An aerial photograph showing a wide river valley. The foreground is dominated by a large, calm body of water, likely a reservoir or a wide river section, with some yellowish-green patches of aquatic vegetation. The middle ground is filled with dense, green forests that line the riverbanks and cover the surrounding hills. In the background, the terrain opens up into a valley with scattered fields, some buildings, and more distant hills under a clear blue sky.

**Owasco Flats**  
**Conservation Planning**  
**and**  
**Stakeholder Survey Project**  
**June 2007**

# **FINAL REPORT**

**of the**

# **OWASCO FLATS**

## **Conservation Planning and Stakeholder Survey Project**

**June 2007**

**By**

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# **1 Executive Summary**

Located at the south end of Owasco Lake, the Owasco Flats is a diverse floodplain encompassing approximately 1500 acres of swamps, emergent marsh, cropland, and fallow fields. The Flats has long been recognized for its ecological significance as well as its value to the health of Owasco Lake. Many have recognized the important role the wetlands play in buffering the lake as well as the potential for an even greater benefit to water quality through the restoration of additional wetlands in this area. Though recognized as a priority project of New York State's first Open Space Plan in 1992, efforts to ensure the future of the Flats have been slow to move forward.

Recognizing that the future of the Flats depended upon a diverse array of public and private stakeholders and landowners, the Central New York Regional Planning and Development Board commissioned the Finger Lakes Land Trust to undertake a year-long study of the ecology of the Flats, and of stakeholder and landowner perspectives concerning the area.

Between June 2006 and May 2007, the Finger Lakes Land Trust completed an intensive analysis of the Owasco Flats. A Steering Committee consisting of representatives from local and state government and local citizen groups was established to identify important issues concerning the conservation of the Owasco Flats. The committee identified water quality, public access and recreation, and wildlife management as key issues. Landowners in the Flats were then interviewed concerning these topics.

A combination of field surveys and the analysis of data from many sources confirmed the ecological significance of the Flats. The Flats offer habitat for a remarkable diversity of flora and fauna, including some species listed as threatened, rare or endangered at the state and national level. Eleven ecological communities were identified in the Flats in accordance with the methodology of the New York Natural Heritage Program. The forest communities are especially diverse with 50 tree species present. Overall, over 360 plant species were found in the Flats.

Local sportsmen have long recognized the significance of the Flats for its abundant populations of fish and wildlife. The Land Trust's year-long study confirmed the widely held view that the Owasco Flats is one of the region's most significant natural areas.

The Flats' designation as part of the Greater Summerhill Important Bird Area (IBA), demonstrates its value to migratory birds. Many birds identified as priorities for conservation by the National Audubon are found within the Flats – including rare species such as the Cerulean Warbler and Least Bittern. Bald eagles have also been sighted within the area and a number of biologists believe that the Flats offer sufficient habitat for nesting.

Other wildlife found within the Flats include abundant populations of game species such as white tailed deer, wild turkey, and waterfowl. A diverse population of reptiles and amphibians includes the spotted turtle – a species of special conservation concern in New York State.

Over the years, the character, and particularly the hydrology of the Owasco Flats, has been dramatically altered by human activities. Successive efforts to drain portions of the Flats for agricultural use have met with varying success. While approximately 395 acres remain in some form of agricultural use today, most drained acreage is now reverting back to wetland.

During the late 1940's, the U.S. Army Corps of Engineers undertook an ambitious flood control project on the Owasco Inlet, which included widening and straightening the channel. These actions effectively increased the Inlet's rate of flow, resulting in increased bank cutting and a deeper channel. The net result of this effort is that the Inlet is now largely separated from its floodplain – no longer allowing the Flats' wetlands to filter floodwaters before they enter Owasco Lake.

Interviews conducted during the course of the project confirmed that water quality was one of the issues foremost in the minds of both community leaders and landowners. Sediment and nutrient loading in the Inlet is considered to be a major problem for Owasco Lake's water quality. It is believed that the restoration of wetland and stream channel areas within the Flats, and elsewhere in the Owasco Inlet watershed, can play an important role in addressing this concern.

The Flats represent one of the largest prospective wetland restoration sites within the Finger Lakes Region. Agricultural use of the Flats has decreased significantly over the past 70 years, and with the recent retirement of poorly drained agricultural land, significant near-term restoration opportunities now exist. The presence of the Cerulean Warbler and two-dozen other forest-dependent birds that are of conservation concern make the Flats one of the region's best candidates for the restoration of wetland forests. The large size of the site allows for forest restoration as well as the restoration of emergent marshes and other wetland types that provide habitat for waterfowl and other wildlife.

The completion of the Land Trust's year-long study revealed that there is considerable consensus among stakeholders and landowners to take steps to conserve the Owasco Flats, while at the same time making a stronger commitment to improving water quality within the watershed of the Owasco Inlet. Nine action steps emerged that will require the investment of public and private resources, and increased cooperation among public and private interests, but also promise to not only conserve an incredible natural resource, but also enhance it for the public benefit.

## 1.1 Conservation Recommendations

The first steps recommended for the conservation of the Owasco Flats are:

- Land protection should be undertaken through implementation of the plan proposed by the New York State Department of Environmental Conservation to create a Wildlife Management Area by purchasing land from willing sellers only. Lands facing the greatest risk of sale and development should be given the highest priority. Consideration should be given to include lands available for sale on the south side of Route 38 within the proposed Wildlife Management Area. Conservation easements (legal agreements that limit development) should be used to protect lands that are intended to remain in private ownership.
- Managers of public open space lands in the Flats should coordinate their efforts and develop a comprehensive public access and recreation plan, as well as a plan to control non-native invasive plant and animal species and address habitat management and restoration efforts.
- Adequate funding for ongoing stewardship must be secured. Funds are needed to accommodate or allow for public access, control non-native, invasive plant species, restore hydrological function, and provide for overall site monitoring and management.

At the same time, the following processes need to be initiated to address long-term water quality and regional resource conservation issues:

- A watershed management plan for the Owasco Inlet should be developed to address water quality issues in a comprehensive fashion. Restoring a more natural hydrological regime to the Owasco Inlet and its floodplain should be considered with respect to fish and wildlife habitat restoration efforts. The Cayuga County Department of Planning and Economic Development and the Cayuga County Soil and Water Conservation District should take lead roles in advancing this watershed management plan.
- In conjunction with the development of a watershed management plan, the U.S. Army Corps of Engineers should be engaged to develop a management plan for the main channel of the Owasco Inlet that will address adverse impacts resulting from past channelization efforts and consider options for enhancing the buffering capacity of the Flats. The plan should also look at the cumulative impact of existing and proposed stream bank stabilization efforts on the Inlet's hydrology and the quality of its fish and wildlife habitat.
- The restoration of both forested swamps and emergent marsh should be undertaken on public and private lands. The feasibility of using wetland restoration to improve water quality in Owasco Lake by increasing the buffering capacity and reducing nutrient loading should be considered for each restoration project.

- To develop a better understanding of the Flats' relationship to other open space lands in the region (both in terms of ecological processes and public use), public land managers should foster a dialogue with their counterparts at Fillmore Glen State Park, Summerhill State Forest, and the Finger Lakes Land Trust's Dorothy McIlroy Bird Sanctuary. Each of these holdings is located within the Greater Summerhill Important Bird Area.
- To balance conservation and development within the Greater Summerhill Important Bird Area, the Central New York Regional Planning and Development Board should consider undertaking a year-long conservation planning and stakeholder survey project, similar to the one completed for the Owasco Flats.

Finally, oversight and guidance needs to be a continuing role of stakeholders in the region and therefore:

- The Steering Committee convened for this project should continue to meet annually to share information and consider issues of concern relating to the Owasco Flats.



## **2 Overview**

The Owasco Flats is a wet river bottom floodplain located in a narrow, glacially steepened valley at the southern end of Cayuga County between the Village of Moravia and the south end of Owasco Lake. Oriented northwest to southeast along its length, the Flats is about 3.5 miles long and between 0.7 and 0.75 miles wide, encompassing about 1500 acres of land (Figure 1). The Owasco Inlet, which is Owasco Lake's largest tributary, meanders through the Flats and empties into the lake to the north. As identified in the tax rolls, private landowners represent 68% of the total land area and governmental and non-profit landowners represent 32% of the land (Figure 2).

The Village of Moravia lies at the southern end of the Flats and was originally the site of a Native American Village. Nearby settlers used the land around the Village to harvest hay prior to its initial settlement in 1789. During the 1800's agriculture flourished in the area and most of the Flats was cleared, except for the wettest area in the north. The Flats have always been appreciated for natural beauty, the abundance of wildlife and plentiful recreational opportunities. Today, the Flats offers a rich ecosystem that is important habitat for a diverse and sometimes rare assemblage of plants and animals and offers ample opportunities for recreational enjoyment.

## **3 Project Summary**

The primary goals of this project were to assemble information about the natural resources of the Owasco Flats and interview landowners and other stakeholders to identify issues of concern and develop options for the future use and conservation of this area. Under the guidance of the Central New York Regional Planning and Development Board and the Cayuga County Department of Planning and Economic Development, the Finger Lakes Land Trust specifically:

- Assessed natural resources within the Owasco Flats through the compilation and synthesis of existing data as well as the gathering of additional information through field surveys;
- Determined the goals and objectives of landowners and other local stakeholders through personal interviews;
- Provided information about land conservation options and the tax incentives associated with conservation easements, as well as general information about the Flats, to landowners and the general public;
- Provided options and recommendations for the future management and conservation of significant resources on public and private land within this area.

The Owasco Flats is defined as the area encompassing slightly more than 1500 acres extending south of Owasco Lake to the Village of Moravia, between State Route 38 to the west and Rockefeller Road to the east. This study also includes the area along the Inlet in the Village, between Aurora St. and Route 38 Bridge (Figure 1).

## **4 Land Use History**

It is unclear what the Owasco Flats looked like prior to the settlement of Moravia, but it would be reasonable to assume that it was thickly forested wetland, except for marsh located in the wettest areas. Agriculture in the Owasco Flats likely commenced as the Village of Moravia was settled. Grazing, haying, and a number of field crops have been grown in the Flats.

In 1938, aerial photographs reveal that approximately 70% of the land was cleared for agricultural use. Since that time, some of the wetter land has been allowed to revert back to forest and shallow marsh so that now only about 25% of the land is classified by the Cayuga County Real Property Services database as agricultural (Figure 3). Much of the land that was apparently actively engaged in agriculture in 1938 is now used intermittently for pasture, hay or is fallow; the rest of the Flats today is covered by forest (30%) and open marshland (20%).

One of the problems with agriculture in the Flats has been the wet soil. Poorly drained soils have made some areas of the Flats impossible to farm or have hindered both the planting and harvesting of crops. The construction of drainage ditches by farmers alleviated some of these problems and allowed additional land to be cultivated. Analysis of aerial photographs reveals that about 15 miles of drainage ditch have been constructed in the Flats (Figure 4), but not all are still clear and functioning. Figure 4 also presents the many remnant stream channels that were apparent on aerial photographs.

Management of the level of Owasco Lake has likely led to changes not only in the amount of land available for agriculture but also in the character of plant communities found in the north end of the Flats. Lake water has been used to power industry since the late 1700's when Auburn was settled. The level of Owasco Lake has been manipulated since the mid-1800's when the Owasco Outlet was deepened 4 feet and widened to 28 feet to provide year-round water for the factories.

The demand for water increased as industry grew and dams were constructed to keep as much water as possible in reserve for the summer "drawdown." As noted in the 1884 book, "Auburn, N.Y., Its Facilities and Resources," this drawdown was significant in the summer months and the water volume was then recharged over the winter. The amount of drawdown would likely vary with the year depending on the snow pack and spring rain. Data on the lake level from 1913 through 1919 obtained from the City of Auburn (Figure 5) illustrate the buildup of water reserves in the winter and spring and subsequent drawdown through the summer to very low levels, reflecting the demands of water-based industry in Auburn at that time.

A change in lake level management likely occurred in the early 20<sup>th</sup> century with the advent of electrification in the factories. With electrification, the use of water by the mills gradually decreased, but additional water was used to generate electricity and supply the City of Auburn. The need for summer drawdown decreased as electricity became widely

available from other sources. The first mention of maintaining higher water levels in the summer was detected on water level data from the early 1930's. The current Rule Curve for management of the Owasco Lake level (Figure 6) was apparently developed in 1961 with the reconstruction of the State Dam on the Owasco Outlet.

The Army Corps of Engineers studied the rule curve in 1984 and reconfirmed its use to control the lake level. This study reported that the lake level should be kept near 713 ft. elevation, the "Recreation Optimum," during late spring and summer and then gradually decreased during the winter to 710 ft, with the option of further drawdown in the event of a deep snow pack. Data on the lake level obtained from the United States Geological Survey (USGS) from 1970 to 2006 (Figure 5) roughly follow the 1984 Rule Curve (Figure 6).

Low lake levels occurring in the summer drawdown of the 19<sup>th</sup> and early 20<sup>th</sup> centuries resulted in drier soils in the Owasco Flats during the growing season. Current management to retain high lake levels during the summer growing season inundates and kills the roots of plants that were previously able to grow. Agriculture is also impeded because the wetter soils make working the soil or harvesting more difficult.

Evidence of changes in vegetation and agricultural use of the Flats can be seen when comparing a series of aerial photographs taken since 1938. Photos highlighting the north end of the Flats reveal the creation of emergent marsh where there was previously a forest with continuous canopy cover on both the east (Figure 7) and west (Figure 8) sides of the inlet. This marsh was likely created by the lake level regulation mentioned above which appears to have begun in 1961. Local residents frequently mentioned that the trees in this area died during the 1970's.

Much of the land that was cleared for agriculture prior to 1938 has either reverted to successional forest or has been overrun by the aggressive non-native invasive Reed canarygrass. A large portion of the areas where Reed canarygrass has become established appears to have been out of production for a significant period of time, but there are some areas that have been in intermittent production as pasture or are mowed periodically. Changes in agricultural land can be detected with the growth of forest on abandoned farmland at the bottom of the photos in Figure 9. The trees were just beginning to take hold in 1938 and gradually grew to a complete canopy cover by 2002.

## **5 Natural Resources Survey**

The Owasco Flats offers habitat for a remarkable diversity of flora and fauna. Some species found in the Flats are considered rare at the State and National level. In addition, the Owasco Flats has been recognized as an Important Bird Area. Natural resources within the Owasco Flats were surveyed through the compilation and synthesis of existing data as well as the collection of additional information through field surveys. Data on the soils and wetlands was compiled with assistance from the Cayuga County Soil and Water Conservation District (CCSWCD) and Cayuga County Department of Planning and Economic Development.

Ecological communities were determined by field surveys with the assistance of an expert botanist, and by analysis of aerial imagery. The avian fauna was investigated with the help of expert ornithologists and with data from the NYS Breeding Bird Atlas. Non-native invasive plants were mapped during field surveys and with the aid of aerial imagery. The Owasco Inlet channel was assessed through the use of aerial imagery, and information provided by the U.S. Army Corps of Engineers (USACE), the New York State Department of Environmental Conservation (NYSDEC), and the CCSWCD. A stream channel expert from Cornell University also surveyed the Owasco Inlet and its main channel through the Flats.

## **5.1 Soils and Wetlands**

Wetlands mapped by the U.S. Fish and Wildlife Service and the NYSDEC represent roughly half of the area in the study area (732 acres) and are located primarily in the northern half of the Flats (Figure 10). However, the amount of wetlands in the Owasco Flats was significantly greater prior to the construction of drainage ditches in agricultural lands.

The soils in the Flats are presented in Figure 11. The most common soil type, Sloan silt loam, is poorly drained, occupies low-lying areas and is flooded several times a year. It is found throughout the county but the largest area is found in the Owasco Flats. The Eel silt loam, the second most abundant soil in the Flats, is found adjacent to the Inlet along most of its length, and is most extensive in the south. This soil has a moderate to high fertility level and currently supports field crops in the southern part of the Flats, whereas in the north it supports rich forest communities.

## **5.2 Ecological Communities**

Eleven ecological communities were identified in accordance with the methodology of the New York Natural Heritage Program (Figure 12). The flora of the Owasco Flats is remarkably diverse with over 360 species identified with the expert assistance of F. Robert Wesley, a botanist affiliated with Cornell University (Appendix 10.7). At present, the northern half of the Flats is evenly split between forest and marsh communities whereas the southern half is old fields, pasture, and cropland.

### **5.2.1 Streamside oak-hickory forest community**

The forest communities in the Owasco Flats are unusually diverse for such a relatively small area. There were a total of 50 tree species identified in the six forest communities in this study. The most diverse and unusual of these communities is the Streamside oak-hickory forest that runs along the northernmost part of the Inlet (Figure 13). Thirty species of trees, or 63% of those found in the Flats, were found in this forest. This community is important habitat for the Shellbark hickory. This species is noted as threatened by New York State. The Maple-basswood mesic forest community is small yet

also very diverse and is found along the sides of the Flats at the base of the surrounding hillside slopes in the north. The understory of this community is particularly rich with many woodland herbs and flowers.

### **5.2.2 Silver maple-ash swamp community**

Silver maple-ash swamp is the most extensive forest community type (220 acres) and is found in the wettest areas of the Flats, surrounding and intergrading with Emergent marsh. This is a structurally diverse forest that is open in character, with an abundant understory where it meets the marsh, but also forms a thick, dense canopy that allows few herbs to grow (Figure 14).

### **5.2.3 Floodplain forest communities**

Three variants of Floodplain forest were identified in the Flats. The Lake-edge floodplain forest is located in a narrow band at the southern end of Owasco Lake on wet shoreline gravel soils and is dominated by large willow and Eastern cottonwood trees. The Successional floodplain forest has become established on abandoned old-fields adjacent to the Inlet. The trees in this community are generally young and form a dense canopy. However, there are a number of large, old trees on the banks of the inlet in this community, including a number of Shellbark hickories. The Floodplain buffer forest community forms a buffer of willow and Box elder trees along much of the southern stretch of the Inlet. The community extends beyond the banks to varying degrees and is absent along many small stretches of bank.

### **5.2.4 Emergent marsh community**

The Emergent marsh community was not evident in the 1938 aerial photos but is now found in the low-lying areas in the northern half of the Flats. Different marsh areas within the Flats are under different hydrological controls; beaver dams, lake level control, and flood control structures on ditches all play a role in maintaining water levels. The fill and gravel road on county land in the northwest part of the Flats very likely blocked the drainage of what was once Silver maple-ash swamp and contributed to its conversion to emergent marsh. Sedges, Reed canarygrass, some shrubs and ferns, and an occasional maple or ash tree on higher ground dominate the vegetation in these areas.

### **5.2.5 Successional old-field community**

The Successional old-field community is found primarily in the middle and southern part of the Flats in low-lying old fields that were abandoned in the 1940's. It covers about 250 acres and in some areas seems to be changing to Floodplain forest, as large, old Crack and White willows expand and fill in the areas between what were lone trees. In the lowest areas there are cattails and a dense cover of Reed canarygrass.

### **5.2.6 Pastureland community**

The Pastureland community occupies about 350 acres, a large portion of which is land that was once in agriculture, but no longer appears to be in production. Some of this land is in active use as pasture or is mowed for hay. There are willows along ditches and other trees near buildings, but the most common plant in this community is Reed canarygrass. Some of the drier soils in this area appear to be only occasionally planted to field crops. A small area of landscaped lawn around homes is also included in this community type.

### **5.2.7 Cropland community**

The Cropland community occupies the driest soils of the Flats. It covers about 310 acres and includes land that is regularly planted with various field crops such as corn and soybeans. However, without ongoing maintenance of drainage ditches it is likely that much of this area would be too wet for agricultural use.

### **5.2.8 Conifer plantation and Landfill communities**

The Flats also contains a few small Conifer plantation communities of Norway spruce and pines in the southeastern part of the Flats. A landfill area from 1971 is located on county land in the northwestern part of the Flats (see 10.7.12).

## **5.3 Avian Fauna**

The tremendous diversity of the Owasco Flats offers significant habitat that is locally uncommon for both migratory and breeding birds. The Flats is part of the Greater Summerhill Important Bird Area (IBA) designated by Audubon New York. IBAs were created through scientific study of Priority Bird Species and their habitat requirements in order to develop a proactive approach to bird species conservation.

A number of birds on the list of New York Priority Bird Species are likely to be found in the Owasco Flats, according to Audubon New York biologist Jillian Liner (Appendix 10.5.1). However, a more comprehensive, site-specific survey should be conducted to better understand year-round bird usage in the Flats. The most notable of the birds identified by Ms. Liner is the Cerulean Warbler, which is listed as a Species of Special Concern (S-SC) by New York State. Biologists have also considered the Flats to be prime habitat for the American (S-SC) and Least Bittern (S-Threatened), which are both considered by New York State to be Species of Greatest Conservation Need (SGCN). Another SGCN is the Bald Eagle (S-T), which has been sighted in the Flats, and some biologists believe there is sufficient habitat for nesting in the future.

## 5.4 Other Fauna

The Owasco Flats has long been recognized to harbor significant populations of both game and non-game animals. Deer hunting has been noted by most residents as an important part of their activities in the Flats. Muskrat and beaver have also been plentiful enough for trapping. Beaver, which were eliminated from the area long ago by trapping, have returned and are very active in the northern part of the Flats. Their dams are actively changing the ecology by creating Emergent marsh that can benefit waterfowl and amphibians. Another species returning to the fauna of the Flats is the River otter, *Lontra canadensis*, which was recently reported by DEC biologists.

The Owasco Inlet and Flats also offer important habitat for fish species. The Emergent marsh is a significant area for Pike spawning. The Inlet has a Water Quality Classification of C(T), which indicates that dissolved oxygen is sufficient for the reproduction and survival of trout. There is a spring run of Rainbow Trout from Owasco Lake into the Owasco Inlet every year.

The Spotted turtle, *Clemmys guttata*, was observed in the Flats during this study and is a Species of Concern in New York State due to habitat loss, pollution and collecting. The Spotted turtle uses emergent wetland, swamp forest and upland habitats, all of which are present within or adjacent to the Flats. Another amphibian, the Spotted salamander, *Ambystoma maculatum*, migrates in great numbers from the hillsides into the Flats to breed each spring.

## 5.5 Non-native Invasive Plants

Non-native invasive plants have become one of the most important issues in facing natural area conservation. As transportation and importation from other continents have become easier and more frequent, so has the intentional and unintentional importation of novel plant species or genotypes of native plants. When these plants are imported, they usually leave their natural enemies behind and are thereby able to grow rapidly and often out-compete native vegetation. The most aggressive invasive plants form dense stands that exclude native plants over wide areas. These monocultures impact fish and wildlife because native fauna are often not adapted to feed on the invasive plants and the plants can alter the physical and chemical nature of the habitat.

This study identified nine invasive plant species that are currently found within the Owasco Flats and pose a threat to native species. Listed in order of importance these are: Reed canarygrass, Common reed, Japanese knotweed, Purple loosestrife, Pale swallow-wort, Garlic mustard, Multiflora rose, Autumn olive, and Honeysuckle.

The most widely distributed invasive plant species in the Flats is Reed canarygrass, *Phalaris arundinacea*. It is a tall cool season grass of wetlands that is native to temperate areas of North America, Europe, and Asia. However, strains introduced into North

America from Europe and Asia have become very aggressive. A farmer on Rockefeller Road introduced Reed canarygrass into the Flats in the late 1940's (Frank Hall, personal communication 2006). It is now found in all areas of the Flats except the annually tilled fields, darkest parts of the forests, and open marsh waters.

Control of this species is difficult because of its dense and deep rhizomatous root mass. Chemicals, burning, and mowing have been found to be effective control measures. The establishment of dense swamp forests in some of the marshy abandoned fields may also reduce the dominance of this grass and allow a more diverse plant community to develop.

The Common reed, *Phragmites australis*, was found in two small patches in the northern part of the Flats (Figure 15). One patch is located in the landfill near the lake (about 500 sq. ft.) and the other is located in the northwestern Emergent marsh community (about 2200 sq. ft.). Although the patches of *Phragmites* in the Owasco Flats are relatively small, this aggressive imported strain forms dense rhizomatous mats over large areas in wetlands throughout North America. Since the patches of *Phragmites* detected in this study are still small, it is recommended that eradication be attempted quickly. Regular monitoring is also encouraged to document the size of the population area and allow evaluation of the treatment efficacy.

Japanese knotweed, *Polygonum cuspidatum*, was found in a number of locations in the Flats along the Owasco Inlet (Figure 16). It spreads quickly by rhizomes to form dense thickets over large areas that exclude native plants and alter the ecosystem. It is easily spread by vegetative means as rhizomes break off, fall into the water and become established further downstream. It is recommended that an effort be made to control this plant within the Flats before it becomes more widespread. Ongoing monitoring will be required to detect further infestation from upstream sources.

Purple loosestrife, *Lythrum salicaria*, was found in the marsh in the northwest part of the Flats (Figure 17). Purple loosestrife has become a very important ecologically damaging species; it forms dense stands in marshes that exclude other plants and are avoided by many sensitive marsh-nesting birds (Blossey *et al.*, 2001a). An effort to establish the biological control of this weed has been remarkably successful at Montezuma Wildlife Refuge and other locations (Blossey *et al.*, 2001a).

The presence of purple loosestrife in the Owasco Flats was noted by members of the Owasco Flats Nature Reserve and the beetles responsible for successful biological control in other locations were obtained and released in 2003. The beetles appear to have become established (Blossey, personal communication 2007) and according to J. Siracusa (personal communication 2007) the abundance of the Purple loosestrife has decreased. It is recommended that both the population of Purple loosestrife and the beetles released to control them in the northwest part of the Flats be monitored carefully to determine the effectiveness of the treatment.

Pale swallow-wort, *Vincetoxicum rossicum*, was found in a few small patches along the Owasco Inlet near the north end of the Flats and near the parking area of land owned by the Owasco Flats Nature Reserve, Inc. (Figure 18). This aggressive weed can form



dense thickets excluding all other plants. It is recommended that this plant be carefully monitored and eradicated, if possible, while the population is still small.

Garlic mustard, *Alliaria petiolata*, was found to be widespread throughout the Flats in all areas except the wettest marshes and the densest thickets of Reed canarygrass. This weed is ecologically very destructive because it forms dense thickets that displace fragile woodland plants. Dr. Bernd Blossey at Cornell has been working on the introduction of European insects to control this weed and is very close to making the first releases. It is recommended that a more detailed study of the abundance of this weed be undertaken, but because of its already ubiquitous distribution and because the potential for biological control is close, limited resources would best be spent focusing on other weed species at this time.

The shrub species, Multiflora rose, *Rosa multiflora*; Autumn olive, *Elaeagnus umbellata*; and Honeysuckle, *Lonicera tartarica*, were found distributed throughout the Flats except in the marshes. They are common invasive species and can form dense thickets, excluding other plant species. They are of particular concern in the northern part of the Streamside oak-hickory forest. These species are widespread and should be monitored and controlled when possible.

With the exception of widespread weeds such as Reed canarygrass and Garlic mustard, many of the invasive weed species found in the Flats are in patches small enough to consider active eradication before they become better established. Public conservation agencies are encouraged to develop a collaborative approach to monitoring and control of aggressive non-native invasive plants in the Flats.

## 5.6 Owasco Inlet

The Owasco Flats is located on the floodplain of the Owasco Inlet – a stream draining a watershed of more than 115 square miles - and is the largest tributary to Owasco Lake. The hydrology of the Owasco Inlet has been and will continue to be one of the most important forces shaping the physical environment and biology of the Flats.

The general position of the Owasco Inlet channel as it passes through the Flats has been largely unchanged since early detailed mapping such as the 1922 soil survey map. However, examination of aerial photographs has revealed the presence of almost 12 miles of remnant stream channels in the Flats (Figure 4). The most noteworthy of these are two channels located in the northeast part of the Flats. These channels can be clearly identified in older aerial images (Figure 7) and in recent color infrared photos (Figure 1, 2006). There is no evidence when these channels were connected to the main channel and the relationship of remnant channels to the main Inlet channel is less clear elsewhere in the Flats. However, it is important to consider that channels in the Flats have not been static over time.

Both the Inlet and its watershed have been dramatically altered by human activities and are an important contributing factor to the quality of lake water. The U. S. Army Corps of Engineers (USACE) initiated a flood control project on the Owasco Inlet in

1947. This project widened and straightened the channel and also removed trees, gravel bars, and debris jams. It also enlarged bridge openings. Most of the gravel bar and debris jam removal was in the southern half of the Flats, whereas most of the tree removal (about 70 trees removed) was in the northern half.

An important part of the 1947 USACE flood control project was an agreement with the State of New York that the State would "... maintain and operate works after completion (of the project) in accordance with regulations prescribed by the Secretary of the Army." (USACE Report 1948). Among other things, the USACE rules for maintenance required the regular patrolling for and removal of trees and woody debris from the channel. According to Kevin Delaney of the New York State Department of Environmental Conservation (NYSDEC) in Syracuse (personal communication 2007), the NYSDEC continues to comply with this agreement by removing debris and trees as required and as access allows.

The most active shifting of the Owasco Inlet channel that can be documented is in the southern end of the Flats near the Route 38 bridge. The shifting of the channel can best be illustrated with a series of aerial images from 1938 to 2006. The area with the most substantial channel meandering is just upstream of the Route 38 bridge (Figure 19).

Indeed, when this meander threatened Warner Road in the mid 1980's, the Cayuga County Soil and Water Conservation District (CCSWCD) installed 400-500 feet of rip rap. The area just downstream of the Bridge has also changed since 1938 (Figure 20). In this section of channel an active oxbow was removed and the channel was significantly straightened between 1954 and 1963. Between 1963 and 2005 the channel meandered markedly downstream of the section that was straightened and the CCSWCD plans to place 50 feet of rip rap in this area during the summer of 2007.

According to Dr. Greg Nagle, a research associate at Cornell University and an expert on stream channels in New York, the net effect of the USACE flood control project was to increase the rate of flow in the channel. He feels that the increased rate of flow is responsible for cutting the banks and deepening the channel, and adds that stream bank erosion is a natural process, but when accelerated by human impacts creates a condition that is unbalanced or in disequilibrium (Rosgen 2006, Jaquette et al. 2005). Dr. Nagle feels that the past work on the channel has essentially separated the Inlet from its floodplain and substantially limits its nutrient buffering ability, especially when the lake level is low at the time of the spring runoff. He also stated that efforts to restore a more natural channel in the Flats would require a study of watershed-wide processes.

## **6 Stakeholder Survey**

A Steering Committee was established for this study, drawing representatives from local and state governmental organizations as well as local citizen groups to identify and discuss important issues concerning the conservation of the Owasco Flats. In addition, landowners in the Flats were interviewed to determine their opinions about important issues. Input from both groups has helped shape the recommendations put forward in this report.

### **6.1 Steering Committee**

A Steering Committee of 22 members was convened representing 20 public and governmental groups with ties to the Owasco Flats (Appendix 10.2). Members of the Steering Committee were interviewed individually to identify key conservation issues. The group also met twice to discuss these key issues and further refine the following issues of greatest concern.

Water quality of the Owasco Inlet was commonly held to be the most important issue facing the Owasco Flats. Many on the Steering Committee have been concerned for years about the sediment and nutrient loads in the Inlet and its effect on lake processes. Sediment has been filling the south end of the lake, requiring dredging, and nutrients, in particular phosphorous, have dramatically increased the growth of weeds in the past 10 years according to residents. Wetland restoration in the Flats was put forward as a possible method to mitigate the impacts of sediment and nutrient loads. Additionally, it was generally felt that management of the Inlet would need a watershed-wide approach.

Public access and recreation was an important issue to everyone. Steps have been taken to increase public access by the creation of the County Park with an access road and parking lot for boat launching as well as subsequent trail and platform construction along the Inlet. Access is currently limited to only a few locations and recreational users of the Flats have brought forward the question of increased access. Motorized recreation in the form of snowmobiles, ATV's, jet skis and motorcycles has been an issue in many recreational settings and the steering committee thought it would be in the Flats also. Development of recreational infrastructure such as parking lots, trails, and interpretive signage has been proposed in the Flats in the past and the committee thought it was important to consider these issues in this planning context.

Wildlife management has been a concern in the Flats because of the heavy recreational use the area receives. The committee felt that management for hunting and fishing was compatible with activities involving non-game species in the Flats. Wetland restoration and public access were also considered important aspects of a comprehensive wildlife management strategy. However, it was also expressed that the creation of extensive open ponds may attract concentrations of waterfowl that could be detrimental to water quality in the lake, due to potential bacterial and nutrient loading.

## 6.2 Landowner Survey

Landowners in the Owasco Flats study area were identified with the help of the Cayuga County Department of Planning & Economic Development. Issues identified by the Steering Committee were used to create a list of survey questions for the landowners. Twenty-five owners of more than 5 acres were identified and contacted by mail. Of these, seventeen were contacted by telephone and agreed to be interviewed for the survey, representing 81% of the privately held land in the Flats. The survey questions covered the following topics:

- (1) What they value most about the Flats.
- (2) How they have used the Flats in the past.
- (3) How they feel about recreational opportunities in the Flats.
- (4) What their future goals are for their land.
- (5) How they feel about the potential acquisition of land in the Flats by the New York State Department of Environmental Conservation to establish a Wildlife Management Area.
- (6) What they feel the most important issues facing the Flats are today.

### 6.2.1 Landowner survey results

Results of the Landowner survey are presented in Appendix 9.3 and are discussed below in the order that questions were asked.

#### Question 1: What do you like most about the Flats?

The respondents generally had more than one answer to this question. The majority (38%) mentioned that they liked the peace and quiet of the Flats. The other most popular responses were the ability to hunt and fish (24%) and the abundance and diversity of wildlife (31%).

#### Question 2: How have you and your family enjoyed the Flats in the past?

There were seven general responses to this question and the most popular by far was hunting and fishing (36%). Other responses were canoeing, kayaking and other forms of boating (14%), farming (14%), and walking (19%). Picnicking, skiing, snowshoeing and horseback riding were also mentioned.

#### Question 3: Questions concerning recreational opportunities in the Flats.

##### A) Should public access be increased in the Flats?

This question stirred the most controversy concerning recreation. Thirty-five percent of landowners were in favor of increased public access, 35% were opposed, and 29% undecided. Most of the negative responses focused on concerns regarding trespassing hunters and trash accumulation as a result of recreational activities in the area. One respondent thought increased access would be okay as long as there was adequate policing. Another mentioned that it might be nice to have public access off of Rockefeller Road.

B) Motorized recreation.

Most respondents reacted negatively to the general idea of motorized recreation in the Flats. However, nearly half (47%) of the respondents felt that snow mobiles were okay as long as they kept to established trails and respected private property. One respondent felt it was important to allow equal access for all types of recreation, both motorized and non-motorized.

C & D) Are you in favor of Hunting, Trapping, and Fishing in the Flats?

There was overwhelming support for these activities in the Flats.

E) Are you in favor of Camping in the Flats?

Responses to this question were not as clear as the others because the soils are so wet most people thought there would be very little space available. Several people thought that tents would be okay, but definitely no recreational vehicles.

F) Do you think Hiking Trails should be developed in the Flats?

Response to this question was mostly positive (47%), with the negative and undecided response split (29% & 24% respectively). Many of the negative and undecided respondents voiced strong concerns over the respect of private property, possible conflicting use during hunting season, and the potential accumulation of trash. A few people answered that they would be happy to have trails through their land as long as there was no foot traffic during hunting season.

Question 4: What are your goals for your land in the Owasco Flats?

The majority of the respondents said they had no plans to change the use of their land (82%). A few mentioned that they would like to improve wildlife habitat or perhaps graze cattle or plant some crops, but their plans did not involve commercial or housing development. Two respondents indicated they might develop the land; one business mentioned they may expand at some future time and another landowner wanted to maintain the possibility, should economics prove favorable in the future. There is a tradition among many of the landowners of handing their land down to their children, but the question remains as to whether this will continue in the future.

Question 5: Do you support the planned acquisition of land by the New York Department of Environmental Conservation to establish a Wildlife Management Area (WMA)?

Many (47%) responded positively to this question and the negative responses were few (12%), but there were a large number of undecided (41%). Most of those responding negatively cited potential problems with increased public access and trespassing, especially during hunting season. A few positive respondents favored the WMA because it would increase public access. Most of the uncertain respondents wanted to know more about how the DEC intends to manage the WMA.

Question 6: Would you be in favor of restoring wetlands in the Owasco Flats?

This question generated a great deal of interest and the response was largely favorable (65%). Those who responded negatively (18%) and undecided (18%) raised concerns over potential flooding issues and how that may impinge on their current use of the land, particularly farming.

Question 7: What do you consider the most important issues facing the Owasco Flats today?

As with the Steering Committee, the most common response was water quality and a concern over pollution (29%). As one landowner stated: “Once the issues of water quality are addressed all the other things will follow.” Privacy and public access are closely linked issues and were the next most frequently mentioned (21%). After these were wetland restoration (17%), concern about development (13%), flooding (8%), wildlife management (8%) and concern about motorized recreation (4%).

## **7 Consideration of Conservation Issues**

The Owasco Flats is truly a unique area in the region that needs to be protected to maintain habitat for rare plants and animals, to enhance water quality and to ensure the recreational enjoyment of future generations. The consensus among stakeholders is that the Owasco Flats is a valuable natural and recreational resource. To ensure the future of this area, many issues need to be addressed concerning public access and recreational development in concert with respect for private land ownership. This is a process that must involve continued discourse among land managers, government agencies, and stakeholders.

A long-term commitment needs to be made to develop and implement a public-private partnership that addresses permanent protection of significant lands in the Flats. A priority should be placed on restoration and habitat enhancement of the Flats and the Owasco Inlet for wildlife and water quality. A commitment must also be made (through both financial and staff resources) to support the ongoing stewardship and to ensure the future of this remarkable resource.

## **8 Conservation Recommendations**

Based on the analysis of information gathered through this year-long study of the Owasco Flats, the following actions are recommended to ensure the future of this unique resource area:

In the near term:

- Land protection should be undertaken through implementation of the plan by the New York State Department of Environmental Conservation to create a Wildlife Management Area by purchasing land from willing sellers only. Lands facing the greatest risk of sale and development should be given the highest priority. Consideration should be given to include lands available for sale on the south side of Route 38 within the proposed Wildlife Management Area. Conservation easements (legal agreements that limit development) should be used to protect lands that are intended to remain in private ownership.

- Managers of public open space lands in the Flats should coordinate their efforts and develop a comprehensive public access and recreation plan, as well as a plan to control non-native invasive plant and animal species and address habitat management and restoration efforts.
- Adequate funding for ongoing stewardship must be secured. Funds are needed to accommodate or allow for public access, control non-native, invasive plant species, restore hydrological function, and provide for overall site monitoring and management.

At the same time, the following processes need to be initiated to address long-term water quality and regional resource conservation issues:

- A watershed management plan for the Owasco Inlet should be developed to address water quality issues in a comprehensive fashion. Restoring a more natural hydrological regime to the Owasco Inlet and its floodplain should be considered with respect to fish and wildlife habitat restoration efforts. The Cayuga County Department of Planning and Economic Development and the Cayuga County Soil and Water Conservation District should take lead roles in advancing this watershed management plan.
- In conjunction with the development of a watershed management plan, the U.S. Army Corps of Engineers should be engaged to develop a management plan for the main channel of the Owasco Inlet that will address adverse impacts resulting from past channelization efforts and consider options for enhancing the buffering capacity of the Flats. The plan should also look at the cumulative impact of existing and proposed stream bank stabilization efforts on the Inlet's hydrology and the quality of its fish and wildlife habitat.
- The restoration of both forested swamps and emergent marsh should be undertaken on public and private lands. The feasibility of using wetland restoration to increase the buffering capacity of the Flats and reduce nutrient loading in Owasco Lake should be considered for each restoration project.
- To develop a better understanding of the Flats' relationship to other open space lands in the region (both in terms of ecological processes and public use), public land managers should foster a dialogue with their counterparts at Fillmore Glen State Park, Summerhill State Forest, and the Finger Lakes Land Trust's Dorothy McIlroy Bird Sanctuary. Each of these holdings is located within the Greater Summerhill Important Bird Area.
- To balance conservation and development within the Greater Summerhill Important Bird Area, the Central New York Regional Planning and Development Board should consider undertaking a year-long conservation planning and stakeholder survey project, similar to the one completed for the Owasco Flats.

Finally, oversight and guidance needs to be a continuing role of stakeholders in the region and therefore:

- The Steering Committee convened for this project should continue to meet annually to share information and consider issues of concern relating to the Owasco Flats.

## **8.1 Land Protection**

At present, only 20% of the Flats is in some form of protected ownership (Figure 2). In absence of a systematic land protection effort, the area and its natural resources will likely suffer from impacts associated with the development of adjacent upland buffer areas over time. In addition, proposed wetland restoration efforts will be much more difficult to achieve due to the fragmented ownership pattern.

Implementation of the State's plan to create a Wildlife Management Area is recommended. Acquisition of lands within the Flats from willing sellers is a key aspect of the plan. Priority for acquisition should be given to those parcels that are at greatest risk of sale and development.

In addition, New York State should consider expanding the proposed project boundary to include lands that would connect the existing project area to a parcel recently acquired by the state as a fishing access site. These intervening lands border a dynamic stretch of the Owasco Inlet. Their incorporation into the project would secure additional streamside habitat for fish and wildlife, prevent inappropriate development, and expand recreational and restoration opportunities.

The forested hillsides surrounding the Owasco Inlet valley are also seen as integral to the overall conservation of the Flats. The mature forests provide valuable habitat for wildlife and birds such as the Cerulean Warbler that inhabit the Flats. These hillside forests are also important in sustaining a high quality water supply to the wetlands in the Flats. Efforts should be made to protect and enhance these forests.

Conservation easements should be utilized as a tool to secure the natural resource values of lands that are expected to remain in private ownership. This flexible tool can provide for active management of habitats while preventing inappropriate development. The Finger Lakes Land Trust has already initiated contact with several landowners in the area who are considering easement donations.

To support both the Wildlife Management Area and conservation easement initiatives, a long-term commitment of public and private funding will be required. Adequate funding for ongoing stewardship of these lands is critically important and should be addressed at the time of acquisition.

## **8.2 Public Access & Recreation**

To accommodate increasing recreational usage in a way that minimizes user conflicts and maintains natural resource values, it is recommended that current and future open space managers (City of Auburn, Cayuga County, NYSDEC, and Owasco Flats Nature Reserve) develop a comprehensive public access and recreation plan for publicly accessible lands in the Flats.



The plan should be developed with input from adjacent private landowners and should address a variety of issues including:

- Boating on the Owasco Inlet (motorized & non-motorized)
- Parking areas and public access points
- Recreational trails, boardwalks, and vista points
- Waste disposal and sanitary facilities
- Interpretive signage
- Hunting, fishing, and trapping
- Bird watching and wildlife watching opportunities
- Environmentally sensitive areas that could be harmed by excessive use

Given changing conditions, the plan should be dynamic in nature and should be periodically updated as needed. Perhaps, most importantly, the managers of public open space within the Flats should be meeting periodically to coordinate their efforts and share information on a regular basis.

### **8.3 Habitat Restoration**

Wetland restoration within this area should dramatically expand available habitat for a variety of fish and wildlife species. Since the Flats is located within the National Audubon Society's Greater Summerhill Important Bird Area, it is recommended that public conservation agencies first seek input from the National Audubon Society and the Cornell Laboratory of Ornithology before proceeding with restoration efforts.

Although it is impossible to know exactly the pre-settlement habitat conditions of the Flats, it is likely that it was a mosaic of wetland types, perhaps similar to those in the northern part of the Flats today. It would therefore be desirable to restore both emergent marsh as well as forested wetlands in the Flats. Habitat restoration activities have the potential to affect site hydrology and nutrient flows. These effects should be carefully evaluated in advance of any restoration efforts.

### **8.4 Management of the Owasco Inlet and its Watershed**

Despite concerns over Owasco Lake's water quality and the fact that the Inlet is the lake's largest tributary, the Owasco Inlet and its watershed presently lack a detailed, overarching management plan. It is recommended that a management plan be developed that considers the interplay among all human activities and needs within the watershed, as well as the goals of maintaining clean water and high quality fish and wildlife habitat. It should particularly focus on the two following issues:

- Nutrient management – which management actions will be most effective in addressing concerns about excessive nutrient inputs into Owasco Lake? Proposals such as biomass/nutrient harvesting should be considered along with more conventional efforts to address non-point source water pollutants.

- Management of the Owasco Inlet Corridor – the U.S. Army Corps of Engineers should be engaged to work with other public agency partners and a variety of local stakeholders to develop a comprehensive management plan for the main stem of the Owasco Inlet. The plan should consider the cumulative impacts of erosion control and bank stabilization activities. It should also assess the feasibility of restoring the Inlet to a more natural condition within the Flats.

## **8.5 Ongoing Community Engagement**

Given the diversity and complexity of issues relating to the future of the Flats, as well as the number of interested stakeholders, it is recommended that the steering committee convened for this project continue to meet on at least an annual basis. Through the committee, key partners will be able to stay informed and have input into decisions made concerning the future of the area.

## 9 Bibliography

- Apfelbaum, S. I. and C. E. Sams. 1987. Ecology and control of reed canary grass (*Phalaris arundinacea* L.). *Natural Areas Journal* 7:69-74.
- Blossey, B., V. Nuzzo, H. Hinz, and E. Gerber. 2001a. Developing biological control of *Alliaria petiolata* (M. Bieb.) Cavara and Grande (garlic mustard). *Natural Areas Journal* 21:357-367.
- Dr. Bernd Blossey, Richford, NY, personal communication, February 2007.
- Burger, M.F. and J.M. Liner. 2005. Important Bird Areas of New York: Habitats worth protecting. Audubon New York. Albany, NY.
- Kevin Delaney, New York State Department of Environmental Conservation, Syracuse, NY, personal communication, March 2007.
- Frank Hall, Moravia, NY, personal communication, September 2006.
- Hauber, D.P., D.A. White, S.P. Powers and F.R. DeFrancesch. 1991. Isozyme variation and correspondence with unusual infrared reflectance patterns in *Phragmites australis* (Poaceae). *Plant Systematics and Evolution* 178:1-8.
- Jaquette, C., E. Wohl, and D. Cooper. 2005. Establishing a context for river rehabilitation, North Fork Gunnison River, Colorado. *Environmental Management* 35: 593-606.
- The Kurtz Publishing Company. "Auburn, N.Y., Its Facilities and Resources". 1884.
- Mahaney, W.M., D.H. Wardrop and R.P. Brooks. 2005. Impacts of sedimentation and nitrogen enrichment on wetland plant community development. *Plant Ecology*. 175(2):227-243.
- Victoria Nuzzo, Richford, NY, personal communication, October 2006.
- Owasco Lake Management Plan Steering Committee and the Cayuga County Water Quality Management Agency. 2000. State of the Owasco Lake Watershed.
- Rosgen, D.L. 2006. River Restoration using a geomorphic approach for natural channel design. *Proceedings of the Eighth Federal Interagency Sedimentation Conference*, April 2-6, 2006, Reno, NV.
- Jean Siracusa, Auburn, NY, personal communication, January 2007.
- U.S. Army Corps of Engineers, Buffalo District. Report: Owasco-1948-01. "Owasco Inlet, Mill and Dry Creeks, Moravia, N.Y., Local Flood Control Project, Operations and Maintenance Manual." October 1948.
- U.S. Army Corps of Engineers, Buffalo District. Report: Owasco-1984-1. "Oswego River Basin, N.Y., Management Plan Analysis. Owasco Lake, N.Y., Final Feasibility Report." January 1984.

## **10 Appendices**

### **10.1 Acknowledgements**

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Cayuga County Soil and Water Conservation District  
Cornell University Institute for Resource Information Systems (IRIS)  
United States Army Corps of Engineers

## 10.2 List of Steering Committee Organizations and Members

### Organizations represented on the Steering Committee:

Audubon New York - Jillian Limer.  
Cayuga County Health Department – Eileen O’Connor.  
Cayuga County Legislative Planning Committee – Steve Cuddeback.  
Cayuga County Parks and Recreation Department – Gary Duckett.  
Cayuga County Department of Planning and Economic Development – Bruce Natale.  
Cayuga County Soil and Water Conservation District – Kelly Crossett.  
Cayuga County Sportsmen’s Federation and DEC-R7 FWMB – Bob Hazelton.  
Central New York Regional Planning and Development Board – Kristy LaManche.  
City of Auburn – Anthony DeCaro.  
Ducks Unlimited – Peter Gibbs.  
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New York State Department of Environmental Conservation – Marie Kautz.  
Owasco Flats Nature Preserve – Jean Siracusa.  
Owasco Lake Anglers – Chet Crosby.  
Owasco Lake Homeowner’s Association – Pam Sullivan, Bev & Bob Siebert.  
Owasco Watershed Lake Association – Al Kozlowski.  
Town of Moravia –Terry Baxter.  
Trout Unlimited – Niles Brown.  
U.S. Fish and Wildlife Service – Sandie Doran.  
Village of Moravia – Don Meyers.

## 10.3 Landowner Survey Results

### 1) What do you like most about the Owasco Flats?

Peace/ quiet	11	38%
Hunt/fish	7	24%
Wildlife	9	31%
Farming	2	7%
TOTAL	29	

### 2) How have you and your family enjoyed the Owasco Flats in the past?

Hunt/fish	13	36%
Boating	5	14%
Farming	5	14%
Walking	7	19%
Picnicking	1	3%
Skiing	1	3%
Horse riding	1	3%
Birding	1	3%
Snowshoeing	1	3%
Camping	1	3%
TOTAL	36	

### 3) Questions about Recreation opportunities in the Owasco Flats

#### 3A) Should Public Access be increased in the Flats?

Yes	No	Maybe	TOTAL
6	6	5	17
35%	35%	29%	

#### 3B) Do you support motorized recreation in the Flats?

##### i) Snowmobiles

Yes	No	Maybe	TOTAL
8	9	0	17
47%	53%	0%	

**ii) All Terrain Vehicles**

Yes	No	Maybe	TOTAL
5	12	0	17
29%	71%	0%	

**iii) Jet ski's in the Inlet**

Yes	No	Maybe	TOTAL
4	13	0	17
24%	76%	0%	

**iv) Motorcycles**

Yes	No	Maybe	TOTAL
2	15	0	17
12%	88%	0%	

**3C) Are you in favor of Hunting and Trapping in the Flats?**

Yes	No	Maybe	TOTAL
16	1	0	17
94%	6%	0%	

**3D) Are you in favor of Fishing in the Flats?**

Yes	No	Maybe	TOTAL
16	1	0	17
94%	6%	0%	

**3E) Are you in favor of Camping in the Flats?**

Yes	No	Maybe	TOTAL
8	6	3	17
47%	35%	18%	

**3F) Do you think Hiking Trails should be developed in the Flats?**

Yes	No	Maybe	TOTAL
8	5	4	17
47%	29%	24%	

**4) What are your future plans for your land in the Flats?**

Keep it the same	Perhaps build	Undecided	TOTAL
14	1	2	17
82%	6%	12%	

**5) Do you support the planned acquisition of land by the New York Department of Environmental Conservation for the creation of a Wildlife Management Area?**

Yes	No	Maybe	TOTAL
8	2	7	17
47%	12%	41%	

**6) Would you be in favor of restoring wetlands in the Owasco Flats?**

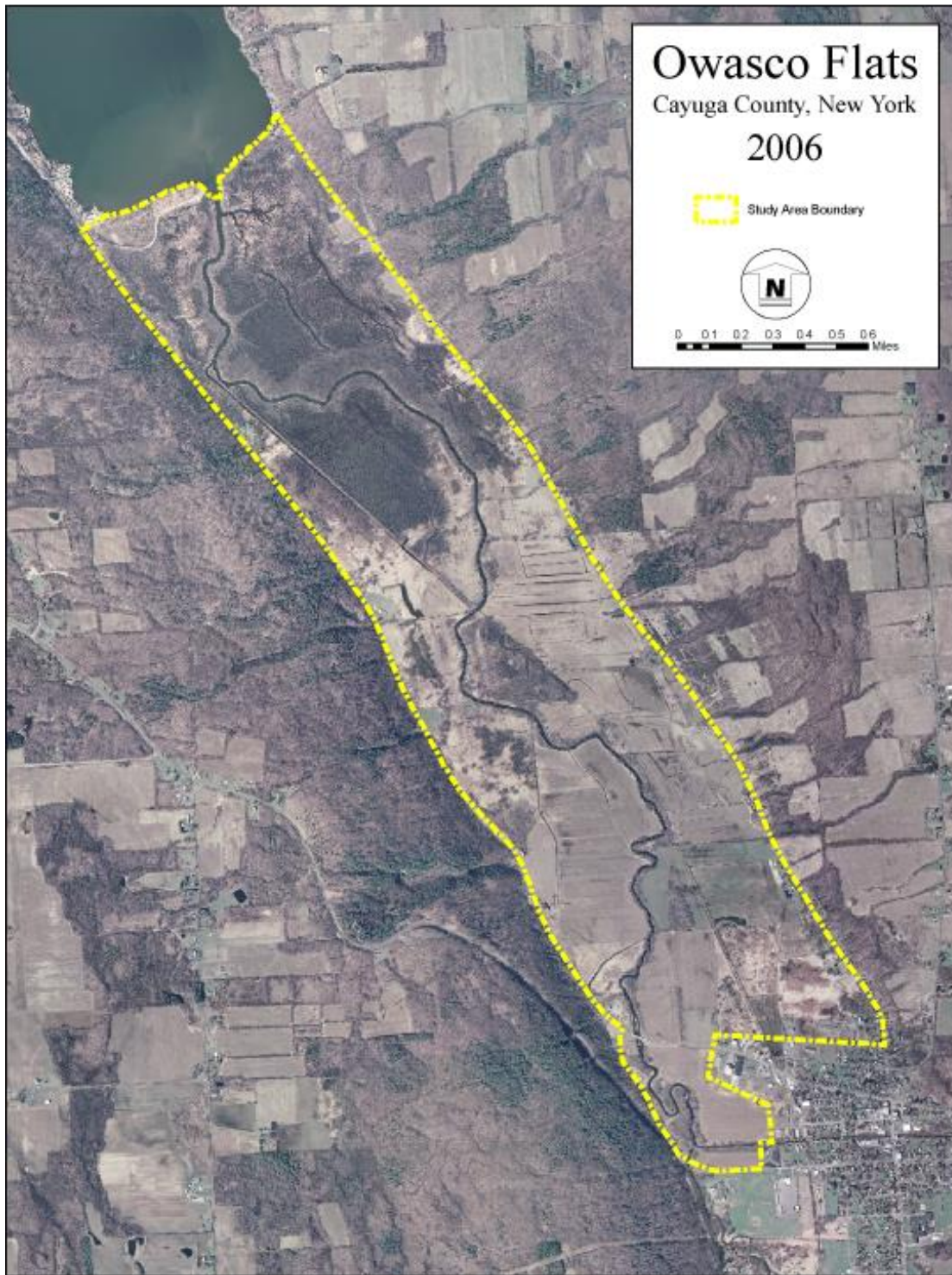
Yes	No	Maybe	TOTAL
11	3	3	17
65%	18%	18%	

**7) What do you feel are the most important issues facing the Owasco Flats today?**

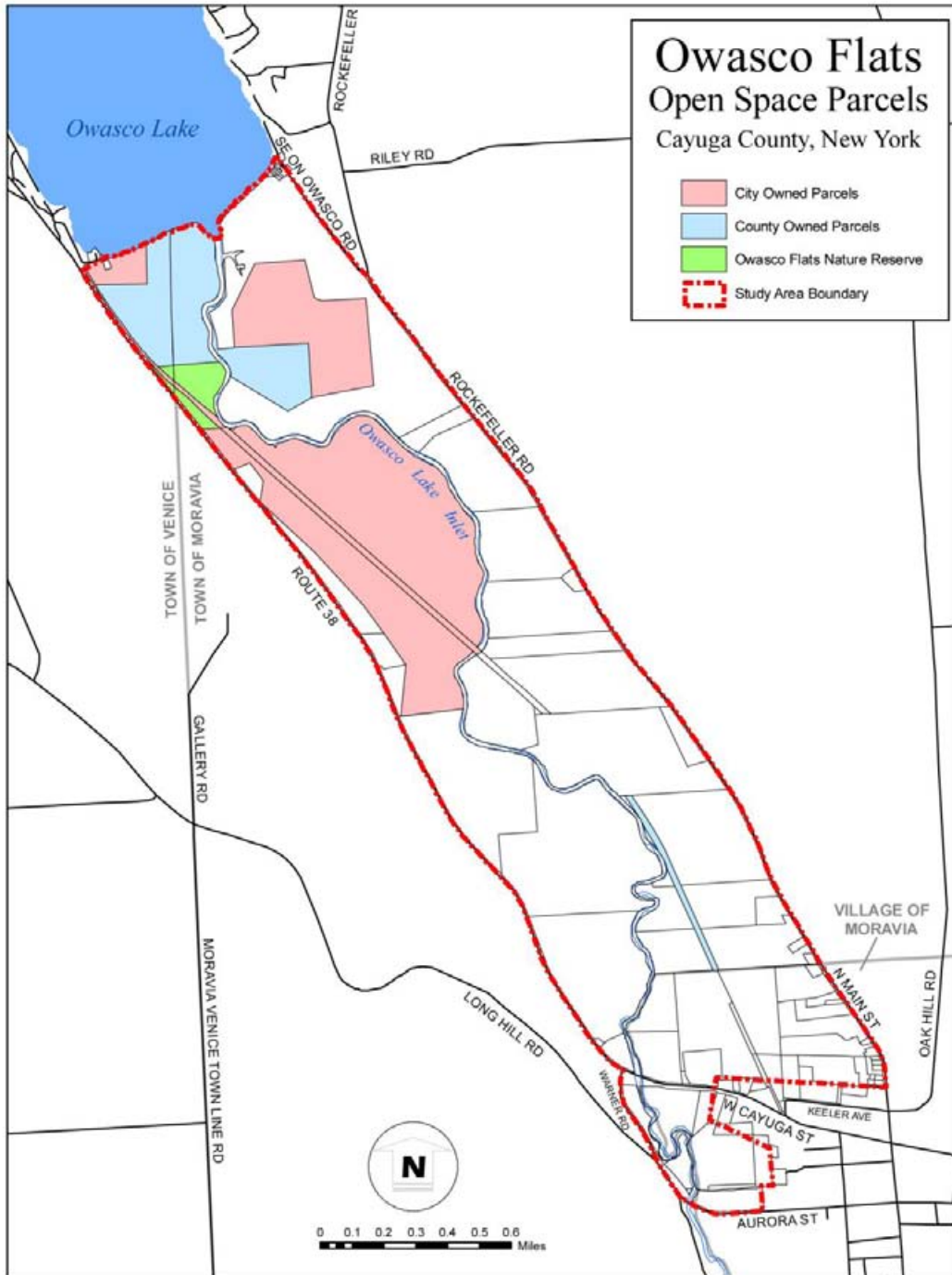
Water quality	7	29%
Privacy and public access	5	21%
Wetland restoration	4	17%
Development	3	13%
Flooding	2	8%
Wildlife management	2	8%
Motorized recreation	1	4%
	24	



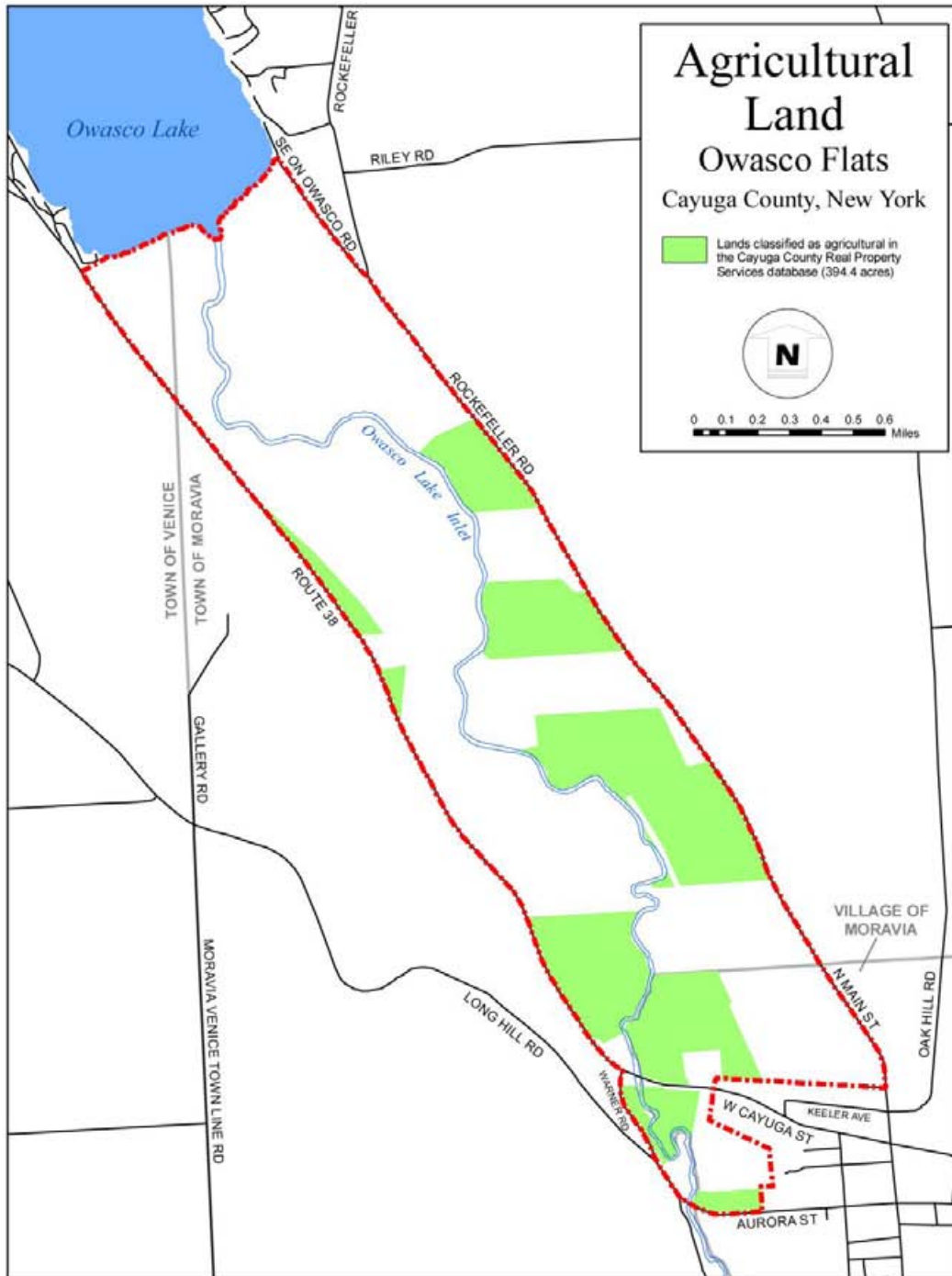
## 10.4 Figures



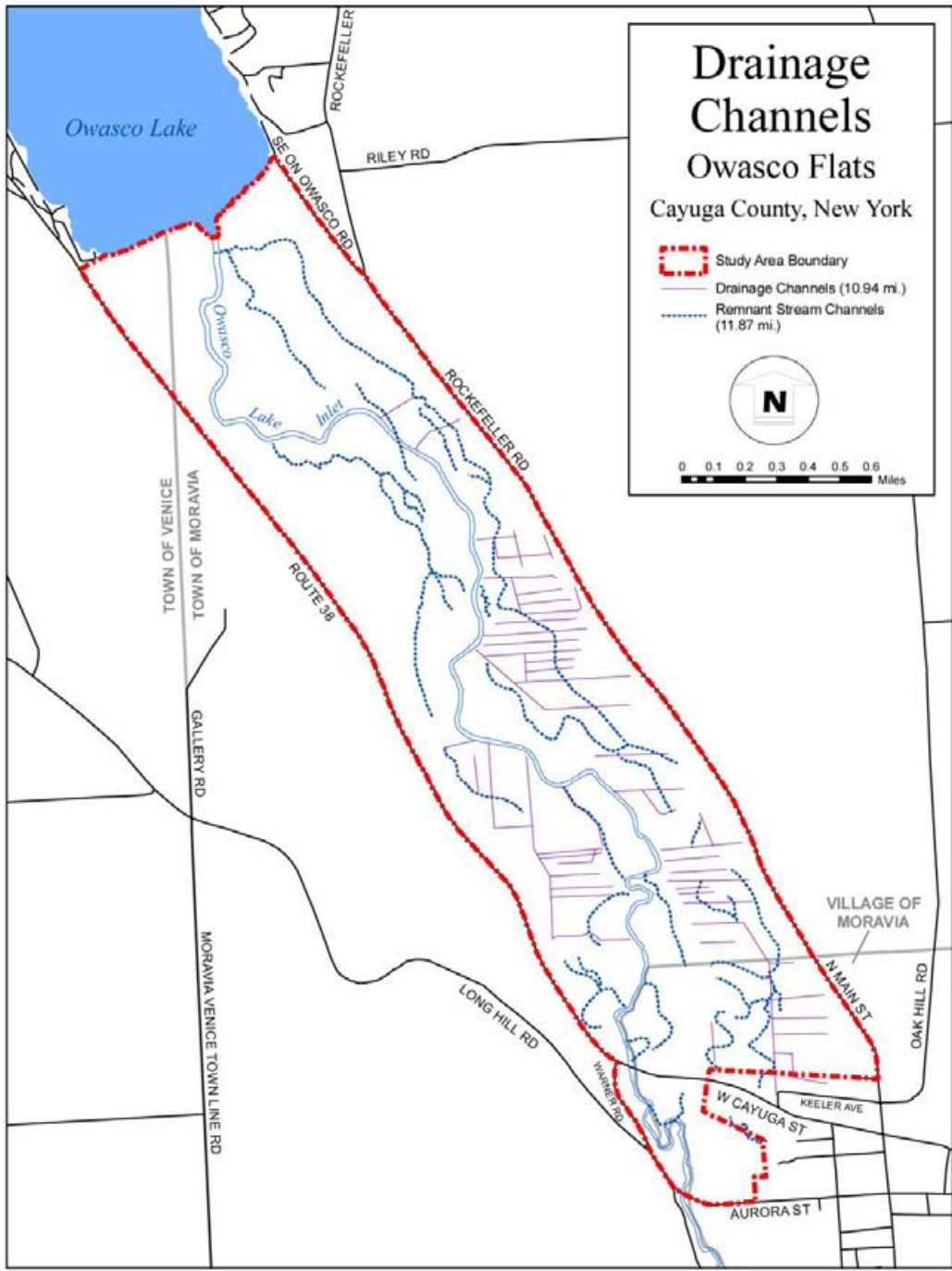
10.4.1 Figure 1. Aerial view of the Owasco Flats 2006.



**10.4.2 Figure 2. Map of the open space and tax map parcels.** Parcels based on tax maps provided by the Cayuga County Department of Planning and Economic Development; it is important to note that this mapping data may vary from land surveys.

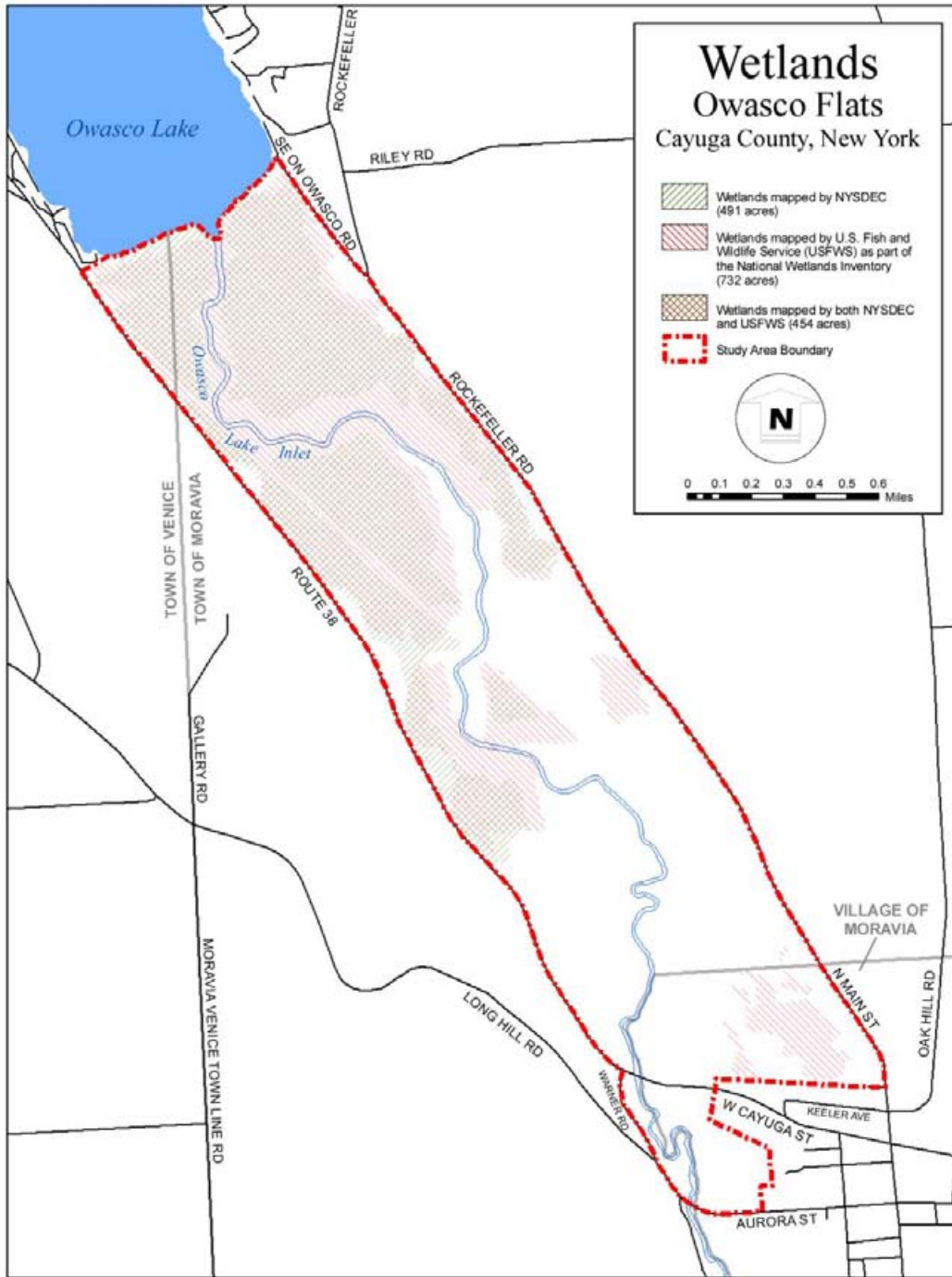


**10.4.3 Figure 3. Map of land classified as agricultural.**  
 Parcels of land classified as agricultural by the Cayuga County Real Property Services.



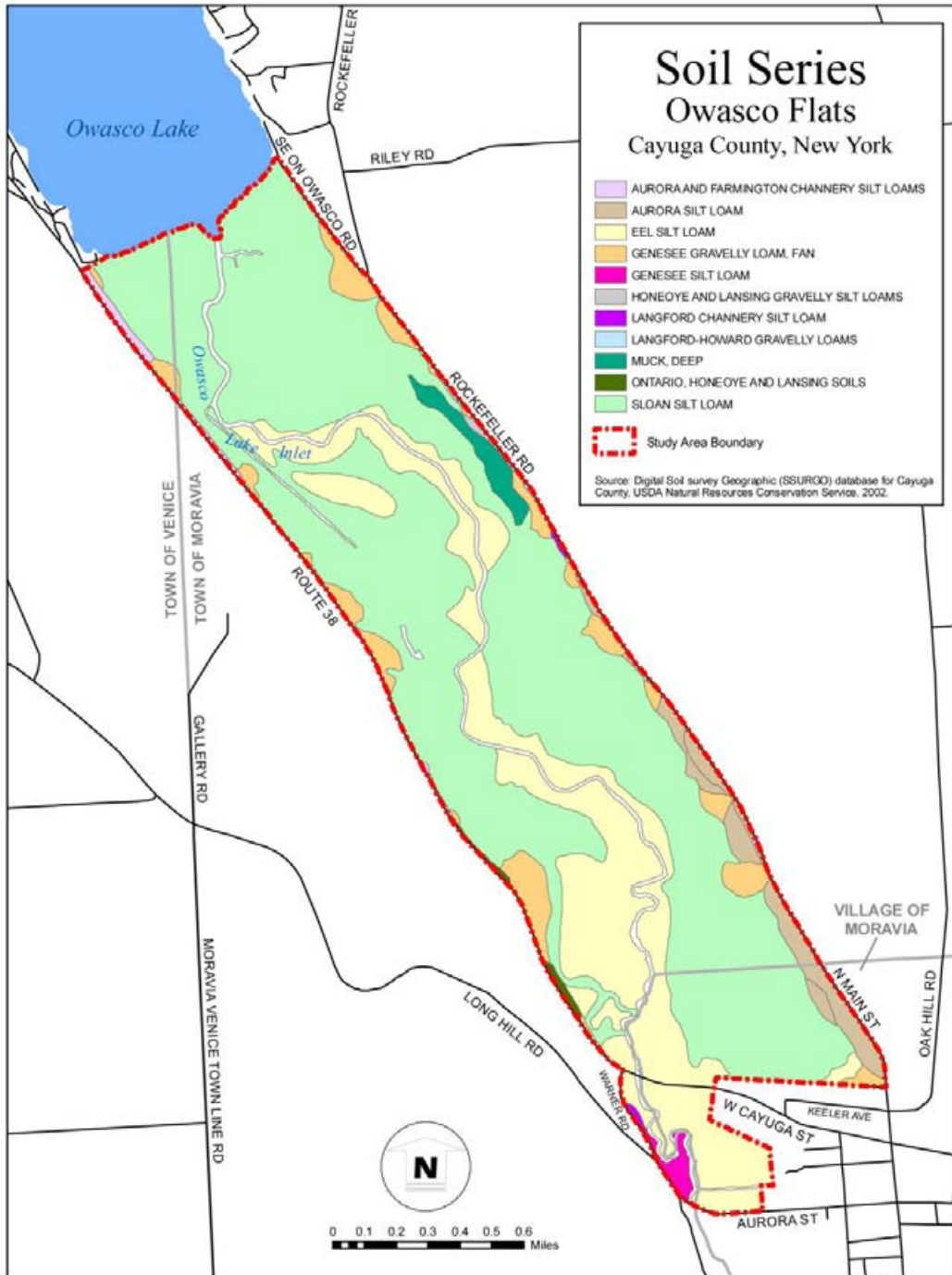
**10.4.4 Figure 4. Map of drainage ditches and remnant stream channels.**

These features were identified from aerial photographs. The remnant channels were difficult to identify and are incomplete, but give an indication of the shifting Inlet channel.

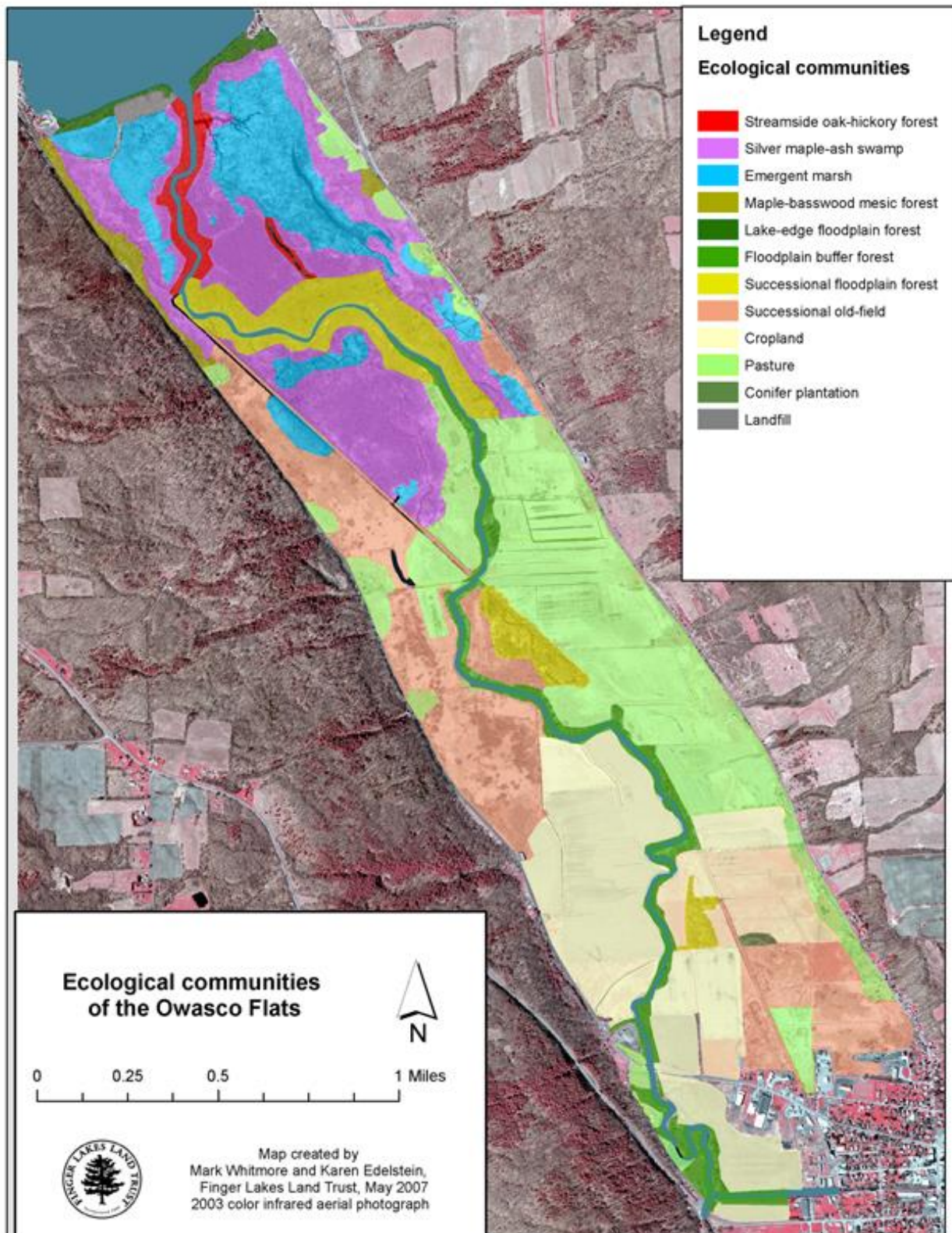


**10.4.5 Figure 10. Map of wetlands in the Owasco Flats.**

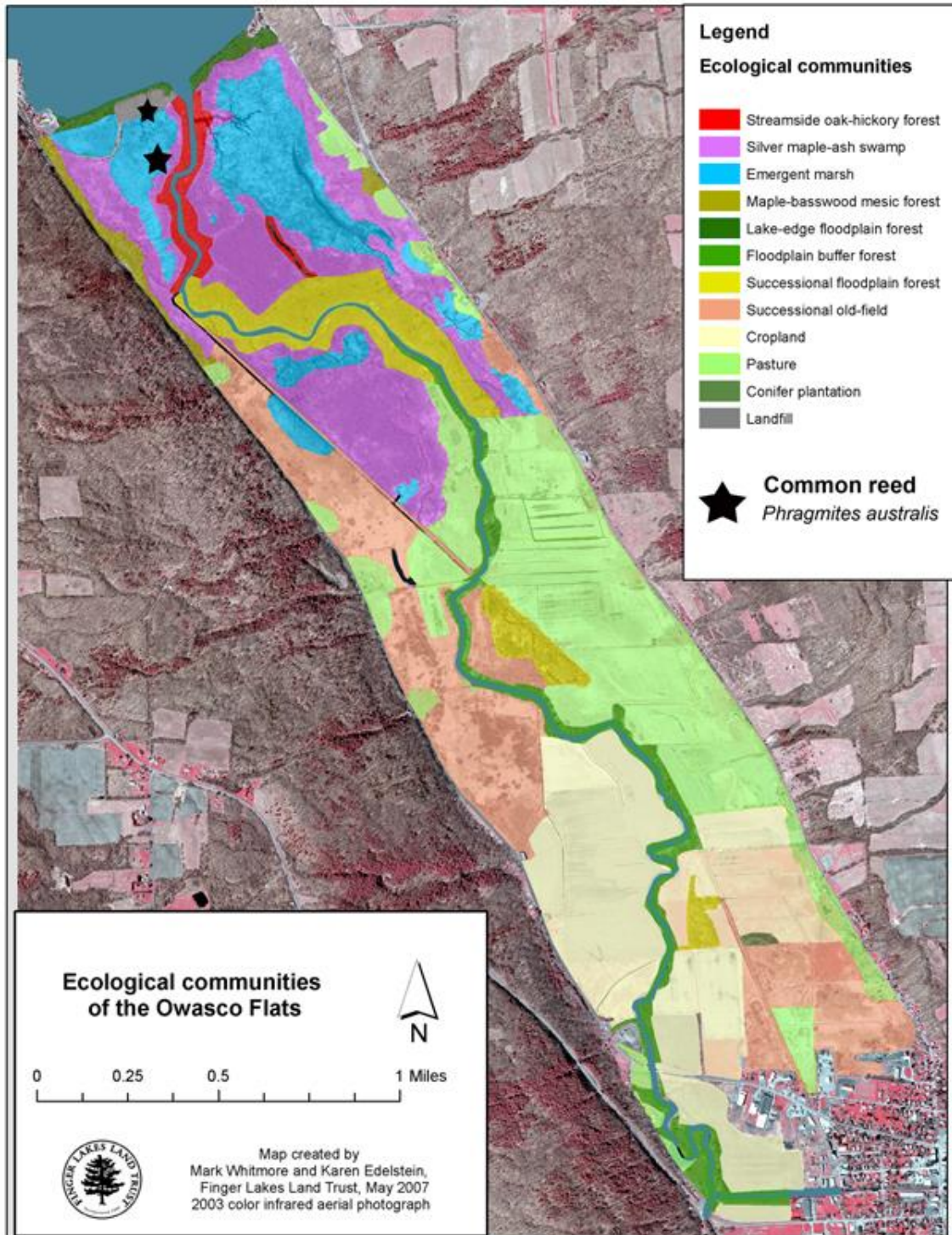
New York State Department of Environmental Conservation and U.S. Fish & Wildlife Service delimited wetlands in the Owasco Flats.



**10.4.6 Figure 11. Map of the soil series in the Owasco Flats.**  
Soil survey data from the USDA Natural Resources Conservation Service, 2002.



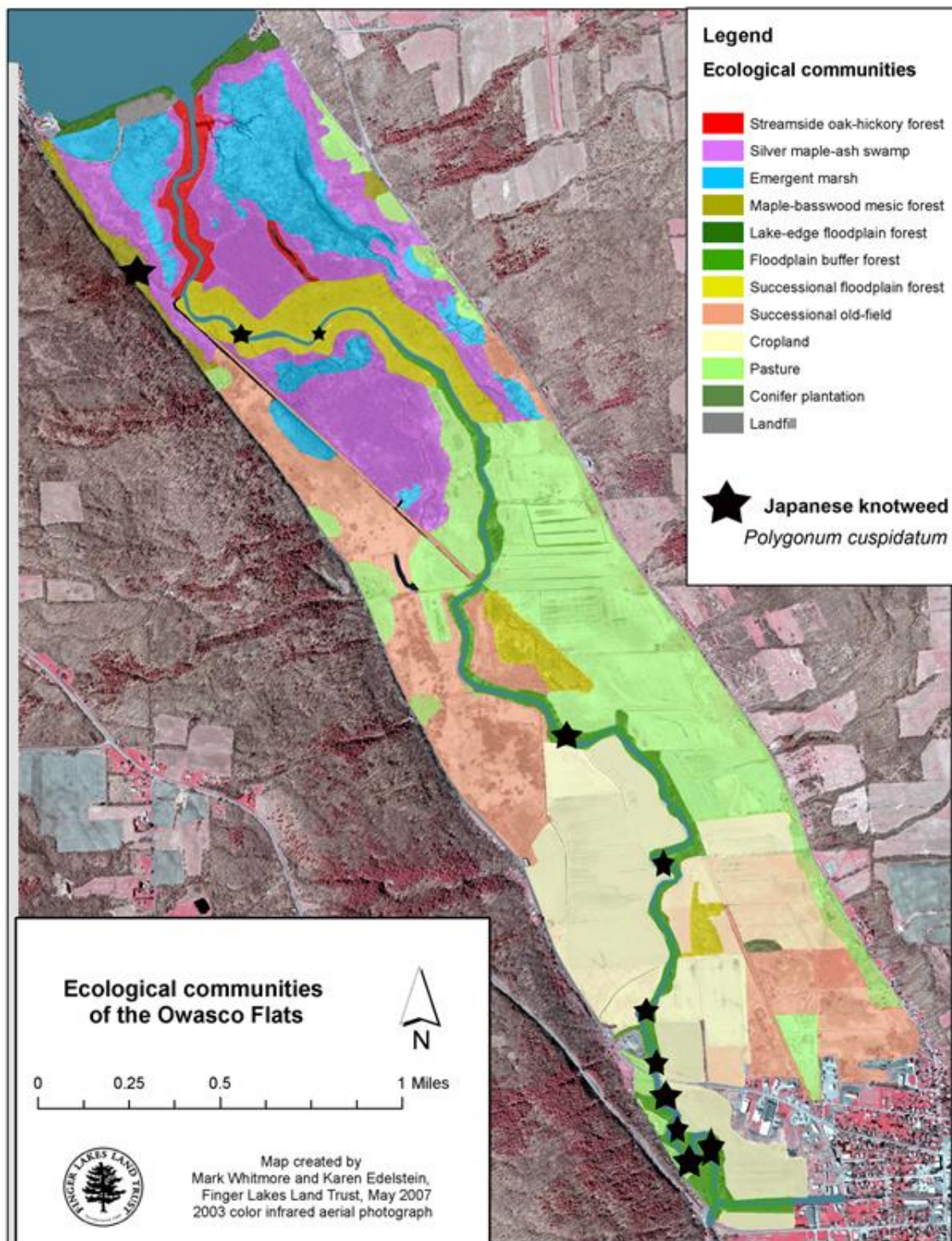
10.4.7 Figure 12. Map of ecological communities of the Owasco Flats.



**10.4.8 Figure 15. Map of Common reed.**

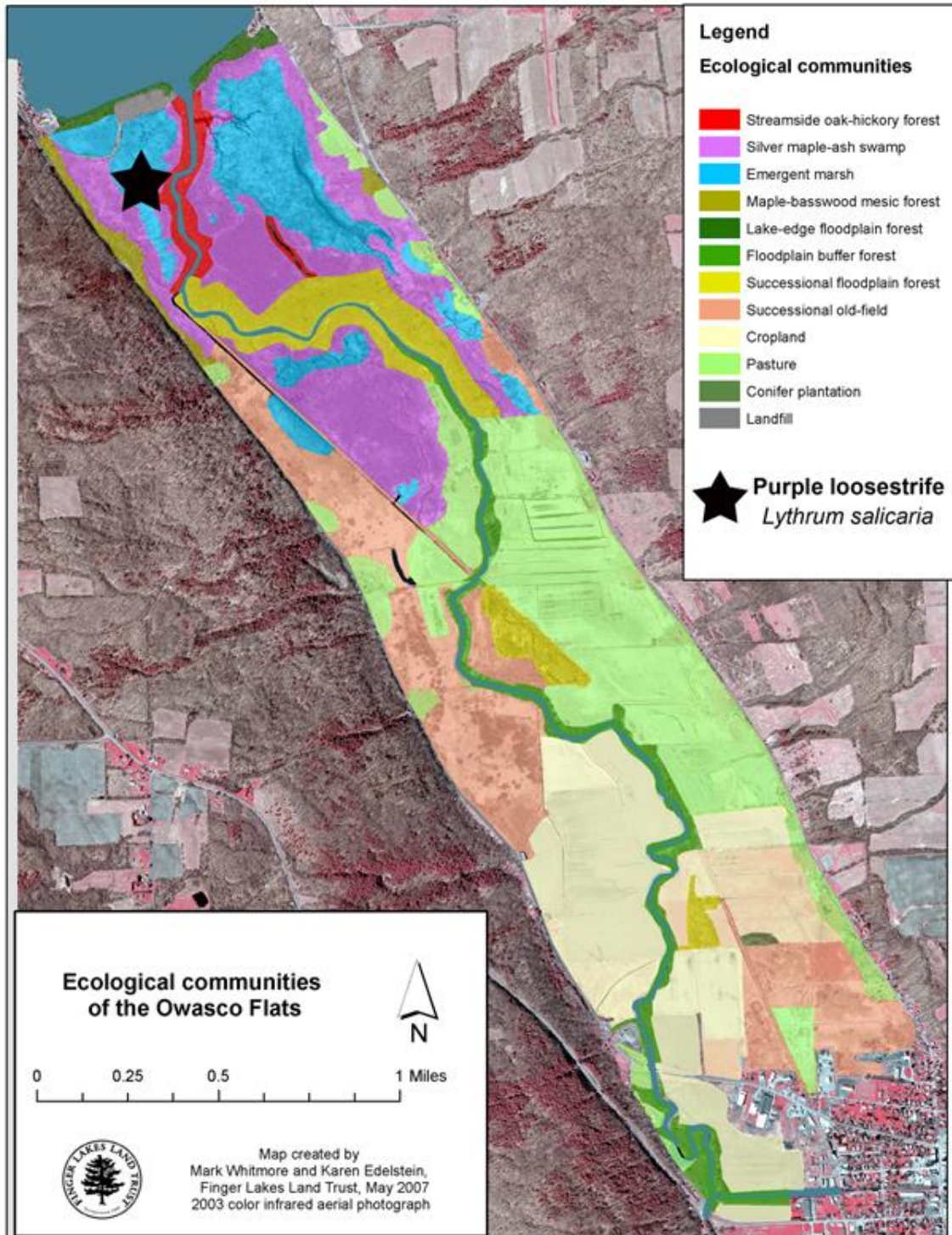
Map of the invasive weed, Common reed (*Phragmites australis*), in the Owasco Flats.





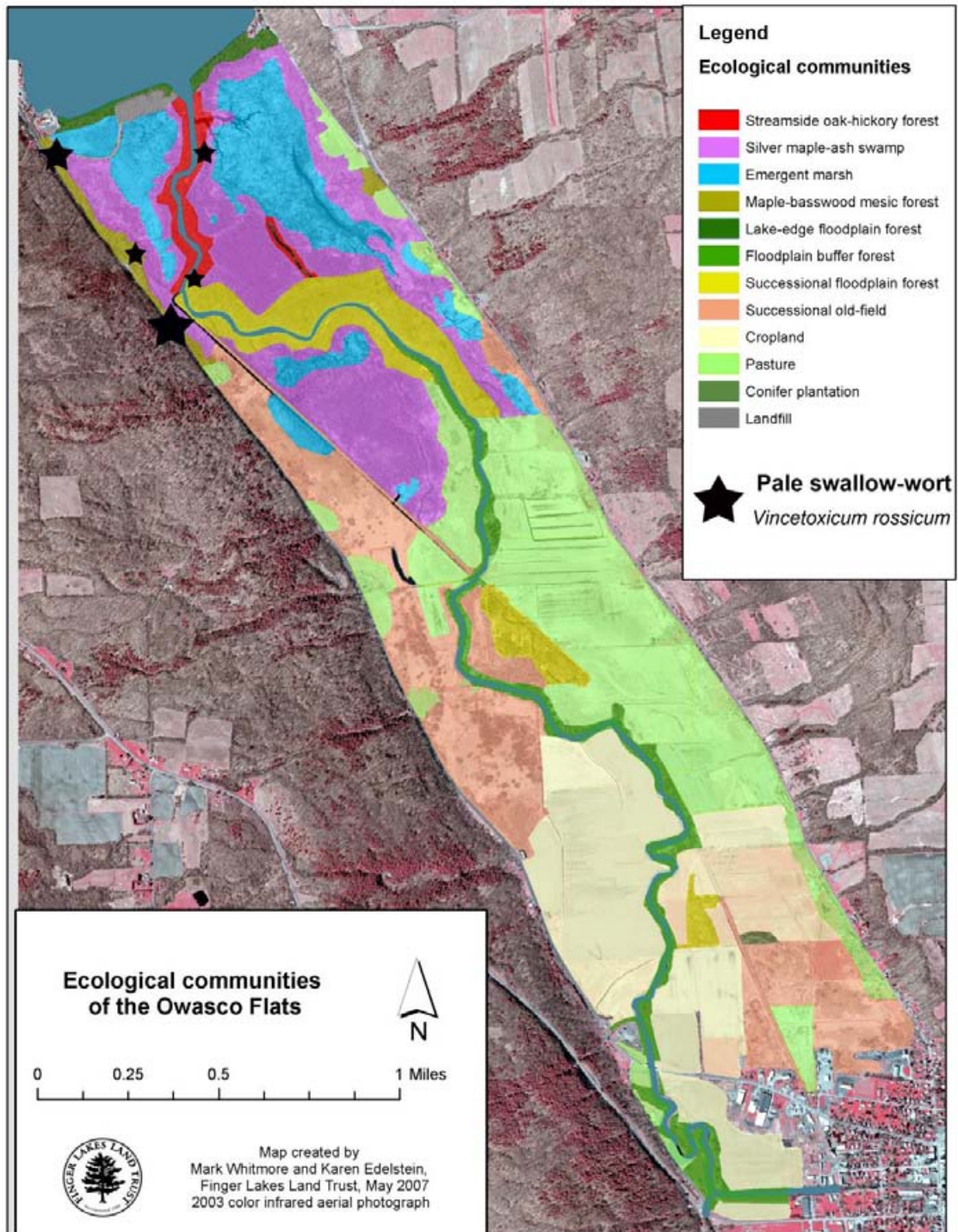
**10.4.9 Figure 16. Map of Japanese knotweed.**

Map of the invasive weed, Japanese knotweed (*Polygonum cuspidatum*), in the Owasco Flats.



**10.4.10 Figure 17. Map of Purple loosestrife.**

Map of the invasive weed, Purple loosestrife (*Lythrum salicaria*), in the Owasco Flats.



**10.4.11 Figure 18. Map of Pale swallow-wort.**

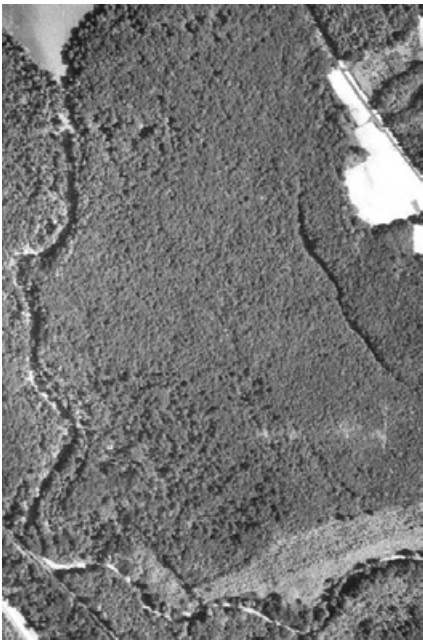
Map of the invasive weed, Pale swallow-wort (*Cynanchum rossicum*), in the Owasco Flats.



1938



1954



1963



2002

**10.4.12 Figure 7. Aerial photos of northeastern Emergent Marsh.**

These photographs from 1938 to 2002 show the development of emergent marsh from what was once swamp forest, as a result of maintaining higher lake levels. Note the two remnant stream channels in the center-right of the photographs.



1938



1954



1963



2002

**10.4.13 Figure 8. Aerial photos of northwestern Emergent Marsh.**

These photographs from 1938 to 2002 show the development of emergent marsh from swamp forest because of higher lake levels and blocked drainage from fill used for constructing the access road on county property.



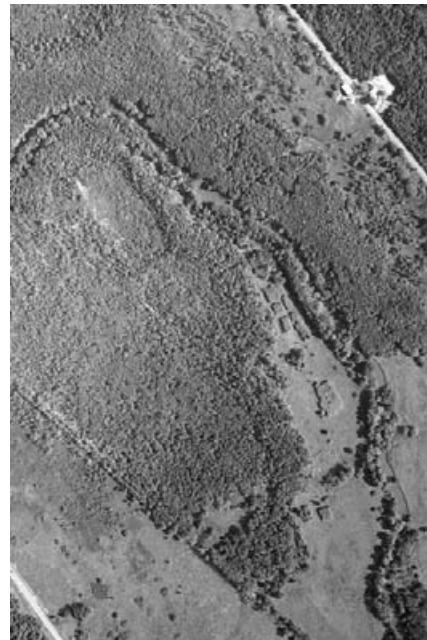
1938



1954



1963



2002

**10.4.14 Figure 9. Aerial photos of old-field succession.**

These photographs taken of the northern Owasco Flats from 1938 to 2002 illustrate an area that has gradually changed from agriculture to forest and marsh.



**10.4.15** Figure 13. Photo of the Streamside Oak-Hickory Forest Community.



**10.4.16** Figure 14. Photo of the Maple-Ash Swamp Community.



2006



1963



1954



1938

**10.4.17 Figure 19. Aerial photos of the Owasco Inlet channel.**

Aerial photographs of the Owasco Inlet channel just upstream of the Route 38 Bridge and just downstream of the Aurora Street Bridge. This is the most active area for movement of the Inlet channel. 400 ft. of rip rap was added to this section of the channel in the late 1990's.





1938



1954

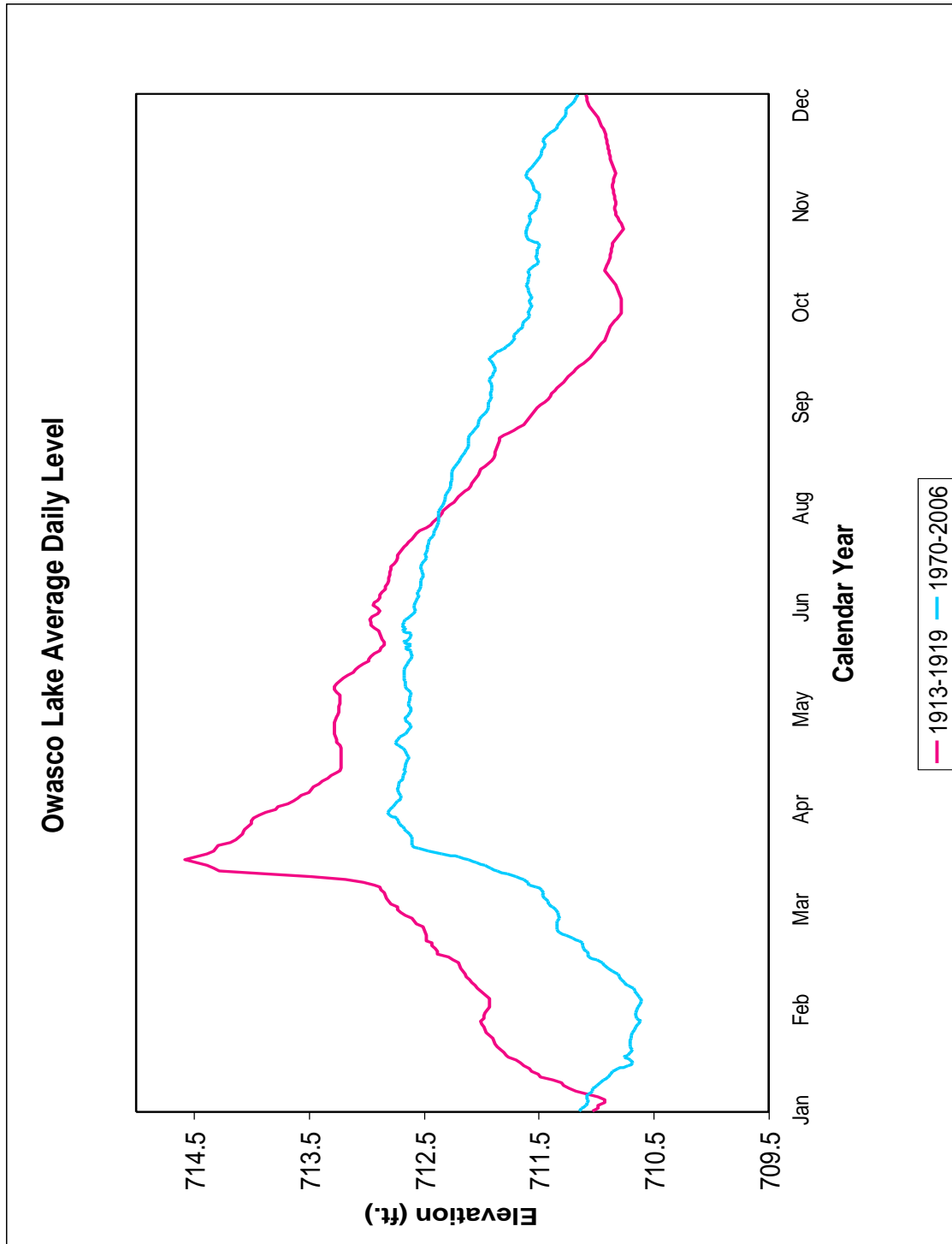


1963

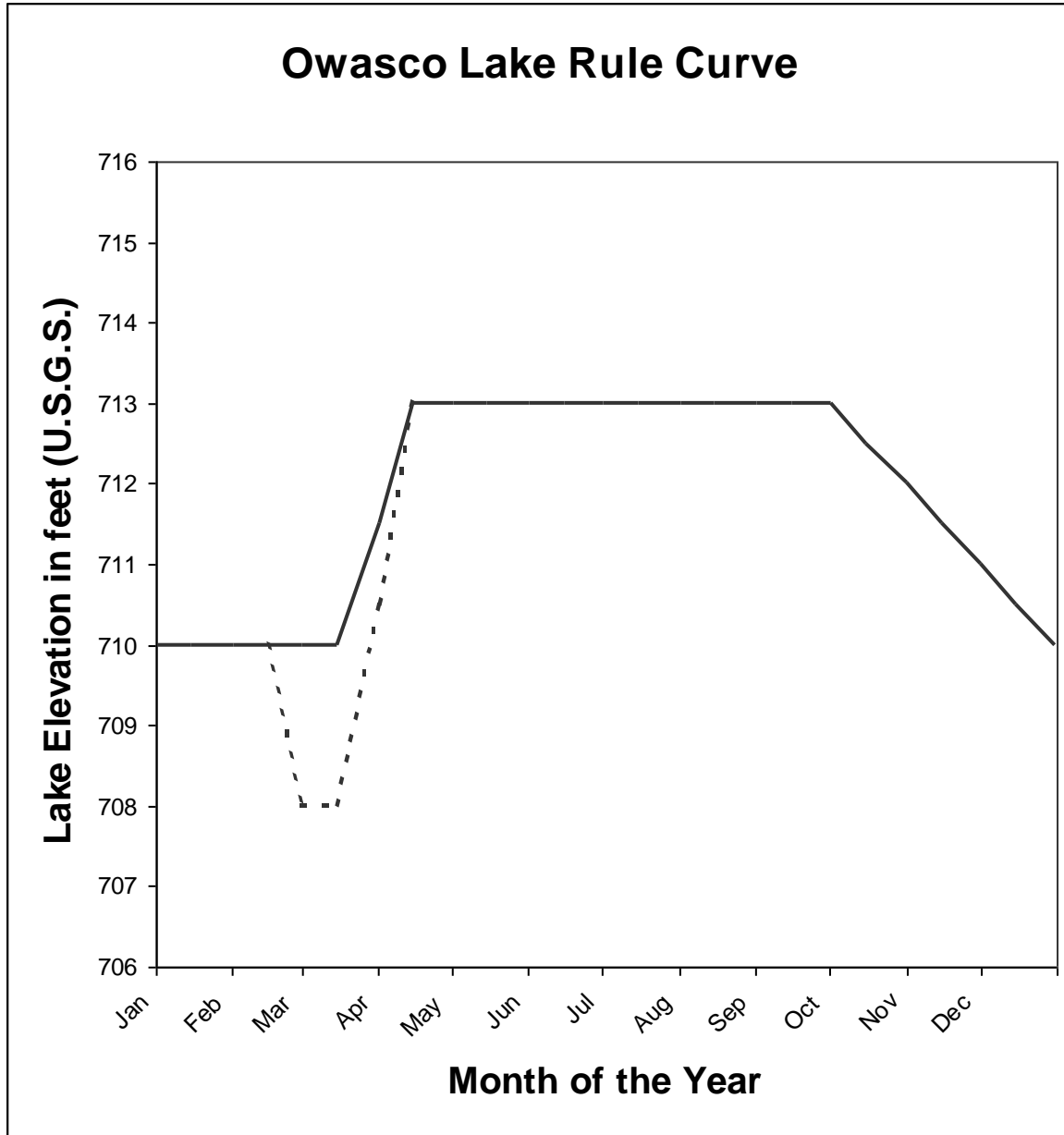


2005

**10.4.18 Figure 20. Aerial photos of the Owasco Inlet channel.** These photographs show the extensive work that has been done around the Route 38 bridge removing a meander, then straightening and widening the channel. Note the channel cutting a new meander in the upper center part of the 2005 photo.



**10.4.19 Figure 5. Lake level from 1913 to 1916 and 1970 to 2006.**  
 Lake level measured by the City of Auburn from 1913 to 1916 and by the United States Geological Survey from 1970 through 2006.



**10.4.20 Figure 6. Owasco Lake rule curve developed in 1984.**

Rule curve developed by the U.S. Army Corps of Engineers in 1984 and used by the City of Auburn to maintain the level of Owasco Lake. The solid line represents the maximum desirable lake level to be maintained for the respective time of year. When there is exceptional snow cover it is permitted for the lake level to be lowered in spring prior to snow melt as indicated by the dashed line.

## 10.5 Flora of the Owasco Flats

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
-----------------	-------------	-------------------------------	------------------------	----------------	-----------------------------	-----------------------------	--------------------------	--------------------------------	------------------------	----------------------	--------------------	----------

### TREES

<i>Acer negundo</i> L.	Box elder	X	X		X	X	X	X	X	X		X
<i>Acer platanoides</i> L.	Norway maple	X								X		
<i>Acer rubrum</i> L.	Red maple	X	X	X	X	X	X	X				
<i>Acer saccharinum</i> L.	Silver maple	X	X	X	X	X	X	X				
<i>Acer saccharinum</i> x <i>rubrum</i> (A. freemanii)	Swamp maple	X	X	X	X	X	X	X				
<i>Acer saccharum</i> L.	Sugar maple	X			X			X				
<i>Betula alleghaniensis</i> Britt.	Yellow birch				X							
<i>Carpinus caroliniana</i> Walt.	American hornbeam	X	X		X	X	X					
<i>Carya cordiformis</i> (Wangenh.) K. Koch	Bitternut hickory	X			X	X	X					
<i>Carya glabra</i> (P. Mill.) Sweet	Pignut hickory	X			X							
<i>Carya laciniosa</i> (Michx. f.) G. Don	Shellbark hickory	X		X			X					
<i>Carya ovata</i> (P. Mill.) K. Koch	Shagbark hickory	X			X		X			X		
<i>Catalpa bignonioides</i> Walt.	Southern catalpa						X					
<i>Celtis occidentalis</i> L.	Hackberry	X				X						
<i>Crataegus</i> sp.	Hawthorn	X				X	X	X				
<i>Fagus grandifolia</i> Ehrh.	American beech	X			X							
<i>Fraxinus americana</i> L.	White ash	X			X		X	X				
<i>Fraxinus nigra</i> Marsh.	Black ash	X	X	X								
<i>Fraxinus pennsylvanica</i> Marsh.	Red ash	X	X	X	X							X
<i>Juglans cinerea</i> L.	Butternut	X			X					X		
<i>Juniperus virginiana</i> L.	Eastern redcedar											X
<i>Liriodendron tulipifera</i> L.	Tulip tree				X	X		X				
<i>Malus</i> sp.	Apple							X				
<i>Ostrya virginiana</i> (P. Mill.) K. Koch	Hop hornbeam				X							
<i>Picea abies</i> (L.) Karst.	Norway spruce										X	
<i>Pinus resinosa</i> Ait.	Red pine										X	
<i>Pinus strobus</i> L.	Eastern white pine									X		
<i>Pinus sylvestris</i> L.	Scotch pine										X	
<i>Platanus occidentalis</i> L.	American sycamore					X						
<i>Populus deltoides</i> Bartr. ex Marsh.	Cottonwood				X	X	X	X	X	X		X
<i>Populus grandidentata</i> Michx.	Bigtooth aspen				X			X				
<i>Populus tremuloides</i> Michx.	Quaking aspen											X
<i>Prunus americana</i> Marsh.	American plum	X			X					X		
<i>Prunus nigra</i> Ait.	Canadian plum	X										
<i>Prunus serotina</i> Ehrh.	Black cherry	X	X		X		X	X				
<i>Pyrus communis</i> L.	Common pear											X

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Quercus alba</i> L.	White oak				X			X				
<i>Quercus bicolor</i> Willd.	Swamp white oak	X										
<i>Quercus macrocarpa</i> Michx.	Burr oak	X										
<i>Quercus palustris</i> Muenchh.	Pin oak									X		
<i>Quercus rubra</i> L.	Northern red oak	X			X			X				
<i>Rhamnus cathartica</i> L.	Common buckthorn	X	X					X				X
<i>Rhus typhina</i> L.	Staghorn sumac				X				X	X		
<i>Robinia pseudoacacia</i> L.	Black locust					X		X		X		
<i>Salix alba</i> L.	White willow	X	X		X	X	X	X	X	X		X
<i>Salix fragilis</i> L.	Crack willow	X	X		X	X	X	X	X	X		X
<i>Salix nigra</i> Marsh.	Black willow		X				X			X		X
<i>Tilia americana</i> L.	Basswood	X			X	X	X	X				
<i>Ulmus americana</i> L.	American elm	X	X	X	X			X				
<i>Ulmus rubra</i> Muhl.	Slippery elm	X						X				
<i>Ulmus thomasii</i> Sarg.	Rock elm				X			X				

## SHRUBS & VINES

<i>Alnus incana</i> (L.) Moench ssp. <i>rugosa</i> (DuRoi) Clausen	Speckled alder		X	X		X	X					
<i>Berberis thunbergii</i> DC.	Japanese barberry	X	X		X	X	X	X				
<i>Cephalanthus occidentalis</i> L.	Button-bush		X	X								
<i>Clematis virginiana</i> L.	White clematis	X			X	X		X				
<i>Cornus alternifolia</i> L.	Alternate-leaved dogwood	X	X		X		X					
<i>Cornus amomum</i> Mill.	Silky dogwood		X	X				X				X
<i>Cornus racemosa</i> Lam.	Gray dogwood	X	X		X				X			
<i>Cornus sericea</i> L.	Red osier dogwood	X	X	X								X
<i>Elaeagnus umbellata</i> Thunb.	Autumn olive	X	X	X	X		X	X	X	X		X
<i>Ilex verticillata</i> (L.) Gray	Winterberry	X	X	X								
<i>Ligustrum obtusifolium</i> Sieb. & Zucc.	Border privet	X				X	X	X	X			
<i>Lindera benzoin</i> (L.) Blume	Spicebush	X	X		X	X		X				
<i>Lonicera xbella</i> Zabel [ <i>morrowii</i> x <i>tatarica</i> ]	Showy fly honeysuckle				X							
<i>Lonicera dioica</i> L.	Glaucous honeysuckle	X				X						
<i>Lonicera tatarica</i> L.	Tartarian Honeysuckle	X	X	X	X		X	X	X			X
<i>Menispermum canadense</i> L.	Moonseed	X			X							
<i>Parthenocissus quinquefolia</i> (L.) Planch.	Virginia Creeper	X	X	X	X	X						
<i>Physocarpus opulifolius</i> (L.) Maxim.	Ninebark	X										X
<i>Prunus virginiana</i> L.	Chokecherry				X							
<i>Ribes americanum</i> P. Mill.	American black currant	X	X		X			X				
<i>Ribes cynosbati</i> L.	Prickly gooseberry				X							
<i>Rosa blanda</i> Ait.	Smooth rose				X							
<i>Rosa multiflora</i> Thunb.	Multiflora rose	X	X	X	X	X	X	X				

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Rosa palustris</i> Marsh.	Swamp rose	X	X	X								
<i>Rubus allegheniensis</i> Porter	Allegheny blackberry							X				
<i>Rubus idaeus</i> L.	American red raspberry		X			X						
<i>Rubus odoratus</i> L.	Flowering raspberry	X			X							
<i>Salix discolor</i> Muhl.	Pussy willow		X	X					X			
<i>Salix interior</i> Rowlee	Sandbar willow											X
<i>Sambucus canadensis</i> L.	Elderberry	X					X	X				
<i>Smilax hispida</i> Muhl. ex Torr.	Bristly greenbrier	X										
<i>Solanum dulcamara</i> L.	Bittersweet nightshade	X	X	X		X		X				
<i>Staphylea trifolia</i> L.	Bladdernut	X	X			X		X				
<i>Toxicodendron radicans</i> (L.) Kuntze	Poison Ivy	X	X		X	X	X	X				
<i>Viburnum dentatum</i> L.	Arrowwood	X		X				X	X			
<i>Viburnum lentago</i> L.	Nannyberry	X	X	X		X						
<i>Vitis riparia</i> Michx.	Riverbank grape	X		X	X	X	X	X				
<i>Zanthoxylum americanum</i> P. Mill.	Common pricklyash											X

## HERBS

<i>Actaea pachypoda</i> Ell.	White baneberry				X							
<i>Adiantum pedatum</i> L.	Northern maidenhair fern				X							
<i>Aegopodium podagraria</i> L.	Bishop's goutweed	X				X						
<i>Ageratina altissima</i> (L.) King & H.E. Robins. var. <i>altissima</i>	White snakeroot	X			X	X		X				
<i>Agrimonia gryposepala</i> Wallr.	Tall hairy agrimony	X			X			X	X			
<i>Alisma subcordatum</i> Raf.	American water plantain			X								
<i>Alisma triviale</i> Pursh	Northern water plantain			X		X						
<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande	Garlic mustard	X	X		X	X	X	X		X		X
<i>Allium canadense</i> L.	Meadow garlic	X			X	X	X	X				
<i>Allium vineale</i> L.	Wild garlic					X						
<i>Amphicarpaea bracteata</i> (L.) Fern.	American hogpeanut	X			X							
<i>Anemone quinquefolia</i> L.	Wood anemone	X				X						
<i>Anemone virginiana</i> L.	Tall thimbleweed				X							
<i>Angelica atropurpurea</i> L.	Purplestem angelica					X				X		
<i>Anthoxanthum odoratum</i> L.	Sweet vernalgrass				X							
<i>Apios americana</i> Medik.	Groundnut	X				X						
<i>Apocynum cannabinum</i> L.	Indian hemp	X							X			
<i>Arctium lappa</i> L.	Greater burdock				X							
<i>Arisaema triphyllum</i> (L.) Schott	Jack-in-the-pulpit	X			X							
<i>Arisaema triphyllum</i> (L.) Schott ssp. <i>stewardsonii</i> (Britt.) Huttleston	Swamp jack-in-the-pulpit	X	X									
<i>Asarum canadense</i> L.	Wild ginger	X			X							
<i>Asclepias incarnata</i> L.	Swamp milkweed			X				X				
<i>Asclepias syriaca</i> L.	Common milkweed	X							X			

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Asplenium trichomanes</i> L.	Maidenhair spleenwort						X					
<i>Barbarea vulgaris</i> Ait. f.	Garden yellowrocket				X							
<i>Bidens connata</i> Muhl. ex Willd.	Swamp beggar ticks			X								
<i>Bidens</i> sp.	Burr marigold			X								
<i>Boehmeria cylindrica</i> (L.) Sw.	False nettle			X								
<i>Caltha palustris</i> L.	Marsh marigold		X	X						X		
<i>Calystegia sepium</i> (L.) R. Br. ssp. <i>sepium</i>	Hedge bindweed	X										
<i>Cardamine bulbosa</i> (Schreb. ex Muhl.) B.S.P.	Bulbous bittercress		X			X		X				
<i>Cardamine concatenata</i> (Michx.) Schwarz	Cut-Leaved toothwort	X	X		X							
<i>Cardamine diphylla</i> (Michx.) Wood	Crinkleroot	X			X							
<i>Cardamine douglassii</i> Britton	Pink spring cress	X			X							
<i>Cardamine maxima</i> (Nutt.) Wood	Large toothwort									X		
<i>Cardamine pennsylvanica</i> Muhl.	Pennsylvania bitter cress		X	X		X						
<i>Carex amphibola</i> Steud.	Eastern narrowleaf sedge				X							X
<i>Carex blanda</i> Dewey	Eastern woodland sedge	X	X		X							
<i>Carex bromoides</i> Schkuhr ex Willd	Brome-like sedge		X									
<i>Carex communis</i> Bailey	Fibrousroot sedge	X	X									
<i>Carex comosa</i> Boott	Longhair sedge		X	X								
<i>Carex cristatella</i> Britt.	Crested sedge			X								
<i>Carex gracilescens</i> Steud.	Slender looseflower sedge	X	X									
<i>Carex granularis</i> Muhl. ex Willd.	Limestone meadow sedge											X
<i>Carex grayi</i> Carey	Asa Gray's sedge	X			X							
<i>Carex gynandra</i> Schwein.	Nodding sedge		X	X								
<i>Carex hirta</i> L.	Hammer sedge		X									
<i>Carex hirtifolia</i> Mackenzie	Pubescent sedge		X			X						
<i>Carex intumescens</i> Rudge	Greater bladder sedge	X	X									
<i>Carex lacustris</i> Willd.	Lakeside sedge	X	X									
<i>Carex laxiculmis</i> Schwein.	Spreading sedge	X										
<i>Carex lupulina</i> Muhl. ex Willd.	Hop sedge	X			X			X				
<i>Carex lurida</i> Wahlenb.	Shallow sedge	X										
<i>Carex normalis</i> Mackenzie	Greater straw sedge			X								
<i>Carex picta</i> Steud.	Boott's sedge	X										
<i>Carex plantaginea</i> Lam.	Plantainleaf sedge	X			X							
<i>Carex rosea</i> Schkuhr ex Willd.	Rosy sedge	X	X									
<i>Carex sparganioides</i> Muhl. ex Willd.	Burr reed			X								
<i>Carex stipata</i> Muhl. ex Willd.	Owlfruit sedge	X	X									
<i>Carex stricta</i> Lam.	Tussock sedge	X	X	X								
<i>Carex torta</i> Boott ex Tuckerman	Twisted sedge	X										
<i>Carex trichocarpa</i> Muhl. ex Willd.	Hairyfruit sedge	X										
<i>Carex vulpinoidea</i> Michx.	Fox sedge	X	X									

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Caulophyllum thalictroides</i> (L.) Michx.	Blue cohosh				X							
<i>Chelidonium majus</i> L.	Celandine				X							
<i>Chelone glabra</i> L.	Turtlehead	X	X									
<i>Cichorium intybus</i> L.	Chickory								X			
<i>Cicuta bulbifera</i> L.	Bulbous water hemlock		X	X								
<i>Cicuta maculata</i> L.	Spotted water hemlock		X									
<i>Circaea lutetiana</i> L.	Broadleaf enchanter's nightshade	X			X			X				
<i>Cirsium arvense</i> (L.) Scop.	Canada thistle	X										
<i>Cirsium vulgare</i> (Savi) Ten.	Bull thistle					X						
<i>Claytonia virginica</i> L.	Virginia springbeauty	X						X				
<i>Collinsonia canadensis</i> L.	Horse balm											
<i>Convallaria majalis</i> L.	European lily of the valley				X							
<i>Coreopsis lanceolata</i> L.	Lance-leaved coreopsis								X			
<i>Coronilla varia</i> L.	Crownvetch	X							X			
<i>Cryptotaenia canadensis</i> (L.) DC.	Honewort	X			X							
<i>Cystopteris bulbifera</i> (L.) Bernh.	Bulb fern				X			X				
<i>Dactylis glomerata</i> L.	Orchardgrass				X							
<i>Danthonia spicata</i> (L.) Beauv. ex Roemer & J.A. Schultes	Poverty oatgrass											X
<i>Daphne</i> sp.	European daphne					X						
<i>Daucus carota</i> L.	Queen Anne's lace				X							
<i>Decodon verticillatus</i> (L.) Ell.	Swamp loosestrife		X	X								
<i>Desmodium canadense</i> (L.) DC.	Showy ticktrefoil	X			X							
<i>Desmodium glutinosum</i> (Muhl. ex Willd.) Wood	Pointedleaf ticktrefoil	X			X							
<i>Dicentra canadensis</i> (Goldie) Walp.	Squirrel corn				X							
<i>Diplazium pycnocarpon</i> (Spreng.) Broun	Narrow-leaved spleenwort				X							
<i>Dipsacus sylvestris</i> Huds.	Teasel								X			
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	Spinulose wood fern	X	X		X	X						
<i>Dryopteris clintoniana</i> (D.C. Eat.) Dowell	Clinton's wood fern				X							
<i>Dryopteris cristata</i> (L.) Gray	Crested wood fern		X									
<i>Dryopteris goldiana</i> (Hook. ex Goldie) Gray	Goldie's wood fern				X							
<i>Dryopteris intermedia</i> (Muhl. ex Willd.) Gray	Evergreen wood fern				X							
<i>Dryopteris marginalis</i> (L.) Gray	Marginal Wood fern	X			X							
<i>Echinocystis lobata</i> (Michx.) T. & G.	Wild cucumber	X			X			X				
<i>Eleocharis</i> sp.	Spike rush		X	X								
<i>Elymus hystrix</i> L.	Bottlebrush grass	X			X							
<i>Elymus</i> sp.	Wild rye	X			X							
<i>Epilobium coloratum</i> Biehler	Purple-leaved willow herb			X		X						
<i>Epilobium strictum</i> Muhl.	Downy willow herb		X	X								
<i>Equisetum arvense</i> L.	Common horsetail	X	X	X		X		X				



SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Equisetum fluviatile</i> L.	River horsetail		X	X								
<i>Equisetum hyemale</i> L.	Horsetail				X		X					
<i>Erigeron philadelphicus</i> L.	Philadelphia fleabane	X										
<i>Erigeron pulchellus</i> Michx.	Robin's plantain	X			X							
<i>Erigeron strigosus</i> Muhl. ex Willd.	Prairie fleabane				X							
<i>Erythronium americanum</i> Ker-Gawl.	Trout lily	X	X		X	X		X				
<i>Eupatoriadelphus maculatus</i> (L.) King & H.E. Robins. var. <i>maculatus</i>	Spotted trumpetweed	X				X	X					
<i>Eupatorium perfoliatum</i> L.	Common boneset	X	X	X								
<i>Eupatorium purpureum</i> L.	Sweetscented joeypyweed	X										
<i>Eurybia divaricata</i> (L.) Nesom	White wood aster				X							
<i>Euthamia graminifolia</i> (L.) Nutt. var. <i>graminifolia</i>	Grass leaved goldenrod		X									X
<i>Festuca pratensis</i> Huds.	Meadow fescue	X										
<i>Floerkea proserpinacoides</i> Willd.	False mermaidweed		X			X						
<i>Fragaria vesca</i> L.	Woodland strawberry					X						
<i>Fragaria virginiana</i> Duchesne	Virginia strawberry		X		X			X				X
<i>Galium aparine</i> L.	Stickywilly	X			X			X				
<i>Galium asprellum</i> Michx.	Rough bedstraw	X		X								
<i>Galium boreale</i> L.	Northern bedstraw		X				X					
<i>Galium mollugo</i> L.	False baby's breath				X							X
<i>Galium odoratum</i> (L.) Scop.	Sweetscented bedstraw						X					
<i>Galium tinctorium</i> (L.) Scop.	Bedstraw	X	X	X								
<i>Galium triflorum</i> Michx.	Woodland bedstraw	X	X				X					
<i>Geranium maculatum</i> L.	Wild geranium	X	X		X			X				
<i>Geranium robertianum</i> L.	Herb robert	X						X				
<i>Geum aleppicum</i> Jacq.	Yellow avens				X							
<i>Geum canadense</i> Jacq.	White avens	X			X	X		X				
<i>Geum triflorum</i> Pursh	Old man's whiskers				X							
<i>Geum urbanum</i> L.	Herb bennet		X							X		
<i>Glechoma hederacea</i> L.	Ground ivy		X		X							
<i>Glyceria striata</i> (Lam.) A.S. Hitchc.	Fowl mannagrass		X	X	X							
<i>Hackelia virginiana</i> (L.) I.M. Johnston	Beggarslice				X							
<i>Helenium autumnale</i> L.	Sneezeweed	X				X						
<i>Helianthus decapetalus</i> L.	Thinleaf sunflower			X								
<i>Heliopsis helianthoides</i> (L.) Sweet	Smooth oxeye							X				
<i>Hemerocallis fulva</i> (L.) L.	Orange daylily							X				
<i>Hesperis matronalis</i> L.	Dame's rocket	X	X		X	X	X	X	X			
<i>Heteranthera reniformis</i> Ruiz & Pavon	Mud plantain	X		X								
<i>Hieracium piloselloides</i> Vill.	Tall hawkweed											X
<i>Hydrophyllum canadense</i> L.	Bluntleaf waterleaf				X							

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Hydrophyllum virginianum</i> L.	Eastern waterleaf					X						
<i>Hypericum ellipticum</i> Hook.	Pale St. Johnswort	X	X	X								
<i>Impatiens capensis</i> Meerb.	Jewelweed	X	X		X	X		X				
<i>Impatiens pallida</i> Nutt.	Pale touch-me-not	X										
<i>Iris pseudacorus</i> L.	Yellow iris		X	X								
<i>Iris versicolor</i> L.	Blue Flag iris	X	X	X		X						
<i>Juncus tenuis</i> Willd.	Pathrush	X										
<i>Lactuca biennis</i> (Moench) Fern.	Tall blue lettuce	X										
<i>Laportea canadensis</i> (L.) Weddell	Canadian woodnettle	X	X		X							
<i>Lapsana communis</i> L.	Nipplewort		X		X			X				
<i>Leersia oryzoides</i> (L.) Sw.	Rice cutgrass		X	X								
<i>Leersia virginica</i> Willd.	Whitegrass	X			X	X						
<i>Lemna minor</i> L.	Duckweed		X	X								
<i>Leonurus cardiaca</i> L.	Common motherwort				X							
<i>Leucanthemum vulgare</i> Lam.	Oxeye daisy											X
<i>Leucojum aestivum</i> L.	Summer snowflake	X	X			X	X					
<i>Lilium canadense</i> L.	Canada lily	X	X									
<i>Lotus corniculatus</i> L.	Bird's-foot trefoil											X
<i>Ludwigia palustris</i> (L.) Ell.	Water purslane		X	X								
<i>Lycopus uniflorus</i> Michx.	Northern bugleweed		X	X		X		X				
<i>Lysimachia ciliata</i> L.	Fringed loosestrife	X	X		X	X	X					
<i>Lysimachia nummularia</i> L.	Moneywort	X	X	X		X	X					
<i>Lythrum salicaria</i> L.	Purple loosestrife		X	X								
<i>Maianthemum racemosum</i> (L.) Link	Feathery false lily of the valley				X							
<i>Maianthemum racemosum</i> (L.) Link ssp. <i>racemosum</i>	Starflowered Solomon's seal				X							
<i>Matteuccia struthiopteris</i> (L.) Todaro	Ostrich fern	X	X		X	X	X	X				
<i>Mellilotus alba</i> Medik.	White sweet clover								X	X		
<i>Melissa officinalis</i> L.	Lemon balm				X							
<i>Mentha spicata</i> L.	Spearmint		X									
<i>Mitella diphylla</i> L.	Twoleaf miterwort							X				
<i>Myosotis scorpioides</i> L.	Forget-me-not	X	X	X		X	X					
<i>Myosotis sylvatica</i> Ehrh. ex Hoffmann	Woodland forget-me-not							X				
<i>Oenothera biennis</i> L.	Evening primrose								X			
<i>Onoclea sensibilis</i> L.	Sensitive fern	X	X	X	X	X	X	X				
<i>Osmunda cinnamomea</i> L.	Cinnamon fern		X	X								
<i>Osmunda claytoniana</i> L.	Interrupted fern			X	X							
<i>Osmunda regalis</i> L.	Royal fern		X	X								
<i>Oxalis stricta</i> L.	Common yellow oxalis				X			X	X			
<i>Packera aurea</i> (L.) A. & D. Löve	Golden ragwort		X		X			X				

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Peltandra virginica</i> (L.) Schott	Arrow arum		X	X		X						
<i>Phalaris arundinacea</i> L.	Reed canarygrass	X	X	X		X	X	X	X	X	X	X
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Common reed			X								X
<i>Phryma leptostachya</i> L.	Lopseed	X			X							
<i>Plantago major</i> L.	Broad-leaved plantain					X			X	X		
<i>Plantago rugelii</i> Decne.	Rugel's plantain	X				X						
<i>Poa alsodes</i> Gray	Grove bluegrass				X							
<i>Poa compressa</i> L.	Canada bluegrass		X		X							
<i>Poa nemoralis</i> L.	Wood bluegrass					X						
<i>Poa palustris</i> L.	Fowl meadow grass	X		X								
<i>Podophyllum peltatum</i> L.	May apple	X	X		X	X		X				
<i>Polygonatum biflorum</i> (Walt.) Eil.	Solomon's seal		X			X						
<i>Polygonatum pubescens</i> (Willd.) Pursh	Hairy Solomon's seal					X						
<i>Polygonum cuspidatum</i> Sieb. & Zucc.	Japanese knotweed	X			X	X	X					
<i>Polygonum hydropiper</i> L.	Water pepper - Smartweed		X	X								
<i>Polygonum pensylvanicum</i> L.	Pennsylvania smartweed		X									
<i>Polygonum sagittatum</i> L.	Arrow-leaved tearthumb	X		X								
<i>Polygonum virginianum</i> L.	Virginia knotweed	X	X		X							
<i>Polystichum acrostichoides</i> (Michx.) Schott	Christmas fern				X							
<i>Potamogeton crispus</i> L.	Curly pondweed			X								
<i>Potamogeton natans</i> L.	Floating pondweed		X	X								
<i>Potamogeton nodosus</i> Poiret	Swollen pondweed			X								
<i>Potamogeton strictifolius</i> Bennett	Narrowleaf pondweed			X								
<i>Prenanthes trifoliolata</i> (Cass.) Fern.	Gall-of-the-earth				X							
<i>Proserpinaca palustris</i> L.	Marsh mermaid weed			X								
<i>Ranunculus abortivus</i> L.	Littleleaf buttercup				X			X				
<i>Ranunculus acris</i> L.	Tall buttercup				X							
<i>Ranunculus caricetorum</i> Greene	Swamp buttercup		X					X				
<i>Ranunculus ficaria</i> L.	Fig buttercup					X						
<i>Ranunculus flabellaris</i> Raf.	Yellow water buttercup	X										
<i>Ranunculus recurvatus</i> Poir.	Blisterwort	X			X							
<i>Ranunculus repens</i> L.	Creeping buttercup		X			X						
<i>Rubus pubescens</i> Raf.	Dwarf red blackberry				X							
<i>Rudbeckia triloba</i> L.	Browneyed susan											X
<i>Rumex crispus</i> L.	Curly dock								X			
<i>Rumex obtusifolius</i> L.	Bitter dock	X				X		X	X			
<i>Rumex orbiculatus</i> Gray	Greater water dock			X								
<i>Sagittaria latifolia</i> Willd.	Broadleaf arrowhead			X								
<i>Sanguinaria canadensis</i> L.	Bloodroot				X							
<i>Sanicula marilandica</i> L.	Black snakeroot, Sanicle	X										

SCIENTIFIC NAME	COMMON NAME	Streamside oak-hickory forest	Silver maple-ash swamp	Emergent marsh	Maple-basswood mesic forest	Lake-edge floodplain forest	Floodplain buffer forest	Successional floodplain forest	Successional old-field	Crop and pastureland	Conifer plantation	Landfill
<i>Saururus cernuus</i> L.	Lizard's tail		X	X		X						
<i>Saxifraga pensylvanica</i> L.	Swamp saxifrage		X									
<i>Schoenoplectus fluviatilis</i> (Torr.) M.T. Strong	River bulrush											X
<i>Scirpus atrovirens</i> Willd.	Green bulrush	X	X									
<i>Scrophularia marilandica</i> L.	Carpenter's square				X	X		X				
<i>Scutellaria lateriflora</i> L.	Blue skullcap		X									
<i>Sisyrinchium montanum</i> Greene	Common blue-eyed grass								X			
<i>Smilacina stellata</i> (L.) Desf.	False Solomon's seal	X	X				X	X				
<i>Smilax herbacea</i> L.	Carrion flower	X				X						
<i>Solidago altissima</i> L.	Tall goldenrod	X	X		X	X			X			
<i>Solidago flexicaulis</i> L.	Zigzag goldenrod	X			X	X						
<i>Solidago gigantea</i> Ait.	Early goldenrod		X		X	X		X				X
<i>Solidago rugosa</i> Mill.	Hairy goldenrod	X	X					X	X			
<i>Sparganium americanum</i> Nutt.	American bur-reed			X								
<i>Spartina pectinata</i> Bosc ex Link	Prairie cordgrass											X
<i>Spirodela polyrrhiza</i> (L.) Schleid.	Common duckmeat			X								
<i>Symphotrichum cordifolium</i> (L.) Nesom	Common blue wood aster			X	X							
<i>Symphotrichum lateriflorum</i> (L.) A. & D. Löve var. <i>lateriflorum</i>	Calico aster	X			X	X			X			
<i>Symphotrichum novae-angliae</i> (L.) Nesom	New England aster								X			
<i>Symphotrichum pilosum</i> (Willd.) Nesom var. <i>pilosum</i>	Heath aster								X			
<i>Symphotrichum prenanthoides</i> (Muhl. ex Willd.) Nesom	Crooked-stem aster	X			X							
<i>Symphotrichum puniceum</i> (L.) A. & D. Löve var. <i>puniceum</i>	Purple-stemmed aster		X	X								
<i>Symplocarpus foetidus</i> (L.) Salisb. ex Nutt.	Skunk cabbage	X	X		X	X	X	X				
<i>Taraxacum officinale</i> G.H. Weber ex Wiggers	Dandelion	X	X		X		X	X	X	X		X
<i>Thalictrum dioicum</i> L.	Early meadow-rue				X							
<i>Thalictrum pubescens</i> Pursh	Tall meadow rue	X			X	X		X				
<i>Thelypteris palustris</i> Schott.	Marsh fern		X	X								
<i>Torilis japonica</i> (Houtt.) DC.	Hedge parsley	X			X							
<i>Trifolium repens</i> L.	White clover					X			X			
<i>Trillium erectum</i> L.	Red trillium	X			X	X						
<i>Trillium grandiflorum</i> (Michx.) Salisb.	White trillium				X							
<i>Triosteum perfoliatum</i> L.	Feverwort, Horse gentian	X			X							
<i>Tussilago farfara</i> L.	Coltsfoot					X						
<i>Typha glauca</i> Godr.	hybrid cattail		X	X								
<i>Typha latifolia</i> L.	Common cattail		X	X								
<i>Urtica dioica</i> L. ssp. <i>gracilis</i> (Ait.) Seland.	Stinging nettle	X			X	X		X				
<i>Utricularia macrorhiza</i> LeConte	Common bladderwort			X								
<i>Uvularia grandiflora</i> J. Smith	Large bellwort				X							
<i>Uvularia perfoliata</i> L.	Perfoliate bellwort				X							

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>	<b>Streamside oak-hickory forest</b>	<b>Silver maple-ash swamp</b>	<b>Emergent marsh</b>	<b>Maple-basswood mesic forest</b>	<b>Lake-edge floodplain forest</b>	<b>Floodplain buffer forest</b>	<b>Successional floodplain forest</b>	<b>Successional old-field</b>	<b>Crop and pastureland</b>	<b>Conifer plantation</b>	<b>Landfill</b>
<i>Uvularia sessilifolia</i> L.	Sessileleaf bellwort		X									
<i>Veratrum viride</i> Ait.	False hellebore		X		X			X				
<i>Verbena urticifolia</i> L.	White vervain	X						X				
<i>Veronica chamaedrys</i> L.	Bird's eye speedwell				X			X				
<i>Veronica filiformis</i> Sm.	Threadstalk speedwell	X						X				
<i>Veronica officinalis</i> L.	Common speedwell		X									
<i>Vinca minor</i> L.	Common periwinkle	X			X							
<i>Vincetoxicum rossicum</i> (Kleop.) Barb. (L.) Moench	Pale swallowwort	X			X		X	X				
<i>Viola labradorica</i> Schrank	Alpine violet	X										
<i>Viola pubescens</i> Ait.	Yellow violet	X	X		X			X				
<i>Viola sororia</i> Willd.	Common blue violet	X		X		X		X				
<i>Viola</i> sp.	Violet	X										
<i>Viola striata</i> Ait.	Striped cream violet							X				
<i>Zizia aurea</i> (L.) W.D.J. Koch	Golden zizia	X	X									

## 10.6 Avian Fauna of the Owasco Flats

### 10.6.1 Audubon New York's Priority Bird Species.

The following birds from the New York list of Priority Bird Species and the New York State Breeding Bird Atlas were identified by Audubon New York biologist Jillian Liner as being likely to nest in the Owasco Flats.

Common Name	Scientific Name	NY Legal Status
Virginia Rail	<i>Rallus limicola</i>	Game Species
American Woodcock	<i>Scolopax minor</i>	Game Species
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Protected
Willow Flycatcher	<i>Empidonax traillii</i>	Protected
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	Protected
Eastern Kingbird	<i>Tyrannus tyrannus</i>	Protected
Yellow-throated Vireo	<i>Vireo flavifrons</i>	Protected
Horned Lark	<i>Eremophila alpestris</i>	Protected-Special Concern
Marsh Wren	<i>Cistothorus palustris</i>	Protected
Veery	<i>Catharus fuscescens</i>	Protected
Wood Thrush	<i>Hylocichla mustelina</i>	Protected
Brown Thrasher	<i>Toxostoma rufum</i>	Protected
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	Protected
Cerulean Warbler	<i>Dendroica cerulea</i>	Protected-Special Concern
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	Protected
Louisiana Waterthrush	<i>Seiurus motacilla</i>	Protected
Hooded Warbler	<i>Wilsonia citrina</i>	Protected
Scarlet Tanager	<i>Piranga olivacea</i>	Protected
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Protected
Field Sparrow	<i>Spizella pusilla</i>	Protected
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	Protected
Bobolink	<i>Dolichonyx oryzivorus</i>	Protected
Eastern Meadowlark	<i>Sturnella magna</i>	Protected
Baltimore Oriole	<i>Icterus galbula</i>	Protected

## **10.7 Ecological Communities of the Owasco Flats**

The ecological communities described in this study (Figure 12) follow those described by the New York Natural Heritage Program.

### **10.7.1 Lake-edge floodplain forest**

This forest community is a variant of the NY Natural Heritage Program Floodplain forest and is located in a narrow band at the southern edge of Owasco Lake on both sides of the Inlet. It is about 12 acres in size and extends inland no more than 100 ft. from the lakeshore. This community is unique in the Flats because wave activity has been an important influence. The soils are well drained with small lakeside cobbles but saturated with water from the lake and flow from the marshes just inland. The dominant trees at the lakeside are large White and Crack willows that are often over 3 ft. diameter and frequently extend out over the water. Further inland there are large Silver maple, Red maple and their hybrid as well as numerous Red ashes. There are also a few Bitternut hickory, Shellbark hickory and where drier, Red oak. West of the Inlet the soils have been altered by the filling activity in 1971 and appear to be drier. Here there are also Eastern cottonwood and fewer hickories. Skunk cabbage is found throughout understory.

### **10.7.2 Silver maple-ash swamp**

This forest community is a good example of the NY Natural Heritage Program Silver maple-ash swamp. It is found in the wettest areas of the Flats surrounding and to some extent intergrading with the Emergent marsh community. It extends almost halfway down the Flats from the lake and occupies about 220 acres. The most abundant tree species in this community are Silver and Red maples and their hybrid as well as Red and Black ash. The size of the trees varies considerably in this community with some large old trees in drier areas at the edge and on hillocks. There are many maples that are dying, primarily at the edge of the marsh community presumably the result of higher lake levels. In this situation there are also many smaller, sapling size trees that have found drier areas to grow on but interestingly enough there are no size classes between the two extremes. This indicates this community may be expanding into the marsh community where lake level control has killed the large maples in the past. However, there are other areas where marsh is likely to encroach into the maple swamp community as beaver continue to expand their range. There are areas in this community that have a very dense canopy of small diameter trees and standing water with understory vegetation only on fallen logs and on tussocks (Figure 13). The understory of shrubs and tussocks is much more developed when the canopy thins in areas where this community intergrades with the marsh community. The most abundant shrubs found in this community were Winterberry and Spicebush.

### **10.7.3 Streamside oak-hickory forest**

This community is an unusual variant of the NY Natural Heritage Program Floodplain forest with significant elements of Appalachian oak-hickory. It runs along the Inlet from near the mouth on Owasco Lake and sits on top of the narrow band of raised, drier soils between the Inlet (Figure 12) and the Silver maple swamp community with

which it intergrades to a small extent. There is also a separate area of this community surrounding a small, water filled remnant stream channel a bit to the east and more in the middle of the Flats. The total size of this community is only about 22 acres yet it harbors an unusual diversity of plant species. This forest is very diverse with a total of 30 tree species. Dominant forest trees are large and old Burr oak, Swamp white oak, and Shellbark hickory. Shellbark hickory is very near the northern limit of its range in the Flats. New York State lists it as threatened, with an S2 rating. The presence in this tree in the Flats is very important since it represents one of the largest populations in the State. About 400 individuals have been counted and there appears to be only one New York State population larger than this. It is therefore very important that special care be taken to conserve this community. Because lake level changes impact its survival it would be important to establish a vegetation-monitoring plan in this community to detect any changes in the vegetation.

Other trees found in this diverse community are Red maple, Silver maple, Swamp maple, Sugar maple, Box elder, American beech, Red oak, Bitternut hickory, Butternut, White ash, Red ash, Black ash, White willow, Crack willow, Basswood, Hackberry, American elm, and Slippery elm. There are many non-native invasive plants growing in this community which should be monitored and removed if possible.

#### **10.7.4 Emergent marsh**

This community is mostly NY Natural Heritage Program Shallow emergent marsh but there are also small elements of the Deep emergent marsh community near the Inlet. This community was not evident in the 1938 aerial photos but is now found in the low-lying areas in the northern half of the Flats occupying about 150 acres. Different marsh areas within the Flats are under different hydrological controls. The large area in the northeast has a large, open connection to the lake and the water level is basically the same as that of the lake. This is the area where the Deep Emergent marsh community is found. The fill and gravel road on county land in the northwest part of the Flats very likely blocked the drainage of what was once Silver maple-ash swamp and contributed to its conversion to emergent marsh. Now, this marsh is a bit higher in elevation than the northeastern marsh and there are two drainage ditches that flow from this area into the Inlet. One of those ditches is near the parking lot at the mouth of the Inlet and the other is near the southern part of this marsh near the boundary of the property owned by the Owasco Flats Nature Reserve. This ditch is larger than the northerly one and the Nature Reserve in cooperation with the USF&WS recently placed a water control structure on it. The areas to the south of the two mentioned above, one immediately to the west of the old rail tracks and the other just to the east of the tracks, are both in an area where beaver are very active and effectively controlling the flow of water.

#### **10.7.5 Maple-basswood rich mesic forest**

This NY Natural Heritage Program forest community is found in the northern part of the Flats running along the eastern and western edges on the slopes between the roads and the Silver maple-ash swamp community. It occupies only about 16 acres and serves as a buffer for the swamp and marsh communities. There are 28 species of trees found in this forest, the most common are Red maple, Sugar maple, Silver maple, American beech, White oak, Bitternut hickory, Shagbark hickory, White ash, Red ash, Cottonwood, Bigtooth aspen, White willow, Crack willow, and Basswood. The understory species in this community are equally diverse with many ferns and Skunk cabbage.



### **10.7.6 Floodplain buffer forest**

This variant of the NY Natural Heritage Program Floodplain community forms a buffer along much of the southern stretch of the Inlet in the Flats. The community occupies about 60 acres, extending beyond the banks of the Inlet to varying degrees and is absent along many small stretches of bank. Some of these trees have been established for a long time as is seen in aerial photos.

### **10.7.7 Successional floodplain forest**

This community is another variant of the NY Natural Heritage Program Floodplain forest that has become established on old-fields that were abandoned in the 1930's and 40's. It occupies about 100 acres along the Inlet in the northern part of the Flats and is adjacent primarily to the Silver maple-ash forest community. The trees are mostly young but along the Inlet there are some older trees that served as a buffer while the fields were still farmed.

### **10.7.8 Successional old-field**

This NY Natural Heritage Program community is found primarily in the middle and southern part of the Flats in low-lying old fields that were abandoned since the 1940's. It covers about 250 acres and in some areas seems to be changing over to more of a Floodplain forest, as large, old Crack and White willows expand and fill in the areas between what were lone trees. In the lowest areas there are cattails and a dense cover of Reed canarygrass. Some of the areas in the south are grazed occasionally.

### **10.7.9 Cropland**

This NY Natural Heritage Program community of actively farmed land occupies the driest soils of the Flats. It covers about 310 acres and includes land that is regularly planted with various field crops such as corn and soybeans. However, without ongoing maintenance of drainage ditches it is likely that much of this area would be too wet for agricultural use.

### **10.7.10 Pastureland**

This NY Natural Heritage Program community occupies about 350 acres, a large portion of which is land that was once in agriculture, but no longer appears to be in production. Some of this land is in active use as pasture or is mowed for hay. There are willows along ditches and other trees near buildings, but the most common plant in this community is Reed canarygrass. Some of the drier soils in this area appear to be only occasionally planted to field crops. A small area of landscaped lawn around homes is also included in this community type.

### **10.7.11 Conifer plantation**

This NY Natural Heritage Program community is represented by a few small parcels in the southeastern part of the Flats. Trees found in this community are Norway spruce and pines.

### **10.7.12 Landfill**

This NY Natural Heritage Program community of only about 5 acres is located in the northern part of the Flats just inland of the Lake-edge floodplain forest and adjacent to the Emergent marsh. It is an area that was filled in 1971 with debris from the construction of New York State Route 38. Trees that are beginning to establish in this area are: Crack willow, Box elder, Cottonwood and White willow. Invasive plants are also becoming established with a small patch of Common reed and some Autumn olive present.

## **10.8 Non-native Invasive Plants in the Owasco Flats**

### **10.8.1 Reed canarygrass**

The most widely distributed non-native invasive plant species in the Owasco Flats is Reed canarygrass, *Phalaris arundinacea*. It is a tall (up to 6 ft.) cool season grass of wetlands that is native to temperate areas of North America, Europe and Asia. However, strains introduced into North America from Europe and Asia have become very aggressive. Reed canarygrass is now considered an undesirable species in lowlands throughout North America because its fast growth clogs irrigation and drainage ditches and it displaces native plant species.

A farmer on Rockefeller Road apparently first introduced Reed canarygrass into the Owasco Flats in the late 1940's (Frank Hall, personal communication 2006). It is now found in all areas of the Flats except the annually tilled fields, darkest parts of the forests and in the open marsh waters. Without detailed background information it's difficult to ascertain the extent to which it has displaced native species, especially in the swamps and marshes in the north. However, this assumption seems valid considering the evidence in many studies of similar habitats (Apfelbaum and Sams 1987) and the observations of local residents (F. Hall 2006).

Control of this species is difficult because of its dense and deep rhizomatous root mass. Chemicals, burning, and mowing have been found to be effective control measures. However, researchers have noted that in areas where Reed canarygrass is common, "restoration projects that establish communities from seeds and human activities that cause vegetation removal are likely to become dominated by *P. arundinacea*" (Mahaney, et al. 2005). Prolonged flooding such as that being conducted by the Owasco Flats Nature Reserve in the northwestern marsh may prove effective at reducing Reed canarygrass but this is a species well adapted to wet conditions and prolonged inundation. The establishment of dense swamp forests in some of the marshy abandoned fields may also reduce the dominance of this grass and allow a more diverse plant community to develop.

### **10.8.2 Common reed**

The Common reed, *Phragmites australis*, was found in two small patches in the northern part of the Flats (Figure 15). One patch is located in the Landfill Community (about 500 sq. ft.) and the other is located in the Marsh Community (about 2200 sq. ft.). Although the patches of *Phragmites* in the Owasco Flats are relatively small, this is potentially a very important invasive plant. *Phragmites* is a very large grass (up to 20 ft.

tall), is perennial and forms dense rhizomatous mats over large areas in wetlands throughout North America. In New York it was recently determined that there are at least two different genotypes, one native and the other introduced (Blossey 2006). It is the introduced genotype that is aggressive and has been found to form pure stands that displace species important for wildlife, and migratory waterfowl in particular (Hauber, et al. 1991). Care should be taken to determine which genotype is present so that the non-aggressive native genotype is not targeted for control. The two small patches of *Phragmites* found in this study have been determined by F. Robert Wesley to be the invasive, introduced genotype.

Many different techniques have been used to control *Phragmites* with varying levels of success. Since the patches of *Phragmites* detected in this study are still small it is recommended that eradication be attempted quickly with techniques that do not harm larger areas. Regular monitoring is also encouraged to document the size of the population area and allow the evaluation the treatment efficacy. The Owasco Flats Nature Reserve received a small grant to treat the two patches found in this study and this work should be completed in fall 2007.

### **10.8.3 Japanese knotweed**

Japanese knotweed, *Polygonum cuspidatum*, was found in a number of locations in the Flats along the Owasco Inlet (Figure 16). It can grow to 10 feet high and spreads quickly by rhizomes to form dense thickets over large areas that exclude native plants and alter the ecosystem. It was likely imported as an ornamental plant from Asia in the 19<sup>th</sup> century and has since spread throughout much of the United States. It is easily spread by vegetative means and will rapidly move down a stream as these rhizomes break off, fall into the water and become established further downstream. It is recommended that an effort be made to control this plant within the Flats before it becomes more widespread. Ongoing monitoring will be required to detect further infestation from upstream sources.

### **10.8.4 Purple loosestrife**

Purple loosestrife, *Lythrum salicaria*, was found in the marsh in the Northwest part of the Flats (Figure 17). It was introduced in the 19<sup>th</sup> century as an ornamental and medicinal plant and is now found in every state except Florida. Purple loosestrife has become a very important ecologically damaging species, it forms dense stands in marshes that exclude other plants and are avoided by many sensitive marsh-nesting birds (Blossey *et al.*, 2001a). Purple loosestrife has degraded many wetlands throughout the United States. An effort to establish the biological control of this weed has been successful at Montezuma Wildlife Refuge and other locations (Blossey *et al.*, 2001a). Members of the Owasco Flats Nature Reserve noted the presence of purple loosestrife in the Owasco Flats and the beetles responsible for successful biological control in other locations were obtained and released in 2003. The beetles appear to have become established (Blossey, personal communication 2007) and according to J. Siracusa (personal communication 2007) the abundance of the Purple loosestrife has decreased. It is recommended that the population of Purple loosestrife and the beetles released to control them in the northwest part of the Flats be monitored carefully to determine the effectiveness of the treatment.

### **10.8.5 Pale swallow-wort**

Pale swallow-wort, *Vincetoxicum rossicum*, was found in a few small patches along the Owasco Inlet near the north end of the Flats and near the parking area of land owned by the Owasco Flats Nature Reserve, Inc. (Figure 18). This invasive member of the milkweed family is found in natural areas in only four states, including New York. It has been found to form dense thickets excluding all other plants and may adversely influence the development of Monarch butterflies. It is recommended that this plant be carefully monitored and eradicated if possible while the population is still small.

### **10.8.6 Garlic mustard**

Garlic mustard, *Alliaria petiolata*, was found to be widespread throughout the flats in all areas except the wettest marshes and the densest thickets of Reed canarygrass. It is a biennial herb that was first introduced on Long Island from Europe in 1868 and has spread throughout much of the eastern United States. This weed is ecologically very destructive because it forms dense thickets that displace fragile woodland plants and is thought to influence the soils and other plants through allelopathy (V. Nuzzo, personal communication 2006). Dr. Bernd Blossey at Cornell has been working on the introduction of some insects from Europe to control this weed and is very close to making the first releases. It is recommended that a more detailed study of the abundance of this weed be undertaken, but because of its already ubiquitous distribution and because potential for biological control is close, limited resources might be best spent focusing on other weed species at this time.

### **10.8.7 Multiflora rose, Autumn olive, Honeysuckle**

These shrub species, Multiflora rose, *Rosa multiflora*; Autumn olive, *Elaeagnus umbellata*; and Honeysuckle, *Lonicera tartarica*, were found distributed throughout the Flats except in the marshes. They are common invasive species and can form dense thickets excluding other plant species. They are of particular concern in the northern part of the Streamside oak-hickory forest. These species are widespread and should be monitored and controlled when possible.