparilla

UMBELLIFERAE

Sanicula sp.--Snakeroot

Cicuta bulbifera--Water-hemlock

Oxypolis rigidior--Cowbane

CORNACEAE

Cornus alternifolia--Pagoda dogwood

Cornus stolonifera--Red osier dogwood

Cornus racemosa--Grey dogwood

ERICACEAE

Vaccinium myrtilloides--Canada blueberry

PRIMULACEAE

Lysimachia thyrsiflora--Tufted loosestrife

Trientalis borealis--Starflower

OLEACEAE

Fraxinus nigra¹--Black ash

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Scutellaria lateriflora--Sideflower skullcap

Lycopus uniflorus--Northern bugleweed

Mentha arvensis--Wild mint

SOLANACEAE

Solanum dulcamara²--Deadly nightshade

SCROPHULARIACEAE

Pedicularis lanceolata--Swamp lousewort

LENTIBULARIACEAE

Utricularia sp.--Bladderwort

RUBIACEAE

Mitchella repens--Partridge-berry

Galium asprellum--Rough bedstraw

Galium labradoricum--Bog bedstraw

CAPRIFOLIACEAE

Viburnum trilobum--Highbush-cranberry

Lonicera dioica--Red honeysuckle

COMPOSITAE

Bidens sp. --Beggar's-ticks

Senecio aureus--Golden ragwort

Solidago patula--Swamp goldenrod

Aster puniceus--Red-stemmed aster

Aster umbellatus--Flat-top aster

Aster lateriflorus--Calico aster

Eupatorium maculatum--Joe-pye weed

Eupatorium perfoliatum--Boneset

Cirsium muticum--Swamp thistle

Total number of plant species: 92

Number of alien, or non-native, plant species: 2 (2 percent)

This approximately 23.7-acre plant community area is part of the Gilbert Lake wetland complex and consists of Southern tamarack swamp, shrub-carr, and second-growth lowland hardwoods. Disturbances to the plant community area include past selective cutting of timber. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

¹ Co-dominant plant species.

² Alien, or non-native, plant species.

Plant Community Area No. 38

POLYPODIACEAE

Thelypteris palustris¹--Marsh fern

PINACEAE

Larix laricina¹--Tamarack

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

JUNCAGINACEAE

Triglochin palustre²--Slender bog arrow-grass

ALISMATACEAE

Sagittaria latifolia--Common arrowhead

GRAMINEAE

Calamagrostis canadensis--Canada bluejoint

CYPERACEAE

Carex aquatilis¹--Aquatic sedge

Carex comosa--Bristly sedge

IRIDACEAE

Iris virginica--Virginia blueflag

ORCHIDACEAE

Liparis loeselii--Green twayblade

SALICACEAE

Salix petiolaris--Petioled willow

Salix candida--Sage willow

BETULACEAE

Betula pumila¹--Bog birch

POLYGONACEAE

Rumex orbiculatus--Great water dock

ROSACEAE

Potentilla palustris--Bog cinquefoil

BALSAMINACEAE

Impatiens biflora--Jewelweed

HYPERICACEAE

Triadenum fraseri--Marsh St. John's wort

LYTHRACEAE

Decodon verticillatus¹--Water-willow

UMBELLIFERAE

Cicuta bulbifera--Water-hemlock

CORNACEAE

Cornus stolonifera--Red osier dogwood

ASCLEPIADACEAE

Asclepias incarnata--Marsh milkweed

LABIATAE

Scutellaria epilobiifolia--Marsh skullcap

CAMPANULACEAE

Campanula aparinoides--Marsh bellflower

COMPOSITAE

Bidens sp. --Beggar's-ticks

Aster junciformis--Rush aster

Eupatorium maculatum--Joe-pye weed

Eupatorium perfoliatum--Boneset

Total number of plant species: 27

Number of alien, or non-native, plant species: 0 (0 percent)

This approximately 5.0-acre plant community area is part of the Gilbert Lake wetland complex and consists of Southern sedge meadow, Southern tamarack swamp, bog, shallow marsh, and shrub-carr. No Federal- or State-designated Special Concern or Endangered species were observed during the field inspection. However, Slender bog arrow-grass (Triglochin palustre), a State of Wisconsin Threatened plant species, was observed during the field inspection.

¹ Co-dominant plant species.

² State of Wisconsin Threatened plant species.

Plant Community Area No. 39

CHARACEAE

Chara sp.--Muskgrass

TYPHACEAE

Typha latifolia--Broad-leaved cat-tail

Typha angustifolia--Narrow-leaved cat-tail

SPARGANIACEAE

Sparganium chlorocarpum--Bur-reed

NAJADACEAE

Potamogeton natans--Common pondweed

Potamogeton amplifolius--Large-leaved pondweed

Potamogeton zosteriformis--Flat-stemmed pondweed

Potamogeton gramineus--Grass-leaved pondweed

Potamogeton pectinatus--Sago pondweed

Potamogeton richardsonii--Richardson's pondweed

Potamogeton friesii--Fries's pondweed

Potamogeton crispus¹--Curly pondweed

ALISMATACEAE

Sagittaria latifolia--Common arrowhead

HYDROCHARITACEAE

Vallisneria americana--Tape-grass

Elodea canadensis--Common waterweed

CYPERACEAE

Scirpus acutus²--Hard-stemmed bulrush

Scirpus subterminalis--Bulrush

LEMNACEAE

Lemna minor--Lesser duckweed

Lemna trisulca--Forked duckweed

NYMPHAEACEAE

Nuphar advena²--Yellow water lily

Nymphaea tuberosa²--White water lily

RANUNCULACEAE

Ranunculus longirostis--White water-crowfoot

LYTHRACEAE

Decodon verticillatus²--Water-willow

HALORAGACEAE

Myriophyllum exalbescens--Spiked water milfoil

LENTIBULARIACEAE

Utricularia vulgaris--Great bladderwort

Total number of plant species: 25

Number of alien, or non-native, plant species: 1 (4 percent)

This approximately 43.2-acre plant community area is part of the Gilbert Lake wetland complex and consists of shallow lake and deep marsh. Disturbances to the plant community area include clearing a channel of vegetation for boat access. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

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- ¹ Alien, or non-native, plant species.
² Co-dominant plant species.

Plant Community Area No. 40

POLYPODIACEAE

Pteridium aquilinum--Bracken fern
Onoclea sensibilis--Sensitive fern
Athyrium filix-femina--Lady fern

PINACEAE

Picea abies¹--Norway spruce

CUPRESSACEAE

Juniperus virginiana--Red-cedar

GRAMINEAE

Glyceria striata--Fowl manna grass
Elymus villosus--Silky wild rye
Elymus virginicus--Virginia wild rye
Hystrix patula--Bottle brush grass
Cinna arundinacea--Wood reed grass
Phalaris arundinacea¹--Reed canary grass

CYPERACEAE

Carex rosea--Curly-styled wood sedge
Carex normalis--Larger straw sedge
Carex pennsylvanica--Pennsylvania sedge
Carex hirtifolia--Sedge
Carex blanda--Wood sedge
Carex gracillima--Sedge

ARACEAE

Arisaema triphyllum--Jack-in-the-pulpit

LILIACEAE

Smilacina racemosa²--Solomon's plume
Smilacina stellata--Starry solomon's plume
Maianthemum canadense--Canada Mayflower
Smilax herbacea--Carrion flower
Smilax ecirrhata--Low carrion flower

DIOSCOREACEAE

Dioscorea villosa--Wild yam

ORCHIDACEAE

Epipactis helleborine¹--Helleborine

SALICACEAE

Populus tremuloides²--Quaking aspen

JUGLANDACEAE

Juglans cinerea--Butternut
Carya ovata--Shagbark hickory

BETULACEAE

Corylus americana--Hazel-nut
Ostrya virginiana--Ironwood

FAGACEAE

Quercus macrocarpa--Bur oak
Quercus bicolor²--Swamp white oak
Quercus rubra²--Northern red oak

ULMACEAE

Ulmus americana--American elm

RANUNCULACEAE

Actaea rubra--Red baneberry
Ranunculus recurvatus--Hooked buttercup
Ranunculus septentrionalis--Swamp buttercup
Thalictrum dioicum--Woodland meadow rue
Thalictrum dasycarpum--Tall meadow rue
Anemone virginiana--Thimbleweed

BERBERIDACEAE

Caulophyllum thalictroides--Blue cohosh
Berberis thunbergii¹--Japanese barberry

CRUCIFERAE

Alliaria officinalis¹--Garlic-mustard

SAXIFRAGACEAE

Saxifraga pensylvanica--Swamp saxifrage
Ribes missouriense--Missouri gooseberry
Ribes cynosbati--Pasture gooseberry
Ribes americanum--Wild black currant

ROSACEAE

Potentilla simplex--Old field cinquefoil
Geum canadense--White avens
Rubus allegheniensis--Common blackberry
Rubus occidentalis--Black raspberry
Rubus strigosus--Red raspberry
Agrimonia gryposepala--Agrimony
Prunus serotina--Black cherry
Prunus virginiana--Choke-cherry

FABACEAE

Amphicarpa bracteata--Hog peanut

OXALIDACEAE

Oxalis stricta--Common wood sorrel

GERANIACEAE

Geranium maculatum--Wild geranium

RUTACEAE

Zanthoxylum americanum--Prickly-ash

ANACARDIACEAE

Rhus radicans--Poison ivy
Rhus typhina--Staghorn sumac

ACERACEAE

Acer saccharum²--Sugar maple
Acer rubrum--Red maple
Acer negundo--Boxelder

BALSAMINACEAE

Impatiens biflora--Jewelweed

RHAMNACEAE

Rhamnus cathartica¹--Common buckthorn

VITACEAE

Parthenocissus sp. --Virginia creeper

TILIACEAE

Tilia americana--Basswood

HYPERICACEAE

Hypericum punctatum--Spotted St. John's wort

VIOLACEAE

Viola sororia--Woolly blue violet

ONAGRACEAE

Epilobium coloratum--Willow herb

Circaea quadrisulcata--Enchanter's nightshade

UMBELLIFERAE

Cicuta maculata--Spotted water-hemlock

CORNACEAE

Cornus racemosa--Grey dogwood

OLEACEAE

Fraxinus americana--White ash

Fraxinus pennsylvanica--Green ash

Fraxinus nigra--Black ash

LABIATAE

Scutellaria lateriflora--Sideflower skullcap

Prunella vulgaris--Selfheal

PLANTAGINACEAE

Plantago major¹--Common plantain

RUBIACEAE

Galium aparine--Annual bedstraw

Galium concinnum--Shining bedstraw

CAPRIFOLIACEAE

Viburnum opulus¹--Highbush-cranberry

Viburnum lentago--Nannyberry

Lonicera prolifera--Yellow honeysuckle

Triosteum aurantiacum--Wild coffee

LOBELIACEAE

Lobelia siphilitica--Great blue lobelia

COMPOSITAE

Helianthus strumosus--Pale-leaved wood sunflower

Solidago gigantea--Giant goldenrod

Aster lateriflorus--Calico aster

Erigeron annuus--Annual fleabane

Eupatorium purpureum--Purple Joe-pye weed

Eupatorium rugosum--White snakeroot

Arctium minus¹--Common burdock

Taraxacum officinale¹--Common dandelion

Total number of plant species: 96

Number of alien, or non-native, plant species: 10 (10 percent)

This approximately 8.8-acre plant community area consists of second-growth mesic woods with areas of lowland hardwoods. Disturbances to the plant community area include past selective cutting of timber and establishment of a farm roadway. No Federal- or State-designated Special Concern, Threatened, or Endangered species were observed during the field inspection.

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- ¹ Alien, or non-native, plant species.
 - ² Co-dominant plant species.